

3 My House, my Fragmented City. The Brazilian Social Housing Programme “Minha Casa, Minha Vida” in the cases of Manaus and Belém

This chapter was submitted as an academic article and is currently under peer-review for a specialised journal. The chapter addresses the influence of the social housing programme Minha Casa, Minha Vida (MCMV) on spatial fragmentation, using the cases of Manaus and Belém (Figure 3.1). The programme is an example of how the urban policies of the federal government can have an impact on spatial fragmentation at the municipal level.

Abstract

This study investigates the relationship between housing policy and spatial fragmentation, specifically in the case of the social housing programme in Brazil called “Minha casa, minha vida” (MCMV - Portuguese for “my house, my life”). As the title of the programme suggests, it aims to improve life quality by increasing housing quality and home ownership, but this article demonstrates that the programme can have a substantial negative impact at the wider urban scale promoting spatial fragmentation. Two case studies are analysed: the cities of Manaus and Belém. The research involved the development of maps using GIS technology crossing data related to spatial fragmentation and the MCMV programme. By creating maps that incorporate these data, it is possible to observe that the MCMV programme is reinforcing existing spatial fragmentation in Manaus and Belém. The article concludes that even though the MCMV social housing programme has had a positive impact on increasing home ownership in the low-income segment, it has also had an adverse impact by reinforcing spatial fragmentation at the city level.

Keywords: Brazilian housing policies; minha casa minha vida; social housing; fragmentation; MCMV; Manaus; Belém

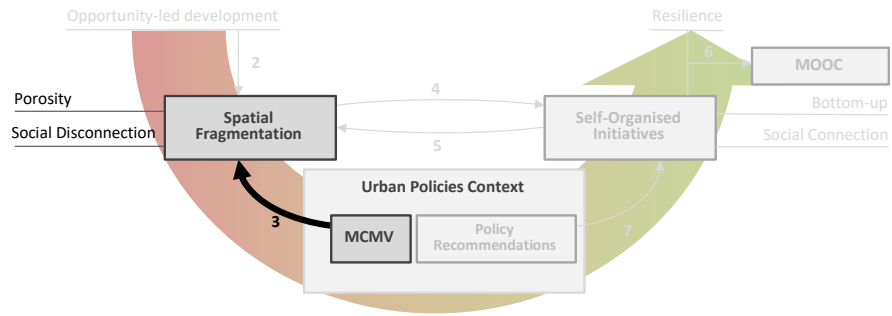


FIGURE 3.1 Conceptual relation of Chapter 3

§ 3.1 Introduction

In 2009, the Federal Government of Brazil started a massive housing programme focusing on the empowerment of those living on lower incomes. The objective of this initiative is to create a comprehensive housing programme with opportunities for the low-income segment to become homeowners paying a low interest rate and living in subsidised housing. To illustrate the scale of the “Minha casa, minha vida” programme (MCMV), €66.6 billion was invested between 2009 and 2015 to construct 3.96 million dwellings in 5,336 different municipalities (Government, 2015).

The research investigates the extent to which the MCMV programme is reinforcing existing spatial fragmentation in Manaus and Belém. With the aim of better understanding the municipal-level implications of comprehensive housing policies applied at the federal level, such as the MCMV programme, the article reveals how the Brazilian MCMV housing programme is intertwined with market dynamics and how this is contributing to spatial fragmentation.

GIS maps were used to display the relationship between spatial fragmentation and the developmental pattern of MCMV dwellings. Even though the MCMV programme is not a traditional urban planning measure initiated by municipal governments, this massive federal-level housing policy is having a significant impact on urban dynamics at the municipal level, and this can be seen on the maps generated.

The phenomenon of fragmentation, when analysed in housing studies, has mainly been viewed through a socio-economic lens as synonymous with inequality and as symptomatic of social fragmentation (Van Kempen, Schutjens, & Van Weesep, 2000). Accordingly, the effects of housing policy on social fragmentation have been researched extensively (Bentham, 1986; Hamnett, 1984; Murie & Priemus, 1994; Robinson, O'Sullivan, & Le Grand, 1985), but its interaction with spatial fragmentation has been largely overlooked. In this sense, because of its massive scale, the MCMV programme offers an opportunity to discover how a single housing policy can interact with spatial fragmentation at the municipal level.

With this in mind, by creating maps that combine data from the Brazilian Institute of Geography and Statistics (IBGE), from the Observatory of the Metropolises (OM), and from the Brazilian Ministry of Cities, this article analyses the effects of federal housing policy in built environments that are already spatially fragmented. Besides the two case studies presented here, the same methodology could be applied to other Brazilian cities where data is available.

The two cities were selected based on the porosity index of chapter 2, which was developed as an analytical tool to compare how porosity is related to growth in different urban centres (ibid). Porosity can serve as a metaphor to describe these threshold areas in a discontinuous metropolitan context, and is particularly common in Brazilian cities. When applied to Brazil's urban context, the porosity index takes into account the number of gated communities and slums areas. In this sense, as used in this article, a high porosity index is also understood as an indication of spatial fragmentation. Since Belém and Manaus had the highest porosity index of the 12 metropolises analysed, these two cities were chosen for further study regarding the MCMV program.

Since spatial fragmentation is an extremely common phenomenon in Brazilian cities, it is vital to understand how housing policies may impact on it. In this regard, maps can help to illustrate how fragmentation and the MCMV programme interact in spatial terms in a single urban area. The GIS maps produced for this article provide a tool with which to analyse the distribution pattern of the MCMV dwellings. This paper is divided into five sections. After the introduction, the theoretical framework will be presented, in which the main concepts are defined and discussed. The third section presents the methodology and discusses how the data were used. The fourth section analyses the maps of Manaus and Belém generated with these data. And lastly, the conclusion discusses the insights gained from these maps and introduces some possible subjects for further research.

