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ORIGINAL ARTICLE

# Sustainable urban development and the role of mega-projects: Experts' view about Madrid Nuevo Norte Project

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## ABSTRACT

The present paper discusses the case of the Madrid Nuevo Norte Project (MNNP) in order to examine the relation of this mega-project with the city's sustainable development. For this reason, the study used a qualitative approach using semi-structural interviews with experts (Madrid's town hall, Madrid State, and the program management office and other external) that relayed strongly with MNNP. The expert panel requirements are split in six expertise areas: sustainability, urban development, urban planning, government or public affairs, project management or Madrid Nuevo Norte (MNN) key stakeholders. The study highlighted the vital importance of MNNP as a flagship sustainable project for the rest of Europe, that meets sustainability criteria for contributing substantially in the improvement of the quality of life of final users and for the community in general. For instance, it contributes to the regeneration of the city's degraded area, to the interconnection of an isolated part of the city and public transportation connection, improving the external image of Madrid. Despite of it, there are some challenges that should be carefully managed such as applying sustainable solutions from other cities not properly tailored to Madrid, housing pricing accessibility increase due to the lack of terrain in Madrid and the politization of the project as discussion topic between local parties. In this context, local authorities should give particular emphasis in complying with the principles of sustainability for improving the overall performance of MNNP, ensuring social justice and prosperity for the people of Madrid.

## KEYWORDS

*mega-projects; urban sustainable development; experts; Madrid Nuevo Norte Project (MNNP); Madrid; qualitative approach*

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## 1. Introduction

It is a well-known established that the last almost 50 years are characterized by the continuing effort of cities, mainly the industrial globally, to reconstruct their images and creating an even more competitive, and sustainable profile in the globalized multidimensional environment. This process led cities to new development path models facing the impacts that de-industrialization period-generated (Gollin et al., 2016; Mega, 1996; Mendels, 1972). Under this option, the processes of strategic planning, urban/city marketing and more recently, city branding have an essential role for cities in order to increase their market share and support their economic development (Anholt, 2008; Ashworth and Voogd, 1990; Kavaratzis, 2004; Kotler et al., 1993; Kavaratzis, Asplund, et al., 1999; Metaxas, 2009; Metaxas et al., 2021; Scherrer, 2002). Therefore, urban/city marketing as a strategic planning process actually connected with cities' development and sustainability (Deffner et al., 2020). To this particular point, strategic planning and the construction of the city's image as "good" (Metaxas, 2003), strongly related to the land use and housing policies (i.e., Bramley and Watkins, 2016; Hansson, 2017) that include as a key strategy, the existence of "prestige projects" (Loftman and Nevin, 1996) or "mega infrastructure projects (mega-projects)" (Mylonas and Xenidis, 2018; Thounaojam and Laishram, 2021; Ward and Skayiannis, 2019). The term mega-project is nowadays most often taken to refer to two major types of schemes—on the one hand, one based on the construction of a huge edifice with strong symbolic significance (e.g., certain flagship museums; see Hamnet and Shoval (2003)), and on the other hand, a larger scheme with complex contents (mixed residential uses, service industries, shared facilities, new transport facilities, etc.) (Oreuta and Fainstein, 2009). In addition, a mega-project could be characterized as a single infrastructure project, for instance, the metro extension in the Rotterdam Region in the Netherlands, or the Vancouver Convention Centre expansion or the National Stadium in Beijing (Ren, 2008; Sroka, 2021), or to become more complex infrastructure such as land-use remodeling plans (Ponzini and Santagelo, 2018; Ryu and Kwon, 2016).

In Europe, for instance, we have some specific cases of mega infrastructure projects that related to urban sustainable development and to regeneration issues. Mitoula and Papavasileiou (2023) examine the critical role of mega infrastructure projects in sustainable urban and peripheral development by presenting a Sustainable Infrastructure Serum Analysis supported by primary field research, using the Athens Metro in Greece as a case study. In addition, Vardopoulos (2022) using the FIX Brewery (the newly founded Hellenic National Museum of Contemporary Art (EMST) in Athens, Greece) as a case study, examines through primary data, the aspects of sustainability focusing on financial investment, environmental protection, cultural heritage preservation, and urban regeneration of the area. From their point of view, Dogan and Stupar (2017) attempt to identify and analyse the dynamics and mechanisms of urban transformation in Istanbul using the case study of three mega-projects currently underway—the Third Bridge (officially named Yavuz Sultan Selim Bridge), the Third Airport, and Kanal Istanbul. Similarly, Giezen et al. (2015) use the concept of strategic capacity for analyzing the decision-making process on mega-projects. In their analysis, by using interviews, Giezen et al. (2015) investigated two large transport projects in The Netherlands: the first is the high-speed train line that runs from Amsterdam to Brussels and Paris, and the second is an interregional transport project that links different transport systems between Rotterdam and The Hague. At the end, Gospodini (2005) attempts to describe the potential of urban transport infrastructure projects such as metro, regional rail and tram, as a catalyst for the development and

redevelopment of urban areas as well as the regeneration of declining areas, by using a sample of 12 European cities as part of the *Transecon* project by the EU.

The present paper focuses on the Madrid Nuevo Norte Project (MNNP) that represents one of the largest urban regeneration projects in European practice and receives recently quite research interest (i.e., Abril, 2020; Baron and Fernandez, 2019; Metaxas et al., 2021; Perez et al., 2021). MNNP takes on the UN's 2030 Agenda as a guide to carry out all its social, environmental and economic sustainability actions. The project addresses the Agenda's 17 Sustainable Development Goals (SDGs), providing proposals on all the points of the international roadmap that can be applied in the project's field of action. According to DCN (2021), MNNP is making headway towards the most demanding sustainability standards in the international arena. It seeks to become a benchmark for future urban developments in this area. More specifically, the present paper discusses the case of MNNP in order to examine the relation of this mega-project with city's sustainable development. For this reason, the study used a qualitative approach using semi-structural interviews with experts that relayed strongly with MNNP. The expert panel requirements are split in six expertise areas: sustainability, urban development, urban planning, government or public affairs, project management or Madrid Nuevo Norte (MNN) key stakeholders.

