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THE EFFECTS OF GEOGRAPHIC LOCATION ON THE PERFORMANCE AND PERCEPTION OF ENTREPRENEURS

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Abstract: There is a clear gap in the literature on comparing entrepreneurship in urban and rural areas and analysing distinct differences between them, impacting their survival and growth. This study aims to find the motivations and classifications of success for urban and rural entrepreneurs. A case study approach was adopted, with six cases on urban and rural Scottish enterprises. These contrasting motivations and conceptions of success have been linked to the way companies strategise. Our findings contribute to the literature by adding an understanding of the motivations of entrepreneurs in rural and urban businesses, respectively. Further, the study was conducted in Scotland, which adds a subsequent understanding of the motivations of entrepreneurs within the country specifically, which can be used in future research within the country.

Keywords:

entrepreneurial motivation; urban entrepreneurship; rural entrepreneurship; policy development

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Introduction

A renewed prominence of Small and Medium-sized Enterprises (SMEs) has taken place in the UK since its decline between 1950 and 1960, particularly in the last two decades. This became apparent, with SMEs making up 99.7% of businesses in the UK (Almeida and Wasim 2023). Consequently, SMEs represent the backbone of both employment and output in the UK. Several studies explore the contributions of SMEs to the UK economy by increasing its competitiveness, generating employment, diversifying activities, and mobilising social and economic services (Kasabov 2016, Antcliff et al. 2021).

Recently, there has been an increase in location-specific enterprise research, examining regional factors (Webber et al. 2009, Florida et al. 2017, Zhang 2020). There is some comparative research on rural vs urban entrepreneurship (Fortunato 2014), but it lacks empirical grounding. Nevertheless, there is a gap in the literature where no comparative empirical studies were conducted on rural and urban enterprises. Hence, in this research, we analyse whether the motivational differences and classifications of success, and aims and goals contrast between rural and urban businesses, and also if this affects the financial success and sustainability of the businesses. Furthermore, motivation and conception of success have not been specifically researched as drivers for financial success and sustainability in a business. Accordingly, this study adopts a case study method, comprising three rural and three urban SMEs. The intention is to find links and themes by comparing the two cases.

This research aims to compare rural and urban SMEs in an attempt to add to the literature analysing the growth and survival traits of the two separate strains of SMEs. The themes that surface from the compiled data are analysed to formulate propositions on the how's and why's of varied business performance by location. Three core research questions guide this study:

- RQ1 – What are the key motivation differences between rural and urban entrepreneurs?
- RQ2 – What is the perception of success for rural and urban entrepreneurs?
- RQ3 – Why do entrepreneurs in rural and urban settings start their businesses, and what are their goals and aspirations respectively?

These three questions provide an opportunity for themes to surface around the topics of motivation and perception of success. The specific themes of the research within the topics of motivation and perception of success are open. Therefore, natural themes and non-influenced links can potentially be formed, creating a reliable data collection and analysis.

Motivation and innovation in entrepreneurship

Entrepreneurship has core links with innovation and business success and it is a key part of exploiting opportunities and environments with proper evaluation. Barringer and Bluedorn (1999) explore the link between entrepreneurial innovation and strategic management, concluding that businesses can use innovation alongside strategic management to increase success and growth. Zahra (1993) supports this assessment, concluding that growth directly involves innovation and entrepreneurial activity. The hypothesis that entrepreneurial mentality relates to positive financial performance is also assessed, specifically in the introductory and decline stages of the product lifecycle (Wijewardena et al. 2008).

Entrepreneurship literature is predominantly based on quantitative research methods (McDonald et al. 2015), strengthening the existing conceptions of drivers for growth. However, this creates bias and it fails to introduce new theories and to open up the scope of the literature (Crook et al. 2010). Braidford et al. (2017: 852) add that "further research along established lines can only marginally add to our understanding". This presents an opportunity for the topic to be explored through qualitative research methods, opening up the scope and presenting new theories to the literature. They argue that it may be that the questions are not being asked in the right ways.

The entrepreneurial driver of motivation to grow has been touted as directly correlating with business growth. Entrepreneurs who are at disposition to grow encounter fewer obstacles than those less inclined to grow (BIS Enterprise Directorate 2011, Allinson et al. 2015). Braidford et al. (2017) conclude that growth-inclined owners were more likely to succeed in the long term, whereas the owner's resistant to growth are more likely to conclude that they cannot grow due to barriers that cannot be surpassed. Accordingly, it can be assumed that entrepreneurship has been proven to be linked with high motivation (Carland and Carland 1991, Sexton and Smilor 1997), but there has been a neglect of the question 'what motivates different types of entrepreneurs geographically?'. A lack of literature in the study of motivation for rural entrepreneurship has been previously identified as well (Eschker et al. 2017). The birth of such enterprises is often due to a need in a local area and if they succeed, their success contributes to the success of that locality (Eschker et al. 2017). A distinction of rural entrepreneurship, including an analysis of the traits of rural entrepreneurs, is delved into by Korsgaard et al. (2015). Their research allows for an increase in engagement with rural entrepreneurship on an academic scale.

Rural and urban entrepreneurship

Some business owners can also be biassed towards their home locations and they can be more likely to remain in the area than to move, even if it means lower costs or better opportunities (Dahl and Sorenson 2010). People sometimes also like to stay in rural

environments because of the quality of life and environment (Brereton et al. 2011). This analysis links the urban and the rural entrepreneur together, with comparable traits of naturally working within home locations and a lack of want to relocate, regardless of opportunity elsewhere. Other literature linking location choice to success suggests that the entrepreneurs who enter more competitive regions have higher failure rates (Sorenson and Audia 2000), which goes against the traditional agglomeration economics. However, this poses the question if certain entrepreneurs who are based in geographical locations that are not optimal for their businesses, for example, rural locations, sacrifice their business success for having quality time with their loved ones. On the other hand, Dahl and Sorenson (2012) and Vallance et al. (2020) suggest that these local connections could also spur success. For Dahl and Sorenson (2012), the prior experience in a region positively affects the success of a business. Klepper and Sleeper (2005), and Dahl and Reichstein (2007) highlight an increased chance of success for start-ups if the owners have prior experience in the industry. Similar to Eriksen and Sundbo's (2016) findings, these findings complement each other and they show that industry and regional expertise can be looked at together as drivers for a successful business. Regional competitiveness has been a key factor in the economic growth of these regions and the attraction of entrepreneurial activities (Aristizábal et al. 2021, Dziekański 2021).

The reason for the start-up of many rural enterprises differs from the traditional motivations of entrepreneurs (Ukanwa et al. 2022). Many rural owners start enterprises to create employment, to meet local area needs, and to be their own boss (Walker and Brown 2004). This goes against the traditional motivations for SMEs, striving for growth and they often have mainly financial motives (Carland and Carland 1991, Sexton and Smilor 1997, Walker and Brown 2004). These motives for starting up a rural enterprise can reflect goals and motives going forward. For example, many rural entrepreneurs aim to stay within a rural community, providing employment and helping to sustain the community, higher than the traditional aims and objective of profits and growth (Besser and Miller 2013). Such differences potentially impact the lack of funding to most rural enterprises, alongside their concentration in low-growth sectors (Barkley et al. 2006). Also, monoindustrialialism could be a limit for entrepreneurs, mainly in rural areas considering Eastern Europe (Risteiu et al. 2021), as in the case of the Roșia Montană area, or in a European avant-garde city, where entrepreneurs pushed the city authorities to fast and in-force developments (Vesalon and Creţan 2019). Scholars researching rural entrepreneurship have highlighted a need for further research into rural entrepreneurship, specifically in the UK. This is due to extensive literature from the developing world that is not fully useful in the UK context (Smith 2017). However, research on rural entrepreneurship in the UK, and specifically Scotland, analyses entrepreneurship in Aberdeenshire fishing villages and it concluded that many rural entrepreneurs are looking less at growth and a large profit but they are aiming for long term survival and local success (Smith 2006).

Much more common than their rural counterparts, literature focusing on urban entrepreneurship has a developed understanding of urban entrepreneurship as a concept (Osorio and Özkazanç-Pan 2014). Osorio and Özkazanç-Pan (2014) define urban entrepreneurs as "promoters of urban economic development", pushing the notion that urban business does not always have geographic boundaries but instead it should be named on their business practice in urban settings. Urban entrepreneurship literature has traditionally been focused on growth (Zahra 1993, Sexton and Smilor 1997, Barringer and Bluedorn 1999, Wijewardena et al. 2008, Fritsch and Kublina 2018). The UN estimates that over two-thirds of the world population will be living in cities by the year 2050. Understandably, the entrepreneurship literature has focused on entrepreneurial activities in an urban environment (Muñoz and Cohen 2016), as this growth has and it will provide more innovation opportunities spurring entrepreneurial activity in urban economies (Săgeată 2014, Anyadike-Danes et al. 2015, Tavassoli et al. 2021). Investments by entrepreneurs in an urban context can occur at various levels as Crețan (2019) reports in his case study on entrepreneurs investing in sports, where a large investment of money in a football club brought inequality at the local level in the city of Timisoara. The policymakers often focus more on the urban areas as well (Lang et al. 2022). Policymakers have encouraged the creation of entrepreneurship support programs that foster social inclusion and create socially mixed neighbourhoods, despite the difficulties that persist in terms of social desegregation, as shown in the studies developed by Crețan et al. (2020) and Méreiné-Berki et al. (2021).

The analysis of the difference between rural and urban entrepreneurship has pushed the notion that this is simply a geographical difference with little to no characteristic difference (Stathopoulou et al. 2004). Agglomeration economies, a major topic of urban economics, goes against this theory. A large body of research disagrees with the work of Stathopoulou et al. (2004) and it uses qualitative and quantitative research methods to disprove their theory (Walker and Brown 2004, Korsgaard et al. 2015, Smith 2017, Carson et al. 2018).

Research gap

The literature on entrepreneurship has many areas of focus that are better explained in a conceptual model. The conceptual model of Figure 1 is made to reflect and to map out the literature to show the gap in the market that the research attempts to fill.

The literature on urban entrepreneurship has a wealth of research on the growth of SMEs, and the motivations and innovative qualities of these entrepreneurs (Oke et al. 2007, Blackburn et al. 2013, Gupta et al. 2013, Wright et al. 2015, Andersén and Samuelsson 2016). This information is useful for the research as it gives us an idea of the type of potential results that can be expected.

Many critics stress that the literature lacks focus on how and why firms grow, away

from the traditional theories (Konzelmann and Fovargue-Davies 2013, Anyadike-Danes et al. 2015). Research on linking the theme of enterprise location to business success specifically has been limited. Specifically, the perception of success, the aims and objectives, and the comparative motivations have lacked depth in the literature, which a comparative in-depth case study can address. Asking both urban and rural entrepreneurs from the same region of the same culture the same questions in a semi-structured setting will make comparisons easy and they allow respective links and themes to naturally occur, rather than to be influenced by the researchers.

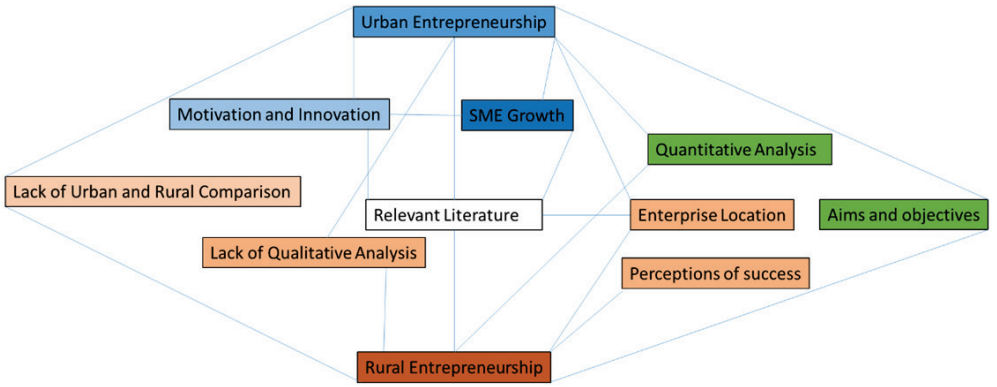

Figure 1. Reflective conceptual model

The research on rural entrepreneurship is also limited. However, it does focus on the different aims and objectives and motivations that the business in these rural regions have. The traditional research on entrepreneurship that has been conducted in urban environments finds that motivations of growth go hand in hand with more or less any SME. In comparison, the research on rural entrepreneurship has come back with contrasting findings. Rural entrepreneurs are more motivated by the opportunity to create employment, providing a service to the local community, and filling a gap in the local market (Barkley et al. 2006). Furthermore, the perception of success is more focused on sustainable businesses or 'slow money' (Smith 2006, Smith 2017), rather than on rapid growth.

The North-East of Scotland is a hotspot for innovation and entrepreneurship in the UK. It had 9.8% of start-ups with a £1m+ turnover in 2013, scaling to £3m+ in 2016, the highest in the UK (Kepka 2020). Enterprises in the North-East of Scotland are clearly entrepreneurial, yet the population of the communities in which these businesses operate also hold a level of entrepreneurialism (Haugh and Pardy 1999). This area of the country contains both rural and urban environments where both types of entrepreneurial enterprises thrive. This socio-economic decline in rural areas is a pressing issue that further emphasises the need for research on rural enterprises to be conducted (Smith 2006). Yet, as the urban enterprise flourishes in the ever-growing

urban environment (Muñoz and Cohen 2016), a case study methodology comparing motivations and priorities of rural and urban SMEs can give comparative analysis and potential reasons as for this discrepancy in success between urban and rural SMEs. Referring to the work of Lee et al. (2004) and Korsgaard et al. (2015), Mayer et al. (2016: 1) also suggest that "studies of regional economic development have either focused on urban or rural areas" independently. Hence, we aim to bridge the gap between rural and urban enterprises by conducting a comparative study.

Methodology

There is a depth of positivist research in entrepreneurship (Wasim 2019). However, there have been several calls in the literature for further qualitative research to be conducted (Allinson et al. 2015, McDonald et al. 2015, Braidford et al. 2017). Allinson et al. (2015) suggests that further research with creative realism through Bourdieusian analysis is required to fill the literature. However, Braidford et al. (2017), who uses Bourdieusian analysis to conclude that growth-inclined entrepreneurs were less likely to perceive barriers as obsolete, suggest otherwise, stating that a positivist approach to researching business performance has critical limitations. There is a widespread view that positivist approaches have fundamental limitations that lead to a lack of comprehensive findings and analysis for the SME's growth and performance (McDonald et al. 2015). Hence, we adopt a relativist interpretivist approach for our research. Although, the lack of a positivist approach does pose some generalisation limitations. However, this promotes further research to be conducted using a relativist approach, rather than the aforementioned criticised use of the realist approach.

The success of the approach taken by Doern and Goss (2013), as well as the recommendations of McDonald et al. (2015) and Braidford et al. (2017), further the belief that qualitative data using a relativist approach will further the research on entrepreneurial motivation. This model attempts to explore factors affecting business performance and how these shape actual outcomes, which, in addition to the comparative qualities of the report, will aim to successfully analyse the motivational differences between urban and rural entrepreneurs and to explore their aims and objectives and classifications of success. Furthermore, the regional entrepreneurial effects are also an underexplored area (Szerb et al. 2019). This will be attempted using semi-structured interviews with three rural and three urban SMEs in the North-East of Scotland due to potential cultural findings that can be made, such as with Doern and Goss (2013). The qualitative data gathered can then be analysed and conclusions drawn, adding to the literature on SME business growth, survival, and motivation.

This study adopts a case study methodology to explore the effects of geographic location on the performance and perception of entrepreneurs. Figure 2 evidences the location of the case studies and the elements which support the analysis on the

influence of geographic location. According to Yin (2017), case studies enable exploring a phenomenon in depth considering the context in which it occurs and they allow to build an archive of descriptive material rich enough to allow subsequent re-interpretations, as entrepreneurship is very context dependent (Wasim et al. 2022).

The semi-structured interviews create a conversation-like discussion to keep the interview free-flowing and to acquire truthful and honest responses. The data gathered through the interviews helped us to analyse and explore the following aims and objectives. Firstly, the key motivations of rural and urban entrepreneurs were analysed through thematic analysis, finding links, and recurring themes throughout each set of entrepreneurs. Secondly, realising the perception of success for entrepreneurs was fulfilled by analysing the three urban entrepreneurs' answers and finding the recurring attitudes that are displayed in accordance with the question. The same process was followed for the rural entrepreneurs. Finally, comparing and contrasting the case study findings to assess the differences between urban and rural entrepreneurship and if these differences (if any) correlate to the differing financial performance, growth, and sustainability of each type of business. The comparisons and contradictions between the case study results could potentially lead to a critical evaluation of the broader topic.

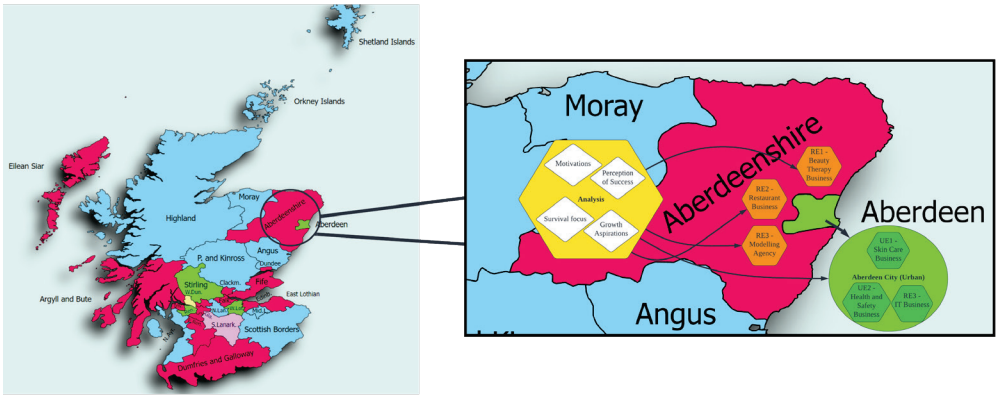

Figure 2. The location of the case studies in Scotland and the research design

The empirical data collection involved entrepreneurs that run enterprises in the North-East of Scotland. The case selection depends on the way instances differ in terms of value known to the concept. In this instance, the value is dichotomous to keep our observation and theory easily recognisable and determinable. Due to this, our case selection consists of six SMEs, compiling three case studies of rural and urban businesses, respectively. The entrepreneurs have been selected in accordance with operating in different industries from one another. This is to avoid data themes influenced by the culture or mindset of a specific industry. Therefore, the resulting findings and themes of each case study can be related back to the common trait of all cases in their respective geographical locations.

The analysis of data was performed using a thematic analysis process. It is a very flexible approach that is not linked to any specific theoretical bias and it is flexible in its use (Braun and Clarke 2006). The thematic analysis aims to find patterns in the data and it can form a proposition that can contribute to the current field of work. The thematic analysis will follow Braun and Clarke's (2006) six-step framework (i.e., become familiar with the data; generate initial codes; search for themes; review themes; define themes; write-up). It offers a clear framework and approach to the analysis. The use of this framework leads to creating a thematic map to illustrate how the themes link together and interconnect with the urban and rural motivations (Figure 3).

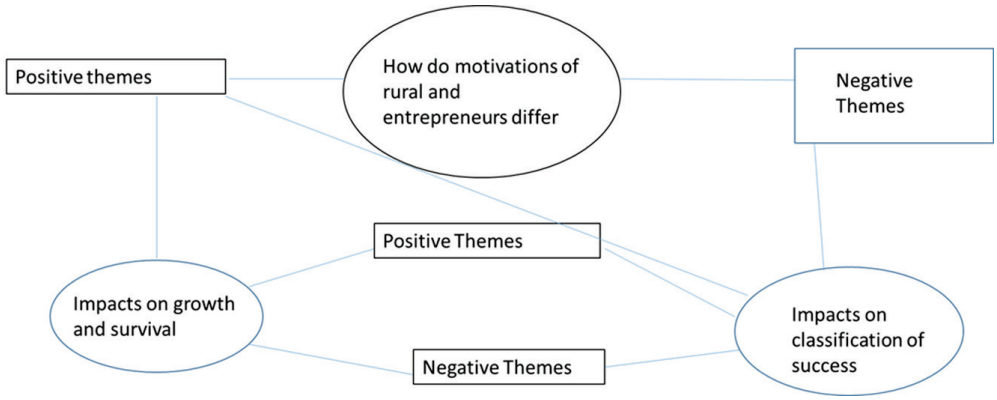

Figure 3. Conceptual model of a thematic map

Table 1 provides a brief description of each case study. In this research, each urban and rural entrepreneur are referred to as a UE or RE, respectively, followed by a number for each.

Table 1. Profile of the case studies

Case study	Description
UE1	A skin care clinic in an urban environment which now employs 15-20 members of staff.
UE2	A health and safety company in an urban environment that employs 5-10 staff.
UE3	An IT company in an urban environment that employs 10-15 members of staff.
RE1	A Beauty Therapy business in a rural environment that employs around five members of staff.
RE2	A restaurant in a rural environment that employs between 5-10 members of staff.
RE3	A modelling agency in a rural environment that is run solely by the owner and it has 30-40 models on its books.

Results

Figure 4 shows the links found through the thematic analysis process. These are the main themes that are being explored in the next two sections.

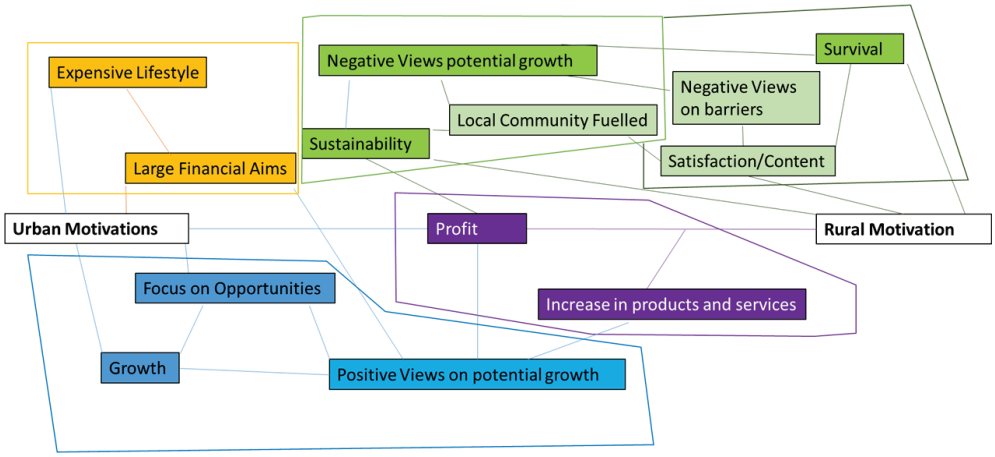

Figure 4. Model derived from the thematic analysis

Urban findings

Financial aims are a theme throughout the interviews. Despite the inclusion of cases from different industries, the focus on financial aims, for example, franchising, selling the business, and large profits, were a continuous theme throughout the interviews. This can potentially be attributed to a more expensive lifestyle in the city. UE3 said that "folk in the city have a more expensive lifestyle, comparatively; all that stuff that goes with living in the city maybe makes people work harder and want to achieve more". UE1 shares a similar vision when it comes down to making a profit and knowing that they are doing the job well. Job satisfaction counts more for them, but there also needs to be financial success, showing how important profits and business success are for the company. UE2 similarly shows this passion for making money, stating that business success means making a good profit that can give them a good lifestyle. UE2 and UE3 very closely link their motivations for profit to their desire for an increased quality of life, proving that many urban entrepreneurs go into business to be financially well off, and to be able to finance an expensive lifestyle. Furthermore, the motivation in terms of the future success and growth of the business is apparent in all three urban cases.

There is potentially a link between increasing urban business products and services that contribute to higher profits and success. UE2 speaks of how growth has led to the business being able to focus on the development of its product and the service it delivers. They mention that they now have more staff that can procure potential customers, which makes a big difference as it means that they can focus on the product that they offer, and how they can integrate that better and improve the service that they offer. We can observe that UE2's plan to double the size of the business has gone hand in hand with the ability to offer an improved service and a more developed product. With the long-term goal of UE2 being able to sell the company for a 'good profit', we can link the development of products and services to the eventual profit of

selling the business once the growth target is met. UE1 and UE2 have similar stories to tell in terms of their urban setting, small start, and branching out and developing their product and service, in turn gaining large growth and profit. This shows that urban businesses' motivation to succeed financially with profit and growth often goes hand in hand with the quality of their product and the depth of product and service that they offer, which can relate back to having the innovative qualities to provide the product or service.

The links that have been found within the case study have shown correlations between large financial aims and an expensive lifestyle, where the success of the urban business can be attributed to the expensive lifestyle of the entrepreneur and the motivation to create profits, so this can be maintained. Conclusions have also been drawn with urban entrepreneurs being growth-focused and having positive views on opportunities. The urban entrepreneurs do not see obstacles as absolute but instead as steps in the road to opportunity and growth. They have clear views of growth and they did not see the lack of employees or the small business size as a problem but as an opportunity to grow. This shared motivated mindset on growth and profit can be seen as the main reason for the success of the business and a trait of urban entrepreneurs. Lastly, the theme of importance put on profit and the increase of products and services show how the urban entrepreneurs do not rest on their laurels but they rather push on even in successful times to increase profits and quality. This constant push shows the competitive and innovative nature of the urban enterprises for higher quality and profit. These three links among the characteristics of the urban entrepreneurs give an insight into why they see high levels of growth and profit within urban SMEs.

Rural findings

The increase in products and services for rural businesses has also been a theme within the interviews. Still, the motivation behind the decision to increase the products and services is more influenced by sustainability and survival. RE3 speaks about how the quality of staff has led to the ability of the company to now offer more services. They state that they do not need to expand or to make themselves bigger as they have a good crew for what they do and the amount they do. When they started, they were just doing fashion shows. Now they can branch out with filming, acting, and photoshoots, enhancing the business's chances of sustainability and survival. This increase in services and products to have sustainability and survival shows that for this enterprise, innovation and the growth of offerings of the business are focused on survival and the ability to sustain business and work coming in, rather than mainly aiming to grow or to make a large profit. New products and services are therefore a constant in a business that wants to succeed. However, it is perhaps the aims and motivations of the entrepreneur that decide if this is for sustainability and survival or for profit and growth.

The rural entrepreneurs interviewed shared many similar views on success, aims, and goals. The increase in products and services for rural businesses has also been a theme within the data. However, the motivation behind increasing the products and services is more influenced by sustainability and survival. There were many links among cases, including a shared, somewhat negative view on potential growth. This is linked to an awareness of barriers. RE3 started a modelling agency over a decade ago based rurally and it works mostly in rural locations with rural clients such as hotels, kilt-makers, etc. RE3 said: "I want profit for the future, but there is no money in the market, which creates huge barriers". This statement shows that although a want for profit is there, the lack of money in the service that they provide creates a barrier for making more money. This view on obstacles is followed by RE2, a restaurant owner who opened the business two years ago. They explain that the long-term goal was to expand when they first opened, but they never realised how many barriers there were and how hard it would be. RE2 highlighted a similar obsolete nature of barriers to growth, showing a negative attitude towards it. These negative views on the potential growth of the business have possibly kept these two businesses from growing. They do not look to overcome issues but instead to accept them as a reason for resting on their laurels and simply sustaining the current business and clientele. This shows that potentially there is a lack of motivation to grow and drive to succeed among rural entrepreneurs, which may be the reason that they have set up rurally, as there is no space to grow. This could also suggest that rural areas attract less growth-motivated entrepreneurial start-ups.

Local community satisfaction and the aim to serve the local community was a recurring theme in the cases. RE1 speaks about their aims for the business going forward as keeping the clients happy. They want to offer a friendly salon that is not just about making a lot of money, but providing a service for the local community and a "nice friendly place". For them, the rural area is handy for the local community with the free parking and it is local, so they would not want to expand. Although these entrepreneurs want to create a successful business, they are not financially motivated. This shows that sustainability and survival may be more of a priority for them than growing and making large profits. RE2 also follows the theme of focussing on providing a good service to the local community, affirming that as they offer more services and products to the local community with their team that has been built over their first year. They aim to increase stability and sustainability within the community. A strong sense of community is yet again shown in this finding. Rural businesses seem to be more focused on contributing to the community than on growth and they are motivated by this as business success rather than huge financial gain.

Comparative analysis

Table 2 provides a comparative analysis of urban and rural entrepreneurs considering the established research questions.

Table 2. Differences between urban and rural entrepreneurs

Urban entrepreneur	Rural entrepreneur
RQ1. What are the key motivation differences between rural and urban entrepreneurs?	
High motivation to grow and expand	High motivation to provide high-quality to the local community
Aims for profit and financial success	Aims for long term sustainable income to ensure survival
Highly competitive, aims to be the best	Aims to provide high-quality to sustain business
RQ2. What is the perception of success for rural and urban entrepreneurs?	
Consistent growth	Locally acclaimed
Market leading	Sustaining a long-term clientele
Consistent profit	Survival
RQ3. Why do entrepreneurs in rural and urban settings start their business and what are their goals and aspirations respectively?	
Wanting to be their own boss	Wanting to be their own boss
Spotting an opportunity to create a profitable business model	Spotting a gap in the local market
Being able to make money that can afford an expensive lifestyle	Providing a service to the local community that is sustainable

Discussion

Key motivation differences between rural and urban entrepreneurs

The case of urban entrepreneurs highlighted a focus on high motivations surrounding growth, profit, and general financial success. These motivations were attributed to the urban entrepreneurs longing for an expensive lifestyle. Urban entrepreneurs often go into business, intending to be financially well off and to be able to finance a luxurious way of living. Further, the urban entrepreneurs' increased drive for these financial successes introduces the suggestion that urban areas attract individuals that are more motivated in this way, due to a more expensive and luxurious lifestyle, in comparison to more rural locations. This leads to higher growth and profit in urban regions. However, the higher competition and the risk factor associated with exploiting novel opportunities to grow can also lead to a higher failure rate. The literature also evidences that by tying risk and failure with growth and innovation (Sorenson and Audia 2000, Habersetzer et al. 2021). Comparatively, rural entrepreneurs had a higher motivation to provide a high-quality service for their local community. This is also evident in Eschker et al. (2017). This reveals a potential reason as to why growth may not be as rife in rural locations, as rural entrepreneurs are not willing to sacrifice the quality of service to the local community for growth. Furthermore, rural entrepreneurs have shown that often their initial motivation to start the business was not of huge

financial gain, unlike the typical urban entrepreneur, but to provide a sustainable service to the local community, which complements the work of Walker and Brown (2004) and Smith (2006, 2017).

Urban entrepreneurs have been found to have a positive approach toward success in general. They had a very positive view of future plans and success. Little to no obstacles or potential obstacles were mentioned and opportunities were a prominent element of every conversation. This correlation leaves the researcher to observe that the higher growth and profit rates of urban businesses may be related to the positive mindset of their owners and the positive attitude towards future opportunities. These opportunities can be focused on and they can be used to innovate and expand the product that the business offers, which backs up the findings of Zahra (1993).

On the contrary, rural entrepreneurs take a more negative approach. The rural entrepreneurs tend to pick out the obstacles to any potential growth or potential higher profit and they focus on these negative elements rather than the opportunities themselves. The general negativity and focus on why high-level profit and growth cannot be achieved, compared to the urban positivity and certainty of growth and profit, show how the entrepreneurs' positive approach towards business opportunities and future business success influences the business path. These findings contest the work of Stathopoulou et al. (2004), which states that the geographical difference has little to no correlation with a characteristic difference. Furthermore, rural entrepreneurs have a larger focus on survival and sustainability, partly due to the lack of risk-taking and content in the product and the lifestyle that the current business brings in.

Perception of success for rural and urban entrepreneurs

Each case was chosen not only because of being a rural or urban business but also for being a successful business. There was a clear comparison to be made on the differences in what success was classed as for rural and urban entrepreneurs, respectively. The urban case study revealed a general feeling that success comes down to making a profit, growth, and financial success. The reasoning for such included wanting to leave a legacy behind and the eventual aim to sell the business for profit. The urban entrepreneurs set out to create a business where they can make their own money for themselves, reflecting on what is classed as a success for these entrepreneurs.

Urban entrepreneurs are believed to have unlimited opportunities to make uncapped earnings. They keep looking to grow and to generate greater financial gains. The idea that this motivation and inclination to grow can directly affect the financial success and growth of the business is not new; Allinson et al. (2015) and Braidford et al. (2017) came to similar conclusions in their research. The rural case study revealed a contrasting opinion on success subjectively, as their motivations were not always growth or financially driven (Sriram et al. 2007).