§ 3.2 Spatial fragmentation in Brazilian cities

Brazilian cities face issues of inequality and segregation in relation to housing policies (Fahlberg & Vicino, 2016; Marques & Saraiva, 2017; Perlman, 2010; Rolnik, Iacovini, & Klintowitz, 2014; Vilaça, 2011). These matters of inequality and segregation also relates to issues of connectivity between different areas of the built environment, which is commonly referred as fragmentation in Latin American cities (Bocarejo, Portilla, & Meléndez, 2016; Calquin, Farris, & Patuelli, 2017). Next to connectivity, Bayón and Saraví (2013) develops on the cultural urban fragmentation in Mexico City. The work of Carrière and De la Mora (2014) studies not only what Brazilian spatial fragmentation is, but also the relation between public policies and spatial fragmentation focused in the city of Recife and on the concept of a “socio-spatial fragmentation”.

Despite the different perspective on spatial fragmentation on Latin American cities, fragmentation suggests an unequal spatial identity in the built environment. For example, the built environment may develop in different forms, accumulating different patterns and infrastructure in the same physical area. In other words, development does not occur in an equal way in all areas (Santos & Dias, 1982). Within the same urban context, thus, it is possible to observe people living in modern skyscrapers while others live in dwellings that are more reminiscent of the infrastructure of the sixteenth century. Here spatial configuration and fragmentation are linked. Santos has analysed the spatial organisation of São Paulo as a collection of different fragments (1990). This approach served as a basis for further research by Balbo and Navez-Bouchanine in their case-study on Rabat-Salé in Morocco. These authors define fragmentation as a characteristic of most cities in developing countries, which contrasts with the orderly space of the developed north. In the words of the Balbo and Navez-Bouchanine:

[...] the city of the developing countries shows a distinct spatial pattern characterized by the variety of the physical environment or the fragmentation of urban space. From an aerial view, most Third World cities appear as a complex mosaic where the various pieces are assembled according to a logic entirely different from the one that of the rational and efficient industrial city model. (Balbo & Navez-Bouchanine, 1995, p.573)

Fragmentation is thus viewed as the sum of autonomous elements, as opposed to segmentation, where distinct elements make up a homogenous whole (Balbo & Navez-Bouchanine, 1995). Identifying the difference between fragmentation and segmentation depends on the autonomous capacity of the various areas of a city. In this sense, it is more logical to identify metropolitan areas with a high number of slums and gated communities as fragmented systems, rather than segmented systems. In this article, the term fragmentation includes not only the difference in the spatial

characteristics of distinct areas of a city, but also the lack of connection between those areas: the lack of interdependency. Fragmentation therefore involves more than just diversity within an urban system. The diverse urban patchwork of Brazilian cities is based not only on the spatial disconnection between autonomous areas, but also on the systematic inequality that is found in Brazil. Marques and Saraiva (2017) have shown that not only the population living in informal settlements have grown in Brazilian metropolises, but they have also become more unequal.

This article uses the notion of spatial inequality to refer to the difference in the spatial configuration of distinct areas and how this impacts on the wellbeing of the city's population. Thus, spatial inequality is not the antonym of spatial similitude, is not about a lack of homogeneity; rather, it is related to how different parts of the built environment influence access to opportunities and services. This perspective is in line with that of Keeling (2015), Bocarejo and Oviedo (2012), and Câmara and Banister (1993), who use the concept of space as a variable that can generate different levels of access to services.

The notion of variations in access to services brings us back to the fundamental concept of a fragmented space, as described by Balbo & Navez-Bouchanine (1995) – namely that spaces are not only different but also autonomous. The presence of extreme variations in access to basic services, such as garbage collection, electricity or sewage, can mean that in some cases these services must be provided autonomously. In this sense, in Brazilian metropolises, spatial inequality can be a driving force towards fragmentation.

The reasons why spatial fragmentation has emerged are not the main focus of this article; however, it is important to explain the underlying forces behind this phenomenon. According to Steel et al. (2017) talk about a speculative urbanism in the Global South, where real estate, speculation and gentrification generates this complex urban patchwork. In line with this, Taşan-Kok (2004), in an opportunity-led environment, the realisation of projects is strongly dependent on the quality of institutional relationships and market conditions. The mosaic of parts described by Balbo and Navez-Bouchanine is also the result of the interaction between Brazilian public institutions and market forces. While some parts of the metropolitan mosaic have developed and benefited from public and private investment, others parts have received limited financial resources or have been ignored by private and public actors completely. This opportunity-led logic, or speculative urbanism, seem to be one of the driving forces behind the fragmentation mentioned by Santos. This interaction between Brazilian public institutions and market forces not only shapes the land development in Brazil, but also the MCMV social housing programme, as will be explained.

It is important to clarify at this point that the MCMV programme is understood here as the concretisation of what we refer to as “housing policy”. This corresponds to Alex Schwartz’s “broad view on housing policy, focusing not only on specific housing subsidy program, such as public housing, but also on the federal income tax code and regulations affecting mortgage lending, land use decisions, real estate transactions, and other activities integral to the housing market.” (Schwartz, 2015, p. 1). In this sense, even though the Brazilian federal government does not fund or construct the dwellings itself, the MCMV subsidised lending scheme, which involves a public bank and private companies, is currently the most comprehensive housing policy in the country.

§ 3.3 The Minha Casa, Minha Vida programme

According to the report from Fundação Pinheiro (Pinheiro, 2013), in 2010 there was a deficit of 6,490,000 dwellings in Brazil, corresponding to 12.1% of the total number of dwellings in the country. The MCMV is a social housing programme launched by the Brazilian Federal administration in 2009 with the aim of reducing this housing shortage. The government is not itself responsible for constructing the dwellings, but it provides financial resources through lending arrangements provided by a public bank (Caixa Econômica Federal). Those living on low incomes can access subsidised loans to buy their own home built by private developers. These loans are subsidised and instalments are limited to 5% of the borrower’s income, enabling the beneficiaries to become homeowners.¹ This structure is used by the government to target those living on low incomes with a comprehensive housing policy (Brazilian Federal Government, 2015), without having to construct the dwellings itself or interfere with the agenda of individual municipalities. It is a social housing financing scheme that does not fit the standard ones seen in Europe or in the United States (Klink & Denaldi, 2014).