The main research objectives related first to the analysis of the theoretical and contextual background from the standpoint of the importance of MNNP as an instrument of urban transformation and support for economic development. Second, the identification by the experts of the concept and the dimensions of the so-called "urban sustainable development", considering the fact that sustainable development is a multi-task meaning.

Following this, the study based on the following hypotheses:

H1: MNN is a project developed under sustainable development criteria, having a positive impact for the city of Madrid (Simon et al., 2016).

H2: MNN is an example of urban sustainable development at European Level (Perez et al., 2021).

H3: MNN is positive in terms of sustainability, image and example for future urban sustainable development projects (Metaxas et al., 2021).

Much of the literature provides a positive connection between mega infrastructure project investments and sustainable development (Metaxas et al., 2021; Vardopoulos and Theodoropoulou, 2018). However, some researchers cite the possible negative impacts of such projects, socially, on social and environmental developments (Thounaojam and Laishram, 2021). Some other studies present evidence based on primary data from social groups of interest (Mitoula and Papavasileiou, 2023) and finally, some other perform structural fuzzy models using primary data by experts' interviews (Vardopoulos, 2019). The benefit of the study related to the identification of the importance of MNNP by experts with strong connection with MNNP operation and analysis. The study uses expert panel research method (Martens and Carvalho, 2016) has been selected to evaluate the impact of MNN as sustainability project considering the importance, size and impact of the project (Ewing and Bartholomew, 2009). This method is common in several sciences but not so common in urban strategic planning and sustainable development areas (Rikkonen et al., 2006; Washington et al., 2009).

The study highlighted the vital importance of MNNP to meet sustainability criteria for

contributing substantially in the improvement of the quality of life of final users and for the community in general. In this context, local authorities should give particular emphasis in complying with the principles of sustainability for improving the overall performance of MNNP, ensuring social justice and prosperity for the people of Madrid. The sections of the paper are the following: literature review focusing on sustainable development and the role of mega-projects in Spain are presented on Section 2, while Section 3 focuses on sustainable urban image. Section 4 analyses the mega-projects related to sustainability, while Section 5 presents the Madrid Nuevo Norte Project as a case study. Section 6 analyses methodology, the data, and the path modelling analysis. Last section concludes.

## 2. Sustainable development and the role of mega-projects in Spain

Since the Bruntland Commission's Report *Our Common Future* (The World Commission on Environment and Developmen [WCED], 1987) and over the last decades, there is an extensive research analysis regarding the concept of *Sustainable Urban Development* (i.e., Diamantini and Zanon, 2000; Kopp and Petretta, 2017; Scipioni et al., 2009) or *Urban/City Sustainability* (i.e., Alberti, 1996; Bulkeley, 2006; Maclaren, 1996; Mensah, 2019; Turcu, 2013).

> *"Sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs."* (WCED, 1987)

Furthermore, the planning of sustainable development should take into account the analysis of local economic forces, the environmental conditions locally and finally, cultural and social distinctive characteristics (Annan, 2002; Conroy and Berke, 2004; Kain and Soderberg, 2008). A common way to explain the concept of "Sustainable Development" is by referring to the economy, society, and environment as three separate but interdependent "pillars". These "pillars" can be represented graphically as supporting sustainability or intersecting circles. All these studies and many others, award three core dimensions of sustainable development in long-term horizon directly connected with urban environment, the economic dimension, environmental and social (Dahri and Omri, 2018; Dempsey et al., 2011; Purvis et al., 2019; Wanamaker, 2018).

On the other way, mega-projects (MP) are characterized by complexity, uncertainty, ambiguity, dynamic interfaces, significant political or external influences, and durations reaching a decade or more (Caldas and Gupta, 2017; Floricel and Miller, 2001). There is a substantial amount of international literature dealing with mega-projects in urban planning and development, which indicates the rising role of large development projects in cities (Dewey and Davis, 2013; Flyvbjerg, 2009; Zekovic and Maricic, 2022). In addition, mega-projects conform to a model of urban sustainable development that many governments favor: high-profile strategic projects with the potential to satisfy immediate aims attract external capital and redefine a neighborhood or the city as a whole (UNCHS-Habitat, 2004). They are also focused on flexibility and diversity, as opposed to being unitary infrastructure; the ideology is based on becoming a "competitive city" rather than just ensuring "progress"; and they consist of complexes or districts, rather than singular structures (Hannan and Sunderland, 2015). Mega-projects are also characterized by exceptionality, as ordinary statutory planning measures are suspended and they are able to bypass official channels using special agencies (Swyngedouw et al., 2002).

Following Sklair (2005), mega-projects act as a prime strategy for the transformation of urban space, whilst their spatial and functional similarity reflects the homogenizing effect of global forces. Flyvbjerg (2017) defines mega-projects as "large-scale, complex ventures that typically cost US$1 billion or more, take many years to develop and build, involve multiple public and private stakeholders, are transformational, and impact millions of people". They also involve international participants with a variety of cultural differences, backgrounds, political systems, and languages (Shore and Cross, 2005), while they involve a variety of stakeholders and businesses with influences the wider economy of cities, regions and nations, and even on the global economy (Sturup and Low, 2019). All mega-projects require the cooperation of the public and private sector. Recent studies prove that the coordination of best governance practices between the public sector and other agents such as private organizations represent a significant improvement in the overall performance of mega-projects (Shaker et al., 2019; Tinoco et al., 2016). Kennedy et al. (2014) classified mega-projects in four categories: (1) infrastructure for basic services, (2) economic development (property development and commercial activities), (3) transport infrastructure, and (4) urban redevelopment. The Urban Mega Projects (UMPs) include e-high-technology, extreme engineering, innovations, sophisticated design with "iconic" buildings and information and communication technology (ICT) infrastructure. Owing to their substantial impact on the community, environment and budgets, UMPs often attract high public attention, political interest and multiple stakeholders.

