Chapter 9
Assessing Urban Resilience in the Metropolitan Area of Lisbon: The Case of Alcântara

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9.1 Introduction

This chapter evaluates the aspects of resilience in Alcântara, the selected case study area located on the western side of the city of Lisbon. Its urban fabrics, land uses and functional links to the city and the metropolitan area allow the area to be defined as a nodal zone amid an area of compact urban development.

The key objectives of this chapter are to assess urban resilience in specific contexts and to discuss the results in a broad perspective. The case study area was selected based on the strategies, land-use policies and key planning documents being applied in the metropolitan area, especially those in which *urban resilience* could be relevant.

As it was not always possible to evaluate both the formulation and implementation phases of the plans, the formulation phase and the expected results were evaluated instead or, in other words, the conditions of the site before and after the implementation of the plans. This strategy allowed an outlining of some prospective results and the assessment of multiple policies/measures. By weighing two attributes – *connectivity* and *adaptability* – it was possible to deduce to what extent the plans and respective policies could potentially contribute to urban resilience in the case study. The choice of these attributes was made based upon the identified disturbances, together with the policies/measures contained within the existing plans. The analysis adopts the evaluation framework defined in Chap. 8, with adjustments to take into account local specificities when necessary.

The evaluation of the Alcântara case is expected to illustrate how improvements in infrastructural *connectivity* and the promotion of Alcântara as a metropolitan centrality contributed to an increase in its socio-economic *adaptation* through the introduction of land-use diversity and urban continuities.

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9.2 The Metropolitan Area of Lisbon

The Metropolitan Area of Lisbon (AML) forms part of the *Lisbon and Tagus Valley Region* (RLVT), a medium-sized *metropolitan polarisation region* within the European context (CCDR-LVT 2008). The region contains five NUTS 3 regions[1]: Oeste, Médio Tejo, Lezíria do Tejo, Grande Lisboa and Peninsula de Setúbal, of which Grande Lisboa and Peninsula de Setúbal make up the Metropolitan Area of Lisbon.

As discussed in Chap. 5, Lisbon experienced a process of urban sprawl beginning in the 1980s, resulting in dense housing areas in the suburban areas served by the railway, low-density areas with detached houses close to links with employment centres, and slums in derelict areas bordering infrastructure and industrial areas in the city cores. From the 1990s onwards, however, the Metropolitan Area of Lisbon began to shift from a model based on the Fordist functional dichotomy between the centre and periphery to a knowledge-based model expressed through a polycentric system, which was clearly stated as an objective in several planning documents. Governance topics are also steadily referred in strategy documents (CCDR-LVT 2007) and gave rise to new institutional solutions for a number of local interventions, as was the case in Alcântara.

In recent years, a consistent metropolitan structure has taken shape, combined with a renewal of land-use opportunities. While the industrial and port areas in the central districts became obsolete due to changes in the production and economic structures, new forms of centrality associated with a knowledge-based economy started to emerge. Likewise, the former radial structure started to evolve into a network system of motorways, creating opportunities for new growth areas along the main axes that had been served by the train in earlier periods. As a result, functional complementarities started to develop, especially between different urban centres and the metropolitan centre, which consists of the municipality of Lisbon and the Tagus Estuary.

Consequently, new land uses that had previously existed in the traditional centres began to emerge in the high-connectivity areas and external rings, together with new dense and specialised land uses, such as shopping centres and malls. With the advent of high mobility patterns, the dimmer urban fabrics began to gain central functions, competing with the city of Lisbon, thus shaping a polycentric metropolitan network that at the same time contributed to a shrinkage process in the metropolitan core, especially in the cities of Lisbon and Barreiro (Morgado 2009). These areas have now acquired an outstanding status in the regeneration agendas of national and EU policies (Polis XXI, Urban Regeneration Agencies, NSRF – National Strategic Reference Framework), as well as in the current outlines regarding the revision of regional and municipal plans.

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[1] The *NUTS/Nomenclature of Territorial Units for Statistics* classification is a hierarchical system for dividing up the economic territory of the EU for the purpose of the collection, development and harmonisation of EU regional statistics: socio-economic analyses of the regions. NUTS 1: major socio-economic regions. NUTS 2: basic regions for the application of regional policies. NUTS 3: as small regions for specific diagnoses, http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/introduction.