By 2015, the programme had reached 5,336 municipalities out of a total of 5,570, which means that 95.79% of the Brazilian municipalities have benefited from the MCMV fund. Nevertheless, the downside of such a comprehensive programme is that government loses its control in the sense that it cannot define strategically where and

¹ The study is based on the “faixa 1” part of the MCMV programme, which focuses on the low-income population, families earning up to R\$1,600.00 (around €400), and which is financed by the Federal Government Fund (Orçamento Geral da União).

which social housing is to be developed, and is reliant on the private sector and market dynamics to provide these new homes. The research from Campos and Guilhoto (2017) also shows that the socioeconomic impact also depends on the typology of the chosen dwelling. This market approach is not necessary problematic, but in a fragmented urban context it can reinforce the opportunity-led development that is already taking place.

The Institute for Applied Economic Research (IPEA), a research institute of the Brazilian Federal Government, has studied the effectiveness of the MCMV programme in reducing the country's housing shortage (Neto, Krause, & Furtado, 2015). Even though it recognises that the MCMV has reduced the mismatch between supply and demand for affordable housing in the low-income sector, the IPEA suggests that much still needs to be done regarding the location of the dwellings provided by the programme:

“MCMV’s operation has shown difficulty in finding well located and affordable land plots, so we suggest a further discussion of location within the program and the inclusion of criteria for the use of additional resources, in order to get better housing solutions in the metropolitan scale.” (Neto et al., 2015, p.6)

The location of MCMV dwellings is a problem pointed out not only by the IPEA, but also by the Brazilian Ministry of Cities itself, which as early as 2010 published a seventy-page guideline document entitled “How to produce well-located housing using resources from the MCMV programme”? (Rolnik, 2010).

Adauto Lúcio Cardoso and Luciana Corrêa do Lago in “O Programa Minha Casa Minha Vida e seus Efeitos Territoriais” (2013) completed various case studies concerning the territorial effects of the MCMV programme, including in the metropolitan region of Belém. Nevertheless, the two chapters in the book about Belém, by Mercês (2013) and Lima et al. (2013), focus more on metropolitan dynamics rather than on the municipality of Belém itself. It is important to highlight that at the time these chapters were published, not a single MCMV development in Belém had occurred for the low-income segment. In this sense, now that 9,634 dwellings in the municipality of Belém and 12,779 in Manaus have been constructed, it is important to reflect on the as yet unclear relationship between current housing policy and spatial fragmentation.

§ 3.4 Assessing fragmentation and the MCMV programme using maps - Methodology

In contrast with Mercês (2013), Lima et al. (2013) and most of the articles in the book edited by Cardozo (2013), this study is based on the creation and analysis of maps. Even though tables and charts constitute an important database for scientific analysis, the maps provide a distinct perspective, enabling us to focus on the spatial distribution and interaction of the MCMV programme with fragmentation. The maps provide a visual representation of the spatial distribution of the variables that we address in this article.

Nevertheless, mapping the spatial implications of broad public policies has its limitations and challenges. The work of Evers and Tennekes (2016) on mapping the spatial impact of broader policies demonstrates the problems that are faced here. Mapping is, by nature, a reductionist representation of a given reality and in this sense will always be a limited, distorted and superficial view of that reality. In this respect, the methodology could be criticised for not including all the underlying forces that promote spatial fragmentation; however, the attempt to visualise the interaction of this comprehensive housing policy with spatial fragmentation remains valuable. It is important at this point to clarify that unlike the work of Evers and Tennekes, this research focuses on only one policy – the Minha Casa, Minha Vida programme – so the problems arising from overlaying multiple policies simultaneously do not apply. Nevertheless, this does not mean that the map could not be improved with additional data. Since some MCMV developments cover a significant area, it would be interesting, for example, to include data on the positioning of each dwelling within the developments and not only the positioning of the development itself, as has been done here.

In order to grasp the structure of fragmentation, as mentioned previously this research uses IBGE data on informal settlements.² The IBGE uses the term *aglomerado subnormal* (subnormal agglomeration) to define those areas that are popularly known as favelas (slums), and introduced the following objective definition of an informal settlement for the 2010 census: a “group made up of 51 dwellings or more that have no property titles and have at least one of the following characteristics: irregularity of access routes, the shape or on the size of the plots, and a lack of essential public services - for example, garbage collection, sewage network, water network, electricity and street lighting” (IBGE, 2010).³

2 The work of Kovacic and Giampietro (2016) addresses how the term “informal settlement” is used and quantified in different contexts, including IBGE’s definition.

3 This article uses IBGE’s *aglomerado subnormal* as the definition of informal settlement.

The term 'informal settlement', as used in this article, is based on this definition of subnormal agglomerations used by the IBGE. On the one hand, the IBGE's definition focuses on spatial and physical aspects, which are insufficient to understanding the dynamics of social inequality, power struggles or other societal challenges (Kovacic & Giampietro, 2016). Nevertheless, it is important to explore this definition in detail in order to understand how informal settlements relate to fragmentation. The IBGE definition of informal settlement mentions groups of 51 dwellings or more without property title, which characterises a collective structure outside the legal framework provided by the state. The group aspect is emphasised, since the definition focuses on collective capacity and ignores the possibility of individual dwellings without property titles. This is not only a collective deviation from the formal urban structure, but also a strong signal of a parallel legal framework. Returning to Balbo and Navez-Bouchanine's fragmentation concept, which recalls not only the urban system as the sum of distinct elements but also the capacity for autonomy between them, the link between informal settlements and fragmentation starts to become sharper, since informal settlements have this autonomous characteristic. Moreover, according to the IBGE, as well as being outside the legal ownership umbrella, informal settlements are not covered by the network of essential public services either. This can also be understood as another autonomous capacity. Informal settlements are still able to receive these essential services, but they are required to provide them autonomously, creating an additional network of services in parallel to the public networks. In this sense, based not only on the variety of the urban mosaic, but also on the autonomous characteristic of each element, we assume that areas denominated as informal settlements according to the IBGE definition are extremely illustrative of the spatial fragmentation in Brazilian metropolises. It is not the aim of this research to dive into how autonomous these informal settlements are; however, it is evident that since they lie in a parallel legal structure and need to provide basic service to themselves, they are intrinsically more autonomous than dwellings on legal parcels.