Goals and aspirations of rural and urban entrepreneurs

The rural entrepreneurs explained that the reasoning behind starting the business was to fill a gap in the local market. There was a product or service that was lacking in the community and the entrepreneurs capitalised on this by starting the business. The success of these businesses for the rural entrepreneurs is not growth-based. In fact, quite the contrary. Two of the three businesses have been in operation for over a decade and so look to sustain their work by retaining client bases. While the third continues to build their clientele to begin making a profit to improve the product further. The consensus in the empirical findings was that success for rural entrepreneurs is to sustain the business and to keep the business going by providing a service to the local community. This theme correlates with the literature closely, and the in-depth nature of the findings further adds to its legitimacy (Walker and Brown 2004, Smith 2006, Smith 2017).

For two of the rural cases, the business was at one time a full-time job but it is now a part-time hustle. This may appear as a lack of commitment. However, this is how many rural entrepreneurs might like to operate, as it is not all about the money for them. The rural entrepreneurs did emphasise the focus on providing a service to the local community that would not be there otherwise. So success for these businesses is often more based on providing this service and on retaining clientele. This contrasting view on success can show why growth and increased profit can be a struggle in rural enterprises, as they may not wish to grow or they are highly motivated to do so either. Furthermore, the urban enterprise has come into the business as they see an opportunity to work for themselves and to provide themselves with uncapped earnings in the process, as suggested by Wijewardena et al. (2008) as well. The business goals of the urban entrepreneurs are high growth and high profit. This is what they aim for from the beginning, and their target market can be global compared to rural enterprises, which are often started only to fill a local gap.

The research contributes to answering the question posed by Konzelmann and Fovargue-Davies (2013) of 'winners to pick' in investment for SMEs, as the findings link motivation, success, and geographical location. This area of research should consider the findings in this paper, among others, to help answer the question posed, spotting potential high growth and profit companies from a young age. The research also adds to the partial literature that assesses the certainty of whether an SME will or will not grow or succeed, finding specific characteristics and traits of businesses and their owners that directly correlate with growth, profit, and sustainability. Moreover, the adopted qualitative research approach has created in-depth analysis previously lacking in the literature, specifically in the UK rural-urban context. The research contributes to the literature assessing the positive relationships between motivation and growth (Allinson et al. 2015, Braidford et al. 2017), and it touts the motivation to grow and to make a profit as a key characteristic of future growth and profitability.

We further contribute to the regional business literature and build on the existing findings (Florida et al. 2017, Szerb et al. 2019).

We fill a gap in the literature of a comparative study assessing the performance of SMEs based on location. The findings contribute to the literature regarding the motivation and perception of business success. The studies exploring urban and rural entrepreneurship using comparative case studies give new insight into understanding the link between geographic location and success.

Although the amount of businesses used in the case study made the data more informative and in-depth, a larger business dataset would create a more robust argument. Further, nationwide businesses, rather than in and around the North-East of Scotland, will potentially further analyse our propositions to confirm the results in larger geographic contexts. Further research should consider a larger sample of businesses to legitimise our findings and propositions, as it would also increase the geographical scope of the research to eliminate geo-cultural opinions. A case study approach was vital to the research as in-depth answers and opinions were needed to formulate the propositions. However, further research testing the conclusions focusing on generality would be advised using questionnaires or similar canvas methods to see a less thorough but denser response rate and to further examine the research propositions.

Conclusions

Our study aimed to understand the links between the enterprise location, the entrepreneurial motivation and the perception of success. These links show how the mindsets of entrepreneurs in different locations affect the performance of the business. The rural findings related firmly to success being based on sustainability and providing a good service for the local community, whereas the urban findings were very growth and profit-focused. The urban entrepreneurs were in business because they wanted to be the best and to come out the other side with wealth and an amount of money that could afford an expensive lifestyle. On the other hand, rural entrepreneurs wanted to keep the business going by retaining customers and sustaining income year on year. Urban areas tend to attract people who have or want a more expensive lifestyle and want to achieve more financially. They are usually motivated to grow the business, and in some cases, they have started the business rurally to keep costs down, with the eventual plan to become urban. Rural areas tend to lend themselves to business owners that have a set market base in front of them to provide to and they are often only created to serve the purpose of filling a gap in the market. A lifestyle business that provides a service creates enough profit to keep the business going but no real growth or exit strategy to create a great financial gain.

We are not claiming that rural entrepreneurs are unable to create high-growth ventures

nor that an urban business cannot grow steadily and sustainably. Our findings suggest a trend where urban areas attract highly motivated, financially driven individuals who want to achieve a lifestyle that is expensive to maintain. Contrastingly, rural areas attract those who desire a more relaxed lifestyle that is not as expensive to maintain, leading to less motivation for high levels of financial success. This alone explains that although there are rural businesses that have come from a small local business to an international company, rural businesses are usually not started or operated with an intention to make massive profits and to grow out with the local community. They rather create a good enough income to justify its operation and to provide a service to the local community. Similarly, urban businesses can be operated on a small scale for the same reason. Still, there is an increased motivation when starting the business in an urban environment, with more competition and higher costs. Therefore, entrepreneurs have high aims to grow and to be profitable. Otherwise, the business will fall behind, which is a problem that many rural businesses do not have to deal with due to a lack of competition. Businesses will succeed if there is a market and motivation within the business. Still, the location has been making a difference in many cases regarding growth, profit, sustainability, and survival.

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HEALTHY LANDSCAPES: A REVIEW OF THE RESEARCH ON URBAN LANDSCAPES ASSOCIATED WITH HEALTH AND WELLBEING

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Abstract: Cities shelter more than two thirds of the world's population, and health security in such environments became a challenge. The outbreak of the SARS-COV-2 pandemic revealed the urgency of assessing urban resilience towards major health crises. Major cities are acknowledged for decreasing the health status of their residents through complex drivers, and researchers from various domains have been addressing these issues for the past three decades. The aim of our study focused on highlighting the main methods and indicators used by scholars to assess the impact of urban landscapes on health, and to cluster urban landscapes based on their conclusions. We scoped the scientific literature published in the past 10 years, addressing the issue of health in relation with urban landscapes. We used statistical approaches, API algorithms, and social network analysis for generating and exposing our results. Most studies focused on perception analyses (mainly self-perceived health), literature reviews or environmental quality impacts on health. Green and blue features were considered therapeutic landscapes, while dense built-up spaces were described as harmful. Urban landscapes are acknowledged as enablers or disablers of health, thus planning strategies and regulations should consider the impacts generated by the design and structure of new urban fabrics.

Keywords:

green spaces;
therapeutic landscapes;
urban sustainability;
well-being

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Introduction

Worldwide, major urban settlements attract population as they are considered environments providing better living standards. These standards are correlated with the coverage and accessibility of public and private services (United Nations 2019). Nevertheless, living in cities inflicts specific habits and routines associated with unhealthy behaviour besides citizens being exposed to pollutants and stress factors (World Health Organization 2012). The high densities of population, specific to major cities proved to be a major vulnerability amid epidemiological breakdowns (Sharifi and Khavarian-Garmsir 2020). These shortcomings are becoming important challenges for planners and policy makers who must concentrate their efforts on keeping the proper balance between the benefits and weaknesses of urban living. Urban living has been acknowledged as unhealthy (Flies et al. 2019), enabling health in such environments being on the agenda of international and regional conventions (United Nations 2021). The pressures on human health in cities has been mostly correlated with the decreased environmental quality and the complexity of stress factors (Snell and Bhullar 2019).

Scholars have approached these issues from various angles, and they endorsed the idea that urban planning embedded with health risk assessments is appropriate for designing healthy cities (Davies and Kelly 2013, Ramaswami et al. 2016). Therefore, planning and health agendas should be aligned at local level, health priorities should be relevant, new tools designed to implement health principals in urban planning should be created, and adequate resources need to be allocated (Carmichael et al. 2019).

The quality of urban landscape influences the way dwellers perceive the urban quality of living (Gavrilidis et al. 2016). The quality of urban living is often correlated with the self-perceived health and the perceived environmental quality (Wolch et al. 2014). Therefore, the main goal of our study is to assess which are the most important features of urban landscapes which are associated in scientific research with health and wellbeing. For achieving this goal, we scope the scientific literature addressing this topic in the past decade to: 1) synthesise the scholars' profile tackling the issue; 2) extract the main methods and indicators used for their assessments; and 3) extract the types of urban landscapes labelled as therapeutic or harmful towards human health.

Health pressures in cities

Environmental quality is an important driver of health issues. Urban areas are acknowledged for dealing with complex environmental challenges (Nita et al. 2022). Mitigating the effects of air degradation in cities is among the common objectives that cities around the world share, as air quality directly impacts the health status of urban dwellers (Ghorani-Azam et al. 2016). Economic activities and heavy traffic, along with the decrease of areas covered with vegetation are the main drivers of air pollution

within cities. Cities are constantly expanding, reinforcing the air quality issues. Particulate matter and nitrogen oxides are the main pollutants of urban air (Taiwo et al. 2014), heavy concentrations exposing urban dwellers to various respiratory and cardiovascular diseases (Shi et al. 2019).

Cities have for long been considered noisy environments, affecting biodiversity as wild species are sensitive to unnatural and intense sounds (Katti and Warren 2004). Humans, however, are sensitive to noise pollution, long exposures causing hearing malfunction, heart related diseases (Hammer et al. 2014), or mental illnesses (Gruebner et al. 2017). Constant noise sources in cities are associated with traffic or construction sites.

Urban vegetation is considered an important asset in the pursuit of cleaner air and better health in cities. Urban green spaces, especially macro-structures like parks and gardens, enhance communities' lifestyles by ensuring better environment, safety and health (Shimamoto 2019). Green urban features proved to be vital barriers against the spread of SARS-COV2 virus (You and Pan 2020). During the imposed restriction due to the pandemics, vegetated areas provided the proper landscapes where urban dwellers could restore their physical and mental conditions (Grima et al. 2020, Venter et al. 2020). However, urban green may be a disabler of health in cities given the fact that some species can provoke allergies or skin irritations (Cariñanos and Casares-Porcel 2011), or they can trigger asthma or respiratory infections (Aerts et al. 2021). Moreover, wild landscapes edging urban areas favours the encounters of wild species with humans, determining a high level of reluctance towards natural landscapes within cities, especially if the media endorses alarming narratives (Neagu et al. 2022). Another argument against urban biodiversity emerged along with the outbreak of the SARS-COV2 pandemics, as, despite the lack of undebatable origins of the virus (Andersen et al. 2020), the first assumptions endorsed the idea of animal origin.

While easier and wider access to healthcare units within cities is an important argument for better quality of life (Paul 2012), the recent health crisis proved that health infrastructures succumb in overcrowded cities (Plagg et al. 2021). The last global pandemics emphasised just another shortcoming enhanced by urban overcrowding. The high density of people in major cities impacts both directly and indirectly human health (Jain and Arokiasamy 2018). Recent global events gave food for thought to scholars and practitioners who now must focus on controlling the urbanisation process considering health hazards as well. Scholars and health specialists considered that built environments, along-side genetics and socio-economic contexts are the main cause for chronic diseases (Sarkar et al. 2014). Therefore, our society has to deal with the paradox that while urbanisation means progress and well-being, these benefits come at the cost of complex health pressure. In order to break this paradox, planning policies and urban management should consider designing cities containing features enabling health, while reducing the ongoing pressure over their healthcare system.

Opportunities for increasing urban health levels

Embedding health aspects in all policies would help to address the planning challenges driven by market forces (Barton and Grant 2013). As the World Health Organization (1986) indicates, "health is created by people within the settings of their everyday life", and to these days and for future years, the main setting in which people will spend their time will be urban or urbanised.

Citizen's access to therapeutic urban landscapes is considered germane considering the modern lifestyles and health risks (Thompson 2011). Lands covered with vegetation are generally accepted as therapeutic landscapes. However, there are differences in providing these benefits based on the type of vegetation or species association. Wide water bodies and a high diversity of tree species, along with greenspace patches that are well interspersed with the built environment are considered to provide more health benefits than any other types of green areas (Mears et al. 2019). Complex topography landscapes and the ones including large water bodies determined positive health effects (Deng et al. 2020). Urban fabrics with blue infrastructures are widely considered as therapeutic landscapes (Volker and Kistemann 2015). Unplanned urbanisation increases the exposure of people to environmental hazards and the heterogeneous nature of human health risk in an urban landscape reveals critical risk hotspots where immediate action should take place (Morandeira et al. 2019). Public health and wellbeing should be integrated into the implementation of nature-based solutions for resilient and liveable urban landscapes (Van den Bosch and Ode Sang 2017).

The planning and design of residential landscapes determines the health level of their inhabitants (Petteway 2019). Most studies are associating mental disorders with socio-economic indicators (poverty, poor education, unemployment, segregation) or major life events, but not much has been dwelled upon the influence of the built environment (Garrido-Cumbrera et al. 2018). Sprawling cities are developing incoherent landscape patterns (Nistor et al. 2021) which determine subliminal stress on the citizens' subconscious (Halpern 2013). The adequate provision of public green space in local neighbourhoods and within walking distance is important for positive mental health (Wood et al. 2017). Urban design enabling access to large green areas is mandatory for planning a green and healthy city (Niță et al. 2018). The distribution of urban green features throughout the cities and their level of accessibility helped scholars to determine which neighbourhoods are more likely to furnish healthier environments for their residents (Cetin 2015).

Both planning and micro-planning in cities must consider how the desired policies would impact the health status (Giles-Corti et al. 2016). However, the healthy city status is reached by implementing policies and planning strategies that enhance and support a healthy lifestyle (Barton and Tsourou 2013). Embracing the smart growth principles may encourage physical activity and lower obesity rates in cities, but at the

same time it would be "naive to think" that by only shifting urban planning codes and regulations would be enough to change behavioural patterns or to alter entrenched development practices (Durand et al. 2011).

Urban landscapes as enablers of health

The complexity of activities and functions occurring in urban environments are clustered in specific landscapes, this conglomerate providing both opportunities and pressures for the dwellers. The design and association among urban landscapes mostly focus on enabling economic efficiency (Hirai 2015). The experiences gathered throughout decades of local and regional health crises, culminating with the global pandemic started in 2020, advocate for considering health protection as another specific pillar of urban planning, along the economic, social, and environmental concerns.

Accessibility and affordability of healthy food within urban areas could influence the eating habits, especially among the vulnerable groups (Hammelman 2018). The edible city approach is considered the right path towards the development of sustainable, liveable, and healthy urban areas as it will encourage residents to adopt healthier eating behaviours (Säumel et al. 2019). Urban blue infrastructures, especially large water bodies, can provide the proper stimulation for outdoor activities, such as paddling or swimming (Volker and Kistemann 2013). Major urban green features, such as parks, gardens or forests are adding up their contribution in stimulating residents to practise outdoor activities (Wolch et al. 2014). Local policy makers and practitioners can create supporting landscapes for a healthy living, designing them to tackle the health burdens of urban society (Root et al. 2017).

Morphological and structural features of urban landscapes influence air quality, especially particulate matter dispersal (Liang and Gong 2020), thus this environmental issue is described within the cityscape through specific chromatics of built-up structures or odours (Quercia et al. 2016). Most urban areas, especially post-communist European countries are still confronted with specific unhealthy landscapes such as brownfields, which are the testimonial of industrial decay from the last 30 years (Kunc et al. 2014). The derelict industrial landscape is mostly reconverted in other types of landscape such as residential, commercial, logistic, or green spaces (Moţcanu-Dumitrescu 2015).

Urban planning can enhance human and environmental health by providing the proper marketability of healthy urban designs, persuading the private sector to invest in it (Carmichael et al. 2019). Health benefits generated through cultural ecosystem services need to be given more attention for being at least considered by practitioners and policy makers in their documents (Chen et al. 2019). Even if there is a considerable amount of knowledge relating the importance of accessibility towards therapeutic landscapes in cities, the need for better evidence and understanding endorsing this desire remains on the table (Thompson 2011).

Methodology

The first step of our analysis was to search and download relevant papers for the study. We have used the scientific databases search engines and the main keywords used during the searching process were: "urban landscape" and "health", complementary using other relevant keywords (Figure 1). The established searching terms were aimed at the title, abstract and keywords. After a preliminary search, we compiled a database of 310 downloaded papers. Going further with an in-depth validation of the downloaded papers (by thoroughly reading the abstracts and the aims of each downloaded paper), the database was downsized to less than 280 papers, most of which were published by Elsevier and MDPI. Therefore, we have decided on keeping for further analysis just papers published between 2010 and 2020 in the two scientific databases. The final analysis database consisted of 262 relevant papers, published in 57 journals (33 in Elsevier and 24 in MDPI).

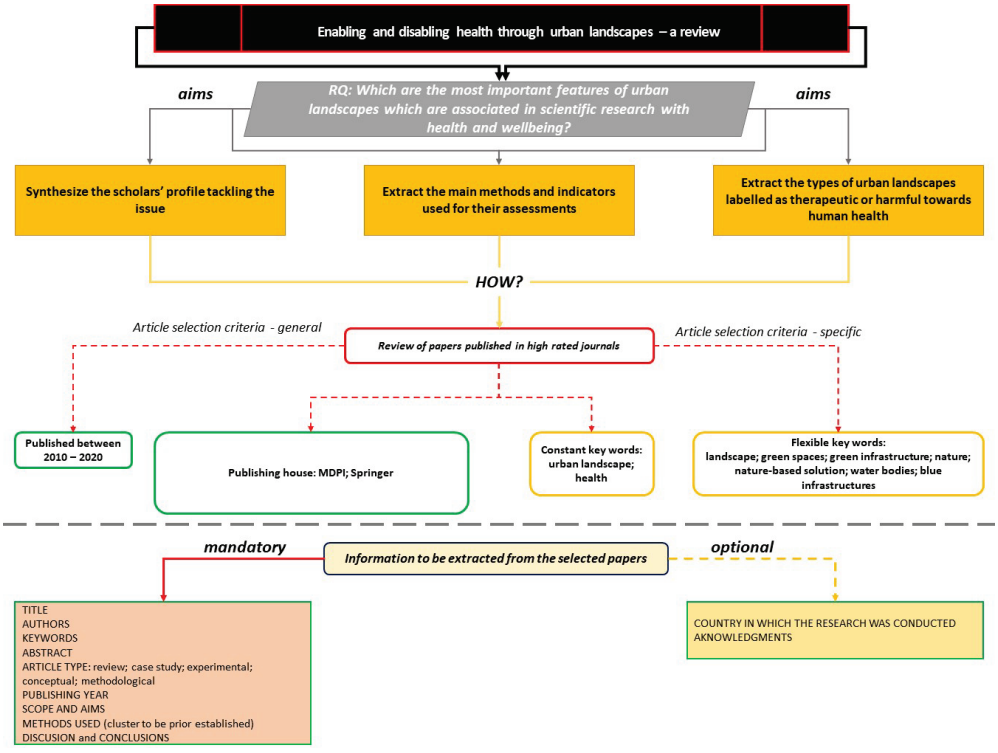

Figure 1. Methodological steps for selecting the proper scientific papers relevant for the assessment

All 262 papers were shared among the research team for an in-depth analysis, which consisted in the reading of the papers and the extraction of their: identification data (ID, doi_wos, title, authors, authors' affiliation, affiliation country, year published and journal's name); general information (abstract, study aims, keywords); approach (scale

of the analysis, location of study area/s and article type); addressed urban landscapes (provided definitions, types of landscape); addressed health issues (provided definitions, types of analysed health, methods and indicators used); perspectives (future directions, study limitations); and outcomes (major findings and conclusions). These data were compiled in an additional database which was used for further processing. After manually extracting the indicated data, we used the Deep Categorization and Text Classification APIs provided by Meaning Cloud (2022a, 2022b) for automatically labelling the abstracts with a specific topic/s. If human validation occurs, using text mining approaches in scientific reviews proved to be efficient in improving the quality of the studies, especially for non-native English speaker authors, as these tools have high accuracy when mining English texts (Dale 2015, Sulova et al. 2017).

Deep categorization is an in-depth rule-based categorization, assigning one or more categories to a text using a very detailed rule-based language that allows you to identify very specific scenarios and patterns using a combination of morphological, semantic and text rules (Meaning Cloud 2022a). The Text Classification API assigns one or more classes to a document according to their content, the classes being determined from a previously established taxonomy (Meaning Cloud 2022b). For this study, we used the IPTC taxonomy (International Press Telecommunications Council), as it comprises more classes which may be applied and may be relevant for scientific publications as well. Using the UCINET software (Borgatti et al. 2002), we provided the network analysis related with the authors' countries of affiliation and with the topics' associations in the reviewed papers. The methods, tools and indicators used in the analysed articles were clustered as indicated in Table 1 and Table 2. The indexes and indicators used in the analysed papers were further clustered by the authors using the DPSIR classification (Smeets and Weterings 1999). For better exposing the outcomes related with the addressed landscape and the health issues analysed in the reviewed papers, we clustered them as indicated in Table 3.

Table 1. Clusters of the methods used by the authors in the reviewed papers

ID	Method cluster	Details
1	Experimental	*Methods involving experiments (e.g.: Usage of VR technologies on human subjects, exposure to urban features while recording various biometrics, biometric analysis among different socio-demographic groups etc.)*
2	Index calculation	*Methods aimed at developing indexes*
3	Literature review	*Papers aiming in reviewing the existing literature on a particular subject*
4	Miscellaneous	*Approaches in which the authors combined methods described in the other clusters*
5	Perception analyses	*Methods based on surveys, interviews, and questionnaires*
6	Remote Sensing	*Methods using satellite imagery to determine urban phenomena*
7	Risk assessment	*Methods assessing the risks of being exposed to various pollutants and pathogens*
8	Spatial analysis	*Methods in which different spatial metrics were computed (e.g., distances, travel time, land uses dynamics)*
9	Statistical processing	*Methods in which raw data were statistically processed*

Table 2. Clusters of the indexes and indicators extracted from the reviewed papers

ID	Index cluster	Abbreviation	Details
1	Ecological	ECO	*Related with species or ecosystem assessments*
2	Physiological	PHI	*Related with human physiology*
3	Psychological	PSY	*Related with psychological assessments*
4	Landscape metrics	LAM	*Usage of indexes attributed to landscape analysis*
5	Demographic	DEM	*Demographic indicators (e.g., age, gender, etc.)*
6	Social	SOC	*Social indicators (e.g., unemployment, homelessness, etc.)*
7	Economic	ECN	*Economic indicators (e.g., investments, budgets, etc.)*
8	Document	DOC	*Indicators extracted through document analysis*
9	Medical Behaviour	BEH_m	*Indicators on human behaviour in relation with health issues*
10	Environmental	ENV	*Data related with environmental components quality*
11	Climate	CLM	*Data related with climate and microclimate*
12	Urban amenities	URA	*Data related with urban amenities (e.g., sewage, water provision, healthcare, etc.)*
13	Environmental behaviour	BEH_env	*Data on human behaviour in relation with environmental components*
14	Perception	PER	*Data extracted through perception analyses*
15	Literature data	LID	*Data extracted through literature review*
16	Spatial metrics	SPM	*Data extracted through spatial analysis*
17	Accessibility	ACC	*Data related with accessibility towards different urban features*

Table 3. Clusters of urban landscape types and health issues addressed in the reviewed papers

Landscape cluster	Details	Health cluster	Details
Foodscape	*Related with food provisioning*	Habits	*Focusing on people's habits and their driving forces*
Social	*Providing social benefits (e.g., shelters)*	Healthy living	*Related with physical activities, good nutrition, or outdoor activities*
Workscape	*Related with people's workspaces*	Mental	*Focusing on the mental wellbeing*
Educational	*Related with the educational buildings*	Physiological	*Focusing on the physiological wellbeing*
Industrial	*Related with the industrial activities and buildings*	Self-reported health	*Related with self-perceived medical data gathered through surveys, interviews, or questionnaires*
Soundscape	*Related with noise stress*	Behaviour	*Related with the human behaviour*
Agriculture	*Related with croplands, allotment gardens or other edible landscapes*	Healthy environment	*Focusing on the health of environmental components*
Cultural	*Related with places providing cultural outcomes*	Overall wellbeing	*Focusing on the general well-being of urban citizens*
Therapeutic	*Mixture of natural and artificial features providing general wellbeing*		

Landscape cluster	Details	Health cluster	Details
Streetscape	*Landscapes perceived from the street level*		
Residential	*Related with housing, private gardens or neighbourhoods*		
Bluescape	*Related with natural or artificial water bodies*		
Leisure	*Related with places where people go for leisure activities*		
Political	*Related with documents, strategies or plans*		
General urban landscape	*Analysis of the overall urban landscape*		
Greenscape	*Focusing on landscapes consisting of natural features*		

Results

Most of the authors addressing the relation between urban landscapes and human health were affiliated in China, USA, UK, and Germany (Figure 2). The authors affiliated in academic or research institutes from these countries represented more than 50% of the total authors inducted in our studies. Authors affiliated with European institutions conducted 40% of the reviewed studies. Most studies were co-authored mainly by researchers affiliated in UK (egnv=0.400), Germany (egnv=0.386), Australia (egnv=0.286), USA (egnv=0.278) and China (egnv=0.263), according to the principal component SNA results (Figure 3). During the analysed period, the interest in the topic has exponentially increased. While from 2010 to 2015 the number of papers failed to exceed 5 articles per year, starting with 2015 the number reached 15 articles per year, with 72 papers in 2019 and 87 in 2020. The emergence of the global health crisis starting from the end of 2019 has spurred the number of articles addressing health in urban landscape. The cumulative impact factor of the journals in which the reviewed articles were published was 202.63 (Elsevier: 155.63; MDPI: 46.69).

Content analysis

After using the Deep Categorization API on the abstracts of the reviewed articles, 74 topics and subtopics were identified. The topic incidence throughout all the analysed abstracts shows that the topic "science" with the subtopic "environment" has a share of 21% of all topics, followed by the topic "medical health" (15%), "Business and Finance>Industries" (7%), and "Medical Health>Diseases and Conditions" (4%). The principal component SNA (Figure 4) shows that most of the topics are correlated with "Science>Geography" (egnv=0.296), "Medical Health" (egnv=0.266), "Business & Finance Industry" (egnv=0.265), or "Healthy Living>Fitness & Exercise" (egnv=0.216).

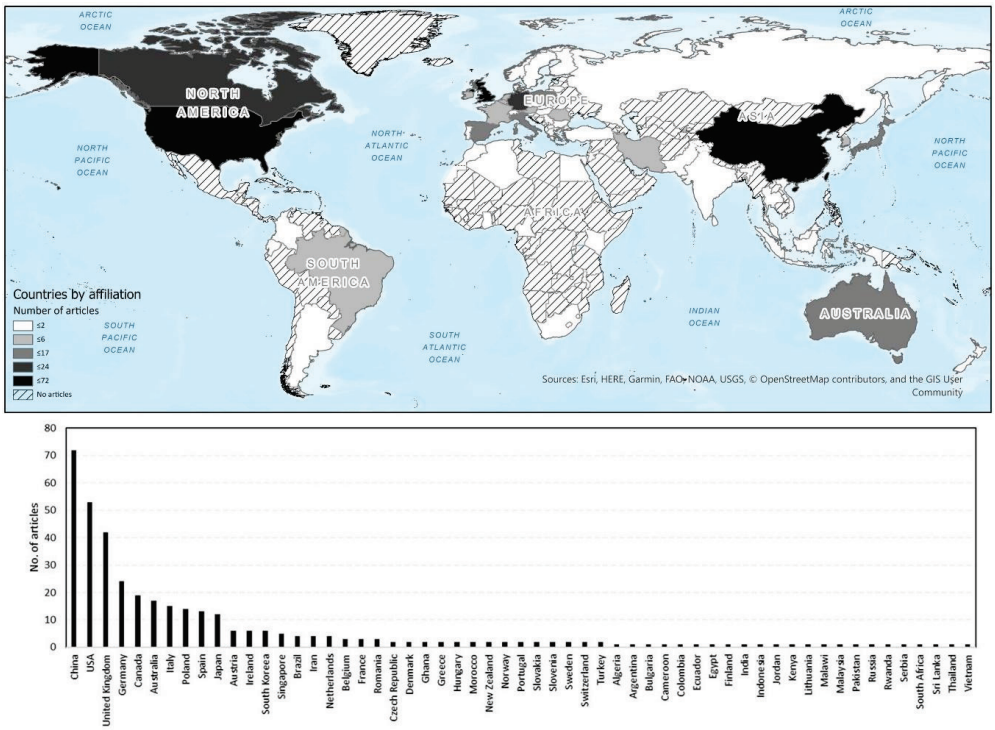

Figure 2. Global representation of the authors' country of affiliation

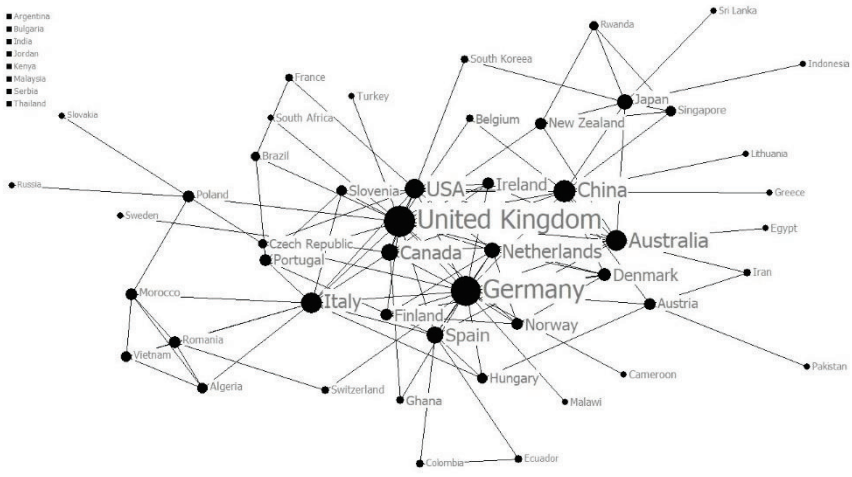

Figure 3. Principal component SNA describing the affiliation countries co-authoring the reviewed articles Label sizes are based on eigenvector values, and node sizes are based on degree

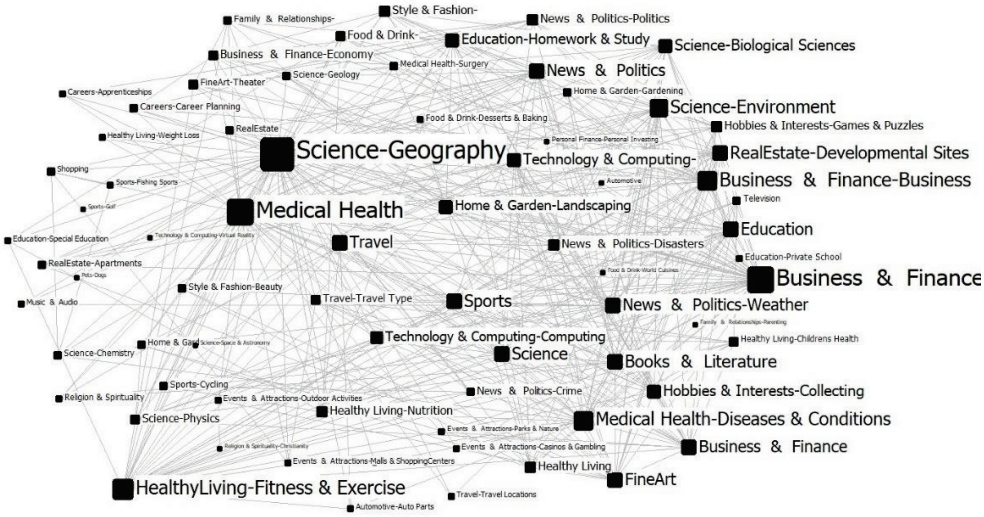

Figure 4. Principal component SNA describing the Deep Categorization topics' association from the abstract of the analysed papers
Label sizes are based on eigenvector values, and node sizes are based on degree

The Text Classification API using the IPTC taxonomy was set to extract the central topics from the analysed abstracts. It extracted 64 topics and subtopics, the most present topics in the analysed abstracts being: 1) politics – interior policy – housing and urban planning (present in 21% of the analysed abstracts); 2) environmental issue – nature, economy (present in 15% of the analysed abstracts); 3) business and finance – construction and property (present in 13% of the analysed abstracts); 4) health (present in 8% of the analysed abstracts); 5) environmental issue – environmental pollution – air pollution (present in 3% of the analysed abstracts).