The complexity and the size of the mega-projects make them inherently tied to the logic of urban growth and development, which leads to wealth creation, prosperity, and urban qualitative transformation (del Cerro Santamaria, 2019). Some authors, such as Guala (2015) and Roche (2017), have focused their attention on the scope that the mega-projects called "big events" have had on the transformation of the urban context. When talking about this type of event, it is not limited only to its celebration, but rather constitutes a powerful device capable of activating stable processes of urbanization, transformation and regeneration of cities. The event usually has a decisive role since it is able to unlock financing, streamline bureaucratic processes and increase institutional capacity. Furthermore, these events are an excellent opportunity to define or even redefine the image of a city and promote both potential and new local development processes.

As examples of this urban renewal coming from important celebrations, we can mention the international competition of some Spanish cities, such as Barcelona JJOO or Seville with the Universal Exposition, both in 1992. These mega-projects played a fundamental role in urban transformations, which was carried out thanks to large investments, also achieving the redefinition of the image as a city as well as its urban renewal (Gastaldi and Camerin, 2018).

The international experience is rich in successful and failed examples of mega-projects. Shenhar and Holzmann (2017) state that the key points for the success of mega-projects are three: clear strategic vision, total alignment, and adapting to complexity. Several studies award the impacts (positive or negative) of mega-projects on local economy by fostering local employment, increasing land values, business opportunities, creation of new investments to the area, generate economic benefits for local government or living standards and wealth distribution to local community (Li et al., 2018; Song et al., 2018; Wang et al., 2020). On the other side, various mega-projects have failed due to extensive overruns, misunderstanding of expectations, or both. In addition, other studies examine mega-project impacts on local and regional environment, focusing on specific sectors such as, water, air and ground pollution, climate change and energy saving, and open green

spaces (Banihashemi et al., 2017; Karji et al., 2019; Ugwu and Haupt, 2007; Xing et al., 2009). Furthermore, mega-projects are connected with social factors, such as reduction of social inequality, provision of basic services and civic facilities, improvement of public transportation and reduction of traffic problems (i.e., Nair and Nayar, 2020; Wu et al., 2020). On the contrary, mega-projects often are connected with negative impacts, like the territorial tensions produced in contexts of extreme social inequalities, irregular distribution of social and civic facilities, insufficient green areas, limited access to water, inefficient and unsustainable public transport solutions. Social injustice to local communities has also captured the attention of many scholars. Mega-projects have displaced many homes and impact on the livelihoods of many people, mainly the ones inhabiting the project's proximity (Thounaojam and Laishram, 2021). Cities are spaces in which inequalities and different degrees of environmental impact are concentrated, but also, the bulk of economic activity and employment (Tomàs, 2023). Given the different problems that mega-projects pose, it is essential to promote certain objectives such as equity in urban development, the fight against poverty, social exclusion and inequality, identifying the "neighborhoods or urban environments that present a greater degree of social, economic vulnerability and environmental". This is one of the lines of action of the Spanish Urban Agenda in collaboration with the European Urban Agenda (Spanish Urban Agenda, n.d.), whose main purpose is to reduce the risk of poverty and exclusion in disadvantaged urban environments.

A study called "Catalogs of Vulnerable Neighborhoods" is considered especially useful, since it offers a broad overview of urban vulnerability in Spanish cities that opens a reflection on its possible causes and the way in which they can be solved. Its goal is to understand urban vulnerability from the perspective of urban quality of life, identifying the problems and opportunities of these neighborhoods, anticipating in some way the concept of urban resilience.

For this, it is advisable to know the reality of our cities, which is the main mission of the Catalogs, to contribute to the development of public policies that integrate the different dimensions of the quality of urban life. The Catalogs are, therefore, useful tools for determining the phenomenon of urban vulnerability in Spain and for integrated urban regeneration (Rodriguez et al., 2021).

In addition, environmental destruction is identified as one of the negative impacts of mega-projects. These issues due to the incorrect implementation of urban development policies have been widely studied and documented in mega-cities such as Cape Town, Durban, Delhi, and Lima (Kennedy, 2015). Of course, these negative impacts are often related to the poor management project performance and their failure to deliver the indented outcomes (Denicol et al., 2020). Mega-projects may be viewed as huge development schemes that are particularly ambitious, expensive, and difficult to manage, with a tendency to fail to meet the initial objectives (Schindler et al., 2019).

In Spain, particularly, there are several mega-projects developed funded by European Union (E.U.) under the URBAN I and URBAN II initiatives. For instance, Hurtado (2017) analyses the *Iniciativa Urbana* (IU), by taking two specific cases studies focusing on Madrid area, Leganés-La Fortuna and Madrid-Villaverde, in order to examine regeneration aspects of the projects developed on these areas.

## 3. Madrid Nuevo Norte Project (MNNP)

### 3.1. A brief history

Along the lines existing in the management of sustainable development, the cities and governments are increasingly aware of the effort needed to be play to reach a consistent ratio and more balanced between natural resources and economic development and the social well-being (Romero-Vargas et al., 2020). The urban history of Madrid Nuevo Norte began in the 1990s under the name of Operation Chamartín, with the main objective of exhaustive remodeling of the North Station and nearby neighborhoods. The approval of this mega-project by the different stakeholders has taken more than 25 years and the current proposal is based on turning the streets, people and public transport into the new protagonists. Some environmental associations affirm that it is a speculative, oversized and unsustainable project, from the social, economic and environmental point of view (Perez et al., 2021). The capital of Spain is immersed in one of its greatest challenges: to achieve a sustainable and efficient urbanism focused on the environment. Sustainability is a complex issue that implies willingness on the part of state institutions to bring about efficient changes in their production and consumption patterns (Linares-García and Vásquez-Santos, 2018), thus becoming a primary objective for which, more and more cities worldwide decide to invest. Madrid Nuevo Norte is one of the largest European projects in urban transformation (Metaxas et al., 2021), which will include new office buildings, homes, green areas and public spaces that will occupy around 75% of the total area of the plan in its set (**Figure 1**). The company behind the project information and promotion is called Castellana Distrito Norte.