The research accessed the shape files of informal settlements in the metropolitan areas of Manaus and Belém. Shape files are extremely useful in GIS software, because they give the precise geographical position and shape of each informal settlement. The shape files provided by the IBGE were analysed using GIS software to isolate data in different layers.

Additionally, this article uses data from the Observatory of the Metropolises regarding urban wellbeing to establish differences in access to urban services. The Observatory of the Metropolises has developed an index called the Índice de Bem-estar Urbano (Urban Wellbeing Index) or IBEU (Ribeiro & Ribeiro, 2013), which includes detailed data from Brazil's 15 major urban areas. The IBEU includes information on five dimensions: urban mobility, urban environmental condition, urban habitation condition, urban

infrastructure, and the collective urban services provided. It is a valuable resource when seeking to understand spatial inequalities at the neighbourhood level, because it is a comprehensive survey that combines into a single index not only spatial differences, but also the capacity to access services. The index ranges from 0 to 1, with 0 indicating the lowest level of wellbeing and 1 the highest. Moreover, the presence of informal settlements was one of the variables taken into account to produce the IBEU index. Nevertheless, since the IBEU index is the result of the sum of numerous variables in the five distinct dimensions, it is interesting to observe how informal settlements, as a fragmentation factor, relate to the final outcome of the index.

Spatial inequality is a relative notion rather than an absolute one. Accordingly, the concept used by the IBEU evaluates the built environment in terms of a relative index based on a comparative spatial analysis of the 15 areas studied. Like the informal settlement data from the IBGE, the IBEU data was also publicly available in a shape file format. The strategy described previously was also applied here and the IBEU data were placed in a different layer of the same ArcGIS file. The research uses the overlap of the data, IBGE's informal settlements and OM's IBEU, in order to produce maps that illustrate spatial fragmentation visually.

The data regarding the programme "Minha Casa, Minha Vida" was provided by the Ministry of Cities of Brazil (Cidades, 2016) and includes the location and number of dwellings financed through the programme. This information was entered into the GIS software together with the previously mentioned data on fragmentation. The MCMV programme is a new factor in relation to fragmentation. They started building MCMV homes in Manaus in 2012 and Belém in 2013. Since maps can measure the spatial implications of public policies within a given timeframe (Dmowska & Stepinski, 2016), this article focuses on the period between the IBEU data on fragmentation in 2010, when there were no MCMV developments, and the 2015 data from the Ministry of Cities on the location of the MCMV developments. In this sense, the MCMV is a new factor regarding spatial fragmentation in both metropolises.

Despite natural particularities, Manaus and Belém have a similar historical background and have gone through similar processes of urban development. The Portuguese founded both cities in the seventeenth century, and they both have a historical centre. They are both located on the Amazon and served as strategic points for trade and defence during the colonial era. They were both affected by the boom and decline in rubber production in the first half of the twentieth century, which had strong implications for the city's built environments. They have also seen robust population growth over the last 50 years, and now have a similar population of around 2 million residents. Moreover, they have similar climatic conditions and similar connections to other Brazilian urban centres (IBGE, 2008). Nevertheless, the spatial configuration

of both metropolises is quite different today, with very distinct fragmentation structure (figures 3.2 and 3.3). Primarily, Belém has a greater challenge with informal settlements than Manaus (Pessoa et al., 2016). This challenge involves the number of informal settlements, and their more complex distribution within the municipality.

Regarding the MCMV programme, this originated as an anti-crisis response (Adauto Lúcio Cardoso & Aragão, 2013). Ironically, the 2008 crisis, which was triggered by the US real estate market, was tackled in Brazil with massive public investment in the real estate market. Both municipalities have benefited from the programme, but they differ its implementation. In Manaus, the municipality took a leading role in attracting investment quickly began what would become the biggest MCMV development in the country. In Belém, due to the city's metropolitan dynamics, neighbouring municipalities started developing MCMV dwellings before Belém, mainly due to the lower price of land on the periphery of the metropolitan region. While the MCMV dwellings are concentrated largely in massive developments in northern areas of Manaus, in Belém they have taken the form of smaller developments. Both cases will be further analysed in the next section.