We have extracted the types of landscapes and health issues that the authors addressed in their studies. Based on the clustering of the landscapes and health issues previously exposed, the most analysed urban features were the greenscapes and the general urban landscapes (Figure 5a), as for the health issues, the most addressed were the overall wellbeing and the health of the environmental components (Figure 4b).

Further, we determined the associations between the analysed landscapes and the health issues within the processed articles. The principal component SNA shows that, besides the "environmental health" (egnv=0.283) issue, the identified landscapes are mainly associated with the overall "wellbeing" (egnv=0.315), "behavioural patterns" (egnv=0.259), and "self-reported health" (egnv=0.220); while the main urban landscapes analysed in relation with different health issues are (Figure 6): "general urban landscape" (egnv=0.328), "greenscapes" (egnv=0.328), "leisure landscape" (egnv=0.320), "streetscapes" (egnv=0.278), and "residential" (egnv=0.255).

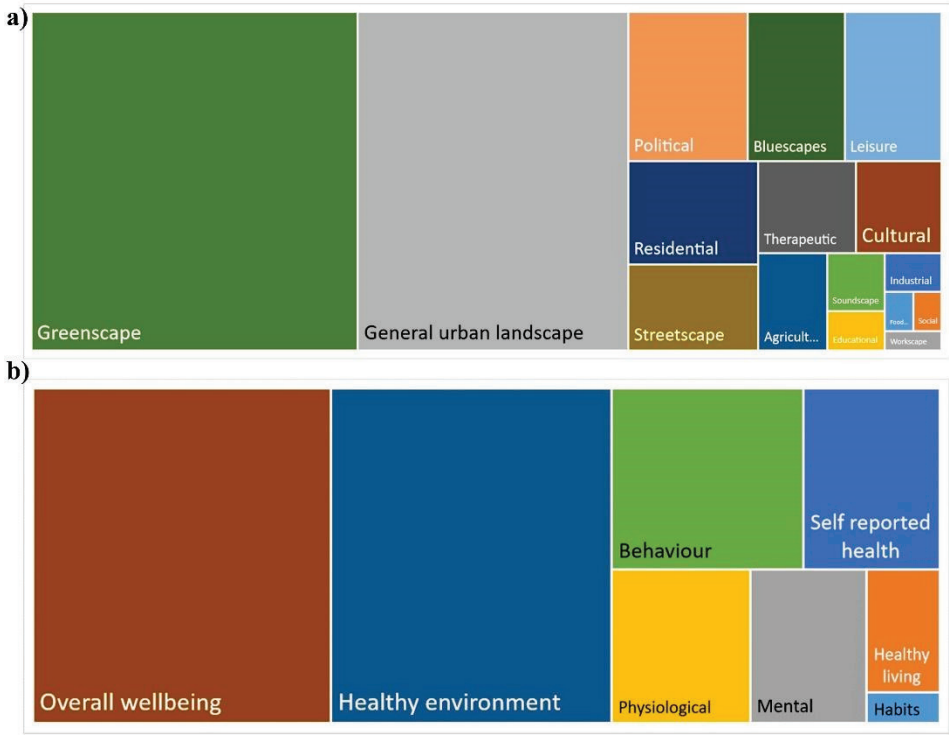

Figure 5. Landscape (a) and Health issues (b) clusters extracted from the aims and objectives of the analysed papers

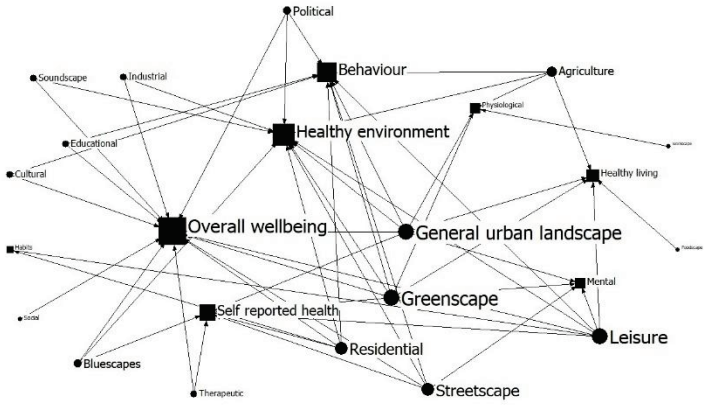

Figure 6. Principal component SNA describing the relations between landscape and health issues clusters within the analysed papers
Label sizes are based on eigenvector values, and node sizes are based on degree

The methods chosen by scholars in their studies were mostly clustered as "miscellaneous" (20%), "perception analyses" (20%), "spatial analyses" (16%), "statistical processing" (15%), and "literature review" (13%). Overlapping the methods used by the researchers with the country of their affiliation, it was expected that

countries generating more articles on the topic to have authors applying various methodological approaches for their assessments. However, we must highlight the European context where even the countries with fewer publications are having authors that apply at least three methodological approaches (Portugal, France, Ireland, and Romania).

The index/indicators clustering using the DPSIR (Drivers, Pressure, State, Impact, Response) classification shows that, in 52% of the cases, the authors used State indicators (Figure 7a), followed by Impact indicators (17%) and Pressure indicators (161%), while Drivers indicators were less used (9%), along with Response indicators (5%). Using the classification developed in this study, the perception data (11%) and the landscape metrics (11%) are the most used parameters in the analysed papers (Figure 7b). However, there are other data which were used in more than 5% of the cases, revealing a wide palette of data types used by the authors in addressing the urban landscapes in relation with human and environmental health.

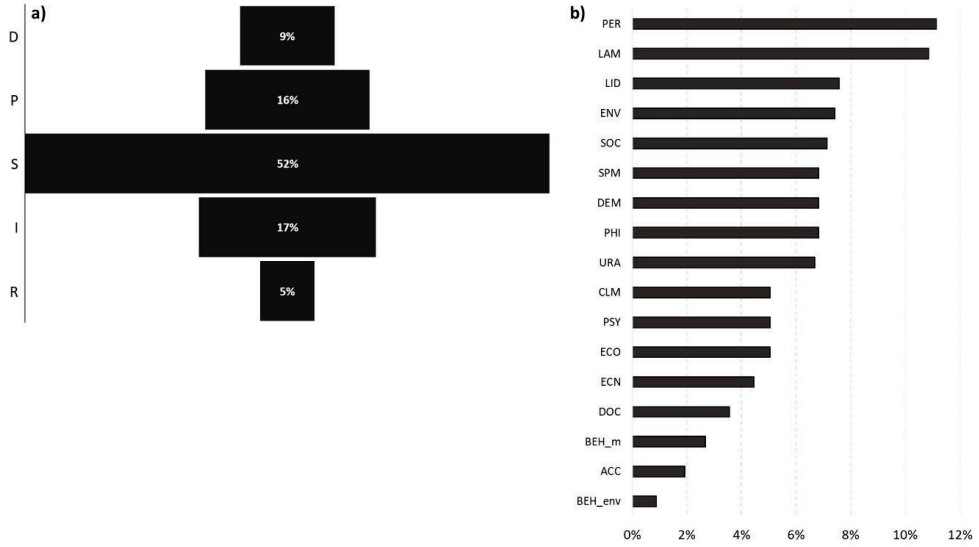

Figure 7. DPSIR classification (a) and Indicators' clusters (b) used in the reviewed articles
The b) section of the image contains the clusters described in Table 2.

Discussion

The review of the literature addressing urban landscapes as drivers of health burdens revealed that, in recent decades, scholars emphasised the health benefits provided by natural features within cities, and they highlighted how high built-up densities weakens human health on medium and long terms. Our study endorses the importance of green landscapes within cities, regardless of their size. Nature and vegetated areas provide serenity for the urban dwellers, but several of the reviewed

studies pinpointed also other urban landscapes as health enablers, such as the bluescapes or foodscapes.

Urban landscapes as health enablers – a transdisciplinary topic

The results revealing the main countries from which the authors of the reviewed articles are affiliated are consistent with the world rankings regarding the scientific production per country (World Bank 2021). The same countries are acknowledged as having the most cities on the path of reaching the health-related UN's SDG (GBD 2015 SDG Collaborators 2016), thus the researchers from these countries have an increased know-how and experience in assessing the health benefits provision of cities. Another argument on why researchers from few countries are addressing this issue is that most Western European, Japanese and Canadian cities are listed in the top 30 in terms of sustainability (Phillis et al. 2017). The fact that mostly British and German authors, along with Asian and North American authors, were involved in joint research projects with scholars from other countries is also consistent with the data provided by the European Research Ranking (2021) and the UNESCO Institute of Statistics (2023), emphasising that research institutes from Western European countries are leading in terms of total research funding expenditure, number of projects being involved in, and number of projects coordinated by, while China, Japan, Republic of Korea or USA are leading in GERD values (percentage of GDP allocated for research and development).

Aspects of urban health could not be addressed either way than transdisciplinary (Grover and Singh 2020), ideas supported also by our results. The topics revealed by the Deep Categorization API revealed a plethora of domains concerned by the urban health subject. While most of the studies were labelled with the "geography" domain, these results are however biased as we focused on urban health issues related with the urban landscape, thus it was expected that this domain or its sub-branches would pop up during the analyses. Nevertheless, three decades ago, scholars have pinpointed how urban health can be addressed from a geographical perspective (Taylor 1993). More recently, geographical approaches were used to emphasise the inequalities of health and wellbeing distribution throughout the cities while highlighting the environmental and planning driving forces for these inequalities (Grover and Singh 2020).

Wealth is also associated with health levels (Qureshi et al. 2017), our results indicating that the reviewed articles were addressing the "business – finance industries" matters. Cities in developing countries which are becoming wealthier are prone to sprawling (Wei and Ewing 2018), and sprawl has been acknowledged to be linked with the health levels, especially the mental wellbeing of the urban population (Garrido-Cumbrera et al. 2018). On the other hand, in developed countries, local authorities are more likely to invest in planning strategies and policies to increase the liveability of their cities, enhancing the health status of their citizens (Shuvo et al. 2020). Environmental quality plays a determining role in the urban health status (Salgado et al. 2020) and all the topics

emerging from it, like climate change, pollution, GHG emission, urban heat island or urban green infrastructures are to become more present in future papers focusing on health within cities. Planning issues are also expected to be frequently associated with urban health analyses as planning policies are the main determinants of urban landscapes in which people are living their daily routine (Carmichael et al. 2019).

The complexity described by the urban environments requires multidisciplinary approaches. Territorial planning requires the proper management space through time, each scientific domain dealing with specific amounts of both (Figure 8). While the expertise of most researchers involved in urban management at a certain level aims at increasing the efficiency only by assessing the socio-economic indicators, health will be under constant and rising pressures. Health should be an intersectoral concern if the future urban world wishes to reach sustainability at all levels (Barton et al. 2003). Through this review, we desire adding more emphasis on the need to consider health impacts in the decision-making process taking place in urban areas. Coherent and proactive urban planning addressing health issues at all levels of expertise could mitigate the negative effects of potential health crises, context that usually determines political turmoil and the rising of populist discourses (Doiciar and Crețan 2021).

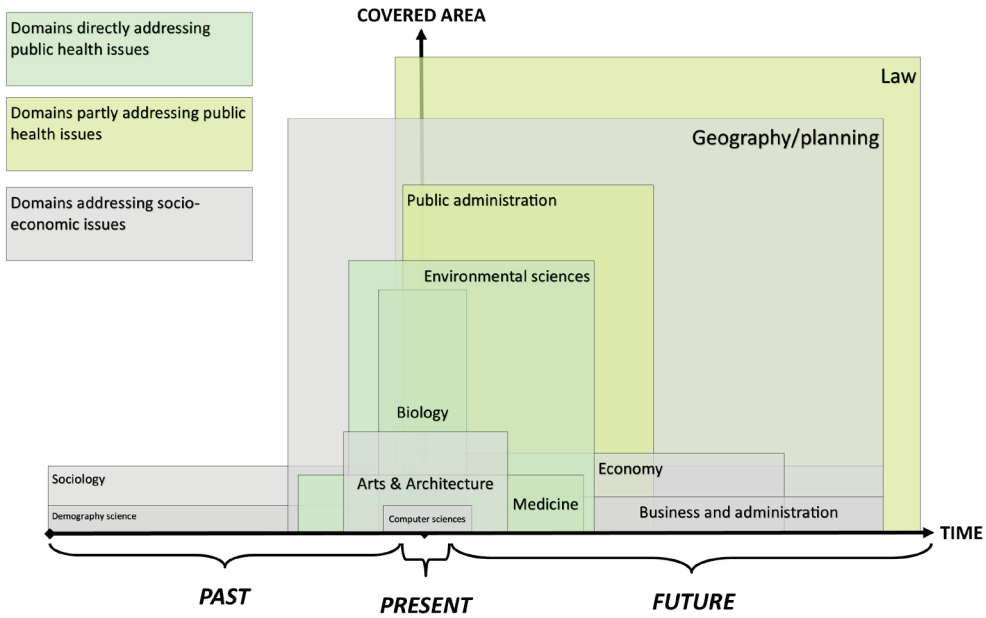

Figure 8. Domains involved in the urban management, by analysed scales and time frames

(Un)healthy urban landscapes

As it was expected, greenscapes were mainly assessed in relation with urban health aspects. This outcome endorses the idea that vegetated areas are improving human

health by mitigating the pressures projected by low environmental quality, especially air pollution, and by providing the proper ground for outdoor activities, enabling people to embrace a healthier way of living (Shanahan et al. 2015). On the other hand, the presence of vegetation within cities has been also viewed as a pressure on human health, mainly to those groups of people with allergies (Cariñanos et al. 2014). The inclu-siveness feature of urban green areas depends on the species composition (Cariñanos et al. 2019) and, more than that, the allergenic potential of some species can be aggravated by the local environmental conditions (Aerts et al. 2021). Therefore, planning and managing the green infrastructure features within urban areas require special attention on the species composition and proper assessment regarding the state of the urban environment. Our results show that greenscapes have been analysed in relation with environmental quality, behaviour patterns, healthy living, mental health, and overall well-being. People manifest positive behaviours when surrounded by nature (Roberts et al. 2019). For enhancing the urban green spaces potential to enable health, planning should focus on their accessibility, quality, equipping, attractiveness, and security (Lee et al. 2015). Similar suggestions are made by the World Health Organization (2017), which encourages planners, practitioners and policy makers to aim their energy in equipping urban green areas with various features that would determine population to adopt a healthier lifestyle.

Besides urban green areas, the authors were engaged in assessing the overall urban landscape in relation with health issues. These holistic approaches are rooted in prior studies addressing the issue in a more niched manner, but, at the same time, they provide the context for further detailed studies for confirming their findings and hypothesis. Urban morphology and the alternance of landscapes within a city have strong effects on the urban functions, healthcare, and traffic conditions (Meng and Xing 2019). The landscapes distribution within cities have been acknowledged to influence the land surface temperature and the occurrence of urban heat island phenomenon (Ramaiah et al. 2020, Yao et al. 2020) which negatively impacts human wellbeing and comfort (Stauber et al. 2018).

The association of the planning and management documents with environmental quality analyses reignites the idea of Kaiser et al. (1974) that environmental quality can be only promoted through suitable planning strategies. This desideratum prevails today as researchers acknowledge that urban planning can enhance human health by considering the quality of environmental components (Carmichael et al. 2019). Leisure landscapes were as well evaluated in relation with all the extracted health issues, excepting physiological health. Engaging in social and cultural activities has a positive impact on the self-reported health status (Cocozza et al. 2020) and the deprivation from leisure activities has negative influences on the general quality of life in cities (Kapuria 2016). Leisure constraints and satisfaction mediate the relationship between socio-economic status and self-reported health (Chick et al. 2015).

Streetscapes consisting of natural features and the traffic limitation generate more benefits over general and mental wellbeing (Wijnands et al. 2019). For improving the environmental quality, sustainability principles should be included in the planning and design of urban streetscapes (Rehan 2013). Visual pollution is often considered a pressure on the mental wellbeing, while shiny ads, or billboards perceived at street level are causing distress to the urban citizens from a psychological perspective (Portella 2014).

Residential landscapes have been highlighted by our results to be associated with environmental degradation, behaviour patterns, self-reported health, and habits. Low-income residential neighbourhoods are considered to cast unhealthy landscapes from a psychological, physiological and environmental perspective (Won and Lee 2020). The amount and complexity of natural features in high density residential districts is scarce, challenging the human and environmental health as well (Wolch et al. 2014), while single dwelling residential fabrics with gardens can project a multitude of benefits (Dennis and James 2017). However, detached houses with gardens are not a viable solution for urban settlements that attract large numbers of inhabitants, but improving the existing multi-dwelling landscapes is something that practitioners and planners are aiming for.

Assessing health at landscape level

The tools and methods used for assessing the relationship between urban landscapes and health are essential for understanding the outcomes of this analysis. Most of the methodologies and tools are borrowed from landscape ecology (Zhou et al. 2018), or remote sensing and GIS (Ramaiah et al. 2020). Perception analyses are also widely used, especially in studies focusing on self-reported health (Garrido-Cumbrera et al. 2018, Won and Lee 2020).

Around 20% of the studies were using perception analyses as methods to evaluate the linkage between different urban landscapes and health. On the one hand, these types of studies require less logistics for gathering data but they entail solid statistical processing knowledge for the results interpretation and meaning. Perception analyses may show specific trends or behaviours, the results being mainly useful if practitioners would like to develop citizen-oriented planning strategies. On the other hand, these types of studies lack quantitative input, being unable to draw straight facts. Studies focusing on perception analyses have emphasised the idea that people feel healthier near areas covered with vegetation (Wood et al. 2017) or near water bodies (Volker and Kistemann 2013). While just the proximity of such features does not guarantee higher health levels for the population living or working nearby, the perceived benefits are undebatable. Self-reported health studies were also conducted within residential areas, objecting that communities from lower socio-economic classes are experiencing negative influences from the built-up areas where they live in (Won and Lee 2020). The perception analysis is a common approach for assessing how the main beneficiaries of urban landscapes are reacting to their planning or management (Zakerhaghighi et al. 2022).

Besides perception analyses, authors have opted for the spatial analyses too. Urban landscapes' dynamics can reveal whether a city is improving its health conditions or not (Carmichael et al. 2019) in relation to accessibility between one landscape to another (Hammelman 2018) or through the shrinkage of the areas covered with natural features (Van den Bosch and Ode Sang 2017). Urban land uses and cover determine the socio-economic profile of a city (Gavrilidis et al. 2015), which ultimately can lead to specific health conditions (Matthews and Gallo 2011). Spatial analyses can derive quantitative data which are able to become fundamental data when designing planning strategies and development scenarios for cities, but, at the same time, they lack the assessment of citizens' needs and requirements. These methods usually ask for more logistics and skills as they require GIS and remote sensing solutions as well as researchers with expertise in using these tools and in interpreting the processed data.

Performing different statistical processes using public data was another approach in the analysed papers. Public data, especially socio-demographic data and health data, are used for highlighting specific health trends in correlation with environmental, economic, or land-use data. Studies consisting of literature reviews represented around 13% of the papers included in this study. They were aimed to condense the knowledge regarding the impact of certain urban landscapes projects over human or environmental health. The data used in the reviewed papers as indicators show that the authors were mainly preoccupied on assessing the state of human and environmental health in relation with urban landscapes and fewer of them focused on the impact or pressure generated by the urban landscapes. Most of the data used in these analyses were extracted from perception assessments, landscape metrics and the literature.

Study limitations and future research directions

The literature synthesis that we have conducted was based on the articles extracted from two scientific databases. To that extent, one may consider that we used a narrow sampling basin for our review analysis. At the same time, the journals from which the reviewed articles were extracted have an important impact within the scientific community and especially within the domain of social sciences. Most researchers that authored the articles included in our analysis have opted for a review analysis as well, thus the works they have addressed are relevant for this study as well. The timeframe from which we extracted our articles may be considered a shortcoming. The outbreak of the SARS COV-2 pandemic fuelled the journals from the entire scientific spectrum with articles; and the scholars with expertise in planning and urban environments addressed the issue in their specific approach. We hypothesise that a future review using the same approach as ours, but after 2020, would generate different outcomes. However, our analysis has captured a time interval in which the interests in the urban landscape and health relation have evolved naturally and they were not influenced by contextual events.

Future studies should investigate clearly and differentiate the healthy from the unhealthy urban landscapes, but they should also describe what processes, policies and concrete measures can decrease or increase the healthiness of urban landscapes. This type of analysis would require a joint effort from scholars of various scientific domains and cultures, and this approach would provide a wider relevance of the potential outcomes.

Conclusions

The outcomes of our review have succeeded in providing an overall picture on which urban landscapes are considered enablers of health by the researchers. We have chosen relevant and prestigious databases from where to extract the papers, meaning that the approaches discovered in these papers are relevant at a wider scale. The overview on the expertise of the scholars concerned with urban landscapes and related health issues showcased that the topic is transdisciplinary, but it is often embraced by researchers with geographic, ecological, or sociological background. This conclusion may be determined by the results regarding the preferred methods of analysis, as most of them are specific tools used in the prior mentioned domains. Emphasising which urban landscapes are enablers or disablers of health completed our proposed set of objectives for this study. Green and blue landscapes are widely considered therapeutic landscapes while other types of urban landscape are considered to contain features posing potential risks for health.

This review offers a perspective on how the research community treated urban landscapes as enablers of human and environmental health for the second decade of the 21st century. The new decade of this century is promising new approaches and more interest in assessing the urban environment and their ability to secure good health levels for their citizens.

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DIFFERENTIATION OF THE SOCIO-ECONOMIC DEVELOPMENT OF THE NUTS-3 SUBREGIONS IN CENTRAL AND EASTERN EUROPEAN COUNTRIES

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Abstract: The article focuses on the analysis of the level of the socio-economic development of 239 NUTS-3 level subregions of Central-Eastern Europe based on 31 indicators categorised within the three subcomponents (factors) of the regional development: the natural environment, the human capital, as well as entrepreneurship and innovativeness. The purpose of the article is to specify the variation in the level of socio-economic development of the subregions within the arrangement of the NUTS-3 units. The level of socio-economic development, as well as the level of the development of its factors, shall be presented based on a synthetic gauge exhibiting the taxonomic distance of a particular subregion from the established pattern of development. In the study, a hypothesis shall be verified according to which the socio-economic development of Central-Eastern European subregions is highly varied, and its highest level is registered in the subregions located around the capitals of the researched states.

Keywords:

regional development;
NUTS-3 units;
Hellwig's reduction method;
distance from the role model

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Introduction

Specifying the level of socio-economic development as well as its changes is an incredibly important research problem both in economic theory and in economic practice. For example, the allocation of the European funds to specific subregions, as well as the intensity of state aid for communities depends on the level of development (Albulescu and Goyeau 2013, Nistor and Glodeanu 2014, Matsuura 2015). Researching the significance of the process of socio-economic development, together with its causes and consequences, is the subject of a lot of scientific reports (Dreyer et al. 2006, Đukičin Vučković et al. 2018, Orlova et al. 2018, Shikverdiev et al. 2019, Jašková and Havierniková 2020, Mukhametzhan et al. 2020).

A characteristic feature of regional development is its spatial differentiation. The growing discrepancies in regional development in turn constitute one of the main problems of the contemporary economy, and the fundamental goal of the European cohesion policy is convergence, i.e. activities directed towards decreasing the differences in the level of development of EU regions (Martin and Sunley 1998, Charron et al. 2014, Beugelsdijk et al. 2018).

Based on 31 indicators categorised within the three subcomponents (factors) of the regional development, we present the level of the socio-economic development of NUTS-3 subregions of eleven countries of Central and Eastern Europe (CEE)according to human capital, natural environment, as well as entrepreneurship and innovativeness. The basis applied to calculate the indicators was the statistical data of Eurostat (2021) database, enriched by the data from the Statistical Offices of the surveyed countries. The main assumption of the article is to present the variation of the level of the socio-economic development of CEE countries that are members of the European Union (Bulgaria, Croatia, the Czech Republic, Estonia, Lithuania, Latvia, Poland, Romania, Slovakia, Slovenia and Hungary) within the arrangement of specific 239 subregions, i.e. the third level of classifying territorial units for statistical purposes applied by Eurostat (the so-called NUTS-3). The level of the socio-economic development are presented based on a synthetic gauge representing a taxonomic distance of a given subregion from the established pattern of development.

This study verifies a hypothesis according to which the socio-economic development of the NUTS-3 subregions in CEE is highly varied, and its highest level is registered in the subregions located around the capitals of the researched countries, and the lowest – in the subregions located the farthest from the indicated large cities, constituting the centres of growth. The research encompasses all NUTS-3 subregions in the EU Member States of CEE – 239 units in total.

Regional development theories

Accepting the definition of a region as a territory-based social system, Hauke and Kossowski (2011) defined the regional development as a combination of socio-economic changes which take place within the region-system. Regional development may be considered in terms of quantity and quality dimensions. Striving towards the increase in work efficiency in all branches of the economy may be considered in the form of quantitative activities, and stimulating the growth of certain layers of activity with a simultaneous lack of encouragement for other branches may pass as qualitative activities (Đukičin Vučković et al. 2018). It is well worth noting that the quantitative dimension of growth is economic development. The development is thus a notion wider than growth, as, apart from quantitative changes, it is accompanied by qualitative structural changes (Bystrova et al. 2015).

The subject matter literature includes a lot of reviews of theories and outlooks on regional development. Part of them is an attempt to systematise them, taking advantage of different takes at that (Illeris 1993, Martin 2015). In this article, a review of the takes on regional development shall be done in terms of the factors of the said development based on the two main trends of the economic thought: (1) the neoclassical one, assuming, in line with the liberal doctrine, minimising the state interventionism and treating the free market economy as a measure of regulating the above mentioned; (2) the neo-Keynesian one, acknowledging state interventionism as necessary and the most important regulating mechanism of regional development.

A concept of regional development relating to the representatives of the classical school of Economics – Adam Smith and David Ricardo – is the theory of comparative cost (Sinha 2019). Within the framework of the concept, Ricardo has proven not only the mistaken nature of the beliefs of Mercantilists concerning international trade, then assuming that only one side of the transaction obtains benefits, but he also supported Smith's argument concerning the loans from the free foreign trade (Sinha 2019). Smith saw the benefits of both exchanging partners, if each of them, thanks to specialising, is in possession of a cheaper product, created with a relatively lower labour input than their partner (Friedmann 1983). Therefore, the main assumption of the theory is a conclusion that a comparison of efficiency and labour costs between two regions shapes the development factor which is cooperation and international trade (Sinha 2019).

Another theory of the neoclassical trend is a concept of convergence formulated by the Nobel Prize laureate Jan Tinbergen (Dekker 2021). The concept is directly related to the theory of comparative cost, and its supporters claim that the trade exchange between the developed and undeveloped (backward) countries may, with time, lead to a decrease in the level of their development, and even to the levelling out the level of income in both those groups (Dekker 2021). Apart from the international exchange, the

factor of development of the concept is also the capital and technological development (Henrekson and Jakobsson 2003).

As opposed to the neoclassical concepts, in the first part of the twentieth century, theories emerged which related to John Maynard Keynes' doctrine (Dimand and Hagemann 2019). The previous concepts were focused on the supply aspect, and Keynes and his followers concentrated on the demand analysis (Dimand and Hagemann 2019). The demand theories postulate different administrative activities, striving towards the creation and the strengthening of the factors of development, such as: increasing the qualifications of the workforce, promoting export, investment in infrastructure, supporting the development of entrepreneurship or creating innovativeness (Florida 2002, Zemtsov and Smelov 2018, Diebolt and Hippe 2019, Li et al. 2019).

The importance of innovating the process of regional development has been emphasised by Joseph Schumpeter, a representative of the Austrian school (De Castro et al. 2018, Emami Langroodi 2021). The development resembles the process of creative destruction (De Castro et al. 2018, Emami Langroodi 2021). Innovation assures, on one hand, a structural change as well as the development, and, on the other – it destroys the previous economic and social structures (De Castro et al. 2018, Emami Langroodi 2021). Not all entities are prepared for such changes. Sometimes they are forced to self-destruct and to introduce new technological solutions (De Castro et al. 2018, Emami Langroodi 2021). Otherwise, they stop being economically viable.

A new theory of growth, initiated by Paul Romer, assumes the possibility of accumulating the factors of development, which is a possibility of achieving a state of durable development, as well as maintaining or even extending the economic differences between regions (Chandra 2022). A stable and long-lasting development is termed within this framework as endogenous development. The basic factors generating growth are: human and physical capital, as well as technological innovativeness (Chandra 2022). The poor regions may not make up for the developmental differences in a different manner than increasing its technological level and investing in human qualifications (Benner 2003, Rodionov et al. 2018, Arranz et al. 2019, Baklanov 2020).

Within the framework of the neoclassical trend, the contemporary model of the so-called new economic geography combines three elements within itself: transport costs, the benefits of an agglomeration, and the costs of the flows of the production input (Krugman 1998). The model takes account of the possibility of the occurring of, or even deepening, of the interregional differences, which, according to Grosse (2010), is a result of the tendencies to accumulate growth factors in the most developed metropolitan regions. A new theory of development as well as a new economic geography have found wide use in the concept of endogenous regional development (Kadyrbechevna Shugova 2018). According to the theory, the economic development

of a particular region depends on factors such as: the endogenous material, its human and social capital, as well as an intra-regional development policy (Kadyrbechevna Shugova 2018). Regional development should constitute an internal effect and it should as well as be managed by a region "from the bottom" (Gallego et al. 2010). The conditions for sustainable regional development should be created by an efficiently managed regional policy. Therefore, the concept rejects the neoclassical assumption of "the invisible hand of the market", to the benefit of neo-Keynesian state interventionism (Gallego et al. 2010).

Regional development might occur in a spontaneous manner, or it might be supervised. The second option relates to shaping development through stimulating the factors of regional development within the conducted regional policy. The subject matter of regional policy is the subject of lively debates among the representatives of different fields of knowledge: Economics, Geography, Law, or Political Science. A rich literature has been created in the subject of regional policy, and the number of definitions is hard to grasp. Defining regional policy is somewhat difficult, especially in the context of activities taken within the structural policy and the cohesion policy of the European Union (Milenković et al. 2021). The notions are often interchangeable, as both the regional policy and the cohesion policy as well as the structural policy have the same purpose, which is decreasing the economic and social differences among the EU regions (Moroshkina 2019).

The mutual relationship and the intertwining of the abovementioned community policies has been specified by Grosse (2010"326), concluding that "regional policy is also termed as a structural policy or the socio-economic cohesion policy. The first term refers to a deliberate activity of public authority agencies striving towards the recreation of the economic structure and a stimulation of the economic growth of a particular area. In the case of the cohesion policy, the aim of the authority is to decrease the developmental differences of the respective territories."

Downes (1996), however, pointing towards the relationship between the structural policy and other community policies, emphasises that the subject matter of the cohesion policy, the structural policy and the regional policy is the same reality, with a reservation that the emphasis of a particular policy is placed differently. Due to their close relationship, Downes (1996) suggests using the "regional structural policy" term.

The European Commission concludes that the regional policy is a conscious and deliberate activity of the central public authority agencies striving towards regulating the interregional proportions of development (Smętkowski and Dąbrowski 2019). The structural policy is, however, a notion used in the European Union almost automatically linked with the Cohesion Policy (Czaplewski and Klóska 2020).

According to Smętkowski (2015), the regional policy in the economic dimension

comprises all forms of state intervention which are directed towards the change in the spatial location of the economic activity. Within such a framework, it aims to correct the effects of free market trends in the direction of ensuring economic growth and the change in income redistribution (Pfirrmann 1995). Within the general framework, the regional policy may be defined as activities aiming to maximise the usability function, i.e. aiming to improve the economic situation of one or more regions (Démurger 2001).

The regional policy is related to the occurrence of differences in the level of the development of the respective regions. The uneven regional development resulting from the investors' decisions, the important aspects of the free-market economy mechanism, or the geographical factors, lead to the varying levels of income, as well as the life quality of the population. The main task of the regional policy is the necessity to limit the scale of those differences (Liu et al. 2018).