**Figure 1.** Madrid Nuevo Norte Project.
*Source:* Madrid Nuevo Norte (n.d.).

The main location of the project is in the Chamartín station that will be equipped with a transport interchange that includes urban and regional transportation, long-distance and high-speed trains, which will make it the point most important high-speed in Spain. It will also be equipped with transportation to the Adolfo Suárez airport. Given the commitment acquired with the environment, around half a million square meters will be allocated to green areas, in which part of them are annexed to existing public parks to create a network of interconnected green areas. These new

natural spaces will constitute a green axis and it would extend from the area of the Chamartin station to the Monte de El Pardo, one of the ecological reference areas of the city of Madrid; this track goes through the new Business Center and the Malmea, Tres Olivos and Las Tablas areas. Therefore, a person could walk from Chamartín to El Pardo only passing through these green areas.

It is also planned the integration of three large office towers within the large green areas together with commercial areas (DCN, 2021). In addition, the construction of 10,000 homes is expected, 20% of which will be used with social housing purposes. The construction and subsequent use of all these buildings will be based on achieving the greatest optimization of energy consumption.

### 3.2. Linkages with sustainability goals

From the beginning, the MNN project has made sustainability its main value, focused on urban regeneration, appearing as a unique opportunity in Europe to implement large-scale pioneering measures of urban sustainability, thus becoming Madrid a leader in the social field, economic and environmental (DCN, 2021). For this reason and to achieve its sustainability strategy, it has followed the 17 UN sustainable development goals, which are part of the 2030 Agenda, the MNN project is based mainly on 12 of them (DCN, 2021). Within the framework of these 12 objectives, special emphasis must be placed on the five where urban design can be contributed to the greatest extent:

Below, they are indicated how the project has been adapted to these five goals the objectives that have served as a basis in its elaboration:

Sustainable development goal #6: clean water and sanitation. A management ideal of the water involves the integrated management of resources water equitably without jeopardizing the sustainability of the essential ecosystems. This approach seeks to guide the development of public policies in this area, to accommodate the economy and the environment in a sustainable way (Biswas, 2008; Griggs et al., 2014; Martínez and Villalejo, 2018). The integral management of the water cycle in the Madrid Nuevo Norte program aims to reduce the water footprint to minimum levels. For this objective to be achieved, it is necessary for the city to equip itself with sustainable drainage systems that are capable of simulating the natural water cycle in the different spaces of the project, for this purpose, porous pavements, wells and drainage ditches are used, with these tools can achieve a reduction of 70% of the volume of water. From this point on, the viability for the development of systems for reusing rainwater from rooftop coverings will be analyzed, building infrastructures that allow its storage and subsequent treatment for use in intelligent irrigation systems, thus reducing considerably the demand for water. This point is essential when referring to the climate forecasts in Spain that will decrease by 10% mainly due to climate change, so the search for sustainable efficiency in water planning is essential.

Sustainable development goal #7: affordable and clean energy. Due to the great environmental deterioration that the world is experiencing, the advance in the transition from fossil to clean energies has accelerated and assumed significantly in recent years (Kalair et al., 2021; Mangla, 2020; York and Bell, 2019). MNNP is identified with this objective from the substitution of fossil transport towards more sustainable means of transport, such as the incorporation of infrastructures that allow the transit of automated buses. In order to achieve that 80% of work trips are made by clean vehicles, it is worth highlighting the Bicimad plan, which focuses on expanding the

system's recharging network, thus favoring the use of electric bicycles. Therefore, smart bike sharing is a driver of innovation in terms of urban mobility. In addition, the levels of demand in terms of efficient building construction become one of the basic pillars to achieve the generation of renewable energy in both public and private buildings. It is therefore essential that construction processes adhere to the fundamentals of environmental management, thus establishing more solid sustainable strategies (Gordillo and Elizalde, 2018). All these points will contribute to achieving the sustainability objectives for an improvement in air quality.

Sustainable development goal #11: sustainable cities and communities. In accordance with goal 11 of the Sustainable Development Agenda, cities must be safe, inclusive, resilient and sustainable. The estimate for 2050 is that the world population will live in urban areas is 70% (The World Bank, 2023). From this data, it is obtained that 95% will be produced in developing countries, which can cause problems of marginalization, waste, water supply, quality of life and public health. However, if managed properly, a high population density in cities can translate into increased efficiency, technological innovation and decreased energy consumption (Garcia, 2017). MNNP recommends a compact urban model with heterogeneous uses. In this sense, the different green areas and public spaces have been determined thinking about the well-being of the citizen, motivating the participation of the communities in different aspects of their design and use. In such a way that, through a new digital tool, people interested in the project can access the website enabled to obtain the necessary information, express their opinions and collaborate on the matter.

Sustainable development goal #13: fight against climate change. It shows how cities can improve their functioning through adaptation policies to respond to climate change and offer practical strategies to address the concerns of cities and reinforce their role as part of the solution (Ahmed et al., 2019; Lockwood, 2013; Reckien et al., 2017). MNN's infrastructures play a crucial role in the fight against climate change by including environmental principles in their designs, which include a wide variety of aspects ranging from the introduction of elements that protect from the sun in public spaces, smart buildings that provide more energy than consumed, up to the use of renewable energy for transport.

Sustainable development goal #17: partnerships for the goals. The MNN project has been developed based on the importance and need to establish deeper relationships and alliances to promote collective responsibility among the different agents and is considered one of the circumstances that favor the achievement of the objectives set (Stott and Scoppetta, 2020).