§ 3.5 Results in Manaus

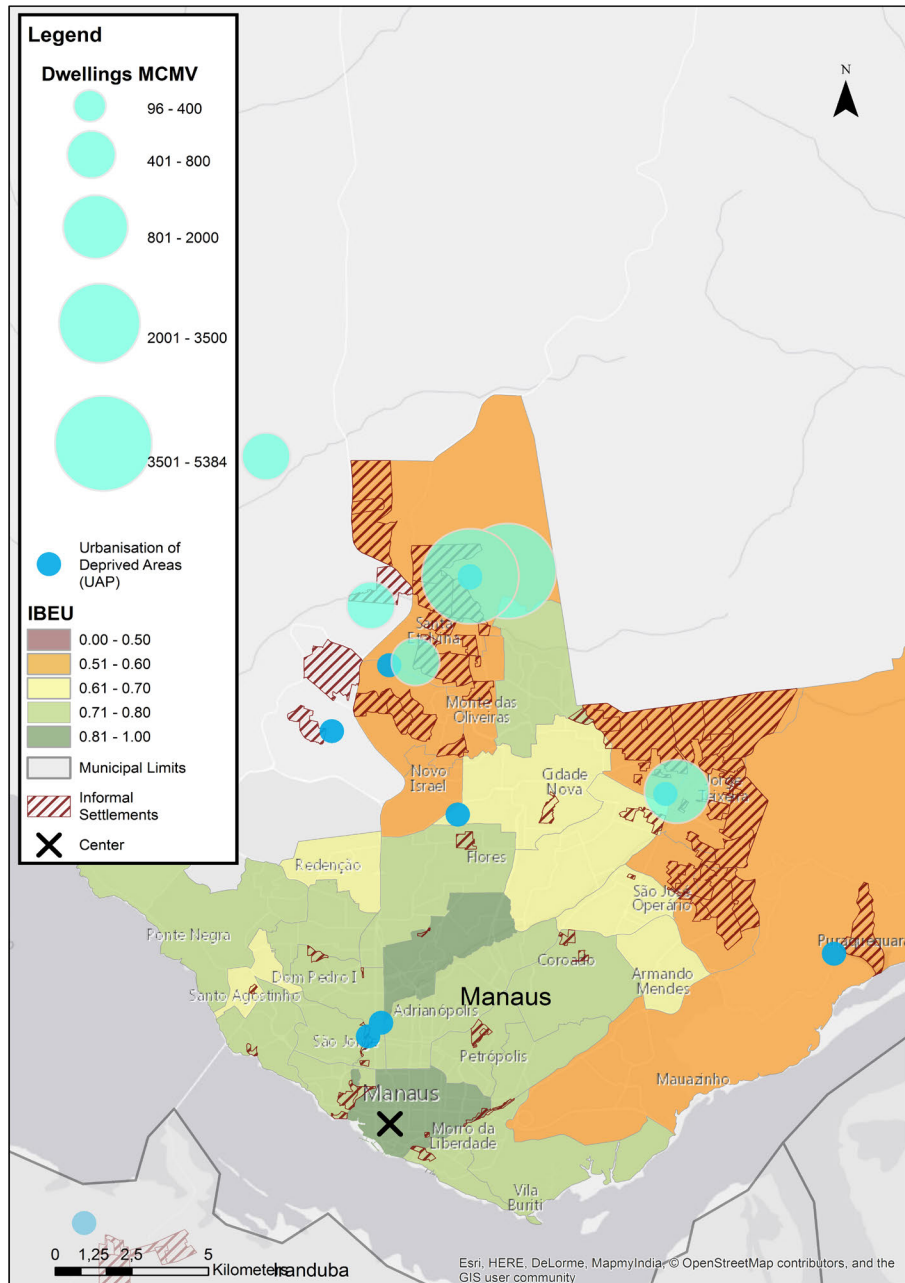


FIGURE 3.2 Map of fragmentation in Manaus and the MCMV programme

The data on informal settlements and urban wellbeing (IBEU) for Manaus reveals that spatial fragmentation follows a clear polar structure with the historical centre as the central pole. The historical city centre as a highly valued urban environment is not a common phenomenon in contemporary Brazilian metropolises, where many historical city centres tend to be affected by urban decay as new developments focus on suburban areas, creating a more complex and multipolar system. By contrast, Manaus consists of an extreme central/periphery system.

The peripheral zones include large areas of informal settlements, especially in the northern and eastern neighbourhoods, while the informal settlements in more central areas are relatively small and dispersed. There is an unequal relationship between the size of informal settlements in the periphery and in the central area. In this regard, it can be argued that the informal settlements in the peripheral areas are more autonomous, since they occupy a larger area and are concentrated mainly in two regions to the north and east of the city, while the central settlements are more connected to the services and municipal infrastructure. Meanwhile, the smaller informal settlements in the central area are more disconnected from each other and in that sense less autonomous. At the same time, the smaller informal settlements in the central area suffer less from lower spatial inequality compared to those in the north and in the east, since they are located in areas that score high on well-being (IBEU). Even though the central neighbourhoods differ on the IBEU index, almost all informal settlements in the city centre are located in areas with an IBEU of above 0.7.

The peripheral areas are also the areas with the lowest IBEU scores. In Manaus, besides the city centre, there is only one neighbourhood with an IBEU value above 0.8. Again, this reinforces the polar structure of the city, which is reflected in the spatial inequality data (Nery, 2014).

Overlapping the two data sets provides the opportunity to graphically observe the relation between spatial inequality and fragmentation. It becomes visually clear that neighbourhoods with intense fragmentation usually have high spatial inequality. Fragmentation and spatial inequality generally coincide in Manaus. Nonetheless, it would be premature at this point to state how they may influence one another. What can be inferred from the map is that fragmentation in Manaus coincides remarkably closely with spatial inequality.

§ 3.6 The effect of the MCMV programme on fragmentation in Manaus

Regarding how the MCMV relates to this fragmented and unequal context, the map reveals the following. Firstly, it shows that the social housing programme in Manaus is basically limited to areas with a low IBEU. This is a reflection of economic dynamics, since those areas with lower urban wellbeing tend to have cheaper land. Cheaper land offers greater profit margins for developers, since the amount paid by the government is fixed per each house built. Assuming that the development of a new housing complex has a positive impact on the wellbeing of its neighbourhood, the MCMV programme might reduce inequalities since it is introducing development into areas with a low IBEU. However, the map in figure 3.2 reveals that the MCMV social housing programme is strictly related to land market dynamics and it merely reinforces the previous market structure rather than changing it. To confirm this, map 1 shows that the MCMV developments have not incorporated informal settlements but have been developed in proximity to them. This perpetuates the isolation, autonomy and lack of access to services and opportunities. Additionally, analysing the geographic position of each MCMV development, it is possible to observe how disconnected these areas are. In table 3.1 we can see that even the closest MCMV dwelling is a 90-minute commute from the city centre.⁴ This shows how disconnected these communities are from the services and opportunities that are available in the city centre. Alternatively, this time is reduced to 36 minutes if the same journey is made by car, which is a great incentive to MCMV house owners to opt for this mean of transportation. However, since the programme focuses on the low-income segment, car ownership may not be an option for most residents.