The need to strengthen the economic and social cohesion of Europe through decreasing the differences in the development of the respective regions was discussed already at the level of creating the European Community. In the preamble to the Treaty of Rome, it has thus been indicated that one of the assumptions of the Communities is "a strengthening of the unity of its economies and ensuring their harmonious growth, through decreasing the differences existing between the respective regions as well as the lagging behind of the regions less privileged" (Madanipour et al. 2022: 818). Introducing this principle to the Treaty of 1957 is widely accepted as the symbolic beginning of the European cohesion policy (Lu et al. 2020).

The sources of the funding of the cohesion policy related activity of the European Union are currently the structural funds and the Cohesion Fund. The European Social Fund (ESF), being the oldest structural fund of the European Communities, is a basic instrument of European social policy (Avgerou 2008). The activity of the fund centres above all around the development of the job market through stimulating the employment of people, counteracting the unemployment, creating and maintaining workplaces, or taking care of a high level of employment (Fongwa and Marais 2016). The activity of the European Social Fund was directed towards the creation of mechanisms conducive to the development of the job market. The fund is thus to contribute to the increase in the level of employment, at the same time stimulating professional and geographical mobility of workforce resources (Benz and Fürst 2002).

The most important financial instrument of the cohesion policy is, however, the European Fund of Regional Development (EFRD). It was launched in 1975. EFRD is directed towards supporting the activity with the aim of levelling out the differences in the level of the respective Community regions (Gburová and Matušíková 2014). The fund aims to contribute towards correcting the basic regional discrepancies in the Community through participation in the development as well as structural adjustment of the regions lagging behind in the development, as well as in transforming the

industrial regions experiencing downfall as well as supporting the transborder, transnational and interregional cooperation (Gburová and Matušíková 2014). Complementing the above mentioned two structural funds is the Cohesion Fund (CF) created based on the Treaty of Maastricht (Palvia et al. 2018). The fund is not a structural fund, as it is not regionally directed, and the aid it offers is aimed at the least developed countries. Its direction is focused on supporting the realisation of national-level projects, and the paying out of aid is dependent on the level of the development of a member state (below 90% of GDP per capita at the national level), as well as maintaining by the state a budget deficit at the level not compromising the possibility of fulfilling one of the basic convergence criteria (Goryachikh and Kravchenko 2020). Support from this fund is granted towards the activities concerning the environment and the TEN-T trans-European transport networks (Ibinceanu Onica et al. 2021).

Among the most frequently mentioned in the literature factors of regional development, there are: aspects related to human capital and economic aspects. As a result of the literature studies, however, a research gap was identified in relation to including environmental aspects among regional development factors. This may be caused by the difficulty in identifying and the insufficient indexing of environmental elements. Therefore, the author of this study decided to address the research gap and to include environmental aspects in his considerations as one of the most important regional development factors. However, due to the low availability of empirical data directly referring to the natural environment, the author is aware of certain imperfections related to the construction of a synthetic indicator.

Methodology

In order to research the level of socio-economic development of NUTS-3 level subregions in the eleven countries of CEE (being EU Member States), a synthetic gauge of the distance from the recommended pattern has been used. The research procedure has been conducted parallelly – in the static dimension (based on the values of the indicators in 2019), as well as in the dynamic dimension (based on the change of the value of the indicators in the years of 2010-2019). The research procedure was composed of five respective stages:

1. specifying the subcomponents – i.e. the factors of regional development;
2. the selection of variables – the creation of a matrix of geographical information;
3. the reduction of the multi featured space;
4. indicating the level of socio-economic development of the units subject to research;
5. the classification of the subregions against the scale of socio-economic development.

A review of the regional development concept allows for specifying the most

important constituents, i.e. factors of regional development. A development factor is a constituent, regional property or an occurrence which impacts the socio-economic development (Feldman 1999, Yun et al. 2017, Naydenov 2019, Khasanova et al. 2020). The socio-economic development has been characterised based on its three subconstituents, termed for the purpose as follows: "the human capital", "the natural environment", and "the entrepreneurship and innovativeness".

Table 1. Indicators taken into account in the analysis specifying the subcomponents of regional development

The subcomponent of development	Indicators
Human capital (11 variables)	The natural growth per 1000 inhabitants; the migration balance per 1000 inhabitants; the feminisation coefficient in total; the share of people at the production age in the total number of people; the share of people at the post-production age in the total number of people; the share of people at the pre-production age in the total number of people; the number of people at the non-production age per 100 people at the production age; the number of people at the post-production age per 100 people at the pre-production age; the median age of the population; the total birth-rate; the average age of women at birth.
Natural environment (10 variables)	The municipal waste per 1 inhabitant; disposed of municipal waste per 1 inhabitant; the share of farmland as well as natural green areas in the total area; the share of farms below 5 hectares in the total number of farms; the share of farmers-farm owners under the age of 35 in the total number of farm owners; registering misdemeanour and a crime concerning the natural environment per 1000 inhabitants; road transport of goods measured in tonnes per 1000 inhabitants; the use of electrical energy for freezing the living quarters (as EU average); the use of the electrical energy for heating the living quarters (as EU average); the quantity of accommodation per 1000 inhabitants.
Entrepreneurship and innovativeness (10 variables)	The share of microenterprises in the total number of economic entities; the creation of enterprise coefficient; the share of the employed in farming in the total number of the employed; the share of the employed in the financial sector in the total number of the employed; the share of the employed in the sector of information and communication in the total number of the employed; the share of the employed in the sector of professional services in the total number of the employed; the share of the employed in services in the total number of the employed; the number of consumables per 1 mln inhabitants; the number of trademarks per 1 mln inhabitants; GDP per 1 inhabitant (as EU average).

The "human capital" subconstituent has been specified through indicators displaying the population potential of a particular subregion, referring to the balance of migration and the birth-rate, the fertility, the level of education, as well as the age structure. Within "the natural environment", indicators concerning the use of land have been considered, the structures of farms, the waste, the burden connected with the road transport of goods and the use of energy for heating and the freezing flats have been analysed. Within the "entrepreneurship and innovativeness" factor, however, the indicators connected with entrepreneurship, the structure of employment, the GDP, as well as the scale of innovativeness measured by the number of trademarks and consumables obtained were considered. All the factors mentioned above that are

connected with the regional development were interrelated. In the striving towards a competitive development of a particular region, the factors ought to be included in the long-term strategy. As Churski (2008) claims, one may thus assume that regional development comprises both the dynamic processes occurring under the influence of specific factors, which determine the character, the direction, as well as the speed of the socio-economic changes, as well as the changes deliberately directed, which through the pro-development factors are aimed at realising the tasks within the regional policy.

At the second stage of the conducted research procedure, a matrix of geographical information was built based on 31 indicators (Table 1), which specified the level of development of the NUTS-3 units in 2019, as well as the changes thereof in the years between 2010-2019, in relation to three subcomponents of growth: the human capital, the natural environment, and the entrepreneurship and innovativeness. Subsequently, Pearson's linear correlation coefficients were calculated between all the researched departure indicators separately for 2019, as well as separately for its change in the years of 2010-2019. It is extremely important, however, for the indicators selected for a synthetic gauge of distance from the recommended pattern to be loosely correlated between each other. As a result, the information capacity of those indicators differs.

The matrices of Pearson's correlation coefficients were the basis of conducting a reduction of the departure variables by using Z. Hellwig's reduction method – i.e. to separate the diagnostic features, i.e. those indicators which shall be taken into account in further research procedure (Balcerzak 2016). The Z. Hellwig's reduction method is used for calculation of the correlation coefficients between the variables. In Z. Hellwig's reduction method, the diagnostic feature is the indicator whose sum total of the absolute correlation coefficients with other features is the highest (it is then called the central feature). Next, those variables are eliminated for which the value of the correlation coefficient with the diagnostic feature is higher than the critical value specified based on the hereinbelow mentioned pattern (Nowak 2018):

$$r^* = \sqrt{\frac{(t^*)^2}{n - 2 + (t^*)^2}} \tag{1}$$

where:

r^* – critical value of Pearson's linear correlation coefficient
t^* – the t-Student statistics value (at the significance level p=0.05)
n – the number of departure indicators (variables)

As a result of the applied method, those variables are eliminated which are significantly statistically correlated with the diagnostic feature (called satellite features). At every next step, there is a reduction of the correlation matrix by the central

feature and the satellite features. The Z. Hellwig's method is repeated, obtaining new reduced correlation matrices, up to the point of exhausting a collection of features or the separation of isolated features (Hauke and Kossowski 2011). The procedure of the reduction of variables has been eightfold: separately for the level of the socio-economic development in total, as well as separately for the level of the development for each subcomponent both in the static dimension (for the data for 2019), as well as the dynamic one (for the data for 2010-2019).

At the next step of the research procedure, a pattern, and an anti-pattern of the level of socio-economic development have been devised. A pattern has been defined as the maximum standardised values of the respective diagnostic features, and the anti-pattern – their minimum values (Spychała 2020). At the next stage, the taxonomic value of each researched subregion of the NUTS-3 level from the pattern of development was devised based on the hereinbelow mentioned pattern (Reiff et al. 2016):

$$d_{i0} = \sqrt{\sum_{j=1}^{m} \left(z_{ij} - z_{0j}\right)^2} \tag{2}$$

where:

d_{i0} – the taxonomic distance of the *i*-subregion from the assumed pattern of development

z_{ij} – the standardised value of the *j*-indicator (feature) for the *i*-subregion

z_{0j} – the standardised value of the *j*-indicator (feature) for the pattern of development

At the last stage of the research procedure, a synthetic gauge for each NUTS-3 subregion was devised, being an indicator of the level of development in a particular subregion. The value of the synthetic gauge was calculated for the general level of the socio-economic level of development, as well as separately for each of the three subcomponents of the development. The synthetic gauge was calculated based on the following pattern:

$$v_i = 1 - \frac{d_{i0}}{d_0} \tag{3}$$

where:

v_i – a synthetic gauge of the level of development of the i-subregion

d_{i0} – the taxonomic distance of the i-subregion from the assumed pattern of development

d_0 – the taxonomic distance of the pattern from the antipattern of development

A synthetic gauge of the level of development assumes values from 0 to 1, with a proviso that the higher the value, the higher the level of the development of a particular phenomenon. Based on the calculated synthetic gauges, a ranking of 239 subregions of the NUTS-3 level in the EU Member States of CEE was established, and its subcomponents were subsequently subdivided into five groups: at a very high (20% of the subregions at the highest value of the synthetic gauge – the 1. group – places 1-48 in the ranking); high (the following 20% of the subregions – the 2. group – places 49-96 in the ranking); average (subregions located on positions 97-143, taking account of their decreasing placement based on a given synthetic gauge – the 3. group); low (subregions on positions 144-191 – the 4. group); and a very low (20% of the subregions at the lowest value of the synthetic gauge – the 5. group – positions 192-239) level of development. Taking account of the research conducted in the dynamic dimension, the subregions for which the indicator took the highest values (20% of the researched units) were classified into the group comprising units of a very high variability of the intensity of the phenomenon, and the units for which the indicator assumed the lowest values (20% of the researched subregions), classified into the group exhibiting the relatively low variability of the level of development of a particular phenomenon.

Results

Table 2 presents the NUTS-3 units exhibiting the highest and the lowest values of the synthetic gauge within the respective subcomponents of the socio-economic development calculated separately for 2019. In Table 3, the NUTS-3 subregions of the extreme values of the synthetic gauge were compiled and calculated for the changes in the years of 2010-2019. Figure 1 contains the choropleth maps representing the spatial variation of the socio-economic level of the NUTS-3 subregions in the EU Member States of CEE in 2019, as well as the changes in the development for the period 2010-2019.

As a result of the conducted research procedure, the spatial differentiation of 239 NUTS-3 level subregions in eleven countries of CEE was presented with respect to the level of socio-economic development, as well as three subcomponents being factors of that growth. In the researched group of units, the value of the synthetic gauge representing the level of the socio-economic development in 2019 ranged from 0.165 to 0.471. The value of the gauge representing the change in the level of the socio-economic development of the subregions in the years of 2010-2019 ranged from 0.392 to 0.581. A similar differentiation was observed in the case of the human capital (0.142–0.623 for 2019, as well as 0.293–0.571 for the change in the years of 2010-2019), the natural environment (0.270–0.479, as well as 0.275–0.659, respectively), as well as the entrepreneurship and innovativeness (0.078–0.830, respectively, as well as 0.233–0.657). One should thus note that the biggest differentiation of the subregions was registered in terms of entrepreneurship and innovativeness, and the biggest similarity of the researched units was observed in the case of the natural environment.

Table 2. Extreme values of the synthetic gauge within the respective subcomponents of the socio-economic development in 2019

The highest values of the synthetic gauge (2019)			The lowest values of the synthetic gauge (2019)		
Item	The NUTS-3 subregion	Value	Item	The NUTS-3 subregion	Value
		Human capital			
1	Poznanski (PL)	0.623	239	Vidin (BG)	0.142
2	Ilfov (RO)	0.618	238	Gabrovo (BG)	0.185
3	Gdanski (PL)	0.618	237	Kyustendil (BG)	0.237
4	Warszawski wschodni (PL)	0.599	236	Teleorman (RO)	0.253
5	Kosický kraj (SK)	0.594	235	Montana (BG)	0.267
		Natural environment			
1	Koszalinski (PL)	0.479	239	Vilniaus apskritis (LT)	0.270
2	Liberecký kraj (CZ)	0.471	238	Gliwicki (PL)	0.284
3	Slupski (PL)	0.468	237	Miasto Wroclaw (PL)	0.298
4	Jihocecký kraj (CZ)	0.417	236	Katowicki (PL)	0.300
5	Gdanski (PL)	0.408	235	Kauno apskritis (LT)	0.301
		Entrepreneurship and innovativeness			
1	Miasto Warszawa (PL)	0.830	239	Vaslui (RO)	0.078
2	Osrednjeslovenska (SL)	0.613	238	Kardzhali (BG)	0.086
3	Miasto Kraków (PL)	0.610	237	Razgrad (BG)	0.099
4	Põhja-Eesti (EE)	0.597	236	Neamt (RO)	0.104
5	Hlavní mesto Praha (CZ)	0.596	235	Silistra (BG)	0.112
		Level of general socio-economic development			
1	Miasto Warszawa (PL)	0.471	239	Vidin (BG)	0.165
2	Põhja-Eesti (EE)	0.465	238	Montana (BG)	0.211
3	Miasto Kraków (PL)	0.460	237	Teleorman (RO)	0.213
4	Osrednjeslovenska (SL)	0.452	236	Kyustendil (BG)	0.215
5	Bratislavský kraj (SK)	0.448	235	Gabrovo (BG)	0.217
6	Obalno-kraska (SL)	0.440	234	Pleven (BG)	0.223
7	Hlavní mesto Praha (CZ)	0.425	233	Lovech (BG)	0.230
8	Warszawski zachodni (PL)	0.423	232	Utenos apskritis (LT)	0.233
9	Miasto Poznan (PL)	0.418	231	Pernik (BG)	0.240
10	Trojmiejski (PL)	0.414	230	Silistra (BG)	0.240

Table 3. The highest and the lowest values of the synthetic gauge within the respective subcomponents of the socio-economic development in the period 2010-2019

The highest values of the synthetic gauge (the period of 2010-2019)			The lowest values of the synthetic gauge (the period of 2010-2019)		
Item	The NUTS-3 subregion	Value	Item	The NUTS-3 subregion	Value
			Human capital		
1	Miasto Warszawa (PL)	0.571	239	Marijampoles apskritis (LT)	0.293
2	Bucharest (RO)	0.542	238	Smolyan (BG)	0.298
3	Timiș (RO)	0.540	237	Taurages apskritis (LT)	0.300
4	Cluj (RO)	0.530	236	Utenos apskritis (LT)	0.317
5	Iași (RO)	0.526	235	Vukovarsko-srijemska zupanija (HR)	0.324
			Natural environment		
1	Telsiu apskritis (LT)	0.659	239	Sibensko-kninska zupanija (HR)	0.275
2	Obalno-kraska (SL)	0.658	238	Primorsko-notranjska (SL)	0.384
3	Goriska (SL)	0.645	237	Zadarska zupanija (HR)	0.400
4	Kesk-Eesti (EE)	0.622	236	Yambol (BG)	0.433
5	Alytaus apskritis (LT)	0.605	235	Dubrovacko-neretvanska zupanija (HR)	0.463
			Entrepreneurship and innovativeness		
1	Põhja-Eesti (EE)	0.657	239	Pieriga (LV)	0.233
2	Vilniaus apskritis (LT)	0.648	238	Koroska (SL)	0.340
3	Cluj (RO)	0.635	237	Zasavska (SL)	0.363
4	Bucharest (RO)	0.633	236	Zemgale (LV)	0.386
5	Miasto Warszawa (PL)	0.622	235	Utenos apskritis (LT)	0.388
			Level of general socio-economic development		
1	Miasto Warszawa (PL)	0.581	239	Sibensko-kninska zupanija (HR)	0.392
2	Bucharest (RO)	0.578	238	Utenos apskritis (LT)	0.409
3	Cluj (RO)	0.571	237	Pieriga (LV)	0.414
4	Põhja-Eesti (EE)	0.566	236	Smolyan (BG)	0.427
5	Vilniaus apskritis (LT)	0.563	235	Primorsko-notranjska (SL)	0.427
6	Lääne-Eesti (EE)	0.558	234	Koroska (SL)	0.438
7	Riga (LV)	0.556	233	Zadarska zupanija (HR)	0.445
8	Kesk-Eesti (EE)	0.555	232	Razgrad (BG)	0.446
9	Vas (HU)	0.549	231	Zasavska (SL)	0.450
10	Iași (RO)	0.549	230	Legnicko-Glogowski (PL)	0.452

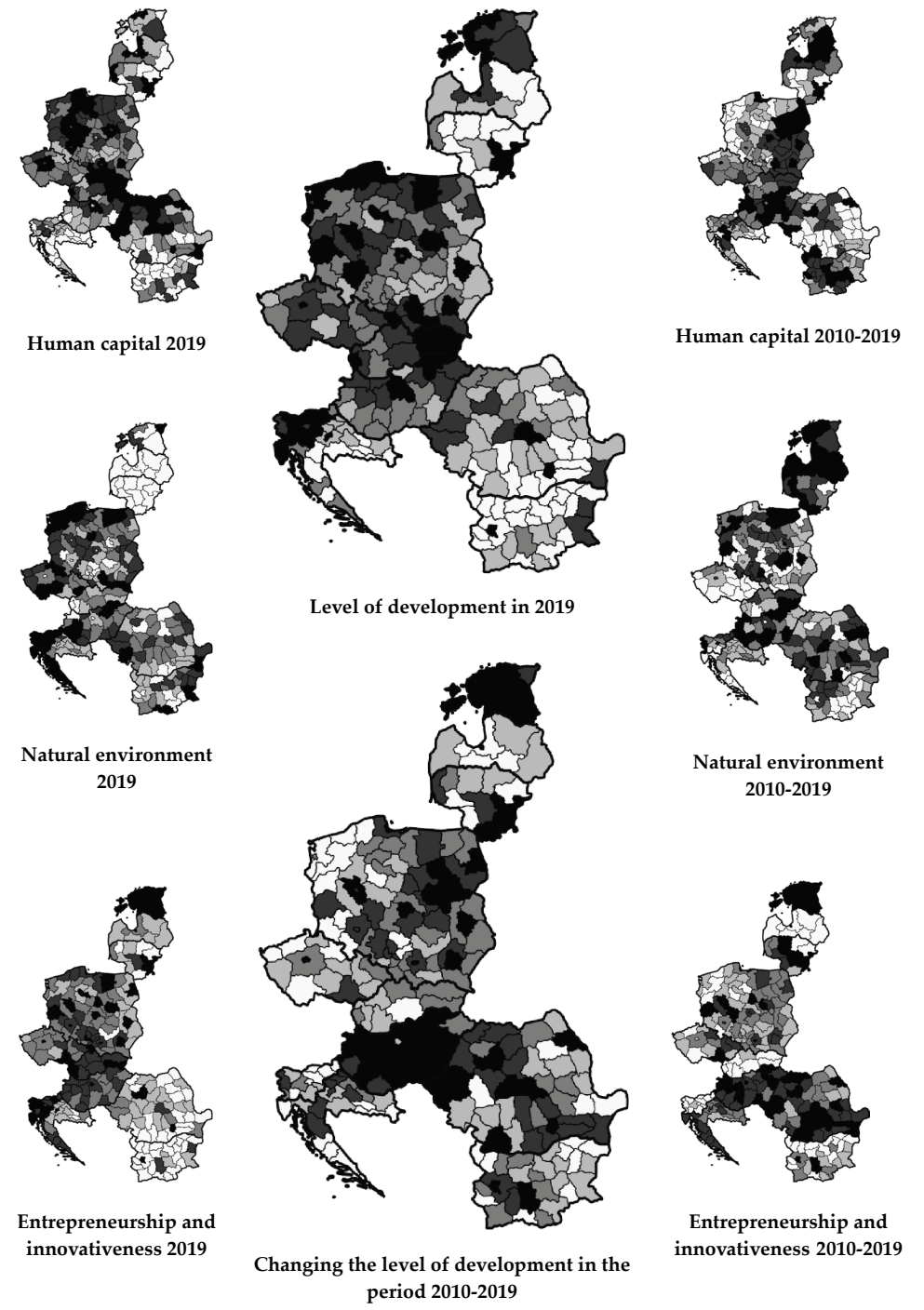

Figure 1. The differentiation of the socio-economic level of the subregions in eleven countries of CEE

Taking account of the level of development for the "human capital" subcomponent, the highest value of the synthetic gauge in 2019 was registered in the Poznański (PL), Ilfov (RO) and Gdański (PL) subregions, and the lowest in the subregions: Vidin (BG), Gabrovo (BG) and Kyustendil (BG). The high position of the indicated districts was decided on by: the beneficial age structure of the population, a high migration balance, as well as a high indicator of fertility. A low position of the respective units was decided on by: the negative birth-rate, as well as a very high share of people at the post-production age in the total number of people.

In regard to the dynamic dimension, the biggest change in the level of development of the "human capital" subcomponent in the years of 2010-2019 was observed in Warsaw (PL), Bucharest (RO) and Timiș (RO) subregions, and the lowest – in the following units: Marijampoles apskritis (LT), Smolyan (BG), and Taurages apskritis (LT) subregions. The weaker position of the NUTS-3 units indicated in the research on the change in the level of development for the human capital was decided on by: the decrease in the birth-rate indicator, as well as an increase in the indicator of the demographic burden. A high position of the respective subregions in the ranking was decided on by: a very high increase in the migration balance, an increase in the share of the people at the production age in the total number of people, as well as a relatively high decrease of the average age of women at the moment of giving birth.

Based on the state of the natural environment, the highest value of the synthetic gauge in 2019 was registered in the following subregions: Koszaliński (PL), Liberecky kraj (CZ), and in the Słupski (PL) subregion; and the lowest – in the subregions: Vilniaus apskritis (LT), Gliwicki (PL), and in Wrocław (PL). The high position of the NUTS-3 units in the research was impacted mainly by: the number of accommodation units per 1000 inhabitants, as well as the lowest use of electrical energy for the purpose of cooling the living quarters, and the high level of the disposed municipal waste per 1 inhabitant. The low position in the ranking of the subregions mentioned hereinabove was decided on by: the problematic road transport of goods measured in tonnes per 1000 inhabitants, as well as a significant amount of municipal waste per 1 inhabitant.

Taking account of the analysis conducted in the dynamic dimension, the biggest improvement of the state of the natural environment in the years of 2010-2019 was observed in the Telsiu apskritis subregion (LT), Obalno-kraska subregion (SL), and the Goriska subregion (SL); and the lowest – in the following subregions: Sibensko-kninska zupanija (HR), Primorsko-notranjska (SL), and Zadarska zupanija (HR). The lower position of the units in the research was decided on by: the increase in demand for cooling the living quarters per capita, as well as an increase in the quantity of municipal waste per 1 inhabitant. A high position in the ranking of the respective units was decided on by: a relatively high share of natural green areas in the area in total, as well as the highest increase, in the researched period, in the percentage of waste disposed of.

In the case of the level of development for entrepreneurship and innovativeness, the highest value of the synthetic gauge in 2019 was registered in Warsaw (PL), Osrednjeslovenska subregion (SL), and Cracow (PL) – in those subregions the most microenterprises per 1000 inhabitants were registered, as well as the biggest share of the employed in the finance sector in the total number of the employed was observed; and the lowest – in the subregions: Vaslui (RO), Kardzhali (BG), and Razgrad (BG) (of the lowest number of microenterprises per 1000 inhabitants, as well as the lowest coefficient of the creation of enterprises). From another standpoint, taking account of the analysis conducted in the dynamic dimension, the biggest progress in the level of development of the "entrepreneurship and innovativeness" subcomponent in the years of 2010-2019 was observed in following units: Põhja-Eesti (EE), Vilniaus apskritis (LT), and Cluj (RO); and the lowest – in the following subregions: Pieriga (LV), Koroska (SL), and Zasavska (SL). The NUTS-3 units position in the conducted research in the dynamic dimension was influenced mainly by: the percentage of the employed in the financial sector, the share of the employed in the sector of professional services, as well as the GDP per capita (in all three indicators, the highest growth was registered in Warsaw), as well as the number of trademarks per 1 million inhabitants (the highest growth in Cracow), as well as the changes in the structure of the enterprises size.

Discussion

Summarising the results of the research conducted on the level of socio-economic development of all 239 NUTS-3 subregions in the EU countries from CEE, one may indicate the following conclusions. The level of the general development of the regions in 2019 was specified based on 31 indicators subcategorized within the three subcomponents of the development: the human capital, the natural environment, and entrepreneurship and innovativeness. The highest value of the synthetic gauge was registered in the big cities that are supra-regional growth centres: Warsaw (PL), Põhja-Eesti (EE) with the capital Tallinn, Cracow (PL), as well as Osrednjeslovenska subregion (SL) with the capital Ljubljana, and Bratislava (SK). The hypothesis stated at the beginning of the article has therefore been positively verified.

Moreover, all eleven state capitals were qualified into the group of units at a very high level of socio-economic development, among which the first ten of the best developed subregions, five capitals were found (Warsaw – the first position, Tallinn – the second position, Ljubljana – the fourth position, Bratislava – the fifth position, Prague – the seventh position), the following two capitals in the second ten (Bucharest – the sixteenth position, Sofia – the seventeenth position), and the three capitals were classified in the third ten of the best developed NUTS-3 units (Budapest – the twenty-first position, Vilnius – the twenty-fifth position, Zaghreb – the thirtieth position). Riga was placed in the thirty-fourth position of the best developed NUTS-3 subregions.

Taking account of the analysis conducted in the dynamic dimension, the biggest change in the level of socio-economic development in the years of 2010-2019 was observed in Warsaw (PL), Bucharest (RO), Cluj (RO), and the Põhja-Eesti subregion (EE), while Vilnius (LT) and Riga (LV) (the 5th and 7th position respectively) were also high in the ranking. The group of units with the greatest change in the level of socio-economic development in 2010-2019 also included for example: Sofia (31st place) and Prague (44th place). On the other hand, Zagreb (HR) was classified only on the 64th place, while the lowest among the capitals were: Bratislava (SK), Ljubljana (SL), and Budapest (HU) (on the 130th, 133rd and 144th place, respectively).

It is well worth noting that the subregions at a very high level of socio-economic development are usually those units in which the biggest change in the development was registered in the years of 2010-2019 (and the reverse). Apart from the capitals of the indicated countries, the group also includes the subregions surrounding the provincial capitals such as those including: Warszawski zachodni (PL), Trójmiejski (PL), Ilfov (RO), and Pest (HU). On the other hand, the subregions at the weakest level of socio-economic development include the NUTS-3 units located at the periphery, as well as far from the strongest regions, e.g. Sibensko-kninska zupanija (HR), Smolyan (BG), Koroska (SL), and Legnicko-Głogowski (PL). One may thus conclude that – on one hand – the current level of development of the respective subregions of CEEan countries is to a large extent shaped by the activities taken in the last decade, i.e. in the period of complete participation in the policy of cohesion of the European Union; and – on the other hand – bigger and bigger disproportions are observed at the level of NUTS-3 units, as to the largest extent, the level of socio-economic development has increased in the economically strongest subregions (in Warsaw, Bucharest and Tallinn), and to the least extent in the relatively weakest developed subregions (e.g. in those located at the north-eastern border of Poland, the southern of Croatia, eastern Bulgaria, and eastern Slovenia). Large developmental disproportions may also be observed in individual countries. Within the area of almost each of them, subregions both at a very high level of socio-economic development, as well as units classified as the 20% of the least developed NUTS-3 units in the researched countries, are located.

Conclusions

Summarising the conducted research, it is well worth looking into the results relating to the respective countries. The level of socio-economic development is highly varied also in the respective states (Table A1 in Appendix). The biggest developmental discrepancies measured both by the value of the synthetic gauge and by the position within the ranking of the best developed subregions were registered in Bulgaria. The countries with a strong variation in the level of socio-economic development are also Poland and Romania, whose capitals are mostly counted as 10% of the best developed subregions, and a lot of NUTS-3 units were found on the last positions of the

compilation. Taking account of the value of the synthetic gauge, Hungary is the country with the lowest development disparities. However, based on the positions of individual NUTS-3 subregions in the ranking, the most balanced level of socio-economic development can be observed in Slovenia.

In the results discussed to date, the most mentioned were the Polish, the Romanian, and the Bulgarian subregions, therefore one may get an illusory feeling that those features are the best (the least) developed. However, a higher frequency of the occurrence of the subregions from those countries in the test results is a result of the fact that in Poland as many as 73 NUTS-3 units (31% among all those being the subject of the research) were established, in Romania – 42 subregions (18% of the researched group), and in Bulgaria – 28 units (12%), while in Estonia only 5 NUTS-3 subregions were established, in Latvia 6 such units, and in Slovakia – 8 NUTS-3. It is related to the assumption that a NUTS-3 subregion must count – apart from certain extraordinary situations – at least 150 000 inhabitants, and 800 000 inhabitants at most, thus the most such units were created in the most heavily populated countries and the reverse.

Table A2 (Appendix) contains a different attitude to the specification of the level of development within the perspective of respective states. The level of socio-economic development was presented there as well as the changes thereof in the NUTS-3-unit subregions of CEE, taking account of the average values of the synthetic gauge of all subregions of a particular state. The highest average value of the synthetic gauge of the general level of socio-economic development, as well as the "natural environment" subcomponent, was registered in the Slovenian subregions. In turn, the highest level of development of the "human capital" subcomponent was registered in Slovakia. The highest average value of the synthetic gauge within the "entrepreneurship and innovativeness" subcomponent, both in the static and dynamic dimension, was observed in Estonia. In addition, Estonia's subregions also saw the highest average value of the measure in terms of changes in the general level of socio-economic development, as well as the greatest improvement in the condition of the natural environment in the 2010-2019 period. On the other hand, the greatest improvement in the "human capital" factor was observed in the Hungarian subregions. In summary, one may thus conclude that, in the analysis comprising the respective NUTS-3 subregions, the Polish, Romanian and Bulgarian units dominate due to their biggest number of subregions. Taking account of the average value of the respective synthetic gauges, the best results were registered in the case of Estonian and Slovenian subregions. The abovementioned considerations, the research conducted, as well as the results obtained may therefore constitute an inspiration for making deeper analyses including the ones of direction.