At this point, it is important also highlight problems that some neighborhood associations (AAVV) have encountered regarding the risks that MNNP entails, beginning with the total volume of buildable space, which is disproportionate to the needs of Madrid. Since of the 2,830,000 m², 1,730,000 m² would be destined for offices. The 11,000 proposed homes are also a high number, since according to these associations there are around 150,000 empty and disused houses. Of this total number of homes, only 20% will be allocated to official protection. This represents an imbalance in the city since the Northwest of Madrid is one of the areas with the least social housing and the emptiest free market apartments and offices. It would be important to break the difference between the southern districts, which concentrate the majority of public housing (and the most polluting infrastructure), and the northern districts, where luxury apartments and chalets are concentrated (DCN, 2021). Another problem of the project is the proposed green area that is

concentrated in a large concrete slab that will serve to cover the train tracks, a very critical point regarding the planification (DCN, 2021).

Finishing with the risks, Madrid Nuevo Norte does not take into account the construction or adaptation of facilities for existing neighborhoods in the area of the operation. If we point out the possible decentralization of the city through the MNNP, it could act as a growth strategy, starting from a circle, the heart of which would be formed by centers of financial activity, followed by another corresponding to intermediate height housing areas and single-family homes, the circle would be closed with the industrial areas.

## 4. Methodology and research questions

Grounded Theory (Charmaz, 2014) is the research methodology selected to provide a qualitative of MNN impact on Madrid (both city and region) from an urban sustainable development perspective through induction. Inductive Method is required in this study, as we need to analyse the validity of some of our hypotheses. In this sense, expert panel research method (Martens and Carvalho, 2016, pp. 24–43) has been selected to evaluate the impact of MNN as sustainability project considering the importance, size and impact of the project (Ewing and Bartholomew, 2009, pp. 343–357). Expert panel technique includes focus groups, gaming simulations, and structured expert panels. These have received considerable attention, both in the literature and in practice, because they are able to handle issues that are not easily quantifiable (Mulligan and Horowitz, 1986). According to Clayton (1997), a panel size depends on the type of homogeneous groups used to provide informed judgments. According to Clayton (1997), expert panel definition for homogeneous groups that include social and professional groups require a panel of five to 10 experts. Among other approaches for expert panel method application, it is applied the structured expert panel approach. However, it was believed that the technique would benefit from the informal setting, the personal input, the immediate feedback, and the guidance of a moderator, which are essential to focus groups (Mulligan and Horowitz, 1986). In addition, a structured approach is needed in order to find a balance and consensus between the arguments of experts representing different disciplines. It is also important in forcing the expert to discuss the bases of their argumentation among each other and the decision maker (Pulkkinen and Simola, 2000). In this study, the expert panel requirements are split in six expertise areas: sustainability, urban development, urban planning, government or public affairs, project management or MNN key stakeholders (**Table 1**).

Based on expert panel's requirements, the research method process includes a first phase where we screen a list of experts to create a panel with a shortlist of them. After that, an unstructured interview is done to refine the initial review questions and to assess, that expert panel is composed with people covering all the expert areas (**Figure 2**).

The analysis of the answers was conducted with two methodologies: first using text classification, analysis and extraction (Research/IT Desk, 2020; Thangaraj and Sivakami, 2018) and second, for each question (Charmaz, 2014; Research/IT Desk, 2020), all answers are confronted. We build the following research questions:

Q1: Based on your knowledge and experience we would like to identify the concept and the dimensions of the so-called "urban sustainable development".

**Table 1.** Experts panel.

| Area of expertise | Data | Comment |
|---|---|---|
| Sustainability | More than 10 years of experience or academic background | If coming from academia, it must have relevant scientific publications. |
| Urban development | More than 10 years of experience or academic background | If coming from academia, it must have relevant scientific publications. |
| Urban planning | More than 10 years of experience or academic background | If coming from academia, it must have relevant scientific publications. |
| Government or public affairs | More than 10 years of experience or academic background | If coming from academia, it must have relevant scientific publications. |
| Project management | More than 10 years of experience or academic background | If coming from academia, it must have relevant scientific publications. |
| MNN key stakeholders | More than 10 years of experience or academic background | If coming from academia, it must have relevant scientific publications. |

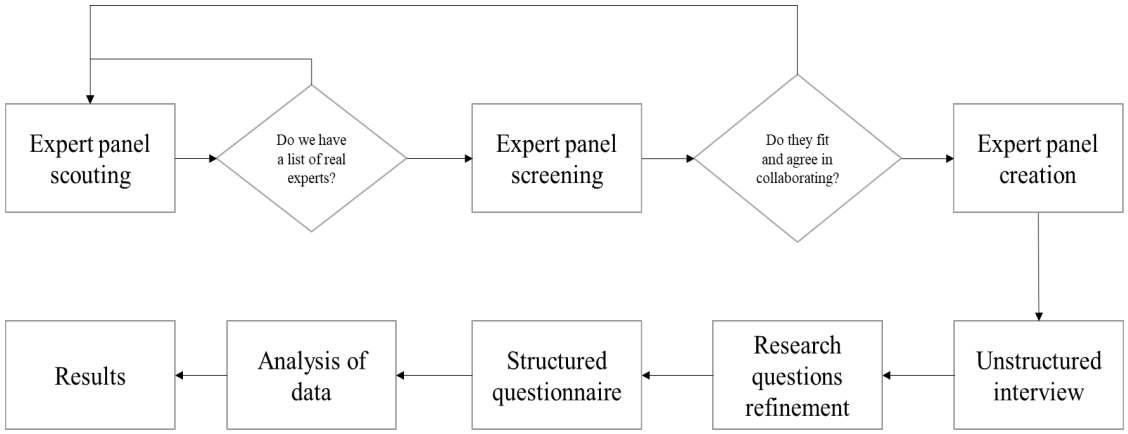


**Figure 2.** Expert panel research process.
*Source: Authors.*

Q2: How you describe the image of Madrid, comparing to other metropolitan European cities? Does Madrid invest on sustainability, social participation or the creation of new businesses?

Q3: Based on your opinion, what will the main positive effects of MNN project be at economic, environmental and social level?

Q4: Do you think that this project could generate negative effects for the city or the state? If yes, please be more specific.