TABLE 3.1 MCMV Dwellings in Manaus

Total number of MCMV dwellings in Manaus: 12,779	Minimum	Maximum	Mean
Journey time to the city centre by public transport (minutes)	90.0	189.0	110.209
Journey time to the city centre by car (minutes)	36.0	50.0	40.596
Distance to the city centre (kilometres)	18.3	26.4	22.368

⁴ The time travelled was based on the estimation provided by google maps on at off-peak hours (12:00) by car and by public transport.

Additionally, no MCMV developments have taken place in those areas with informal settlements closer to the city centre. The development of social housing programmes in those deprived areas closer to the city centre would have a greater impact on reducing fragmentation, since they would not add to urban sprawl, would have less impact on the transportation system and would increase the interdependence between these areas. In this sense, the map in figure 3.2 demonstrates the limits of the MCMV social housing programme in Manaus. The existing fragmentation created by opportunity-led development is clearly being reinforced, since the MCMV programme operates within the same market structure and does not incorporate informal settlements that have a lower market value. It is therefore extending the same existing logic to suburban areas of Manaus.

Furthermore, even though it could be argued that since the MCMV developments are located in areas with a lower IBEU, the programme could be reducing spatial inequality; however, it is still not clear how the MCMV could effectively improve urban wellbeing, since it tackles only one dimension of the IBEU index: housing quality. The impact of the MCMV programme on other aspects such as transportation, security, sewage and garbage collection, among others, is still unclear. Many locations where the program is developed have poor public services. Thus, even the possible positive outcome of the MCMV programme of reducing fragmentation through the improvement of the local wellbeing depends on more comprehensive policies and this has yet to be confirmed.

Fragmentation in Manaus is caused by informal settlements and the spatial inequality reflected in the IBEU data; however, it can be observed that the MCMV programme does not tackle the informal settlements issue effectively, since the social housing programme is limited to areas with a lower IBEU; and informal settlements in areas where the urban wellbeing is higher are completely left out of the MCMV logic and spatial fragmentation closer to the city centre is not addressed by the MCMV programme.

The map also reveals that the private companies involved in the MCMV programme in Manaus aim for economies of scale and focus on larger projects rather than smaller ones. Once again, this is a market-driven phenomenon that reinforces existing opportunity-led development in Manaus and thus perpetuates the same logic that produced existing spatial fragmentation in Manaus: opportunity-led development.

One possibility for improving the dwelling conditions of areas not covered by the market logic of the MCMV programme would be to apply to the federal fund for the Renewal/Urbanization of Deprived Areas (UAP – Portuguese acronym for “urbanização

de áreas precárias”).⁵ This data was added to the map as a reference to highlight the differences between the location of the MCMV programme and the areas subject to this comprehensive urban policy that is unrelated to market forces. The application of the UAP fund is conducted by the municipality, which applies for this funding from the federal government. If granted, the municipality earns the freedom to use it directly in areas of its own choosing. The UAP was used here as a base for comparison, since it is also federal-level funding to be used for urban infrastructure improvements; however, it does not rely on market dynamics. The location of the blue dots on map 1 reveals that unlike the MCMV programme, the UAP improvements are not limited to those areas with a low IBEU or peripheral informal settlements. It is natural that UAP funds are targeted on areas of low urban wellbeing, where the majority of the informal settlements are; however, these resources can be used more strategically and also incorporate smaller isolated pockets with a high IBEU. In this sense, the UAP could provide an important counterbalance for the market dynamics that drive the MCMV programme.

5 The data is public and can be accessed on the webpage of the Ministry of Cities: <http://cidades.gov.br/habitacao-cidades/programas-e-acoas-snh/67-snh-secretaria-nacional/programas-e-acoas/122-programa-urbanizacao-regularizacao-e-integracao-de-assentamentos-precarios> - last access on 23/04/2019
And on the webpage of Brazilian Geo-space data: <http://www.visualizador.inde.gov.br/> - last access on 23/04/2019