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APPENDIX

Table A1. The NUTS-3 subregions of the highest and the lowest level of the socio-economic development in the EU Member States from CEE in 2019

Country	The most developed region NUTS-3			The least developed region NUTS-3		
	The name of the region	Value	Place	The name of the region	Value	Place
Bulgaria	Sofia	0.397	17	Vidin	0.165	239
Czech Rep.	Hlavní mesto Praha	0.425	7	Kraj Vysocina	0.319	152
Estonia	Põhja-Eesti	0.465	2	Kirde-Eesti	0.329	133
Croatia	Grad Zagreb	0.379	30	Vukovarsko-srijemska zupanija	0.259	219
Latvia	Riga	0.375	34	Latgale	0.274	206
Lithuania	Vilniaus apskritis	0.386	25	Utenos apskritis	0.233	232
Hungary	Budapest	0.390	21	Békés	0.303	170
Poland	Warszawa	0.471	1	Sandomiersko-jedrzejowski	0.286	188
Romania	Bucharest	0.399	16	Teleorman	0.213	237
Slovenia	Bratislavský kraj	0.448	5	Trenciansky kraj	0.333	115
Slovakia	Osrednjeslovenska	0.452	4	Pomurska	0.333	117

Table A2. Average values of the synthetic gauge in the subregions of researched countries

Item	Bulgaria	Czech Rep.	Estonia	Croatia	Latvia	Lithuania	Hungary	Poland	Romania	Slovenia	Slovakia	CEE
Number of NUTS-3 subregions	28	14	5	21	6	10	20	73	42	12	8	239
Level of development in 2019												
General: the average value of the synthetic measure	0.267	0.346	0.373	0.304	0.314	0.286	0.342	0.352	0.310	**0.386**	0.366	0.328
Human capital: the average value of the synthetic measure	0.377	0.480	0.464	0.392	0.470	0.441	0.473	0.502	0.486	0.434	**0.529**	0.465
Natural environment: the average value of the measure	0.254	0.277	0.255	0.277	0.218	0.197	0.269	0.261	0.254	**0.372**	0.247	0.263
Entrepreneurship and innovativeness: the average value of the synthetic measure	0.171	0.280	**0.405**	0.240	0.256	0.223	0.281	0.300	0.195	0.353	0.328	0.260
Changing the level of development in the period 2010-2019												
General: the average value of the synthetic measure	0.487	0.490	**0.546**	0.487	0.484	0.493	0.526	0.503	0.507	0.475	0.492	0.500
Human capital: the average value of the synthetic measure	0.456	0.443	0.444	0.429	0.476	0.383	**0.482**	0.450	0.426	0.436	0.463	0.444
Natural environment: the average value of the measure	0.522	0.512	**0.578**	0.505	0.574	0.563	0.551	0.539	0.545	0.545	0.540	0.538
Entrepreneurship and innovativeness: the average value of the synthetic measure	0.476	0.504	**0.599**	0.514	0.414	0.515	0.534	0.507	0.535	0.439	0.465	0.506

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THE IMPACT OF ECONOMIC, POLITICAL, AND INSTITUTIONAL FACTORS ON BUDGET BALANCES OF THE HEAVILY INDEBTED EUROPEAN COUNTRIES

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Abstract: The present study identifies socioeconomic, political, and institutional factors that shape extensive budget unbalances in four European Mediterranean countries (Portugal, Italy, Greece, and Spain), causing significant deficits and a public debt equal to (or above) 120% of their respective Gross Domestic Product at the end of 2020. The regression analysis, run on official statistics, demonstrates that the dynamics of fiscal deficits in these countries are largely heterogeneous. This outcome suggests that the various factors and contexts considered here exert different effects in each country. Political factors played an important role in Greece, being less important in Spain, and having a negligible role in both Italy and Portugal. On the contrary, institutional factors were recognized as particularly important in Greece, Italy, and Portugal. Although important almost everywhere, the magnitude of the impact of economic factors also differed across the four countries.

Keywords:

budget balance;
current account balance;
public debt;
Excessive Deficit Procedure;
Southern European countries

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Introduction

By the end of 2020, the public debt of Southern European countries, according to Eurostat estimates, reached (or even overpassed) 120% of their respective Gross Domestic Product (GDP), doubling the maximum limit set by the Stability and Growth Pact (SGP), which is set at 60%. These countries, frequently recalled under the 'PIGS' acronym, include Portugal (135%), Italy (156%), Greece (206%), and Spain (120%), as indicated by Eurostat data. Particularly high budget deficits during the last decades – intensifying with the 2007 crisis – were at the base of the large public debt in these countries. We examine the issue of public debt in Southern European countries because of its great importance. A large (and growing) public debt has many economic consequences that have been extensively discussed in earlier literature (Modigliani 1961, Friedman 1978, Blanchard and Perotti 2002, Congressional Budget Office 2014, Reinhart et al. 2015).

The most important consequences include the following issues. First, the financial displacement of the private sector from the public sector. As state borrowing increases, a higher percentage of national savings goes to government securities and not to private investment finances. As a result, the public sector displaces the private sector, a phenomenon known as the "crowding-out" effect. Second, higher real interest rates. Given the insufficiency of total savings, the public sector exerts upward pressure on interest rates. Third, greater risks of a fiscal crisis. As debt continues to rise, investors might lose confidence in the government's ability to repay the costs of servicing the public debt (interest and amortisation). Fourth, overvalued exchange rates, the result of which is the widening of balance of payments deficits. Fifth, decreased state ability to respond to problems, by limiting the possibilities of fiscal policy and economic policy in general to exercise their interventionist role in the economy.

Under such conditions, the effectiveness of fiscal policy as a means of stabilising the economy is significantly limited. The problem is more serious in the Eurozone member states, such as the specific four Mediterranean countries under consideration, which have lost the autonomy of their monetary policy, since it is exercised centrally by the European Central Bank. So, while Japan, for example, has a very high public debt (amounting to 267% of its GDP at the end of 2020 according to estimates provided by the country's Ministry of Finance), it does not face the same risk of default as the countries under consideration for the main reason that it maintains the independence of its monetary policy.

There are several macroeconomic factors that affect the budget balance. The most important ones are the real GDP, the level of unemployment and the external sector of the economy, namely the current account balance. We assume that the real GDP growth and unemployment reduction may improve the budget balance, since an

increase in total output is associated with increases of budget revenues. Decreasing unemployment is in turn associated with reductions in public expenditures, mainly social transfers. The relationship between the current account balance and budget balance is a more complicated issue. In fact, the correlation between the budget balance and current account balance is the core issue of the so called "twin deficits hypothesis", according to which large and growing budget deficits are reflected in the widening of current account deficits, leading to the inherent decline in the economic policy credibility, macroeconomic imbalances, and a slowdown in economic growth (Miller and Russek 1989, Cavallo 2005).

This hypothesis was at the base of an extensive literature that empirically confirmed the interdependence of the budget balances and the current account balances without providing a clear answer for the direction of causality (Papadogonas and Stournaras 2006, Kalou and Paleologou 2012, Tang and Fausten 2012, Algieri 2013, Forte and Magazzino 2013, Bird et al. 2019, Ahmad and Aworinde 2020, Furceri and Zdzienicka 2020, Afonso et al. 2021). A possible conclusion is that, at least in the long run, the two outcomes are co-integrated, implying the existence of a long-term equilibrium relationship (Tang and Fausten 2012). The budget balance is also dependent on its previous, short-term development path (e.g., one-year or two-year lag). As a matter of fact, the one-year lag and, more rarely, the two-year lag of the dependent variable is used to allow for any existing adjustment process and persistence of budget balance (Petrakos et al. 2021b).

Political and institutional factors were also demonstrated to influence the budget balance. In the recent past, the influence of political fiscal cycles and Political Budget Cycles (PBCs), and the impact of rules and policies of European Institutions (e.g., those aimed at reducing public sector deficits in the EU countries) were extensively documented. Earlier studies have revealed that, in general, the PBC magnitude and persistence decline when (i) the level of socioeconomic development rises (Block 2002, Shi and Svensson 2006, Vergne 2009)[1]; (ii) the quality of institutions improves (Persson and Tabellini 2005); (iii) the transparency of the political process increases (Klomp and De Haan 2013b) – with the introduction of checks and balances on governance functions; and when (iv) the level of democratic maturity consolidates, usually together with the age of democracy (Shi and Svensson 2003, Akhmedov and Zhuravskaya 2004, Brender and Drazen 2005, Brender and Drazen 2007, Klomp and De Haan 2013a). Another factor affecting PBCs is the extent of media freedom. The restriction of press freedom reduces citizens' information as far as government action is concerned and it prevents them from having a clear picture of the economic policy

[1] The existing empirical research has confirmed that PBCs are more evident in developing economies (De Haan and Sturm 1994, Brender and Drazen 2005, Shi and Svensson 2006, Prichard 2018).

at large (Alt and Lassen 2006, Ademmer and Dreher 2016, Veiga et al. 2017)[2].

Moreover, the four Mediterranean countries considered in this study have entered the Excessive Deficit Procedure (EDP) under the Corrective Arm of the SGP, for long time intervals. Namely, Portugal has been subjected to the EDP between 2005 and 2017, Italy between 2005 and 2013, Greece between 2004 and 2017 (with a brief stop between 2007 and 2009) and Spain between 2009 and 2019. These long periods during which the four countries were subjected to EDPs justify a specific study of these countries' dynamics with the final aim of investigating the effectiveness of the EDP of the SGP in reducing public deficits and, possibly, PBCs. It should be noted that the issue of the effectiveness of the SGP in consolidating public finances of the EU member states (European Commission 2021) is at the heart of the current debate on the aims and directions of its revision (Mileusnic 2021).

The present work aims at investigating the main economic, political, and institutional factors which affected the public budgets of these four European countries since the early 1970s and leading to increased public sector deficits. Assuming heterogeneous (cause-effect) relationships in the Mediterranean economic space (Salvati 2016, Carlucci et al. 2017, Salvati 2018), we tested (i) the growth rate of real GDP, (ii) the unemployment rate, and (iii) the external sector of the economy (namely the current account balance), as key economic variables affecting the budget balance. Moreover, as we have already stated, we examined the effects of various political and institutional factors on the budget balances of the four Southern European Countries.

Methodology

Our motivation for this research stems from Figure 1, where the European Union countries are classified according to their corresponding general government consolidated gross debt (GD) as percentage of their GDP in 2020 (GD/GDP), according to Eurostat. More specifically, the first group includes those countries whose public debt as percentage of GDP was at least two times higher than the maximum allowed by the SGP, namely 60% of GDP. The second group includes the countries whose public debt as percentage of GDP was significantly higher than the maximum allowed by the SGP (between 80 and 120). The third group includes the countries whose public debt as percentage of GDP was higher than the maximum allowed by the SGP (between 60 and 80). The fourth group consists of countries whose public debt as percentage of

[2] Very often, despite the "institutionalised freedom" (that we might call "nominal freedom") of the media, the politicians in power enjoy the so called 'incumbency advantage' (Bohn 2019), that is that they have a greater coverage, and they are evaluated more positively than their political opponents (Freier 2015). This capacity of incumbents is facilitated using optimistic economic forecasts during the election years which provide them with room for fiscal manoeuvre (Bohn and Veiga 2021).

GDP was lower than the maximum allowed by the SGP (between 40 and 60). Finally, the fifth group includes those countries whose public debt as percentage of GDP was much lower than the maximum allowed by the SGP, i.e., below 40. In 2020, only the four Southern European countries under consideration had a public debt that amounted to at least 120% of their respective GDP (Portugal: 135%, Italy: 156%, Greece: 206%, and Spain: 120%).

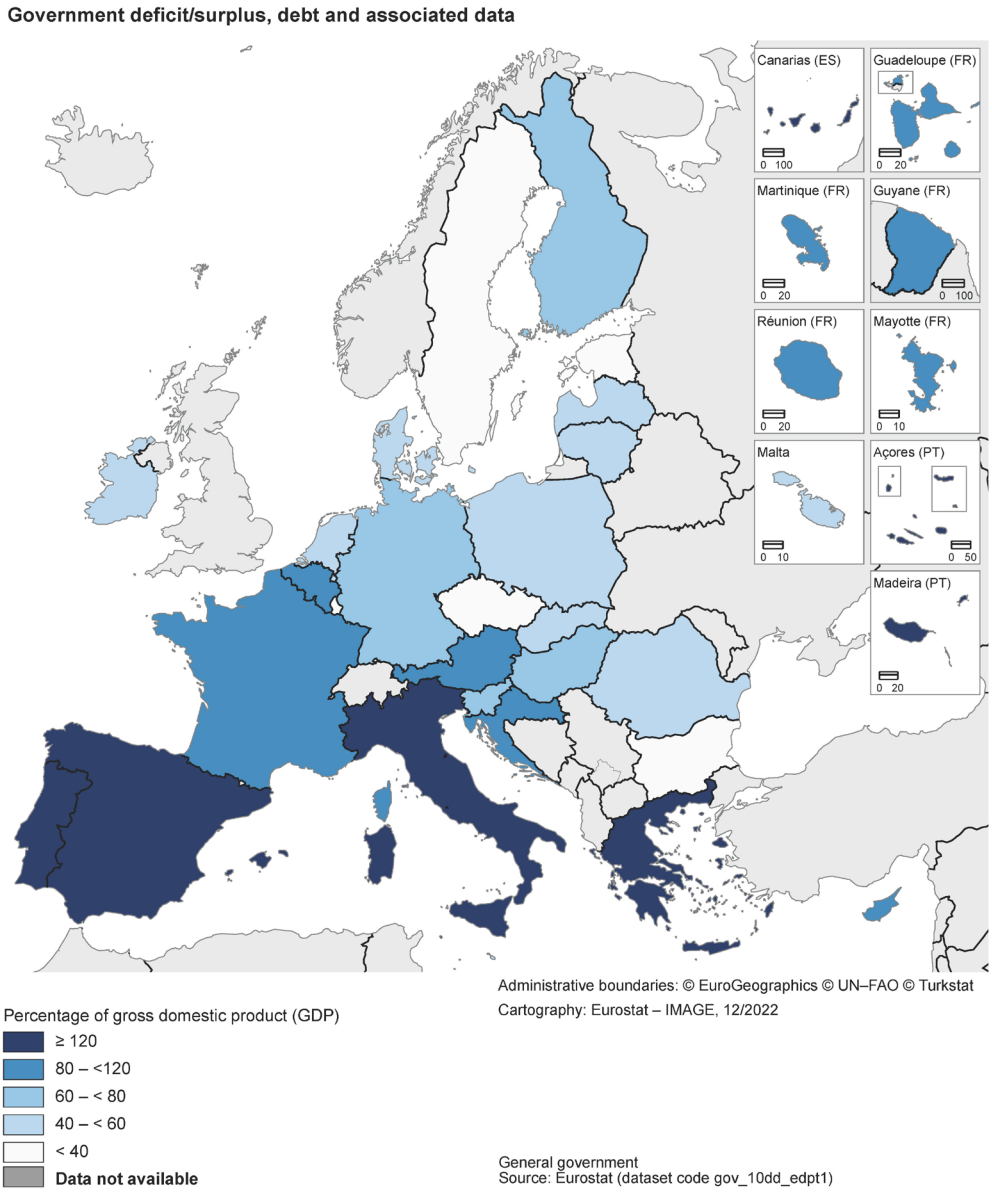

Figure 1. Government consolidated gross debt as a percentage of GDP for the European Union countries in 2020

To investigate the effects of economic, political, and institutional factors on the budget balances of the most heavily indebted European countries (Portugal, Italy, Greece, and Spain), an empirical and exploratory approach was adopted based on regression models run on annual data that cover half a century between 1970 and 2020. However, the year 2020 was omitted from the empirical analysis because of the sudden impact of Covid-19 pandemic on the macroeconomic variables, a confounding issue that cannot be examined explicitly in the context of our empirical models.

As we have already stated, the real GDP growth rate, the rate of unemployment and the current account balance are assumed here as the most important economic variables affecting the Actual Budget Balance (ABB), taken as the dependent variable. However, we use two lagged dependent variables (lag-1 and lag-2), namely ABB-1 and ABB-2, as predictors to allow for any adjustment process of budget balances, as it is described below. The use of lag-1 and lag-2 variables prevented the use of predictors referring to 1970 and 1971.

In order to examine the effects of political and institutional factors on budget balances we resort to World Bank indicators. The World Bank estimated a set of political and institutional variables called governance indicators and it released a dedicated database entitled 'Worldwide Governance Indicators', including six variables (the extent of public sector corruption, the level of government effectiveness, the extent of political stability and the absence of violence, the degree of regulatory quality, the extent of the rule of law, and the degree of existing accountability). Although these political and institutional indicators are widely used in empirical research, they are associated with two disadvantages. First, they cover only a short period, namely the years since 1996. Additionally, the estimates for 1997, 1999 and 2001 are unavailable, thus limiting the total number of observations and preventing their incorporation in an extensive, time series regression analysis, being in turn highly cross-correlated. Based on this rationale, the above indicators were considered in the context of this research only in a qualitative manner.

The existence of political fiscal cycles or PBCs in PIGS countries was also tested in our study. According to the literature (Petrakos et al. 2022a, 2022b), PBCs are associated with the direct efforts of governments to maximise their chances of re-election or to minimise the risk of votes' loss by pursuing opportunistic expansive fiscal policies in the last months before the elections. These policies are undertaken with the sole aim to give voters who are supposed to have a "myopic perspective" a false impression (Bonfiglioli and Gancia 2013). More specifically, government action is assumed to opportunistically exploit "informational asymmetries" of voters (Persson and Tabellini 2000), mainly due to the existence of weak media, by providing the impression that the economic policy pursued is effective and therefore contributes to improving social welfare (Rogoff and Sibert 1988, Rogoff 1990, Alesina et al. 1993, Alesina et al. 1997, Shi and Svensson 2003,

Shi and Svensson 2006, Brender and Drazen 2007, Brender and Drazen 2008, Bonfiglioli and Gancia 2013, Veiga et al. 2017, Bohn 2019, Bohn and Veiga 2021).

The effectiveness of European Institutions aimed at reducing public sector deficits is the main institutional factor considered in this study. The Treaty on the Functioning of the European Union and, in particular, the Corrective Arm of the SGP, established the EDP as the mechanism limiting the PBC risk. Having together "preventive" and "corrective" aims, the mechanism has been designed to prevent European Union member states from having "excessive" public sector deficits, i.e., overpassing 3% of the country's GDP, or to correct them in case they occur[3]. It is noted that the SGP, which is in principle a political commitment of the EU member states, and the Treaty of the European Union, constitute the framework of the EU fiscal policy.

More specifically, it is the effectiveness of EU fiscal rules on limiting budget deficits and consequently PBCs[4] that we examine here. Earlier studies found that SGP did not affect politically motivated fiscal policy (Mink and De Haan 2006). In other words, SGP seems to be almost ineffective in reducing PBCs (Efthyvoulou 2012). However, Gootjes et al. (2019), using a broad measure of fiscal rules, find that, since the global financial crisis of 2007, PBCs have only occurred in countries with weak fiscal rules. This broad conclusion implies that, in the case of countries subjected to the EDP such as PIGS, that are mature democracies and have strong fiscal rules, we should expect that national elections do not significantly affect national fiscal policies causing PBCs.

Data and variables

The actual budget balance (ABB) expressed as a percent share of GDP in the respective country, based on Eurostat definition and measurement, was taken as the dependent variable. ABB quantifies the total effects of fiscal policies of the respective countries on electoral and non-electoral periods, since it incorporates the effects from both the revenue side of the state budget, via the reduction of general government taxes, and the expenditure side of the state budget, via increases in general government spending. We express the budget balance as per cent share of GDP – and not in absolute monetary terms – for three reasons. First, because the percentages in principle provide a more reliable measure of the relative magnitude of a given variable than the absolute values.

[3] The SGP is a set of rules designed to ensure two main objectives. First, that EU member states pursue sound public finances and, second, that they coordinate their fiscal policies. The EDP of the SGP is a step-by-step procedure that tries to ensure that EU member states adopt appropriate policy responses to reduce their "excessive" deficits.

[4] In general, fiscal rules intended to limit or to prohibit public deficits reduce the government's capacity to behave opportunistically and therefore to create PBCs (Rose 2006, Von Hagen 2006, Alt and Rose 2009, Benito et al. 2013, Klomp and De Haan 2013a). However, there is also the counter-argument that fiscal rules might induce elected politicians in power to circumvent them by resorting to 'creative accounting' (Milesi-Ferretti 2004).

Second, because per cent terms remove the long-term effect of inflation on the examined variable. Third, because the main budgetary constraint of the EU member states is to avoid entering the EDP, which is enforced when a member state has breached, or is at risk of breaching, a budget deficit above 3% of the country's GDP (Petrakos et al. 2021a). Predictors of ABB include five cardinal variables and two dummy variables as described in the following lines.

Regarding the one-year and two-year lag of actual budget balance (ABB-1 and ABB-2) as per cent share of GDP in the respective country, this variable assumes that the budget balance of the previous one (or two) year(s) might affect the budget balance of the current year, suggesting how the budget balance might be "compounded". The one-year (or two-year) lag of the dependent variable expressed as per cent share of GDP may delineate slow adjustment processes and the persistence of budget balance's temporal structures.

The growth rate of the total real GDP (TYGR) estimated by Eurostat was introduced as a predictor of ABB, assuming that a slowdown in economic growth may stimulate the government to increase further public expenditures and to reduce the ABB in order to limit economic and social impacts of stagnation. Conversely, a sustained economic growth allows the government to raise public revenues and to increase the ABB. The unemployment rate (UNR) released by Eurostat was assumed as an additional factor pressing governments to increase public expenditures, mainly on social transfers, and to reduce ABB in order to limit the economic and social impact of such conditions. Conversely, lower rates are usually associated with rising public revenues and reduced public expenditures, thus increasing ABB.

The current account balance (CAB) released by the World Bank as per cent share of GDP in a given country was introduced with the aim at examining whether there is a causal relationship between CAB and ABB, i.e. to test the validity of the so-called "twin deficits hypothesis", in turn incorporating two dummies: Election (ELE), a dummy assuming the value of 1 in the years of general/national elections in a given country and 0 otherwise; and EDP, a dummy assuming the value of 1 in the years during which each individual country had been subjected to the EDP and 0 otherwise.

Statistical analysis

Following the standard literature on PBCs (Shi and Svenson 2006, Veiga and Veiga 2007, Sakurai and Menezes-Filho 2011, Chortareas et al. 2016), the following model's specification was adopted (Ciommi et al. 2019). Let y_i^c denote the observed annual value of the actual budget balance (ABB) of the c country (c = 1 for Portugal, 2 for Italy, 3 for Greece, and 4 for Spain), considered as the response variable on the i-th time segment (i = 1 to 49), covering the time interval between 1970 and 2019. Furthermore,

let x_{ji}^{c} denote the observed value of the cardinal variables j (with j = 1 to 5) and the observed value of dummies z_{ki}^{c} (with k = 1 or 2) on the i-th time segment (Mancini et al. 2018). The average response variable was modelled as a linear combination of predictors (Lamonica et al. 2020) as follows:

$$\mathrm{E}(y_i^c) = \beta_0 + \sum_{j=1}^{5} \beta_j^c \, x_{ji}^c + \sum_{k=1}^{2} \gamma_j^c \, z_{ki}^c \qquad (1)$$

The results of the above model, estimated via the Ordinary Least Square regression (Salvati et al. 2018), were reported separately for each country.

Results

Greece

The empirical model for ABB in Greece has a good fit (adjusted R2 = 0.758) and statistical significance (F = 30.4, p < 0.0001), with significant predictor's coefficients (Table 1). The standardised residuals of the model were symmetrically distributed around the zero mean with s = 2.17, with four outliers (2.33, -2.37, -3.42, and 2.56) with high self-sensitivity (leverage score) corresponding with 2000, 2009, 2014, and 2015, respectively. Three more influential observations with Cook's distance > 0.2, corresponding to 2008, 2012 and 2013, respectively, were illustrated in Figure A1 (Appendix). The Shapiro-Wilks test results were weakly significant (0.94, p = 0.023) and they delineate a moderate departure of residuals from normality, as clearly shown in the QQ plot, due to the presence of the outliers mentioned above. However, the relative plots in Figure A2 (Appendix) reveal no serious estimation issues. The Low Variance Inflation Factor (VIF < 2) indicates the absence of multicollinearity.

Italy

The empirical model for ABB in Italy showed an excellent fit (adjusted R2 = 0.91) and a high significance (F = 122.8, p = 0.0001), with most of the predictors receiving significant regression coefficients (Table 1). Standardised residuals of the model were symmetrically distributed around zero mean with s = 1.06, with the presence of two outliers valued at 2.64 and 2.39 with high self-sensitivity (leverage score) corresponding to 1998 and 2009, respectively. Two influential observations with Cook's distance > 0.15, corresponding to 1976 and 1997, were illustrated in Figure A3 (Appendix). Furthermore, the Shapiro-Wilks test (0.977, p = 0.440) rejected the hypothesis of residual deviation from normality, in line with the QQ plot and the additional plots shown in Figure A4 (Appendix). The Low Variance Inflation Factor (VIF < 2) indicates no multicollinearity issues in the data.

Table 1. Model results explaining the budged balance (ABB) variability

Country	Predictor	Coefficient	Standard Error	*t*-Statistic	*p*-value
Greece	Constant	0.826	0.768	1.08	0.288
	ABB-1	0.603	0.126	4.79	0.000
	ABB-2	0.316	0.130	2.43	0.019
	CAB	0.283	0.099	2.85	0.007
	ELE	-2.075	0.678	-3.06	0.004
	EDP	2.114	0.779	2.71	0.010
Italy	Constant	-4.560	0.917	-4.97	0.000
	ABB-1	0.923	0.050	18.31	0.000
	UNR	0.369	0.080	4.61	0.000
	TYGR	0.353	0.086	4.10	0.000
	EDP	1.467	0.481	3.05	0.004
Portugal	Constant	2.98	2.81	1.06	0.294
	ABB-1	0.481	0.137	3.51	0.001
	CAB	0.189	0.078	2.47	0.018
	TYGR	0.194	0.107	1.82	0.076
	UNR	-2.20	1.18	-1.87	0.068
	EDP	2.27	1.06	2.14	0.038
Spain	Constant	-0.474	0.355	-1.34	0.188
	ABB-1	1.194	0.134	8.93	0.000
	ABB-2	-0.404	0.132	-3.06	0.004
	ELE	-0.902	0.490	-1.84	0.073

Portugal

The empirical model explaining the ABB for Portugal with the use of seven predictors was significant ($F = 17.9$, $df = 5$, $p < 0.0001$), displaying an adjusted $R2 = 0.638$ (Table 1). The model assigned significant regression coefficients to ABB-1, CAB, and EDP. TYGR and UNR were weakly significant. Based on the results of preliminary statistical tests, the UNR variable (x_4^1) has been transformed via square root function and added in the final model. Specifically for Portugal, this transformation assumes that, as unemployment increases, the actual budget balance will drop (given the negative coefficient of UNR) at a decreasing rate. In other words, the expansionary fiscal policy measures, which tend to decrease the actual budget balance, are more effective in reducing unemployment when there is spare capacity in the economy, i.e., when the unemployment rate is high. At the limit, as the unemployment rate tends to zero, incurring budget deficits will have no impact on unemployment.

The standardised residuals of the model fit are symmetrically distributed around the zero mean with $s = 1.87$, with the presence of one outlier valued at -2.33 corresponding to 2011. Two more influential observations were identified with Cook's distance > 0.15

and high self-sensitivity (leverage score), corresponding to 1982 and 2010, respectively (Appendix: Figure A5). Furthermore, Shapiro-Wilks test (0.95, p = 0.06) rejected the hypothesis of significant deviations of residuals from normality, in line with the results of QQ plot (Figure 2). Additional information on residuals were shown in Figure A6 (Appendix), revealing no serious divergence from the basic model's assumption. In addition, the low Variance Inflation Factor (VIF < 2) indicates no multicollinearity issue.

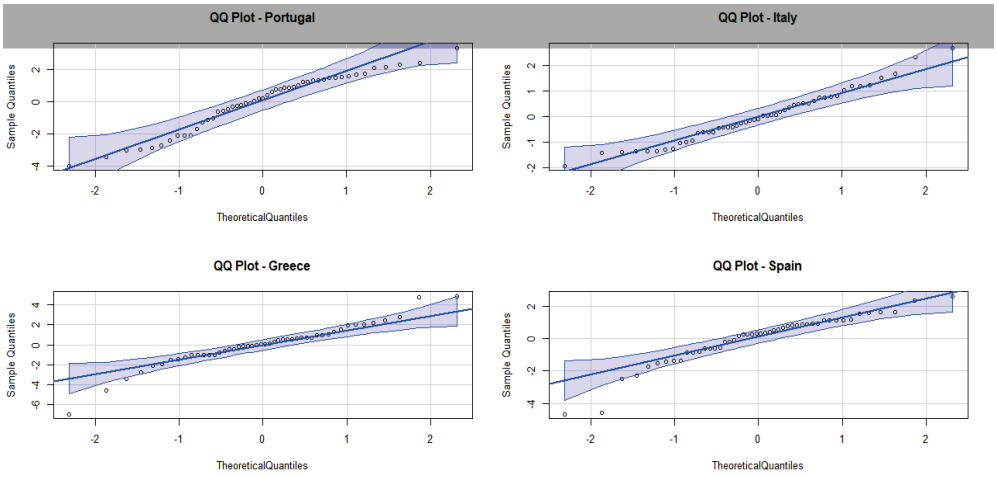

Figure 2. QQ plots by country

Spain

The empirical model for Spain showed a good fit (adjusted R2 = 0.786), a high significance overall (F = 53.8, p = 0.0001), and few significant regression coefficients (Table 1), which include ABB-1 and ABB-2, as well as ELE, although the latter was only weakly significant. The standardised residuals were symmetrically distributed around the zero mean with s = 1.54 and the presence of three outliers (-3.25, -3.58, and 2.15) corresponding to 2009, 2010, and 2011, respectively. Two influential observations with a large leverage score and Cook's distance were identified in 2008 and 2009, respectively (Appendix: Figure A7). The Shapiro Wilks test was moderately significant (W= 0.91, p = 0.002), delineating a weak departure of residuals from the normality assumption, due to the presence of the three outliers. The inspection of Figure A8 (Appendix) revealed no serious divergences with the basic assumptions' characteristic of model's residuals. The Low Variance Inflation Factor (VIF < 2) indicated no multicollinearity.

Discussion

The statistical analysis delineates how budget balances of the four countries were not affected by the same economic, political, and institutional factors or, at least, these

factors did not affect them to the same degree. In other words, PIGS countries were not associated with the same patterns regarding the consolidation and determinants of their budget balances. A comparative summary of the model's results (Table 2) indicates that the actual budget balance (ABB) of the four countries was largely affected by the one-year lag of the same variable (ABB-1). Moreover, in the cases of Greece and Spain, ABB was affected by the two-year lag of their budget balance (ABB-2), although in a different way (positive and negative influence respectively for Greece and Spain). The unemployment rate (UNR) exerted a positive influence on ABB in the case of Italy and a negative influence in the case of Portugal. The external sector of the economy and the Current Account Balance (CAB) positively affected ABB in the cases of Portugal and Greece, having a more significant impact in the latter country. In other words, the results suggest how the 'twin deficits hypothesis' may apply only in the cases of Portugal and Greece. Moreover, the ABB of Portugal and Italy seems to be positively affected by the corresponding TYGR.

Table 2. A synopsis of (significant) impacts on the actual budget balance based on regression model's coefficients by country

Predictor	Portugal	Italy	Greece	Spain
ABB-1	0.481	0.923	0.603	1.194
ABB-2			0.316	-0.404
UNR	-2.20	0.369		
CAB	0.189		0.2831	
TYGR	0.194	0.353		
ELE			-2.075	-0.902
EDP	2.270	1.467	2.114	

Based on these findings, the hypothesis of political budget cycles seems to apply only to the cases of Greece and Spain. However, its effects – as measured by the model coefficients – were more intense for Greece (-2.075) than for Spain (-0.902). Social instability, the supposed weakness of national institutions, and an ineffective system of checks and balances may justify the negative impact of PBCs on ABB in Greece. Consequently, reducing public deficits and consolidating public debt in Greece seems to be much more difficult in political terms (and less acceptable from a purely social perspective) than in the other Mediterranean countries evaluated in this study[5].

On the contrary, the EDP seems to be effective in reducing public sector deficits (and, consequently, in limiting PBCs) in the cases of Portugal, Italy, and Spain, but not to the

[5] We have empirically estimated that PBCs in Greece not only increase public sector deficits but, more importantly, they destabilise the economy, a fact of particular importance (Petrakos et al. 2022c).

same degree based on the regression coefficients, being likely more effective in Portugal (2.27) and Spain (2.11), and less effective, but still important, in Italy (1.47). In general, we conclude that the fiscal rules imposed by the European Institutions in the context of the SGP are effective on limiting budget deficits even in the case of highly indebted European countries. In the case of Greece – where PBCs are very serious – the positive effects on ABB caused by the EDP seem to outweigh the negative effects of PBCs (2.11 vs -2.08 regression coefficients). The SGP in Greece was therefore seen as a necessary mechanism for achieving the required adjustment of public finances.