Q5: The main goal of this project is to regenerate the part of the city of Madrid focusing on sustainability and sustainable city's development. Do you believe that something that could help Madrid to become more competitive/attractive to other cities in Europe or the world?

Q6: Based on your opinion, do you believe that MNN could become an efficient factor/tool/component for Madrid's image promotion and support as a benchmark urban planning city at European/international level?

Q7: Based on your knowledge and experience what are the main factors in order the main goal of linking this project with Madrid's sustainable development, to become successful at different scales

(local, regional and international)?

## 5. Analysis

Based on these requirements, through a first scouting of experts from Madrid State experts (Subdirectors, General Directors, vice Ministers and Ministers), Madrid City Council (Subdirectors, General Directors and Councilors), Project Promotion Office, Academia (main universities of Madrid) and international sustainability experts, it was created a list of 59 experts. After a first screening to comply with at least three out of six of the panel experts' requirements, a shortlist of 28 experts was created and 12 of them finally became part of the expert panel, none of them from out of Spain as it has been indicated by some of the contacted experts that the reason they rejected the invitation is that the scope of the MNN is so big that there is not detailed information to evaluate it without documentation in Spanish and there is no international promotion among the academy to do so. 12 experts including compose the expert panel: Madrid State decision makers, Madrid City Council decision makers, MNN key stakeholders and independent experts of which four of them came from the academia (**Table 2**). The main potential bias of the study is the political influence of some of the respondents that working for the public institutions selected by the political party managing the City Council or Madrid State. In order to avoid biased conclusions, it has been added among the decision makers public servants that were the evaluators of the project in terms or urbanism, environmental assessment, infrastructures, etc., not selected by politicians as well as independent experts in opposition of project sponsors or politics related experts.

**Table 2.** Level of expertise of the panel.

| Area of expertise | No. of experts out of X |
|---|---|
| Sustainability | 4 |
| Urban development | 5 |
| Urban planning | 3 |
| Government or public affairs | 4 |
| Project management | 4 |
| MNN key stakeholders | 5 |

The panel of X experts have answered all questions, except for one expert that rejected the answer of two of them for political reasons. Therefore, all the experts, generating 44 pages, have covered 98% of the questions that were analyzed with two methodologies: first using all the text words and also for each one of the questions, second for each questions, all answers are confronted.

The most cited words by the panel are (**Figure 3**): sustainable, cities, quality, management and global. Meaning that not only sustainability makes part of urban sustainable development but also: project management, quality of the actions and globalization.

Q1: Based on your knowledge and experience, we would like to identify the concept and the dimensions of the so-called "urban sustainable development".

All experts of the panel answered to this question except one, arguing that it was not an expert in urban development and sustainability. Inside those that are experts in sustainability, urban planning


**Figure 3.** Word panel analysis.
*Source: Authors.*

and urban development, the common answers focus on academic or practitioners' definitions that are synthesized as "compromise between urban heritage, adaptation and strategic planning" while ensuring the fulfilment of current and new regulations in sustainability. While for non-experts in those areas, it is more related to the creation of new spaces in the cities refurbishing degraded areas or ensuring the minimal impact in terms of environment.

One of the outcomes that came from the panel is that sustainable urban planning implies a global and international vision of urban activities far from the old strategies based on local regulation. This is now very different based on the classical sustainability approach (economy, society and environment) where urban environments are inside a globalized network of cities. It is also reflected in some answers that urban sustainability must be tailored to the real conditions of the urban areas and not applying generic solutions that could not be valid for Madrid. Therefore, a strategic vision of the urban development is a pillar of the future evolution of cities to guarantee sustainability that should include availability, accessibility, attractiveness, affordability, and awareness of sustainable options.

As a summary, one of the respondents said:

*"... Sustainable urban development implies a strategic, global vision that reflects on the role of cities in a globalized context and another point of view closer to its inhabitants that cares about their quality of life on a day-to-day basis."*

On the contrary, some experts are not fully convinced about the sustainability of the project or the current idea of sustainability because every actuation has an impact:

*"It is an idea that tries to make the processes of urban development and transformation compatible with new planning patterns that promote a less 'harmful' impact on our populations."*

Q2: How you describe the image of Madrid, comparing to other metropolitan European cities? Does Madrid invest on sustainability, social participation or the creation of new businesses?

All panel experts answered to the question except one. Seven of the experts appoints the perception that Madrid's image compared with other cities in Europe while there is one that just identifies the position of the city in the Euro-Cities SDG index as image. The arguments in favor of a good image of Madrid are related to the openness of the population, the cultural offering and the business activity of the city, making it attractive for tourists, professionals willing to be relocated in Madrid and investors looking for new opportunities. In this sense, one of the experts' remarks "*Madrid is on the top 5 of cities in terms of artificial intelligence investment and ecosystem growth.*" The weather is also one of the arguments for attractiveness of the city, despite of not being directly related to urbanism together with the wide variety of entertainment in Madrid region. One of the experts argued "*the city guarantees fun at all hours, another of Madrid's hallmarks, and it is compact enough to be able to visit its places of interest in short periods of time. This fascinates a diverse European public that comes in short periods, attracted by the possibility of visiting the tapas bars, the Prado Museum or the Thyssen-Bornemisza, both of the first level, the well-known terraces and the plenty of fun night spots, as well as escaping to Toledo or Segovia to return to the capital a few hours later.*"

In terms of sustainability, all experts who answered to this question agree on the effort done on sustainability investments during the last decade including public transportation, creation of new green areas, regeneration of degraded areas of the city and water services (among other topics). They also agree on the social participation paths through the available platforms of the city hall and the different associations represented at district level. From a new business creation point of view, they all see MNN as an opportunity and it seems that Madrid is becoming a pole for financial, service, technology and education businesses.

Q3: Based on your opinion, what will the main positive effects of MNN project be at economic, environmental and social level?