§ 3.7 Results in Belém

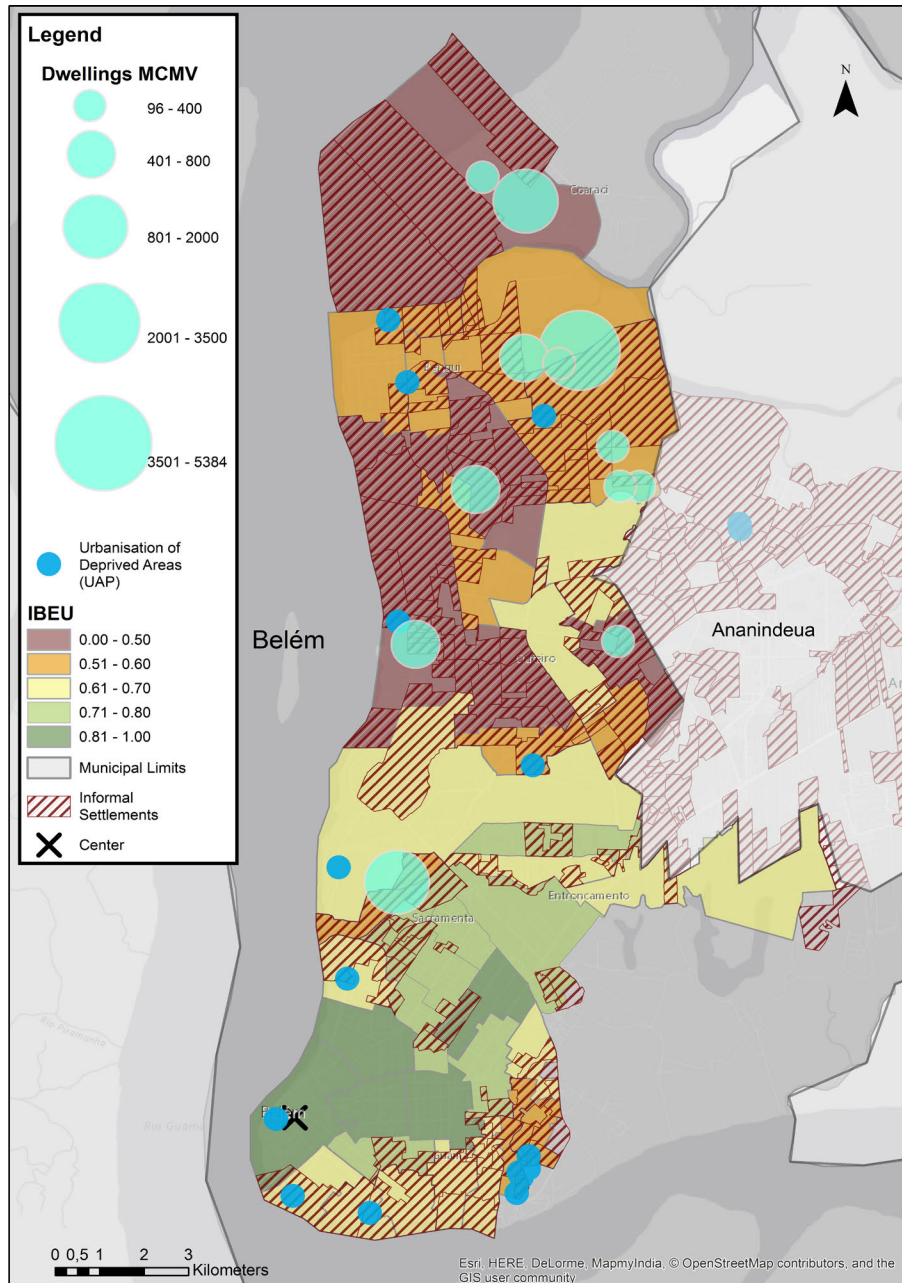


FIGURE 3.3 Map of fragmentation in Belém and the MCMV programme

The map of Belém that was generated demonstrates a more complex urban configuration compared to Manaus. Firstly, there is considerably more fragmentation in Belém, which can be seen by the large number of informal settlements. More than 50% of dwellings in Belém are situated in informal settlement areas, which has a significant impact on its urban system. Secondly, spatial inequality is also higher in Belém. There are vast areas with an IBEU of less than 0.5, while there is not a single such neighbourhood in this category in Manaus. Thirdly, the influence of the historical city centre is not as straightforward as in Manaus. There are large areas of informal settlements around the city centre, and also neighbourhoods with a low IBEU. Fourthly is the greater influence of adjacent municipalities. While the Manaus urban zone is more detached from neighbouring cities, Belém has a contiguous urban connection with Ananindeua and Marituba towards the East.

Regarding informal settlements, Belém has the highest ratio of dwellings in informal settlements of all twelve of the Brazilian metropolises. The fragmentation is so extreme that it is possible to argue that this informal parallel structure overweighs the formal official structure. This is an inversion of the logic we would expect from the terms formal and informal, as if living in an informal settlement (subnormal agglomeration) was more “normal” than actually living in a formal settlement. This informal structure is evident in large areas of the city, from north to south.

When spatial inequality is analysed separately, the severity of the situation is clear. As mentioned previously, Belém has large neighbourhoods with an extremely low IBEU. These are concentrated in the northern and middle sections of the city. The concentration of low IBEU areas in the north indicates isolation and a wider problematic zone. However, it is not the aim of this article to analyse the IBEU data alone. The Observatory of the Metropolises’ report on Belém’s IBEU (Ponte, Lima, Cardoso, & Rodrigues, 2014) can be accessed for further information on this issue.

§ 3.8 The effect of the MCMV programme on fragmentation in Belém

The overlap between the fragmentation information and the MCMV data (figure 3.3) shows that the location of the MCMV dwellings in Belém also follows market dynamics and therefore reinforces spatial fragmentation. Even though the social housing programme here has not followed economies of scale and is more dispersed, there is not a single MCMV development in an area with a medium (0.6-0.7) or higher IBEU. Fragmentation in Belém is complex and diffuse, but the MCMV initiatives are

concentrated in the northern areas with a low IBEU, which shows the limits of the programme. The only MCMV initiative closer to the city centre⁶ is located in a low IBEU area and was developed by accident. The area was occupied by squatters, which resulted in an MCMV project after a long negotiation between the municipality and the owners of the land. The squatters were removed, but the area was handed over to developers to implement an MCMV dwelling complex.

Although there are more MCMV developments closer to the city centre than in Manaus, the average of journey time from a MCMV dwelling is still high (table 3.2). Relying on the public transport system, a MCMV resident takes an average of 67 minutes to reach the city centre.⁷ Even with a lower average journey time than Manaus, the access to services and opportunities for these communities is compromised, which reveals once again an exacerbation of the fragmentation of the urban environment.

TABLE 3.2 MCMV Dwellings in Belém

Total number of MCMV dwellings in Belém: 9634	Minimum	Maximum	Mean
Journey time to the city centre by public transport (minutes)	32.0	97.0	67.127
Journey time to the city centre by car (minutes)	20.0	87.0	49.205
Distance to the city centre (kilometres)	7.0	66.7	24.591

In the case of Belém, there is a sizeable area of informal settlement close to the historical city centre, which has a high IBEU, but these areas were not considered for MCMV development. As in Manaus, the fragmented spaces near the city centre of Belém fell outside the market logic that dominates the MCMV programme, and as in Manaus, the locational limitations of the MCMV programme are clear. In addition to failing to connect fragmented spaces in the central area, the MCMV is also pushing the logic of fragmentation into the periphery of the city, increasing urban sprawl according to the same opportunity-led logic that has traditionally led to spatial fragmentation.