The results of our analysis regarding PBCs in Portugal, Italy, and Spain are in accordance with earlier studies stating that the phenomenon is more evident in developing countries (Brender and Drazen 2005), and almost negligible or very limited in developed economies (Andrikopoulos et al. 2004, Shi and Svensson 2006, Mandon and Cazals 2019). Greece seems to be an exception, having from this respect the characteristics of a developing economy, which are mainly the limited quality of its institutions (Afonso et al. 2015) and the weak checks and balances (Trantidis 2016), considering also that its governments are often accused of clientelism (Mitsopoulos and Pelagidis 2011) and populism (Christodoulakis 2019). As for the results of our analysis referring to the effectiveness of the EDP in Portugal, Italy, and Greece, they are in contrast with earlier studies supporting its ineffectiveness in stabilising budget balances (Mink and De Haan 2006) but are in accordance with more recent research outcomes on the issue (Efthyvoulou 2012, Gootjes et al. 2019, De Jong and Gilbert 2020).

Conclusions

The basic objective of this study was the investigation of the main economic, political, and institutional factors that affect the budget balances of the heavily indebted Southern European countries, that is Portugal, Italy, Greece, and Spain, frequently recalled under the 'PIGS' acronym. We found that the dynamics of budget deficits in these countries are largely heterogeneous, implying that the various factors and contexts considered exert different effects in each individual country. However, the extent of this effect differs significantly in magnitude between these countries. In all four countries, the budget balance of a given year is affected by the budget balance of the previous year and in some cases (e.g., Greece and Spain), by the budget balance of the year before. The budget balances in these Southern European countries are also affected by some macroeconomic variables (the growth rate of total output and the rate of unemployment in Portugal and Italy; the current account balance in Greece and Portugal, implying that the external sector of the economy affects state budget balance). The European Institutions, namely the Excessive Deficit Procedure of the Stability and Growth Pact, seem to contribute to the stabilisation of public finances in Portugal, Italy, and Greece, with no significant effects in the case of Spain. Political factors such as the

political business cycles seem to negatively affect budget balances only in two countries, namely Spain and Greece, with no effects in the others. However, they have limited effects in Spain while being rather large in Greece.

There are of course other factors that affect the budget balance that have not been considered in our models because their official measures or estimates are only available for short time intervals. We have already pointed out the importance of 'governance indicators' provided by the World Bank for a restricted time period (1996-onwards). With this perspective in mind, future studies should make a more extensive use of these (or similar) indicators. This informative set of variables may delineate a different analysis' frame revealing the importance of other political and institutional factors in consolidating budget balances, such as political stability, the level of government effectiveness, and the degree of regulatory quality.

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APPENDIX

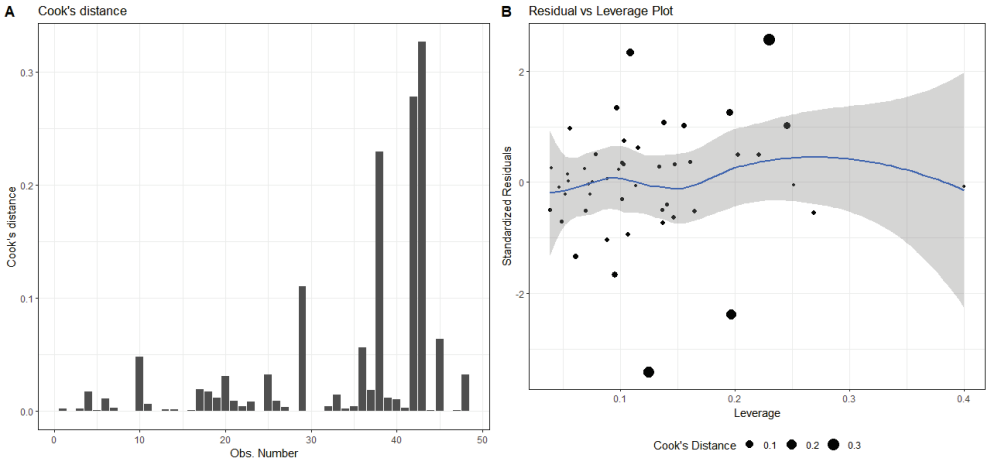

Figure A1. Cook's distance and Leverage plots for Greek data

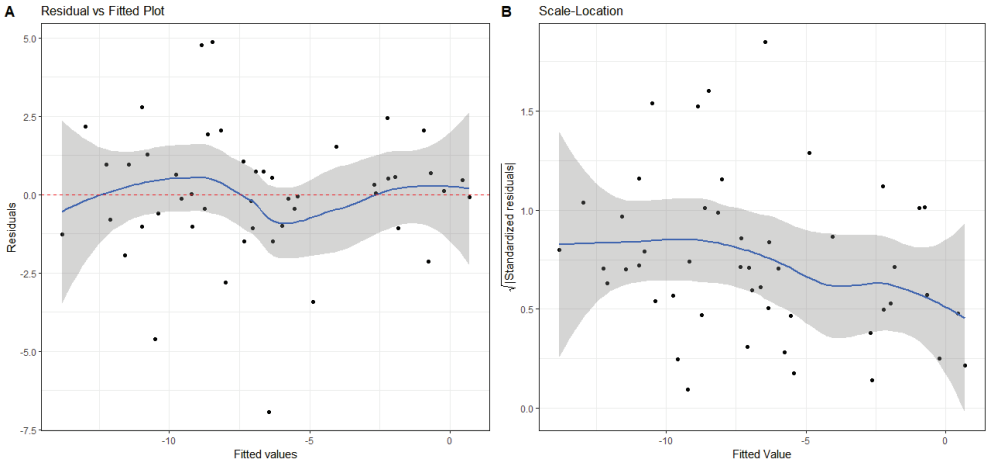

Figure A2. Residual plots for Greek data

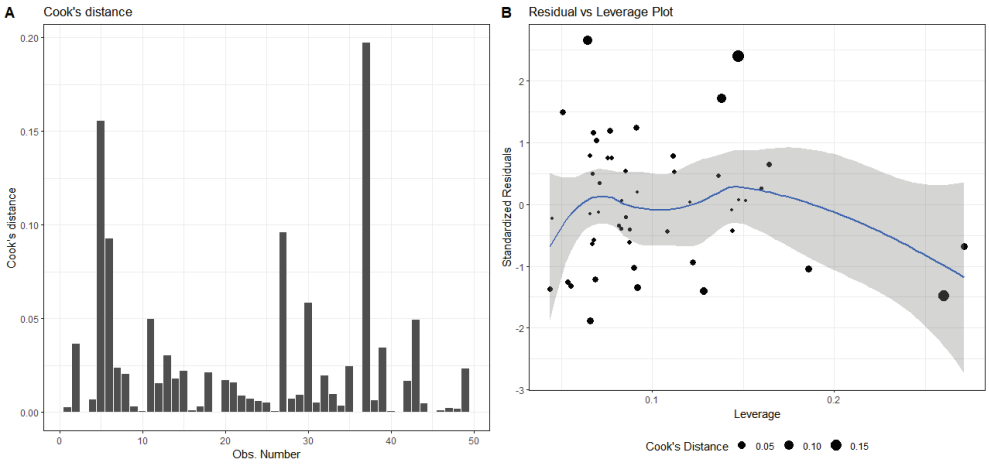

Figure A3. Cook's distance and Leverage plots for Italian data

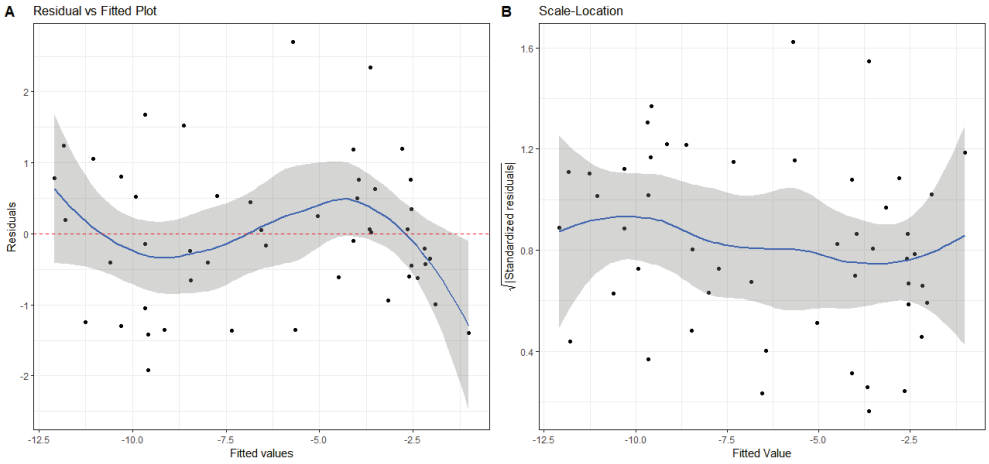

Figure A4. Residual plots for Italian data

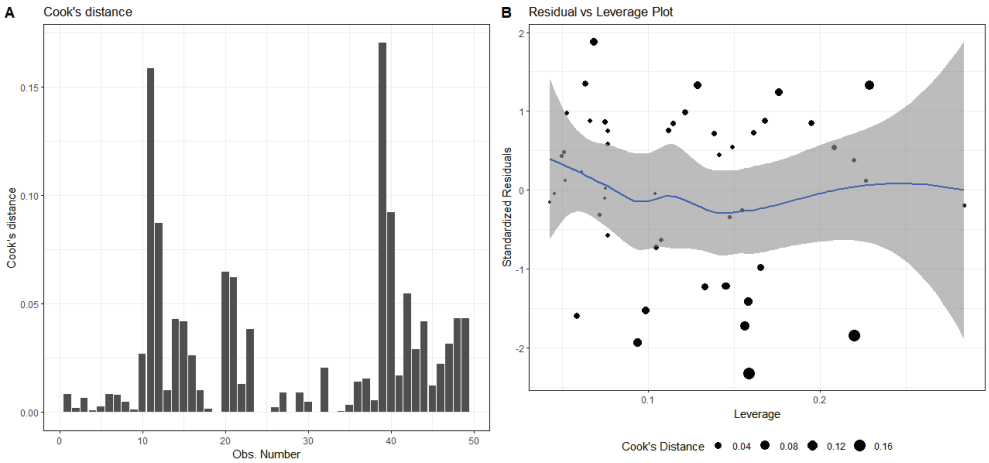

Figure A5. Cook's distance and Leverage plots for Portuguese data

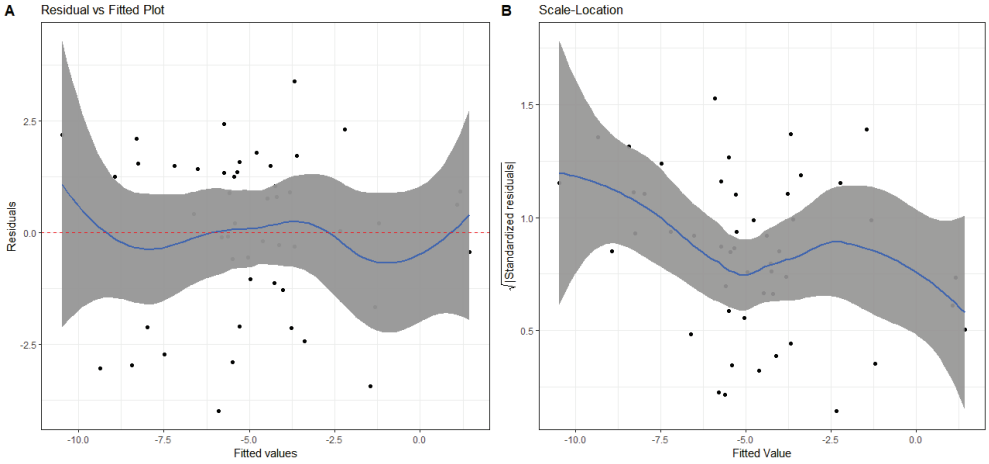

Figure A6. Residual plots for Portuguese data

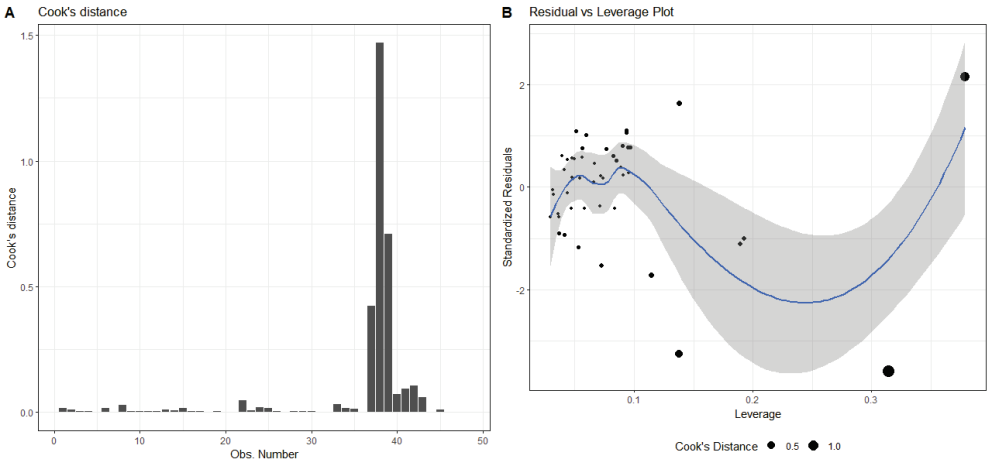

Figure A7. Cook's distance and Leverage plots for Spanish data

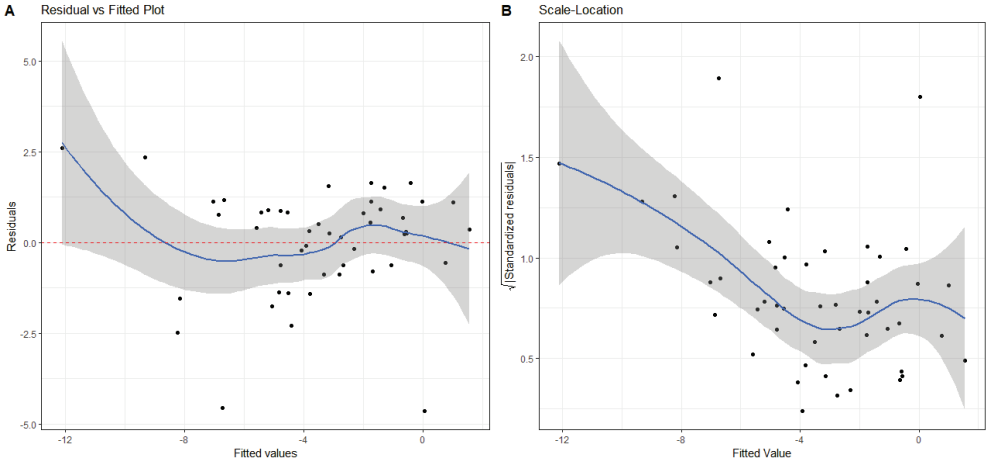

Figure A8. Residual plots for Spanish data

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ANALYSIS OF SPATIAL DISPARITY OF PHARMACIES IN VIRGINIA, U.S.A.

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Abstract: Many scholars have studied spatial equity issues of urban service delivery facilities in the past, including the pharmacy accessibility and pharmacy deserts. However, the analysis of spatial disparity of pharmacies in Virginia is lacking. To fill this research gap, we employed both statistical and geospatial methods to examine the pharmacy disparity and desert issues in Virginia. These methods include correlation, stepwise regression, average nearest neighbor analysis, network analysis, and geographically weighted regression (GWR). We examined five vulnerable populations and their accessibility to pharmacies. These subpopulations include racial minorities (defined as non-white population in this study), persons with income below the poverty level, older adults (age 65+), persons with disability, and households without vehicles. We found that spatial inequity of pharmacies exists in Virginia. At the statewide macro level, the spatial distribution of older adults is, largely, correlated with that of pharmacies. However, as revealed by GWR at local levels, the spatial pattern of pharmacy distribution is much more complicated, exhibiting both spatial inequity and social inequity (especially racial inequity, which is ubiquitous in Virginia). Pharmacies may be adequate for certain groups of people, but simultaneously inadequate for others.

Keywords:

spatial disparity;
accessibility;
geospatial analysis;
pharmacy;
Virginia

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Introduction

Spatial disparity or inequity of essential human services is a universal phenomenon that is intriguing to geographers, planners, spatial scholars, and others across the world. They probe into this issue from different perspectives, using different methods, and focusing on different subjects.

Pharmacy is an important urban service delivery outlet related to public health. Everyone needs to access pharmacies now and then to fill medical prescriptions, to consult with pharmacists about prescribed and over-the-counter drugs, or to receive vaccinations like the most recent COVID-19 vaccination, etc. Due to these reasons, in 2021 alone, 4.69 billion prescriptions were filled at pharmacies across the United States, and it is expected that this trend will continue unabated in the years to come (Statista 2022).

Virginia is a state with a diverse population of close to 9 million and a complex physical environment (mountains, plains, and coastal areas). The distribution of pharmacies is very uneven in Virginia resulting in pharmacy deserts (Abell et al. 2011) or the lack of accessibility to pharmacies. The adverse effects of pharmacy deserts and spatial inequity must be examined and understood in order to propose better public health solutions and policy recommendations on improving racial equity and promoting social justice in this area.

However, there is a scant attention paid to the spatial equity issues of pharmacies in Virginia. In particular, no rigorous statistical analysis has been performed at the macro- and micro-level on the relationship between the pharmacy locations and county-level socioeconomic characteristics. This paper intends to fill this research gap by conducting and reporting the results of correlational analysis, stepwise regression analysis, clustering analysis, such as the average nearest neighbour analysis, network analysis, and geographically weighted regression analysis.

Pharmacy Types and Distributions

There are different types of pharmacies. According to Barber et al. (2019), nearly 40% of pharmacies in the United States are chain pharmacies, like CVS, Walgreens, etc. Approximately 3% are within hospitals and clinics, 11% are inside mass retailers, such as Walmart and Costco, and 10% are in grocery stores. The rest of the pharmacies – about 35% – are independent, or privately owned, either established in a single store or a group of several stores. Different pharmacies have different characteristics in terms of their prescribed medications, licensed pharmacist profiles, business hours, and operation models, etc. In addition to their diverse characteristics, the pharmacy locations are also unevenly distributed in space across the United States. For example, in 2021, California had 6,081 pharmacies, the most of any state. California, Texas, New

York, Florida, and Pennsylvania round out the top five states for pharmacy locations. In contrast, Alaska had only 111 pharmacies in the same year (IQVIA 2022).

Spatial Equity

As an evolving concept, spatial equity is variously defined and the issue of how to measure spatial equity is somewhat nebulous and often difficult. According to Truelove (1993), spatial equity could be measured by such methods as: mapping areas beyond the range of service, service-to-needs ratio, correlation analysis, etc. Nevertheless, it is generally believed that the analysis of spatial equity is concerned with comparing the locational distribution of facilities or services to that of different socioeconomic groups, usually referring to different residents having an equal access to certain services (Talen and Anselin 1998, Tsou et al. 2005, Omer 2006, Chang and Liao 2011, Mashrur and Meher 2015).

With the elapse of time, the definition of spatial equity was expanded from spatial dimensions to include social dimensions, such as class, ethnic groups (Wen et al. 2013), income, and age (Comber et al. 2008). For example, Yao et al. (2014) revealed spatial and social inequities in HIV testing utilization in rural Mozambique. All these studies suggest that spatial equity research should take into account both spatial dimensions and social characteristics.

Just like African American and other minority ethnic groups in the U.S., the Roma communities in Romania and Central/East Europe have been discriminated and marginalized due to historical (e.g., slavery and nomadic history), cultural (e.g., self-exclusion), economic (e.g., low-income) and other reasons (large family, low education, social discrimination by the mainstream society). In terms of spatial inequity, in some Roma quarters, households must travel relatively long distances for shopping, since Roma rarely run retailing businesses in their communities (Creţan and Turnock 2008, Creţan et al. 2020). In Romania, evictions and invisibilisations create a heightened vulnerability to displaced people (Vesalon and Creţan 2012, Alexandrescu et al. 2021). Their destinations normally lack access or could have long distance access to basic social services, including pharmacies (Méreiné Berki et al. 2021). The miserable situation of Roma also exists in other European countries and regions, for example in Szeged, Hungary, where current efforts which strive for the desegregation and integration of urban Roma will be difficult to implement (Creţan et al. 2020, Méreiné Berki et al. 2021).

Accessibility

Accessibility is a measure used to evaluate whether spatial equity has been achieved (Talen and Anselin 1998). Among the different metrics measuring spatial equity, the accessibility-based approaches (e.g., the gravitational potential model, the two-step floating catchment method, etc.), and their corresponding improved models (Talen and

Anselin 1998, Shen and Sanchez 2005, Luo and Qi 2009, Chang and Liao 2011, Mao and Nekorchuk 2013, Hu et al. 2019, Zhao et al. 2020), are relatively popular methods for measuring spatial equity. For example, based on the gravity model, Chang and Liao (2011) developed a spatial equity index to explore the spatial equities of urban parks in Tainan City, Taiwan, from both accessibility and mobility perspectives. Talen and Anselin (1998) evaluated the spatial equity of public playgrounds by a gravity potential in the case of Tulsa, Oklahoma.

It is noted that, more recently, there was a trend to integrate travel modes into traditional accessibility models. For example, in order to explore the influence of travel modes on the spatial equity of healthcare facilities, Mao and Nekorchuk (2013) proposed a Two-Step Floating Catchment Area Method (2SFCAM), and they integrated bus and car travel modes into this model. Shen and Sanchez (2005) considered the impact of walking and driving on spatial equity, and they integrated those travel modes into a potential model. Hu et al. (2019) integrated the competition and attraction factors into the spatial equity model in the case of accessing the Changchun urban nursing homes in China. Zhao et al. (2020) used an Enhanced Two-Step Floating Catchment Area Method (E2SFCAM), based on a Gaussian function proposed by Luo and Qi (2009), to measure the accessibility to tertiary and secondary hospitals in Beijing.

Pharmacy Desert

It is noteworthy that the spatial equity research thus far has identified the existence of the so-called "pharmacy desert" phenomenon (modeling after the term "food desert") in the low-income and minority-dominant communities. The term "pharmacy desert" refers to certain communities with a lack of pharmacy access or pharmaceutically underserved areas (Bonner 2015, Pednekar and Peterson 2018). According to the research results of Di Novi et al. (2020), the difficulty in accessing drugs because of "pharmacy desert" negatively influences the patients' adherence to drug regimens, which requires that the prescription to be obtained promptly and the drug to be taken as prescribed in terms of dose, dosing interval, duration of treatment, and any additional special instructions.

Qato et al. (2014) found that "pharmacy deserts" are prevalent in Chicago's predominantly minority communities. In 2012, there were disproportionately more pharmacy deserts in Chicago's segregated black communities, as well as in low-income communities and federally designated Medically Underserved Areas.

Based on their visits to 408 pharmacies located in 168 socio-economically diverse communities, Amstislavski et al. (2012) found that geographic access to a neighborhood pharmacy, the type of pharmacy, and availability of commonly prescribed medications varies significantly across communities. Pharmacies in poor

communities had significantly higher odds of medications being out of stock.

In the paper of Wisseh et al. (2021), pharmacy deserts were identified as census tracts where the nearest community pharmacy was 1 mile or more away from a census tract's centroid. K-means clustering was applied to group pharmacy deserts based on their composition of social determinants of health indicators (SDOH), such as poverty level, household ownership, vehicle ownership, education attainment, health insurance status, and language spoken at home.

In general, the people living in pharmacy deserted areas receive lower quality pharmaceutical services and they have less access to such services, creating disparities in pharmaceutical care (Oliveira et al. 2021). For example, research shows that an overall low quality and a limited availability of care contributes to lower medication adherence rates (Akinbosoye et al. 2016). Furthermore, a person in an underserved community may not receive the same in-depth explanation of their drug treatment plan as a person in a well-served community, increasing the likelihood of premature termination of drug treatment (Davis et al. 2017). Furthermore, people living in the low-income neighbourhoods may pay higher prices for their prescription medication than people in the middle- and high-income neighbourhoods, contributing to even further lower medication adherence rates and social equity issues (Qato et al. 2017).

The research and studies reviewed above have provided us with the framework to identify the needed research about spatial disparity of pharmacies in Virginia. In specific, we have identified the following research gaps which we intend to focus our study on and gain further insights:

1. First, the studies related to spatial disparity of pharmacies are lacking for Virginia;
2. Second, the geospatial analysis is insufficient. So far, the Geographic Information System (GIS) has primarily been used as a mapping tool in most of the prior studies. No extensive statistical analysis has been performed to examine the relationship between pharmacy locations and socioeconomic characteristics;
3. Third, a more fine-grained micro level analysis of pharmacy locational variation across space was also inadequate in Virginia.

Given these research gaps, we take a more comprehensive approach to investigate the relationship between vulnerable populations and their accessibility to pharmacies in Virginia. While there are various vulnerable populations under different contexts in the literature (Waisel 2013, Shi and Stevens 2021), we focused on the subpopulations who we believe are likely to experience inadequate access to pharmacies. They include racial minorities (defined as non-white population in this study), persons with income below the poverty level, older adults, persons with disability, and households without vehicles.

Methodology

Our study utilized SPSS to carry out traditional statistical analyses as well as ArcGIS to perform various geospatial analyses. We started with a correlation analysis to examine the relationships between variables followed by a stepwise regression to identify the key independent variables that would be retained in the regression model. We then carried out a series of geospatial analyses beginning with the Average Nearest Neighbour analysis to study the spatial distribution pattern of pharmacies. We also conducted a network analysis to measure the access to pharmacies by travel time based on the network distance. Lastly, we used the Geographically Weighted Regression (GWR) to examine accessibility to pharmacies of different vulnerable populations.

Data Sources

Pharmacy Locations

We downloaded the pharmacy locations in Virginia from the SafeGraph Company. According to SafeGraph, there were 1,668 pharmacies in Virginia in 2021. The dataset includes the latitude and longitude coordinates of all pharmacy locations. The pharmacy locations in Virginia are geocoded as shown in Figure 1.

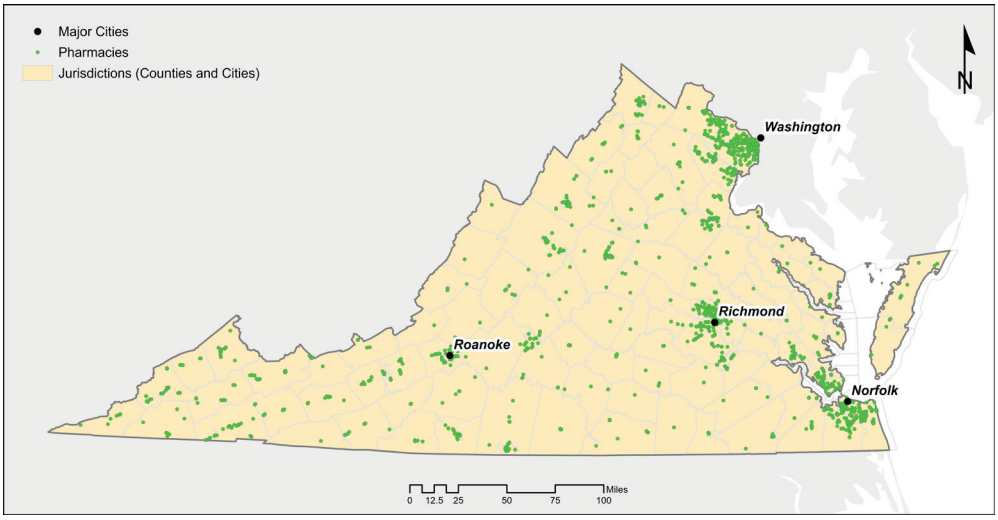


Figure 1. Pharmacies in Virginia

Vulnerable Populations

We obtained the data of vulnerable populations from the 2019 American Community Survey (ACS) – 5-Year Estimates Detailed Tables. In specific, the following tables were obtained to extract the respective vulnerable populations:

- B02001 Race: racial minorities (defined as non-white population in this study);
- B17001 Poverty Status by Sex by Age: persons with income below the poverty level;
- B01001 Sex by Age: older adults;
- B18101 Sex by Age by Disability Status: persons with disability; and,
- B08201 Household Size by Vehicles Available: households without vehicles.

Geographic Unit of Analysis

The above vulnerable populations data were collected at the local jurisdictions level (a total of 133 counties and cities) and then joined to the jurisdictional geographic features. Because the ACS data were estimated from samples, larger sample sizes would yield better estimated results. In contrast, many census tracts have no pharmacies located in them even though there may be pharmacies in their neighbouring tracts, which would lead to erroneous and invalid results. These are the two reasons why we decided to use local jurisdictions as geographic units of analysis in this study.

Network

The data source of the street network originally came from the Virginia Geographic Information Network (VGIN), which is the GIS Clearinghouse with a repository of geospatial data produced and used by state agencies in Virginia.

Pharmacy Visit

To gauge the realized access to pharmacies, the number of pharmacy visits during the period of June 27 (2022) to July 4 (2022) was downloaded from the SafeGraph website. In that period, there were a total of 54,133 pharmacy visits in Virginia.

Description and Normalization of Variables

Given that there were 1,668 pharmacies distributed among 133 local jurisdictions in Virginia, the number of pharmacies in each jurisdiction was determined and normalized by its area in square miles. It serves as the dependent variable of our study, i.e., number of pharmacies per square mile (denoted as Pharmacy_D hereafter). When it comes to the independent variables, we also normalized five vulnerable populations (the descriptive statistics are shown in Table 1) by their associated jurisdiction area on a per square mile basis. They are denoted as:

- Non_White_D – number of non-white persons (per square mile)
- Below_Poverty_D – number of persons with income below the poverty level (per square mile)
- A65_or_Older_D – number of persons aged 65 or older (per square mile)
- Disability_Pop_D – number of persons with disability (per square mile)
- No_Vehicle_HH_D – number of households without vehicles (per square mile)

Table 1. Descriptive statistics of variables (N = 133)

	Minimum	Maximum	Mean	Std. Dev.	Skewness	Kurtosis
Pharmacy_D	0.000	3.910	0.239	0.517	4.020	21.293
Non_White_D	0.040	3,881.080	272.486	572.467	3.427	14.728
Below_Poverty_D	0.530	1,049.000	107.392	198.669	2.654	7.875
A65_or_Older_D	1.800	1,156.980	112.859	192.413	2.823	9.726
Disability_Pop_D	1.020	714.010	90.248	142.742	2.068	4.216
No_Vehicle_HH_D	0.080	539.430	28.015	69.429	4.988	30.374

Results

Correlation Analysis

We examined the correlation coefficients between the dependent and independent variables to gain an understanding of their relationships. All independent variables exhibit a positive relationship with the dependent variable Pharmacy_D (Table 2). However, the strengths of the relationship vary among the independent variables. In specific, A65_or_Older_D has the strongest relationship (r=.865) followed by Disability_Pop_D (r=.737), No_Vehicle_HH_D (r=.662), Non_White_D (r=.654), then Below_Poverty_D (r=.633).

Table 2. Correlation coefficients between variables (N = 133)

Variables	*Pharmacy_D*	*Non _White_D*	*Below _Poverty_D*	*A65_or _Older_D*	*Disability _Pop_D*
Non_White_D	.654**				
Below_Poverty_D	.633**	.826**			
A65_or_Older_D	.865**	.906**	.836**		
Disability_Pop_D	.737**	.902**	.908**	.937**	
No_Vehicle_HH_D	.662**	.856**	.810**	.865**	.812**

*** The correlation is significant at the 0.01 level (2-tailed)*

Regression Analysis

Given the correlational relationships identified above, we subsequently ran a stepwise regression to derive a model of selected independent variables which made a statistically significant contribution to the R^2. The stepwise regression went through four iterations and it settled on the following four independent variables in the order of the increment to the R^2 in each iteration: A65_or_Older_D, Non_White_D, Disability_Pop_D, and No_Vehicle_HH_D. It should be noted that Below_Poverty_D was excluded because it did not make a statistically significant contribution to the R^2

after the above four independent variables were included in the regression model. The resulting multiple regression model is thus expressed as:

*Pharmacy_D (predicted) = b0 + b1*A65_or_Older_D + b2*Non_White_D + b3*Disability_Pop_D + b4*No_Vehicle_HH_D*

This regression model (Table 3) showed a strong relationship between the independent variables and the dependent variable (Multiple R = .929). The independent variables also explained over 85 percent of the variance in the dependent variable (Adjusted R^2 = .858). When it comes to the influence of independent variables on the dependent variable, the standardized coefficients or beta weights revealed that A65_or_Older_D has the strongest influence (beta = 1.869) followed by Non_White_D (beta = -.537), Disability_Pop_D (beta = -.377), then No_Vehicle_HH_D (beta = -.190). It is worth noting that, when all selected independent variables are entered, A65_or_Older_D is the only independent variable that has a positive beta weight in the regression model while the other independent variables are negatively associated with the dependent variable. In other words, jurisdictions with higher standardized Non_White_D, Disability_Pop_D, or No_Vehicle_HH_D tend to associate with lower standardized Pharmacy_D. This finding of negative beta weights provided insights of potential pharmacy deserts in relation to different independent variables.