The most indicated positive effect is the regeneration of a degraded area (Fuencarral district) where abandoned industrial facilities and contaminated soils would be reverted into a space for housing, businesses and green areas. The creation of new jobs during and after the development is the second effect more mentioned by the experts together with the economic boost of this new area of the city.

*"Although public investment in infrastructures and services will be very substantial by the municipality, around 1200 million euros, the balance is positive, not only in purely monetary terms but also in terms of economic activation, attraction of companies, urban regeneration, new infrastructures and job creation."*

Other identified positive effects are improvement of public transportation, connection of this area with the downtown, connection with green areas inside and outside the city (green corridors) and introducing circular economy with energy efficiency in a new area of the city as test to be extrapolated to the rest of districts.

As a summary, one of the experts said that:

*"Madrid Nuevo Norte is an opportunity to claim that character from the urban regeneration and serve as a model for developments more in line with the essence of the city."*

Q4: Do you think that this project could generate negative effects for the city or the state? If yes, please be more specific.

Most of the panel experts indicate that they do not agree on MNN generating negative effects for the city or the state. Some side comments were made to keep attention on areas of improvement or control during the execution: mobility impact on emissions, discontinuity on political decisions and housing price. However, some inconveniences may be created during the execution of the project, as indicated by one of the panel experts:

*"However, it should be noted that the project has numerous environmental controls both in the planning and execution phases, with the participation of public administrations and environmental control of the work, as well as a rigorous environmental monitoring program that will allow the application of new corrective measures in the event that those already provided prove insufficient and that the inconvenience and negative repercussions will be temporary."*

On the other hand, it is indicated by some of the experts that the drawback of the project is its length and the political conflicts between admirations managed by different parties, leading to delays, extra cost or even project cancellation. This would have a clear economic and social impact for both the investors and the citizens living close to this area to be regenerated. An additional drawback exposed by the experts is:

*"One of the expected negative effects for part of the population is the increase on housing price but it shall be studied if the price increase correlates with the new value according to the services, businesses and infrastructures. From my opinion, this problem does not come from MNN but from the management of captive ground for building controlled by the public sector and owned by few building companies. This could be solved without public intervention on prices (removing subsidies for the purchase of a home) and liberalizing the ground transaction/ management."*

Q5: The main goal of this project is to regenerate the part of the city of Madrid focusing on sustainability and sustainable city's development. Do you believe that something that could help Madrid to become more competitive/attractive to other cities in Europe or the world?

All the panel experts indicate that they think that MNN will generate help in the competitiveness and attractiveness of the city and the State. As a summary, three of the experts expressed that "*Madrid Nuevo Norte is the flagship project of the city*."

The main argument is their perception of MNN as a living lab of sustainable urban development from where other similar actions could be derived in any city inside or outside Europe. The second argument more mentioned is the location of the urban activities really close to the financial area of Castellana and including a regeneration of the High-Speed train Station that will accelerate the economic boost of the city in this area. This unique location thanks to the accessibility by public transport, will have a positive not only in the region of Madrid but also in the rest of Spain as Madrid is located in the geographical center of the Nation and is the biggest transportation hub of the country. The third argument is that MNN will support the growth of the local and regional economy in line with the growth of the past 10 years attracting investment that is more international due to the scale and scope of the project, not comparable to any project in Europe.

As a summary, one of the respondents' states, "*the growth in wealth that Madrid has sown during the last decades now has to be accompanied by the best way of living in Europe.*"

On the other hand, one of the experts is not sure about the impact on the attractiveness:

*"Not sure about attractiveness, probably more competitive than it is now."*

Q6: Based on your opinion, do you believe that MNN could become an efficient factor/tool/component for Madrid's image promotion and support as a benchmark urban planning city at European/international level?

All panel experts believe that MNN is becoming an efficient factor to promote the image of Madrid City and Madrid State at international level. One of the main identified factors is the location, and the transportation connectivity close to business centers:

*"The area will have extraordinary connections, due to its speed and accessibility, both by public transport and through renewed road connections, to the nearby Adolfo Suárez-Madrid Barajas international airport, which is only 7 kilometers away in a straight line. The promoters of the project explain that this new business center will allow Madrid to compete with other large European regions and capitals when it comes to attracting large companies and international institutions."*

Some of the key aspects is that MNN is one of the biggest regeneration urban programs in Europe together with the international certifications in sustainability BREED and LEED for urban planning are a reference for urban transformation in Europe. An additional aspect that is an efficient tool is the public-private collaboration shown since the approval of the Urban Plan for MNN in 2020 that could only be affected by political issues. An additional aspect pointed by three of the experts is the impact at national level where other cities may take the lessons learnt from MNN in future urban planning.

Q7: Based on your knowledge and experience what are the main factors in order the main goal of linking this project with Madrid's sustainable development to become successful at different scales (local, regional and international)?

The main identified factors identified by the panel affecting different scales are: Long-term planning, Public-Private coordination and partnership, Scalable and exportable solutions and Legislation to recover a degraded area of a city:

*"The regeneration project proposed by MADRID NUEVO NORTE focuses on a much degraded area of the city, which, despite constituting its northern end, presents characteristics that are not appropriate to its privileged situation. The area is a large "gray" urban void occupied by the train tracks that give access to the Chamartín station (fundamental in the railway connection between Madrid and the north of Spain), wastelands and semi-abandoned industrial areas that cause the disconnection between the Residential and tertiary areas consolidated bordering, give a lamentable image of the north of the city and generate serious traffic problems."*

At local level, the plan of regeneration a degraded area is the more influential one together with the stakeholder's coordination during the urban planning approval phase. At regional level, the environmental assessment processes, and the coordination from the public and the private

stakeholders its being and will be the most influential factor to guarantee the upgrade and construction of new infrastructures (water, energy, mobility, etc.) and at international level, the BREED and LEED certificates of sustainability, making MNN a reference in urban sustainable development.