When we compare the UAP initiatives, it becomes clear that there are also dwellings close to the city centre that are in a precarious condition and could benefit from social housing initiatives. In figure 3.3, it is clear that there are more UAP initiatives in the

6 This refers to the development called “Res Viver Val de Cans”.

7 The time travelled was based on the estimation provided by google maps on at off-peak hours (12:00) by car and by public transport.

city centre than in the northern periphery. As seen in the case of Manaus, the UAP fund could be used as a strategic tool to counterbalance the opportunity-led development present in the MCMV, which reinforces the spatial fragmentation of Belém.

§ 3.9 Conclusions and comparative analysis

Unlike the traditional procedure used to analyse fragmentation on the basis of socio-economic characteristics (Van Kempen et al., 2000) or on the lack of connectivity between different areas of the city (Bocarejo et al., 2016), this article has taken an approach that delves into the complex relationship between social and spatial fragmentation at the city level by focusing on the territorial impact of housing programmes such as the MCMV. As a massive social housing programme, the MCMV programme was an opportunity to address the issue of fragmentation on a more comprehensive scale. The two maps generated using different dimensions of fragmentation and data from the MCMV programme in Manaus and Belém have shed some light on this topic. The MCMV programme is clearly reinforcing existing spatial fragmentation in Manaus and Belém by accelerating urban sprawl based on its strongly market-driven implementation. It has been possible to display the locational consequences of a social housing programme based on market dynamics. Such programmes are notorious for exacerbating spatial fragmentation in Brazilian urban areas.

The result of the territorial displacement of a social housing programme that follows a strict market logic can be observed in Table 3.3, which shows that the average journey time of an MCMV resident in Manaus and Belém to reach the city centre off-peak hours is 91 minutes. The capacity of such a programme to generate access to the opportunities and services in the city centre is very limited, reinforcing the isolation and the autonomous capacity of these communities, as well as the spatial fragmentation of the cities as a whole.

TABLE 3.3 MCMV Dwellings in Manaus and Belém

Total number of MCMV dwellings in Manaus and Belém: 22,413	Minimum	Maximum	Mean
Journey time to the city centre by public transport (minutes)	32.0	189.0	91.96
Journey time to the city centre by car (minutes)	20.0	87.0	44.30
Distance to the city centre (kilometres)	7.0	66.7	23.32

The approach to social housing taken by the federal government is also fragmented in itself. The maps show that the MCMV programme limits its development to areas with low urban wellbeing, which is not necessarily a bad approach provided the local scale is observed. Assuming that the MCMV programme improves housing conditions in areas where it is implemented, this could benefit areas of low wellbeing and ease spatial inequality (one aspect of spatial fragmentation in Brazilian metropolises). Nevertheless, at the municipality level we can observe the negative influence of the MCMV programme on spatial fragmentation in the city as a whole. These maps show that the implementation of the MCMV programme at the city level is problematic, since it is limited to areas of low urban wellbeing at the periphery, creating a renewed move towards fragmentation. Additionally, since the MCMV follows market dynamics, it reinforces the speculative urbanism, pointed out by Steel et al. (2017), in areas where the programme is implemented. In this sense, even though the MCMV programme may ease spatial inequality, its implementation is more problematic than a preliminary analysis would suggest. Since the MCMV programme is relatively new, more time will be needed for further data to be produced and research to be conducted on this matter. Nevertheless, the limitations of the MCMV programme in addressing spatial fragmentation in the central areas of Manaus and Belém are clear. This aspect of the programme raises concerns not only because it constitutes a missed opportunity to reduce fragmentation through a comprehensive housing programme, but also because, as mentioned previously, it reinforces the opportunity-led development logic, extending it into the periphery of urban areas.

Moreover, data from the Renewal/Urbanization of Deprived Areas programme (UAP) reveal the locational contrasts of a comprehensive policy whereby municipalities can apply the funds without necessarily following market dynamics. The UAP developments are not restricted to areas with low urban wellbeing and they also include informal settlements closer to the city centres, where market conditions are less attractive. In this sense, not only could the UAP programme be a more effective urban policy through which to address spatial fragmentation, but it could also be a strategic tool to counterbalance the spatial fragmentation caused by the MCMV programme. However, the scale of the MCMV programme is significantly greater than that of the UAP programme: while the former is present in 5,336 municipalities, the latter covered only 90 municipalities in 2009.

Even though the MCMV programme is relatively new, the maps presented in this article show clearly the spatial distribution of the dwellings in Manaus and Belém. It is fundamental to create incentives to improve the implementation of the MCMV programme and ensure that it reaches central areas of cities. Using a spatial fragmentation lens, the combination of a more balanced social housing approach using

market dynamics and public initiatives could be the starting point for generating more positive outcomes.

It is important to acknowledge at this point that since the research conducted is limited to two Brazilian metropolises, other case studies would be extremely helpful to create a more comprehensive understanding of the spatial fragmentation dynamics of the MCMV programme. The same methodology used in this article could be replicated in other Brazilian cities where data are available. Additionally, the MCMV programme is still being implemented and could still be changed. In this sense, at present, it is impossible to predict how future stages of the programme will be implemented. Furthermore, it would be interesting to understand the social forces underlying these fragmented spaces. How do local communities cope with the push towards fragmentation? To what extent does spatial fragmentation affect social connections? A clearer overview of these local dynamics would strengthen the macro understanding of the impacts of massive social housing programmes such as the MCMV programme.

This study shows that a large-scale programme to provide social housing, such as the MCMV programme, may focus only in the provision of housing and overlook other spatial consequences for the wider built environment such as spatial fragmentation. Due to the mechanisms of the land market, social housing provision may end up in peripheral locations, which may be detrimental to social cohesion, and may add to existing fragmentation of urban systems. Using the same market logic, other social housing programmes outside Brazil may also face the same challenges and end up exacerbating undesirable spatial fragmentation at the city level. We have shown clearly that when designing social housing programmes, spatial fragmentation should be taken into account and counterbalanced with specific planning policies.

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