Table 3. Final regression model derived from the stepwise regression analysis

						Collinearity Statistics	
Independent Variables	**Coefficient**	**Std. Error**	**beta**	**t**	**Sig.**	**Tolerance**	**VIF**
Constant	-0.033	0.020		-1.601	0.112		
A65_or_Older_D	0.005	0.000	1.869	16.717	< 0.001	0.086	11.643
Non_White_D	0.000	0.000	-0.537	-6.051	< 0.001	0.137	7.325
Disability_Pop_D	-0.001	0.000	-0.377	-3.713	< 0.001	0.104	9.597
No_Vehicle_HH_D	-0.001	0.001	-0.190	-2.708	0.008	0.219	4.571
Dependent Variable:	*Pharmacy_D*: number of pharmacies per square mile						
Independent Variables:	*A65_or_Older_D*: number of persons age 65 or older (per square mile)						
	Non_White_D: number of non-white persons (per square mile)						
	Disability_Pop_D: number of persons with disability (per square mile)						
	No_Vehicle_HH_D: number of households without vehicles (per square mile)						
Multiple R = 0.929	R^2 = 0.863	Adjusted R^2 = 0.858		F = 200.940 (p < 0.001)			

We also conducted a collinearity diagnostic test, yielding the results shown in Table 4. Since the condition indices for all dimensions are below 10, we believe that the

potential multicollinearity among the independent variables is not a serious issue for our multiple regression model.

Table 4. Collinearity diagnostics (dependent variable: Pharmacy_D)

Dimension	Eigen value	Condition Index	Variance Proportions				
			(Constant)	*A65_or_ Older_D*	*Non_ White_D*	*Disability _Pop_D*	*No_Vehicle_ HH_D*
1	3.984	1.000	0.010	0.000	0.010	0.000	0.010
2	0.733	2.331	0.810	0.000	0.010	0.000	0.020
3	0.161	4.981	0.110	0.020	0.020	0.110	0.780
4	0.081	6.994	0.060	0.140	0.940	0.100	0.030
5	0.040	9.943	0.000	0.840	0.020	0.790	0.150

Average Nearest Neighbour Analysis

We then shifted our focus to the spatial distribution of pharmacies in Virginia. Based on the geocoded results, it is visually evident that pharmacies are clustered in the urban areas, especially in Northern Virginia, Central Virginia, and the Hampton Roads urban areas. To quantitatively investigate the cluster pattern further, we performed an Average Nearest Neighbour analysis (Figure 2) which affirms that the spatial distribution of pharmacies is highly clustered, with a z-score of -61.6993 ($p < 0.001$). It is also worth noting that the resulting Nearest Neighbour Ratio of 0.2103 indicates that the observed average distance is much shorter than the expected average distance of pharmacies under random distribution.

Network Analysis

Given that pharmacies are highly clustered spatially, it is obvious that pharmacy-abundant places have better access to pharmacies in Virginia than places where pharmacies are sparse. To gain a better understanding of the accessibility to pharmacies, we conducted a network analysis using ArcGIS to delineate pharmacy service areas based on street network distance that can be reached from pharmacies in three specified travel times by car: less than 10 minutes, 10-20 minutes, and 20-30 minutes. It should be noted that the specified travel times were arbitrarily defined in this study to help the delineation and comparison of accessibility to pharmacies. The underlying rationale is that places which are closer to pharmacies would require less travel time to reach them, hence better accessibility. The resulting service area polygons are shown in Figure 3, which clearly indicate that the pharmacy deserts, i.e., places with poor access to pharmacies, are primarily located outside of the urban areas in the western and southern parts of Virginia.

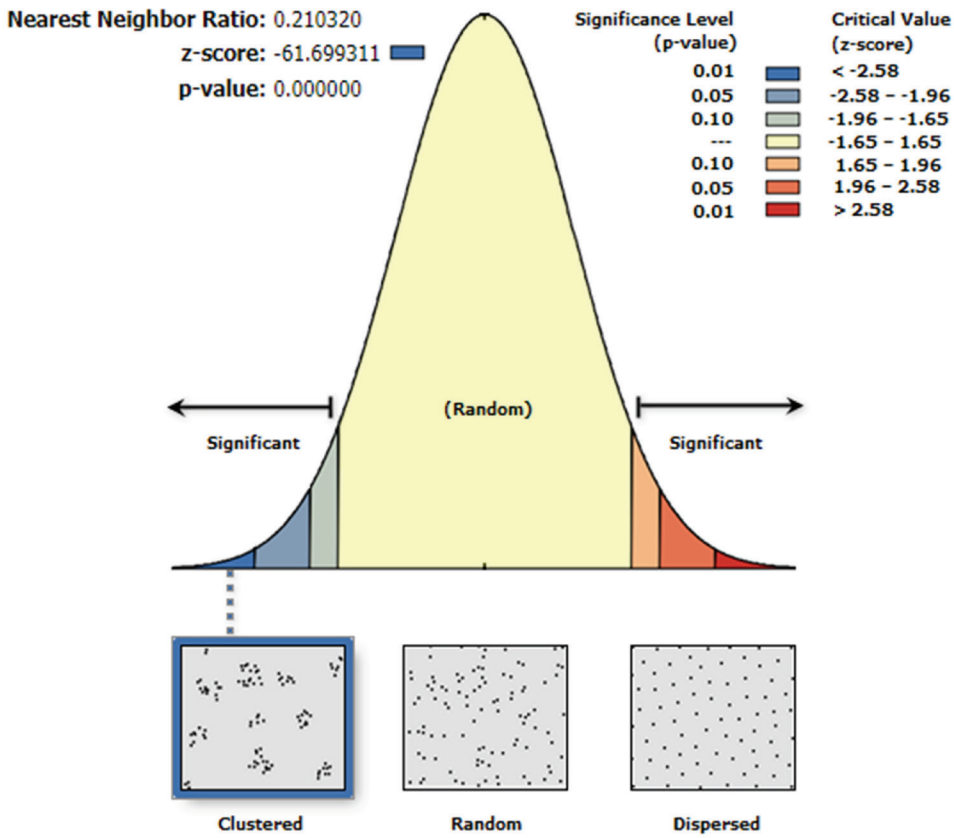


Figure 2. Average Nearest Neighbour analysis

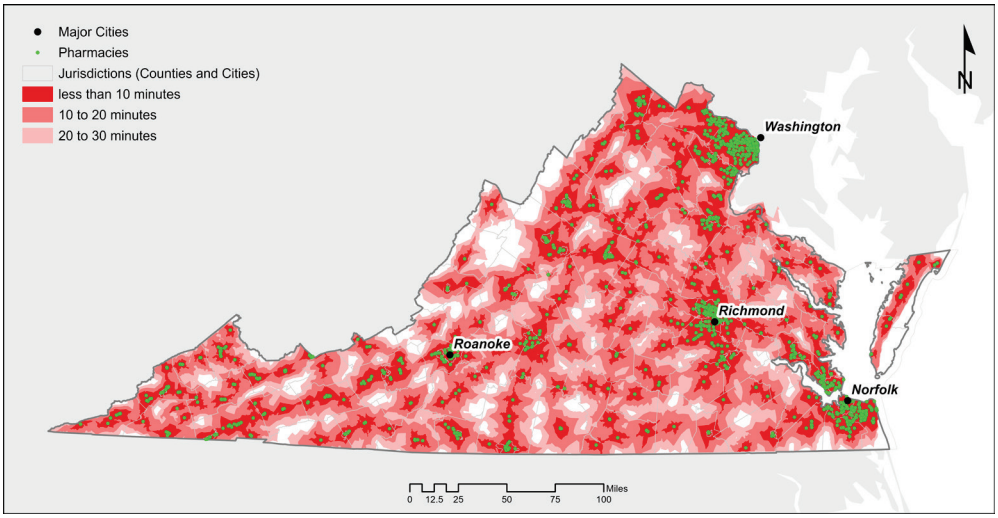


Figure 3. Access to pharmacies measured by travel time based on the street network distance

In addition to the accessibility measured by travel time based on the network distance, we also examined the number of visits to pharmacies as a proxy for the realized access. We obtained the number of pharmacy visits during the period of June 27 (2022) to July 4 (2022) from the SafeGraph website. They were aggregated to the jurisdiction level so that each local jurisdiction has a combined total of visits to pharmacies located within that jurisdiction. The visit volume is proportionally symbolized in relation to the access to pharmacies (Figure 4). It can be observed that urban areas are generally associated with a greater number of visits. However, it is worth noting that there are places in Virginia with better access to pharmacies but with a low visit volume.

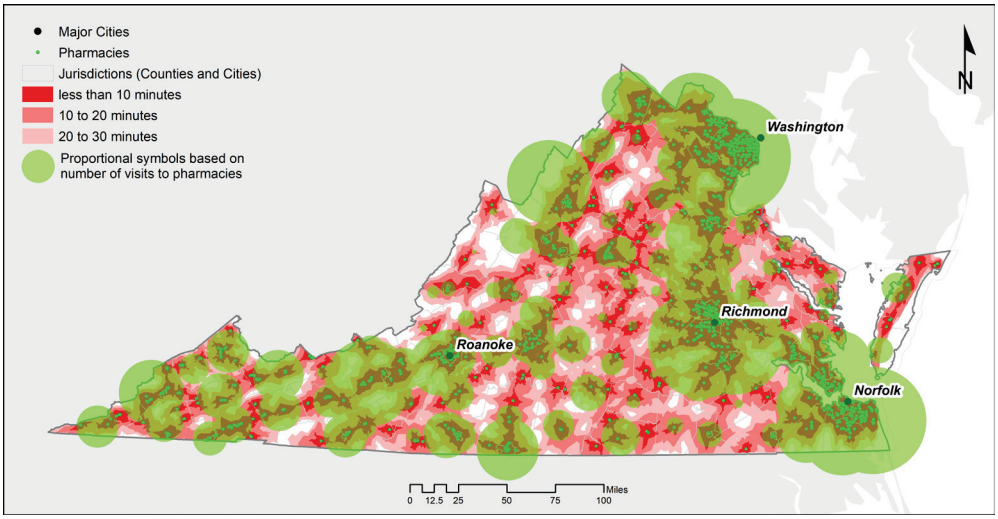


Figure 4. Number of visits to pharmacies in relation to the access to pharmacies

Geographically Weighted Regression (GWR) Analysis

While the network analysis painted a clear picture of accessibility to pharmacies based on the street network distance and travel time, it does not consider the vulnerable populations and their accessibility to pharmacies. Furthermore, the traditional linear regression model merely provided an overall picture of the relationships between the distributions of pharmacies and the vulnerable populations at macro level, as it still lacks the ability to capture local variations of such relationships. According to Chakravorty (1996), the spatial disparity may imply significant differences between neighbouring geographic features even when similar attribute values are spatially clustered.

To overcome these shortcomings, we used ArcGIS and we carried out a Geographically Weighted Regression (GWR) analysis to examine the relationships, which takes into account the pharmacy location information. The advantage of GWR over traditional linear regression is that GWR can model changing relationships spatially at a local geographic level than the entire study area as a whole (Fotheringham 2002, Mitchell

and Griffin 2021). GWR has found many other applications as well, such as in studying accessibility to primary health care (Bagheri et al. 2009), spatial epidemiology of infectious disease (Liu et al. 2011), and the spatially varying predictors of population health (Shoff and Yang 2012).

We constructed our GWR model based on the same model specification derived from the stepwise regression where Pharmacy_D is the dependent variable; and the independent variables are A65_or_Older_D, Non_White_D, Disability_Pop_D, and No_Vehicle_HH_D. Figure 5 shows the spatial distribution of independent variables.

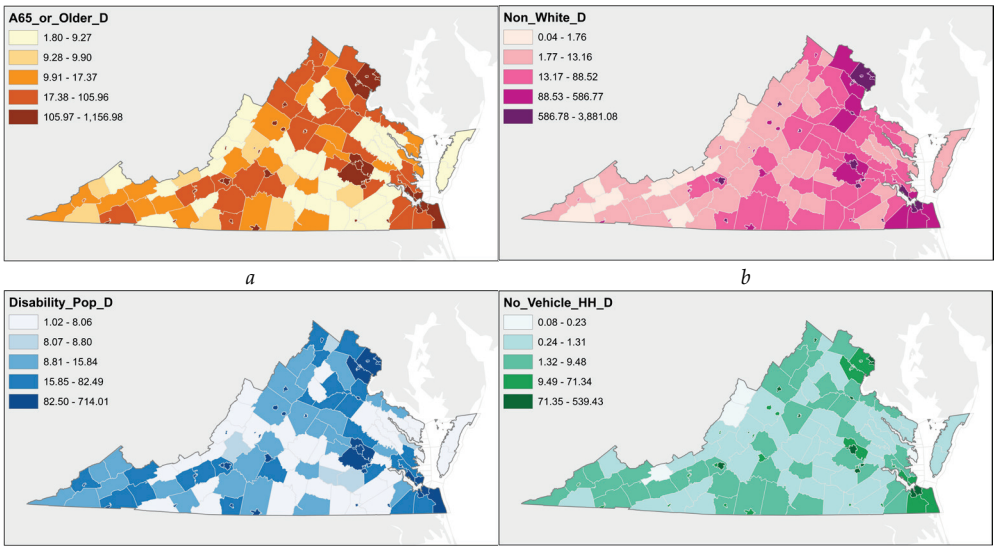
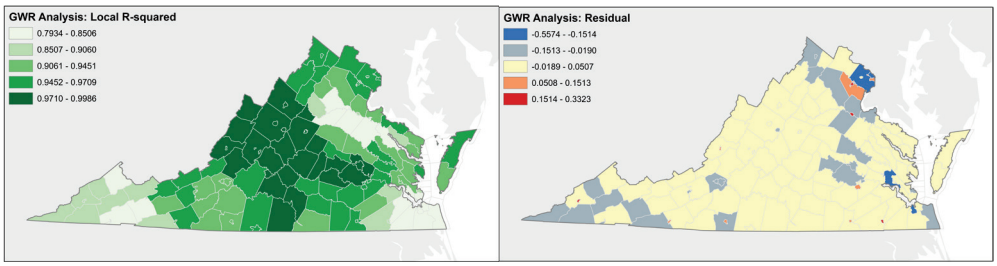


Figure 5. Spatial distribution of independent variables
(a) A65_or_Older_D, number of persons aged 65 or older per square mile; (b) Non_White_D, number of non-white persons per square mile; (c) Disability_Pop_D, number of persons with disability per square mile; and (d) No_Vehicle_HH_D, number of households without vehicles per square mile.

We specified the adaptive kernel and a bandwidth of 30 neighbours to solve the local regression analyses. GWR delivered an Adjusted R^2 of .960, and an improvement over .858 derived from the stepwise regression (Table 5). The spatial distribution of GWR outputs is illustrated in Figure 6.

Table 5. Geographically Weighted Regression

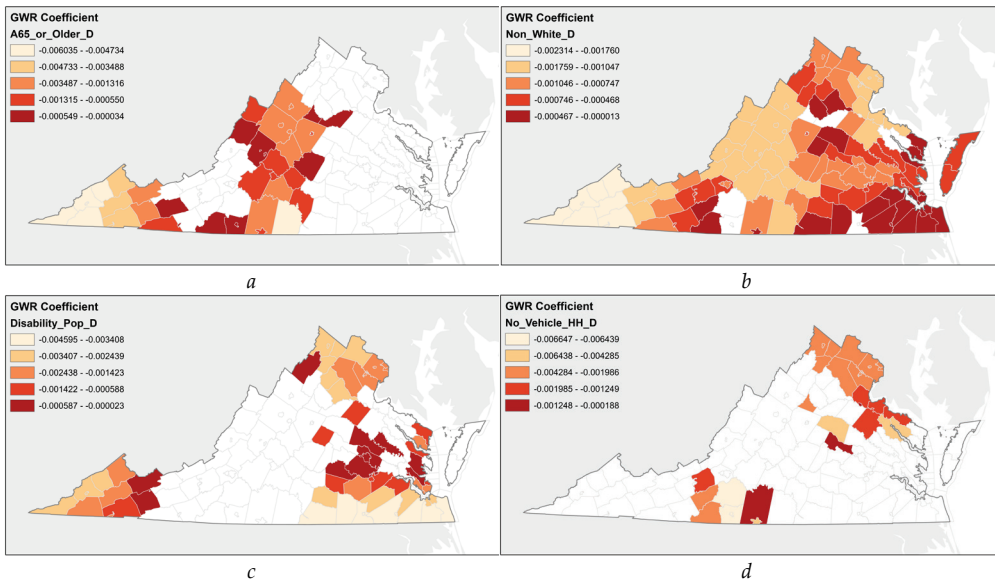
Dependent Variable:	*Pharmacy_D*: number of pharmacies per square mile		
Independent Variables:	*A65_or_Older_D*: number of persons age 65 or older (per square mile)		
	Non_White_D: number of non-white persons (per square mile)		
	Disability_Pop_D: number of persons with disability (per square mile)		
	No_Vehicle_HH_D: number of households without vehicles (per square mile)		
Neighbours = 30	**AICc** = -102.615	**R^2** = 0.973	**Adjusted R^2** = 0.960



a *b*

Figure 6. Spatial distribution of GWR outputs: (a) local R-squared; (b) residuals

A key characteristic of GWR is its ability to compute local regression coefficients associated with independent variables for each local jurisdiction. The local coefficients can be used to examine the varying relationships between the independent variables and the dependent variable Pharmacy_D. In the context of pharmacy deserts, we focused on the negative coefficients of each independent variable derived at the local jurisdictional level. This helps to highlight the inverse relationship between a given independent variable and the Pharmacy_D. When the vulnerable populations are all considered, local jurisdictions might have adequate pharmacies for certain populations but inadequate for others, relatively speaking (Figure 7).



a *b*

c *d*

Figure 7. Spatial distribution of negative GWR coefficients associated with independent variables: (a) A65_or_Older_D, number of persons aged 65 or older per square mile; (b) Non_White_D, number of non-white persons per square mile; (c) Disability_Pop_D, number of persons with disability per square mile; (d) No_Vehicle_HH_D, number of households without vehicles per square mile

Even though A65_or_Older_D is the only independent variable with a positive beta

weight in the stepwise regression indicating an overall positive relationship with Pharmacy_D, GWR revealed that the relationship varies over space among different jurisdictions. Figure 7(a) symbolizes the jurisdictions with negative local coefficients showing places where pharmacies are inadequate for people aged 65 or older.

Among the independent variables, the Non_White_D is the only one that has negative local coefficients across most jurisdictions. This means that pharmacies are inadequate to various extent in relation to non-white persons in Virginia overall. Figure 7(b) shows the variation of local coefficients, where the inadequacy of pharmacies is more severe in the jurisdictions coloured in red than the ones in yellow.

When it comes to Disability_Pop_D, pharmacies are relatively inadequate mainly in northern, southern, and western Virginia – Figure 7(c). As to No_Vehicle_HH_D, a few jurisdictions in north-eastern and south-central Virginia, shown in Figure 7(d), do not have adequate pharmacies in relation to households without vehicles.

Discussion

This pilot study is our first attempt to examine the pharmacy desert and disparity issues in the Commonwealth of Virginia. The most important findings are threefold. First, the pharmacy locations are unevenly distributed in Virginia. They are primarily clustered in three major urban areas: Northern Virginia, Central Virginia, and the Hampton Roads urban areas, which leave the pharmacy deserts to be more present in rural areas in the western and southern parts of the Commonwealth. Second, of the five vulnerable populations examined in this study, the concentration and distribution of senior citizens (aged 65 or older) are most significantly associated with the pharmacy locations at state-wide macro level.

Third, at the more fine-grained local levels, however, the GWR analysis has exhibited very complex spatial patterns along different social dimensions: local jurisdictions might have adequate pharmacies for certain populations but inadequate for others, demonstrating the existence of social inequity besides spatial equity. For example, in the western and southwestern parts of Virginia, pharmacies are inadequate for people aged 65 or older. Pharmacies are inadequate to various extent in relation to non-white persons overall revealing that racial inequity of access to pharmacies is ubiquitous in Virginia. The minority social groups are still more or less marginalized in American society due to historical, economic, social, and other reasons, which bear resemblance to those in the Roma communities in Eastern Europe. Racial inequity issues persist in the U.S. When it comes to people with disabilities, pharmacies are relatively inadequate mainly in northern, southern, and western Virginia. As to households without vehicles, inadequate pharmacies are observed in a few jurisdictions in north-eastern and south-central Virginia.

Based on the above findings, this paper makes the following policy recommendations for Virginian governments: governments should encourage the opening of more pharmacies in the rural parts of Virginia, such as the western and southwestern parts of the state, by providing more tax breaks and other incentives in these pharmacy deserted areas. Governments should invest more money in public transit and alternative transportation modes so that those households without vehicles, people with disabilities, and minority transit captive riders can also access the local pharmacies. Governments should be more sensitive to the social inequity and spatial inequity issues existing in pharmacy locations and their service delivery.

Despite the above preliminary findings and recommendations, we recognize a major limitation of the study in terms of pharmacy service capacity such as pharmacy types, service hours, number of pharmacists, number of prescription medications filled, etc. In addition, conducting a comparative study on the spatial disparity of pharmacies between urban and rural areas would offer more in-depth findings which can be based upon to devise effective policies to address issues related to the spatial disparity of pharmacies in Virginia.

Conclusions

The spatial disparity of social services such as pharmacies is a complicated phenomenon with many dimensions. Along the spatial dimension, pharmacy locations are simply unevenly distributed across space, which can be measured by many spatial statistical or geospatial tools, such as the average nearest neighbour analysis and network analysis. Though this case study presents the unique Virginian case, its methodology can be applicable to other countries as well.

Along the social dimension, the factors are much more complicated. For example, due to racial discrimination, gentrification, redlining and housing eviction, minority ethnic populations, especially African Americans, are more likely to be displaced to live in the cheap and dilapidated areas where no pharmacies exist nearby. These poor people are typically the transit captive riders with lower vehicle ownership. Except for the largest metropolitan areas such as New York, most areas in the U.S. do not have developed transit networks, which make disadvantaged people worse off in accessibility. To dig into more details of social issues requires more relevant data to be collected in the future.

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IMPLEMENTATION OF SUSTAINABLE DEVELOPMENT GOALS AT THE LOCAL-NEIGHBOURHOOD SCALE

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Abstract: The 2030 Agenda for Sustainable Development Goals (SDGs) establishes global goals from an action plan at various scales on the south of Latin-American. To pursue this agenda, however, it is necessary to facilitate cooperation between actors, agendas, and urban policies at the local-neighbourhood level to enable the progressive transformation that the Agenda projects. The objective of this paper is to propose a methodology that translates these SDGs to the local-neighbourhood scale and to apply it to "Barrio Virgen de Lourdes", located in San Juan province, Argentina. The study was carried out in a participatory manner, in conjunction with community, academic, and governmental actors. As a result, Urban Sustainability Indicators and action strategies according to neighbourhood SDGs were obtained. In addition, a Sustainable Development Index was designed to assess the impact of actions on the realisation of the SDGs at different levels of government. This methodology represents an effective tool to contribute to sustainable development and social inclusion.

Keywords:

community participation;
local planning;
urban governance;
Sustainable Development Goals.

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Introduction

The United Nations (UN) promotes two important initiatives worldwide based on the development and protection of human rights. One of them is the Millennium Declaration (United Nations 2000), which encourages a new global alliance. In Argentina, nine associated objectives, known as the Millennium Development Goals (MDGs), were established. The other initiative is endorsed by the World Summit on Sustainable Development, materialising the "2030 Agenda for Sustainable Development" (United Nations 2015). This agenda aims to establish an action plan to expand the scope of action. It includes 17 Sustainable Development Goals (SDGs) and 169 targets included in the economic, social, and environmental dimensions (United Nations 2015).

The 2030 Agenda involves a "revitalised Global Alliance" committed to supporting the implementation of relevant strategies and action programs (United Nations 2015). It highlights that governments are responsible for carrying out, at the national, regional, and global levels, the follow-up and examination of the progress achieved in the fulfilment of the goals and targets in the next 15 years at the different levels (United Nations 2015). Likewise, it states that it is necessary to develop indicators that contribute to this work, as well as disaggregated quality data that are accessible, timely and reliable to help measure progress and ensure that no one is left behind, since these data are fundamental to decision-making (United Nations 2015).

The United Nations call for increased support to strengthen data collection and capacity building in the Member States, in order to establish national and global baselines, in particular for the goals that do not include clear numerical targets (United Nations 2015). It also encourages member states to conduct periodic and inclusive reviews of national and sub-national progress. In addition, the Agenda engages the world, regional, and national levels in its implementation and it specifies that the member states must use the existing planning instruments, such as national development and sustainable development strategies (United Nations 2015).

The SDG Report shows that despite progress in some areas, enormous challenges remain that require integrated solutions (United Nations 2019). It is understood that there are valuable opportunities to accelerate progress by analysing the interrelationships that exist between the goals (United Nations 2019). The problems are interrelated, and so are the solutions to poverty, inequality, climate change and other global challenges (United Nations 2019).

The same report highlights that, due to the speed of urbanisation, the world population living in cities is expected to increase by 60% by 2030 (United Nations 2019). This is an issue that needs to be addressed because cities are the engines of economic growth at present, but they represent around 70% of global carbon emissions and more than 60% of the resource consumption (United Nations 2019). Consequently, rapid urbanisation

results in a growing number of issues that prevent cities from growing in a more sustainable and inclusive way (López and González González 2019, United Nations 2019).

In this context, the Latin American Centre of Administration for Development (CLAD for its acronym in Spanish) clarifies that the state and public administration, in order to achieve the SDGs, must take the lead in finding solutions to the great problems that Latin America faces through governance and the role played by cities. Cities, however, do not have the capacity to address by themselves the quantity, intensity and complexity of the problems affecting the citizens of our region today (Velázquez López 2019). In this regard, Carrera and López Moreno (2014) emphasise that a reformed governance paradigm requires articulating efforts, fortifying formal coordination mechanisms, defining concurrent responsibilities, and providing the necessary resources and incentives to each level of government. This shows the enormous responsibility and the challenges involved in strengthening the capacities of local authorities as well as supra-municipal and metropolitan levels of government. It is necessary to link local equity policy with the jurisdiction of the territory, through programs that allow the transfer of resources between and within cities (Carrera and López Moreno 2014).

The process of State reform in Argentina encourages decentralisation. Municipalities show themselves as spaces for political reconstruction and renewed management based on effectiveness-efficiency, articulation with civil society organisations, and the search for dialogue and cooperation at the micro-regional level (García Delgado 1998). However, the municipality also appears as a point of condensation of social fragmentation, the mediation crisis, and the lack of resources (García Delgado 1998). In these conditions, approaching the city implies using vertical relations of supra-subordination, as well as radial or fluid networks. In this regard, governance implies recognising the importance of other actors who participate in the public space and that can contribute to effectively solving complex problems in a context of active collaboration and communication (Velázquez López 2019). In the words of Bourdieu (2011), from the social reproduction that is linked to a locally based social space, the position in this familiar space or sub-space can be experienced as a microcosm of the social space as a whole (Bourdieu 2011).

The aforementioned reasons justify the need to think about the dynamic role played by the local-neighbourhood scale from the micro-relationships. This is a priority in the articulation of territorial scales and levels of government for the implementation and monitoring of the SDGs in a cross-sectoral manner. For this reason, the objective of this work was to translate the SDGs to the local-neighbourhood scale and to propose a methodology for "Virgen de Lourdes neighbourhood" (VLN), San Juan province, Argentina, with a focus on Goal 11 of the SDGs: "Make cities and human settlements inclusive, safe, resilient and sustainable by 2030". It is conceived from the premises of "global partnership" proposed by the 2030 Agenda and the complementary policies in the measurement of actions, strategies, and programs at different scales. To this end,

Urban Sustainability Indicators and action strategies are proposed according to the neighbourhood SDGs. A Sustainable Development Index was also incorporated to evaluate the level of impact of actions on the implementation of the SDGs at different levels of government. The participatory methodology conceives the community, together with academic and governmental actors, as active agents that contribute to decision-making. The results obtained aim to contribute to the future constitution of an urban action plan by proposing specific action strategies.

Background, concepts, and definitions

United Nations (2015) propose a progressive transformation towards economic, social, and environmental sustainability. The Argentine Republic is one of the 193 Member States that subscribe to the Agenda, as part of the reference guide for the work between now and 2030. The SDGs are a planning tool for countries at global, national, and local levels. Their long-term vision aims to generate public policies and instruments for budgeting, monitoring and evaluation and to support each country on its path towards sustained, inclusive and environmentally sound development.

This Agenda states that cities are home to the majority of humanity and sustainable development cannot be achieved without significantly transforming the way we build and manage our urban spaces. The SDGs pay special attention to cities by proposing Goal 11 with regards to their sustainability. This goal highlights that cities will determine whether we will continue on the path of constant and increasing exploitation of the world's resources or whether we can take a more sustainable path (United Nations 2015).

The New Urban Agenda III was adopted at the UN Conference on Housing and Sustainable Urban Development in 2016 and it proposes a change in the understanding of sustainable urban development. It points out that it must become an engine of economic, social, and human development that protects the environment and it generates well-being, justice and equity. To achieve this, it sets three fundamental objectives: to promote quality of life, an inclusive and competitive economy, and resilient and sustainable urban development. Based on these objectives, the document establishes challenges that seek to guide institutions to achieve an inclusive and people-centred vision (ONU-Habitat III 2017).

These documents show that it is necessary to radically transform our unsustainable modern cities and our way of living in them. The construction of a sustainable city involves recovering the control of the complete cycle of energies and materials that allow our existence. Reducing traffic at all levels and distances is, therefore, a priority task. The recovery of the city, built, modified, and rehabilitated by its citizens, is also an essential condition for its sustainability (Vázquez Espi 2004).

These ideas are closely related to the concept of governance understood as an

articulation of interests and conflict management. It focuses on the institutional efficiency of the State, the satisfaction of the population's needs, the construction of citizens as subjects of law, and their relationship with the political system (Altmann 2013). Participatory networks and the right to the city must act especially by cross-cutting the relationship between local governments and social actors, in order to expand the exercise of citizenship. The extension of the state sphere to the public sphere allows citizens to have the instruments of participatory democracy (Grin 2019).

The growing and complex challenge that cities face creates the need to rethink and reorganise the fundamentals of the relationship between the State and society at local level (Grin 2019). The concept of governance is defined as the ability of societies to equip themselves with systems of representation, institutions, processes, and social bodies as an instrument of democratic control, participation in decisions and collective responsibility (European Commission 2001). Therefore, local governance strengthens these processes if it is understood as planning and management systems (Orbea Celaya 2009). Reese (2007) highlights that management for development through planning implies deploying a process "interested" in the future effects of decisions made in the present. The situation in which the territory is located (initial situation) and the situation that one hopes to attain (desired situation) must be established through mechanisms and resources that determine intermediate situations.

Urban planning has been critically evaluated in terms of its legitimacy, rationality, and operability. Consequently, its theoretical instruments and legal framework must be reviewed. The most widespread methodology used at the urban scale is the strategic planning approach, which takes as a starting point the SWOT matrix (Nozica et al. 2020). Hope is placed on Territorial Planning as a technique for addressing the multi-scale, systemic and comprehensive nature of the territory. On the other hand, "planning should be adapted to local circumstances and to the different development trajectories of mid-sized urban areas" (Grădinaru et al. 2015: 141). But "it will always be down to communities themselves to frame their own solutions by expanding development-oriented NGO networks to intensify promotion of economic potential and enhance skill and competence levels" (Creţan et al. 2005: 37). Finally, urban planning and urban sustainability should take care of the human-nature relations in the urban neighbourhoods, including ethics on animals' care (Creţan 2015) and the reduction of urban green spaces (parks, trees) (Wang 2009).