Some experts regret that MNN would increase the differences between the south and the north of Madrid:

> *"From a social point of view, it could be increased the difference between north and south of Madrid (both in the city and the state) if actuations in other areas of the city/region are not taken in parallel. It has to be understood as a public project with private investment, not self-regulated by the market but intervened."*

On the other hand, four experts have expressed their concern about potential political problems delaying the execution of MNN where private sector must be the one driving the most part of the actions except for those infrastructures depending on the public sector.

## 6. Discussion

The selected experts for the report seem to be at the highest level of hierarchy in Madrid town hall, Madrid State and the program management office and all the independent experts come from the academia or from the sustainability and urban evaluation. This means that the number, experience and variety of roles provide certainty and objectivity to this study (Basias and Pollalis, 2018, pp. 91–105; Fainshmidt et al., 2020, pp. 455–466) from a qualitative point of view and is aligned with the correct size of an expert panel method implementation as method for the analysis.

It is needed to compare what was obtained in the answers to the different research questions with the three hypotheses that we want to corroborate or discard. So, the analysis of results is summarized as follows:

H1: MNN is a project developed under sustainable development criteria.

H1 is demonstrated by all public documentation of the project as well as international accreditations awarded to the project: LEED for Communities Plan and Design (gold level), BREEAM and LEED. In addition, the experts consulted agree that MNN is a project established under sustainability criteria although, depending on the political bias, they do not share the same point of view about social or environmental sustainability, meaning that sustainability excellence perception is different depending on the background of who evaluates it.

H2: MNN is an example of urban sustainable development at European Level.

Most experts corroborate that, indeed, MNN is an example of sustainable urbanism that is at the level of the main European cities. Experts also stress the high demand met in environmental matters to receive permits from different local, regional and national governments. In addition, the MNN project has been compared with other projects in Europe and abroad, which is aligned with the literature (Bulkeley, 2006), but showing the differences not easy to compare between projects with quite different scopes.

H3: MNN is positive in terms of sustainability, image and example for future urban sustainable development projects.

There seems to be consensus that MNN will mean improvements in terms of sustainability, in particular for the regeneration of a degraded area of the city and in terms of future sustainable developments in other areas of Madrid or for the management of natural resources such as water (Biswas, 2008). However, it seems that the politicization of the project to use it as an ideological weapon can negatively affect the image of the city if political parties do not focus discussions on the relevant issues in sustainability and it is not clear how the inflation, restriction of land and high investment could maintain house pricing at an affordable level for the citizens. This housing price issue is shared among different studies (Bramley and Watkins, 2016), but this study is not focusing on the rootcase but just showing that it seems to be a potential drawback in social sustainability.

## 7. Conclusions

The main conclusions for each research question can be summarized as follows:

Q1: The concept and the dimensions of the so-called "urban sustainable development" remain as the three classic ones: environment, economy and society.

Q2: The image of Madrid, compared to other metropolitan European cities, seems to be at least at the same level and the majority of experts clearly say that Madrid city Council and State of Madrid invest on sustainability, social participation and the creation of new businesses.

Q3: The main positive effects of MNN project at the economic level is the creation of a new business pole at the north of the city close to the four towers business area, from an environmental point of view, the recovery of a degraded area of the city transforming this into a living area from an abandoned industrial one and at social level, it seems that the wellbeing of the current citizens living close to MNN will improve thanks to better infrastructure, commerce and leisure areas.

Q4: This project could generate negative effects for the city mainly on the social side with the housing price increase being one of the most impacting effects increasing the difference between north and south of the city. In addition to this, the political use of the project from different municipal and regional parties could lead to the paralysis of the project with a negative impact on employment and infrastructure development.

Q5: The main goal of this project is to regenerate the part of the city of Madrid focusing on sustainability and sustainable city's development and seem to be a key factor that could help Madrid to become more competitive/attractive than other cities in Europe.

Q6: MNN could become an efficient factor for Madrid's image promotion, but probably not a key factor to increase tourism. Nonetheless, this project clearly shows Madrid as a primer in sustainable urban planning at European.

Q7: The main goal of linking this project with Madrid's sustainable development, to become successful at different scales (local, regional and international) is to regenerated a degraded area of the city to increase wellbeing, business and to increase the efficiency in environmental management of the urban planning.

In general, there have been identified a series of benefits for the city that can be summarized as follows: Global vision fitted into a local project, MNN as flagship sustainable project in Europe, regeneration of a degraded area of the city, interconnection of an isolated part of the city and public transportation connection improving the external image of Madrid as city.

MNN is perceived as a guide for future mega-projects for these main reasons: it has been certified in terms of sustainability, the project plan includes continuous improvement and adaptation to new sustainable good practices, and it is an example of public-private collaboration in long-term mega-projects.

Despite of it, there are some challenges that should be carefully managed: applying sustainable solutions from other cities not properly tailored to Madrid could lead to unproper solutions from an urbanistic point of view decreasing the wellbeing expected for the citizens (i.e., longer transportation time from home to work or vice versa); housing pricing increase due to the lack of terrain in Madrid is one of the major challenges not easy to be solved as the land management is relaying on public decision makers (i.e., land speculation or subsidized housing may increase the pricing of the surroundings leading to a global increase of prices); and the politization of the project as discussion topic between local parties that could delay project execution, increase the total budget or cancelling the project in the future. One of the aspects that has not been measured in this report and could ampliated in further research is the one related to the gender impact (Abril, 2020). Nevertheless, none of the experts showed special relevance about this topic related to MNN as Economy, Ecology and Society seem more powerful topics to be discussed.

So, as a summary, the main conclusions that we can obtain to answer the seven research questions and being aligned with the three hypotheses of this study are that: MNN is a project developed under sustainable development criteria, an example of urban sustainable development at European Level and positive in terms of sustainability, image and example for future urban sustainable development projects.

## Author contributions

Conceptualization TM; methodology, JSG; investigation, JSG and LJ; resources, JSG and LJ; writing—original draft preparation, TM, JSG and LJ; writing—review and editing, TM; supervision, TM; project administration, TM. All authors have read and agreed to the published version of the manuscript.

## Conflict of interest

Authors declare no conflict of interest.

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