SDGs reference at the local level: Contributions to the field of study

The National Council for the Coordination of Social Policies of the Presidency of the Nation has presented a guide and a manual for the local (provincial) adaptation of the SDGs (Ministry of the Interior, Public Works and Housing 2020). It provides guidelines and methodological suggestions for the incorporation of these SDGs as a management

and planning tool at the municipal level. The manual summarises the lessons learned so far in the implementation of the 2030 Agenda in the country, with results from municipalities throughout the national territory, and it includes new contributions of guidelines (Ministry of the Interior, Public Works and Housing 2020).

Numerous initiatives and programs have been promoted by different agencies. For example, an OECD program supports governments in the localisation of SDGs (OECD 2019). The territories receiving assistance include (OECD 2019):

- Cordoba Province (Argentina), which is developing a participatory process involving private sector and civil society actors to jointly define a 2030 vision and to identify the main drivers of social inclusion.
- The city of Kitakyushu (Japan), which aims to create opportunities in the economic and social sectors using the environmental SDGs by linking green industry, offshore wind energy, ecotourism, and culture to strengthen employment and to foster social cohesion through intergenerational solidarity.
- Southern Denmark (Denmark), which aims to use the SDGs to form a new 2020-2023 Regional Development Strategy.
- Viken County (Norway), which uses the 2030 Agenda as a framework for implementing the territorial reform.

The Basque Country has created a guide to orient the transfer of the 2030 SDG to the local scale (Ihobe Public Company for Environmental Management 2019). In addition, the United Nations Development Program (UNDP) aims to help with the implementation of goals through work in 170 countries and territories, with integrated solutions focused on systems, root causes and connections between challenges. It addresses not only thematic sectors but also people's daily realities (United Nations 2020b). Finally, the closest experience to San Juan province is the case of Mendoza, Argentina (United Nations 2020a), which is discussed below.

Methodology

Study area

San Juan city has a centralised institutional model. Municipalities have transferred their land management rights to the Provincial Directorate of Urban Development (DPDU for its acronym in Spanish). The absence of land regulation instruments and the lack of inter-institutional coordination is a limitation in urban management and planning. The city is characterised by low-density and urban expansion by leaps and bounds. The population has decreased in the Capital Department and it has grown in the other departments. This historical trend makes it difficult to improve accessibility to urban services and facilities (Nozica et al. 2020).

The Virgen de Lourdes Neighbourhood (VLN) is located in Rivadavia Department, a suburban area of the Greater San Juan (Figure 1). Land use is predominantly residential with a medium population density according to the urban code of the province. It has 196 housing units and 216 homes with a total population of 800 residents.

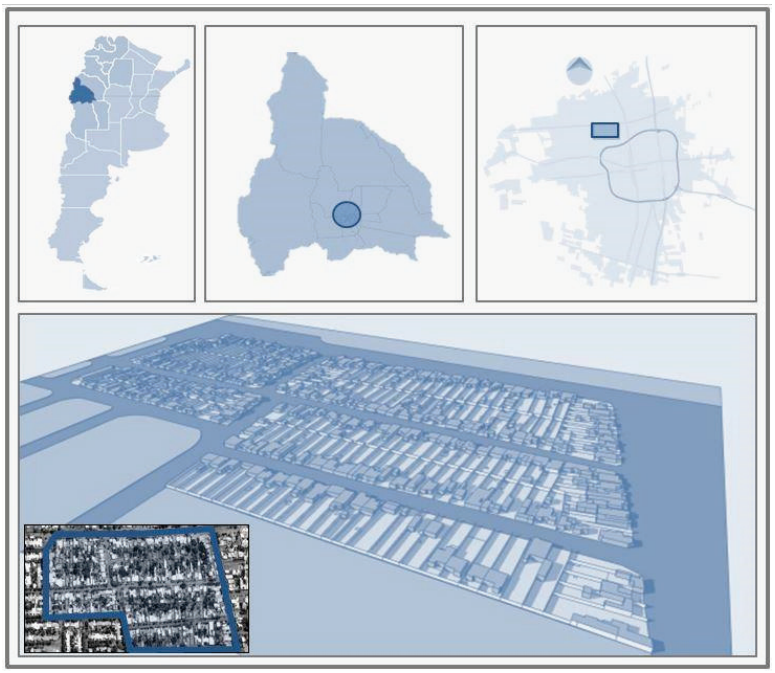

Figure 1. Location of Virgen de Lourdes neighbourhood, San Juan city, Argentina
Source: based on data estimated by the authors and Google Earth image (2019)

The VLN combines an excellent location in the urban structure of the Greater San Juan in a depressed sector of the peri-urban area with a high percentage (83%) of households below the poverty line. Its inhabitants are willing to participate actively for the collective benefit.

The peri-urban area appears today as the place where the processes installed by global capitalism crystallise: social fragmentation, spatial segmentation, absence of public policies and advance of the real estate market (Puebla 2009/10). These inter-phase areas have generally been postponed from the planning and actions of the State at different historical moments (López-Goyburu 2019).

SDG analysis

According to the UN, the localisation process of the SDGs at the municipal level implies integrating these goals into the strategic axes of local government policy in three aspects of sustainable development: the social, economic, and environmental

dimensions. Priority goals and indicators must be determined to allow the monitoring and reorientation of government actions. This implies the creation of a framework for the formulation and implementation of development policies at the local level that makes visible the contribution of the municipality to the achievement of the SDGs through its actions (United Nations 2020c).

Mendoza province (Argentina) has experience in the adaptation of SDGs (United Nations 2020a), which is taken as a reference. The Municipality of Godoy Cruz, through the Municipal Plan of Territorial Organisation (PMOT) Law 8051/09 OTyUS (Government of Mendoza 2009), establishes goals and actions based on the strategic axes of the municipal government, articulated with the 2030 Agenda (SDG). It also complies with the guidelines defined in the Provincial Land Management Plan (PPOT) Law 8999/17 (Government of Mendoza 2017). It should be noted that Mendoza has the only Land Use Law in Argentina, which can be taken as a relevant normative precedent. It is part of Law No. 8051 of 2009.

Mendoza, along with San Juan, San Luis, and La Rioja provinces, forms the Cuyo Region. They share the characteristic (like other settlements in the Andean range) of being productive oases surrounded by desert where the water resource plays a structuring role (Nozica et al. 2011). Although the regions served as intermediate frameworks for planning and territorial ordering, at present they are not used as such (Mattioli 2019). However, the SDGs offer an opportunity to reinforce interprovincial implementation and cooperation mechanisms and to articulate guidelines for land use planning as an intermediate scale between the region and nation. In this sense, the experience generated in the province of Mendoza at the normative and localisation levels of the SDGs provides a model in tune with the local and provincial reality of San Juan.

The goals at the local-provincial scale were based on the strategic axes of the provincial government. These are outlined in the "San Juan 2030 Strategic Plan", related to the 2030 SDGs. Subsequently, the translation of the SDGs to the local-neighbourhood scale (Figure 2) was based on the consensus of strategic axes attained in participatory workshops conducted for the VLN community. These workshops allowed the residents to be recognised as active agents that contribute to decision-making, in cooperation with academic and governmental actors.

It is worth noting that the municipal level was not addressed in the translation of the SDGs as municipalities have transferred their land management rights to the DPDU. This centralised entity manages urban planning and ordering for the whole of the provincial territory. The DPDU is an institution inherited from the centralised administration that generated the reconstruction process of the city of San Juan, after the earthquake of 1944. Despite the constitutional reform, neither its functions nor its scopes were altered. For this reason, there are no municipal instruments that summarise goals or management axes that allow a reference to the SDGs.

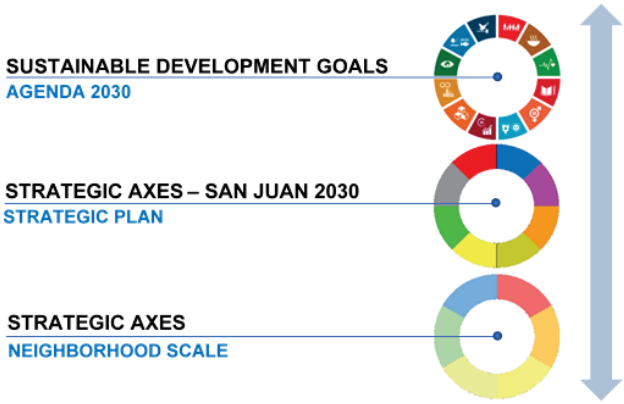

Figure 2. Methodological scheme for defining the SDG indicators
Source: based on SDGs Images (United Nations 2020b)

Máttar and Cuervo (2017) highlight the challenge that multi-scalar and multi-temporal articulation implies because long-term planning is a requirement for development. Matus (1980) argues that the multi-scalarity of planning seeks to develop a process where the micro level (the neighbourhood) is integrated with the macro level (the city, the region, the country, the world) meeting different demands and dynamics, according to criteria from the different territorial scales.

It should be considered that although the SDGs show some compliance at the national level, their operationalisation at the subnational and departmental levels is a real challenge. At the local level, the task of territorialising these global goals generally poses difficulties related to the approach and measurement of variables and indicators, as well as to the technical and financial capacity of those responsible for carrying out this activity.

In addition to the above, there are limitations associated with the community's capacity for participation, perspectives and interests, continuity of participants, as well as resources that allow for continuity over time. All this allows us to understand the complexity of these experiences.

On the other hand, there is an opportunity for the academic sector of the region to conceive common methodological approaches that consider planning from the point of view of "complex global systems". Both the Faculty of Architecture, Urbanism and Design of the National University of San Juan (Mattioli 2016, Nozica et al. 2020) and the National University of Cuyo in the province of Mendoza (Gudiño et al. 2016) are working on this approach. For this reason, the regional scale is relevant within the framework of the intervening scales for inter-institutional articulation. In turn, the local-neighbourhood scale would act as the endogenous push in solving problems from the neighbourhood towards the higher scales.

Participation of the Virgen de Lourdes community

The VLN participated in the activities of a project called "Participation, integration, organisation and collective management in the recovery and rehabilitation of neighbourhoods, Virgen de Lourdes, Rivadavia Department". Two workshops were held for the purpose of getting to know the neighbours, fostering community organisation, and stimulating citizen participation. The aim of this undertaking was to engage the community in the formulation, implementation and control of the different activities related to their needs and interests. Thus, the neighbours expressed their needs, interests, and proposals within the framework of sustainability (Figure 3), enabling social integration with their environment.

Figure 3. Workshop experience
Source: Mattioli (June, 2019)5

Results

Construction of SDGs at the local-neighbourhood scale

A proposal of SDGs at the local-neighbourhood scale was developed by the authors according to the conceptual background presented above and input from the neighbours' participation in the workshops. Table 1 shows the global SDGs and their translation to the proposed neighbourhood scale. The proposal of these goals reflects the particularities of the real needs of the VLN residents. For example, the high percentage of working-age women who are unemployed promoted a concept of housing that goes beyond the requirements of residence and habitability. This makes it possible to think of housing as real opportunities at the family and community levels. It is also possible to envisage new forms of relationships and a multiplicity of functions for housing. Complementarity and association would enable a solidarity economy based on social benefit, possibility of providing care or attention, and agroecological production, among others. Housing thus becomes the basic unit of social reproduction.

Table 1. Proposal of Global SDGs at the local-neighbourhood scale.
Source: Adapted from Arroyo O'Grady (2015)

Global SDGs	SDGs proposed at the local-neighbourhood scale
1. Ensure access for all to adequate, safe, and affordable housing and basic services and upgrade slums.	1. Access to quality housing, conceived as a space of real and concrete opportunity for family and community progress.
2. Provide access to safe, affordable, accessible, and sustainable transportation systems for all and improve road safety, in particular by expanding public transport, with an emphasis on the needs of people in vulnerable situations, women, children, people with disabilities and the elderly.	2. Promote spatial accessibility to public transport, guaranteeing its proximity to the commuter service.
3. Increase inclusive and sustainable urbanisation and capacity for participatory, integrated, and sustainable planning and management of human settlements in all countries.	3. Formulate participatory neighbourhood improvement plans. Urban development must become an engine of economic, social, and human development that protects the environment and generates well-being, justice, and equity.
4. Redouble efforts to protect and safeguard the world's cultural and natural heritage.	4. Protect buildings or spaces of value that can constitute the basis for strengthening the neighbourhood identity, such as the opportunity to have valuable infrastructure capable of accommodating complex uses.

Global SDGs	SDGs proposed at the local-neighbourhood scale
5. Significantly reduce the number of deaths and people affected by disasters, including those related to water, and substantially reduce direct economic losses related to the global gross domestic product caused by disasters, with special emphasis on the protection of the poor and people in vulnerable situations.	5. Formulate neighbourhood contingency plans, considering the losses of life, infrastructure and services caused by disasters
6. Reduce the negative per capita environmental impact of cities, with special attention to air quality and the management of municipal and other waste.	6. Manage household waste in a sustainable manner.
	7.a. Conceive public space as a space for coexistence, leisure, exercise, exchange, and other multiple uses.
7. Provide universal access to safe, inclusive, and accessible green areas and public spaces, particularly for women, children, the elderly and people with disabilities.	7.b. Propose strategies that provide solutions to quality urban spaces in terms of thermal, light and acoustic comfort. This quality will depend on the integration of the microclimate, the urban configuration, and the materials that characterise it.
	7.c. Protection of shadows in the road from a certain number of trees. Create bio-climatically comfortable public spaces, characteristic of an oasis city.
8. Support positive economic, social, and environmental links between urban, peri-urban, and rural areas by strengthening national and regional development planning.	8. Guarantee the spatial and functional continuity of the city, articulating the processes of expansion and social cohesion in such a way that dispersed urban developments are not created.
9. Substantially increase the number of cities and human settlements that adopt and implement integrated policies and plans to promote inclusion, efficient use of resources, mitigation of and adaptation to climate change, and resilience to disasters, and develop and implement comprehensive disaster risk management at all levels, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030.	9.a. Optimisation of the demand for domestic and public water from the application of saving measures in homes and substitution of part of the demand for non-potable water, which implies the use of rainwater and wastewater.
	9.b. Guarantee that basic services are accessible (in time, distance, and quality) to all citizens, including the vulnerable population in any circumstance.
	9.c. Propose energy self-sufficiency strategies for homes and public spaces based on solar thermal or photoelectric capture capacity.
10. Provide support to less developed countries, including financial and technical assistance, so that they can build sustainable and resilient buildings using local materials.	10. Encourage houses built with passive systems (without thermal bridges, cross ventilation, good insulation, and light colours for the facades), using bio-climatically appropriate technologies.

To summarise the SDGs proposed at the local-neighbourhood scale, it is convenient to organise the goals into six groups as follows: accessibility to quality housing, public transport, public space, social cohesion, environmental efficiency, and sustainable urban management.

Figure 4 shows the interrelationships between the territorial and government scales and the groups of neighbourhood goals. It can be seen that the objectives related to sustainable urban management are conditioned by the policies of the different levels of government: national, provincial, and municipal. In turn, the groups that refer to the neighbourhood scale collaborate with the Sustainable Urban Management of municipal competence.

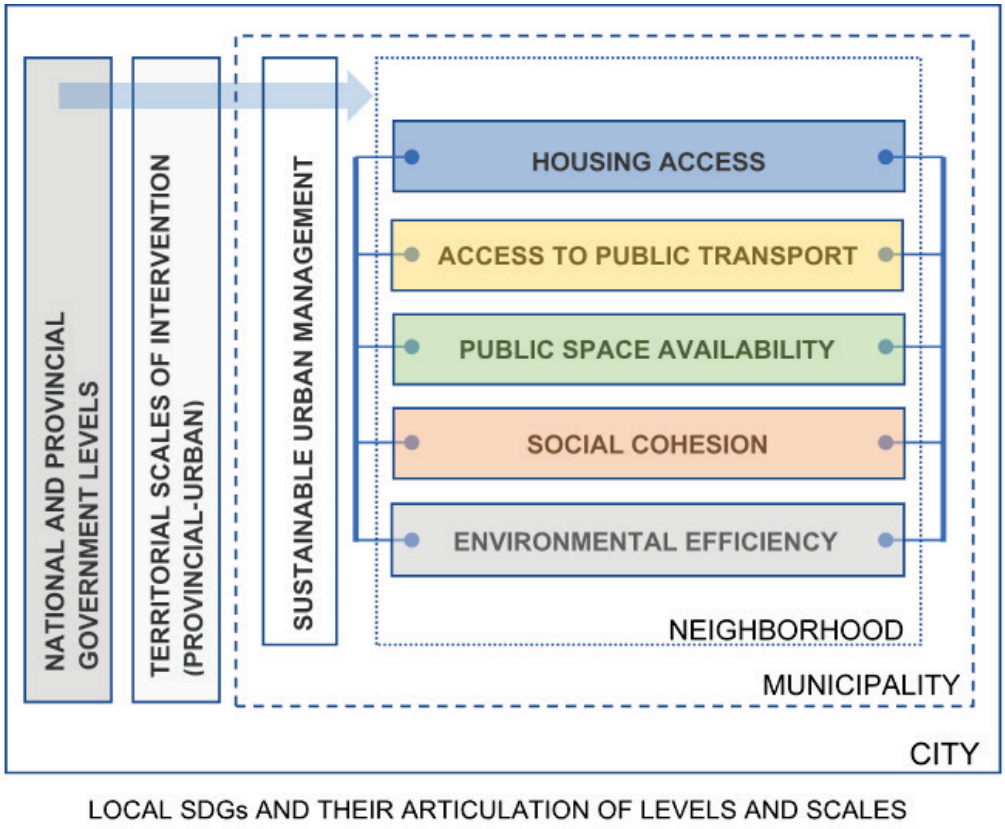

Figure 4. Multi-level and multi-scalar relationships between the SDGs

Table 2 articulates the neighbourhood goals with the objectives of the provincial government (government axes according to the San Juan 2030 Strategic Plan) and the 2030 SDGs, considering the need for articulation between the levels of government and territorial scales.

Table 2. List of Global SDGs, strategic axes of the provincial government and neighbourhood goals based on the SDGs (2015)

		Neighbourhood Goals					
		1. Accessibility to quality housing	2. Accessibility to public transport	3. Accessibility and provision of public space	4. Social cohesion	5. Efficiency	6. Sustainable neighbourhood management
Axes of government	1. State and institutions						■
	2. Government and public policies				■	■	
	3. Social development, integration, and diversity	■					
	4. Economy, production, and labour						■
	5. Innovation and modernisation					■	
	6. Occupation and use of the territory	■	■	■	■	■	■
	7. Local development						■
	8. Integration						■
Sustainable Development Goals	1. End of poverty	■					■
	2. Zero Hunger						■
	3. Health and Welfare						■
	4. Quality Education						■
	5. Gender Equality						■
	6. Clean water and sanitation					■	
	7. Affordable and clean energy					■	
	8. Decent work and economic growth						■
	9. Industry, innovation, and infrastructure					■	
	10. Reduction of inequalities						■
	11. Sustainable cities and communities	■	■	■	■	■	
	12. Responsible production and consumption					■	■
	13. Climate action					■	
	14. Underwater life						
	15. Life of terrestrial ecosystems						
	16. Peace, justice, and strong institutions						■
	17. Partnerships to achieve the objectives						■

Neighbourhood indicators based on the SDGs

According to the previous six categories of goals, indicators and action strategies for the VLN are proposed taking into account the SDGs (table 3). These goals resulted from the needs expressed and evaluated in the participatory activities.

Table 3. Proposal of indicators and action strategies based on the SDGs at the local-neighbourhood scale

Category	Goal	Action strategy	Proposed indicators
1. Accessibility to quality homes	Guarantee access to quality housing, conceived as a space of real and concrete opportunity for family and community progress.	Propose new urban-architectural typologies of housing that guarantee a socially diverse fabric in terms of family groups and social levels.	*Quality of construction materials:* % Percentage of CALMAT (level of construction based on materials) category IV and V dwellings. *Residential status:* % of residents with title deeds. *Accessibility to public services:* % homes connected to services. m^2 per home.
2. Accessibility to public transport	Encourage spatial accessibility to public transport, guaranteeing its proximity to the commuter service.	Allow access on foot to the public transport network that guarantees the connection between the main points of attraction in the city, as well as the maximum number of multimodal commute options.	*Location of public transport stops:* Availability of public transport stops separated by no more than 300 metres. Urban connection, time/distance to central nodes.
3. Accessibility and provision of public space	Conceiving public space as a space for coexistence, leisure, exercise, exchange, and other multiple uses.	Propose strategies that provide solutions to quality urban spaces in terms of thermal and light comfort, typical of an oasis city. This quality will depend on the integration of the microclimate, the urban configuration, and the appropriate materials of the region.	*Provision of green spaces:* Available green space area (GS) per inhabitant (Inh) (minimum $10m^2$/Inh). It should have 8000 m^2. *Access to green spaces:* 2000 m^2 at a distance of less than 200 m. 5000 m^2 at a distance of less than 750 m. *Tree provision:* 400 trees/km neighbourhood street. 1 tree/20 m^2 of built area. *Provision of public roads:* % of public space for pedestrians and common uses.
4. Social cohesion	Guarantee basic services that are accessible (in time, distance, and quality) to all citizens, including the	Build a city accessible to all, with short distances, where services are spatially accessible.	*Maximum distances:* Local shops 1000 m. Primary school 500 m. Day-care centre for infants 300 m.

Category	Goal	Action strategy	Proposed indicators
	vulnerable population in any circumstance.		Secondary school 800 m. Sports centres 500 m. Municipal office 800-1000 m. Primary health care centre 800 m. *Community centres.*
5. Efficiency	Incorporate the principles of efficiency in the use of resources to urban development in order to produce the minimum disturbance of ecosystems.	Provide residential buildings according to the typology (multi-family or single-family) with energy capturing sources (thermal and photovoltaic) and passive solutions to reduce dependence on non-renewable energy sources. Establish strategies for optimising domestic and public water demand.	*Energy consumption per home.* *Water consumption per home.*
6. Sustainable neighbourhood management	Promote the comprehensive collective management of the neighbourhood that allows the recovery of public spaces, family homes, and their urban environments, contributing to the construction of the public dimension of community life.	Coordinate the actions for the rehabilitation of the neighbourhood with public and private organisations from different areas and sectors together with the neighbours.	*Existence of:* Land use planning plans at the municipal level. Participatory neighbourhood improvement plans. Neighbourhood contingency plans. Participatory housing recovery plans. Participatory housing production programs.

Case study evaluation

The following is the evaluation made for the VLN case study according to the proposed indicators and presented categories:

1. Accessibility to quality homes: It can be noted that the greatest demands were focused on the quality of public space and accessibility to housing. The quality of the construction materials was found to be poor, with 70% made of adobe or mixed brick-adobe, which does not meet the needs of the seismic zone of San Juan, and 26 homes were in critical condition. Only 21% of the households are legally owned by the inhabitants. A low percentage of homes have connections to public services (mainly sewer and gas), due to connection costs, the quality of the home construction materials and the lack of property titles. In addition, 83% of the inhabitants are below the poverty line, with high levels of informality.

2. Accessibility to public transport: There is a good supply of public transport and road connectivity in the sector. Buses circulate on the main roads, and bus stops are located within a range of 300 metres but they offer no shelter, information, or ramps for people with reduced mobility. Public transport runs with acceptable frequency.
3. Accessibility and provision of public space: Deficiency is evident in the availability and quality of public space, given the scarce provision of green spaces, the poor condition of sidewalks and the lack of signage, lighting, and ramps. The tree irrigation and rainwater drainage systems are in critical conditions. The streets lack curbs, although the pavement is complete and in good condition.
4. Social cohesion: Access to health and education services do not show critical situations in relation to availability and access, except for a percentage of people with disabilities. On the main roads, there are premises for daily and occasional shopping. The area is supplied with school infrastructure, offering access to primary and secondary schools, as well as kindergarten establishments. The Neighbourhood Community Centre does not meet the minimum conditions for proper operation.
5. Efficiency: Energy consumption and water consumption per dwelling are parameters within normal to low limits.
6. Sustainable neighbourhood management: With regard to sustainable neighbourhood management, VLN only has a participatory housing recovery plan. The neighbourhood is experiencing a continuous process of impoverishment of the urban fabric, which contrasts with its privileged location close to the province's centrality. This translates into low competitiveness in the land market, due to a problem related to property ownership and a lack of interest from urban investors.

Proposed Neighbourhood Sustainable Development Index (NSDI) and level of incidence

A Neighbourhood Sustainable Development Index (NSDI) is proposed in order to determine the level of sustainability of a neighbourhood, with six categories (Table 3), which are related to the goals described in Table 1. This index makes it possible to assess the level of incidence of such goals grouped by the Government Axes of San Juan province and the 2030 SDG. Each goal is considered to have the same weight in the NSDI, with only the weight of each action varying proportionally. Correspondingly, each goal affects 16.7% of the index (Table 4). Equation 1 expresses the proposed index.

$$NSDI = WG_1 + WG_2 + WG_3 + WG_4 + WG_5 + WG_6 \quad (1)$$

where,

WG1 = Weight of neighbourhood goal 1, *WG2* = Weight of neighbourhood goal 2, *WG3* = Weight of neighbourhood goal 3, *WG4* = Weight of neighbourhood goal 4, *WG5* = Weight of neighbourhood goal 5, *WG6* = Weight of neighbourhood goal 6

The result of the NSDI is a number between 0 and 100. The higher the number, the greater the level of sustainable development of the neighbourhood.

Table 4. Sustainable Development Index and goals according to government scales

		Neighbourhood goals					
		1. Accessibility to quality housing	2. Accessibility to public transport	3. Accessibility and provision of public space	4. Social cohesion	5. Efficiency	6. Sustainable neighbourhood management
Axes of government	1. State and institutions						6.67
	2. Government and public policies				33.3	11.1	
	3. Social development, integration, and diversity	25					
	4. Economy, production, and labour						6.67
	5. Innovation and modernisation					11.1	
	6. Occupation and use of the territory	25	50	50	33.3	11.1	6.67
	7. Local development						6.67
	8. Integration						6.67
Sustainable Development Goals	1. End of poverty	25					6.67
	2. Zero Hunger						6.67
	3. Health and Welfare						6.67
	4. Quality Education						6.67
	5. Gender Equality						6.67
	6. Clean water and sanitation					11.1	
	7. Affordable and clean energy					11.1	
	8. Decent work and economic growth						6.67
	9. Industry, innovation, and infrastructure					11.1	
	10. Reduction of inequalities						6.67
	11. Sustainable cities and communities	25	50	50	33.3	11.1	

12. Responsible production and consumption					11.1	6.67
13. Climate action					11.1	
14. Underwater life						
15. Life of terrestrial ecosystems						
16. Peace, justice, and strong institutions						6.67
17. Partnerships to achieve the objectives						6.67
Total by goal	100	100	100	100	100	100
Incidence of the goal on the total SD of the neighbourhood	16.7	16.7	16.7	16.7	16.7	16.7
Total SD of the neighbourhood	16.7	16.7	16.7	16.7	16.7	16.7
	100					

Discussion

The 2030 SDG Agenda sets a strong global precedent for a progressive transformation towards a sustainable city model. However, it should be noted that the development and monitoring of many of the goals set entail the responsibility of local governments within their legal competences. This represents a great challenge in the current situation facing Latin America and Argentina.

Therefore, it is essential to provide normative instruments for territorial planning that regulate land use as well as planning and management with a comprehensive, systemic, inter-jurisdictional and interactive vision between the market, the State and society (Gudiño et al. 2016, Mattioli 2019). Mendoza is advancing in this sense, which represents an opportunity for inter-provincial or regional cooperation, as an intermediate scale of assessment as long as other provinces follow the same path.

Sustainability must unfailingly be achieved based on cooperation and association between different levels, organisations, and the general public interest, through coordinated action to solve problems in accordance with the principle of shared responsibility (González González 2002). This is of vital importance, and it entails an increasing complexity due to the scope of the negotiations in diverse contexts of governance and governability at different territorial scales. Moreover, the practical implications of this work reinforce the idea that localising the SDGs at local and neighbourhood scales merits additional efforts related to neighbourhood participation and self-management, as well as multilevel engagement and collaboration.

Finally, it is highlighted that works such as, Grădinaru et al. (2015), Nagy et al. (2018), Méreiné-Berki et al. (2021), among others, could contribute to the future development of research in areas of urban expansion, as well as to the debate on indicators and ways

of implementation for the SDG agenda. They also collaborate with the study and planning of intermediate cities in the framework of sustainability, participation, and social relations at the local level.

Conclusions

The SDGs offer an opportunity to strengthen inter-jurisdictional implementation and cooperation mechanisms aimed at articulating the guidelines of the different territorial scales and levels of government. To this end, it is necessary to articulate efforts, to propose coordination mechanisms, to define responsibilities, and to allocate resources or incentives to each level of government.

Currently, efforts to "localise" the SDGs have been focused on national, provincial, and municipal levels, with incipient cases in Argentina at the last level. The neighbourhood scale is not considered in this translation. For this reason, this work aimed to generate a proposal for the "localisation" of the SDGs at the neighbourhood scale, evidencing the need to define and quantify the goals according to local realities. The translation for the VLN made visible the centralised structure of the DPDU of the province of San Juan, which hindered the proper management of the municipalities.

It was observed that the municipalities play a predominant role in the chain of collaboration with the monitoring of the SDGs, since they are the ones that materialise the concrete actions in the territories. The neighbourhood scale makes it possible to achieve the objectives in a collaborative way among the different actors involved by considering the social and spatial reproduction logic of the inhabitants and, therefore, the different territorial scales. The experience in the VLN equips the inhabitants with tools to develop as citizens and subjects, contributing to the resolution of their problems. This implies that the proposed process is reversed from the micro-relationships in the articulation of territorial scales, generating bottom-up development with a top-down policy framework (ODS), and the different axes of government that support it. The localisation of the SDGs at the local-neighbourhood level allows us to state that it represents an effective tool to measure the contribution generated by local actions at the various scales involved.

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Aims & Scope

Urban and regional questions are crucial in understanding the present territorial conditions. From the World Bank's 'rediscovery' in its 2009 Report of the potential of cities in encouraging economic growth, to the multiple ways in which cities are being drawn into the processes of neoliberalism, to the dynamic growth of cities in the developing countries in Asia far out stripping the scale of cities in the older urbanized nations – everywhere there are signs of a rapidly changing urban condition. The same is true for the regions where 'old questions' of regional economic disparity and uneven development are being given a new twist as economic globalization impacts the national and local arenas.

JURA, the Journal of Urban and Regional Analysis, working as an Open-access journal (with two issues/year, in **April and in October** - starting with 2023; previously annually publishing in June and in December, for the period 2009-2019), was launched as a response to the exciting world of urban and regional research emerging in reaction to these changes happening in the real world.

JURA represents the initiative of the Interdisciplinary Center for Advanced Research on Territorial Dynamics (CICADIT) at the University of Bucharest working in collaboration with Ronan Paddison at the University of Glasgow, for the period 2009-2020. Starting with 2021, JURA is also supported by the Professional Association of Romanian Geographers (APGR). While the intention is that articles published by JURA will draw on examples throughout the world, particular emphasis will be given to urban and regional change as it is being experienced in Eastern Europe.

Transitional economies, and urban and regional shifts in the region since the end of the socialist regimes have been profound. The socialist regime had its particular effects on the regional economy and the cities, linked with structures that, in many ways, were very different from the trends apparent in Western Europe in the post-World War II period. Since 1990, change has been swift, challenging our theoretical understanding of the processes; for example, it is plausible to transport theories of contemporary urban change under neoliberalism developed in the advanced economies to the transitional economy. The legacy of the socialist regime, its imprint on the city physically and socially, provides further reason to suppose that urban (and regional) development in transitional economies is distinctive. These differences re-emphasise a consistent axiom underpinning the study of cities and regions: that if it is possible to point to broad theories that apply across different regions of the world, they often need to be modified taking into consideration the local conditions.

Though JURA is primarily concerned with looking at urban and regional change in the transitional East European economies, case studies exploring similar problems but in other parts of the world are certainly parts of the journal's agenda. The remit of the journal is emphatically interdisciplinary. The analysis of the urban and regional conditions needs to be interdisciplinary. Urban and regional researchers usually tend to belong to a discipline reflecting their training whether as sociologists, geographers, urban planners or any number of subjects concerned with the study of space and place. Our training very often endorses an appreciation of how other disciplines explore the city and the region. For the journal, the acknowledgement of the many disciplines that are concerned with understanding cities and regions will be indicated by the different disciplinary backgrounds reflected in the published papers. Articles will be published by geographers, sociologists, urban planners, economists, political scientists, to mention just a few of the scholars involved in the urban and regional study.

Edited by Prof. PhD. Ioan IANOS