At a regional level, new strategic planning documents (Lisboa 2020 Regional Strategy) have proposed new institutional solutions, in particular, for local interventions. The latest revision of the regional plan (PROT-AML), promoted with the participation of various municipalities and institutions, aims to address the previous shortage of multilevel actions, which in the past prevented the regional plan from acting efficiently through municipal planning tools. The current key topics addressed in the Metropolitan Area of Lisbon (AML) planning and policy documents include (1) multilevel and cross-scale coordination, (2) an ecologic metropolitan network, (3) an effective metropolitan transport authority and (4) development of polycentricism (CCDR-LVT 2007).

Alcântara represents an important part of the AML as far as urban trends and population dynamics are concerned on the strength of its sensitive location in Lisbon. Throughout history, Lisbon has experienced great cultural diversity (Roman, Muslim and Christian since 1147) and has undergone several erudite urban developments, some of which have been internationally acknowledged (e.g. the eighteenth-century *Baixa Pombalina*). Development began in a small core which is the current downtown area, and now the city has an urban radial outset, complemented by a rural belt that has been subjected to progressive urbanisation. The eastern side of the city, which was previously an industrial area, witnessed a process of regeneration as a result of the World Exhibition in 1998. The western side is mostly taken up by the Monsanto Forest Park and Belém, a waterfront area containing a number of monumental structures (e.g. Jerónimos Monastery).

Alcântara is a pivotal area between the old downtown and Belém. Its status as a former industrial and port area with a particular social structure contributed to shrinkage, which is today being addressed through the "step-by-step" implementation of various projects detailed in the Alcântara Master Plan. Alcântara's potential as a key node in the polycentric metropolitan network has always been acknowledged, and this status has been reinforced with its consideration in the main polycentric system defined in Lisbon's Municipal Master Plan (PDM, recent revision), which is focused around five centralities along the city's Ring railway line (C.M.L 2010) (Fig. 9.1).

In an assessment of this area in terms of resilience, it was hypothesised that by improving the infrastructural *connectivity* of the area, the socio-economic *adaptation* of Alcântara would increase, introducing a new metropolitan centrality with the introduction of land-use diversity, urban continuities and public transport alternatives.

9.3   Alcântara: *Connectivity* and *Adaptability* as the Promoters of Adjustment to Change

Alcântara can be considered as an area in which the deindustrialisation process has not yet been completed. The local population is in decline, due both to the ageing of the population and the relative inability of the area to attract newcomers. In addition, economic and social dynamics are stagnant, further contributing to the definition of the area as being under *shrinkage*.

Fig. 9.1 Metropolitan Area of Lisbon and case study location (Source: FA-UTL 2010)

Alcântara is located in a particularly steep valley along one of Lisbon's former mid-nineteenth-century boundaries (the *First Ring Road*). A canal, tunnelled below street level in the 1940s, used to flow along the valley ending in a muddy lagoon with a tidemill. The lagoon was filled in the late eighteenth century to accommodate one of the first industrial settlements in the city close to the harbour and railway infrastructures. As a result, some of the areas along the river have become subject to flooding, leading to its definition as a flood and seismic risk area.

Functionally, there are several aspects contributing to the uniqueness of Alcântara as a centrality with regard both to the city and to the metropolitan area, particularly the harbour area and the Cascais suburban railway/Ring railway line junction. In recent decades, the last of the industrial units have been abandoned, and a large derelict area has emerged that is in dire need of urban regeneration (C.M.L. 2008), for which several plans have been proposed.

Of these plans, the sectoral ones have seen partial implementation (REFER/ Railway and APL/Port Area Authorities); however, the Alcântara PU, a Development Plan, only recently is expected to be approved, already under the umbrella of the new Lisbon PDM. This plan comprises various proposals with implications on the urban area, including an important environmental and landscape project and "Alcântara XXI", a large real-estate urban development project to be carried out by a public-private partnership (C.M.L. 2008; Manuel Fernandes de Sá. Lda 2010).

The territorial development model for Lisbon sets out three priorities: (1) to strengthen Lisbon's role in the global and national networks, (2) to revitalise the consolidated city and to promote sustainability and (3) to develop urban qualification and public participation. The primary topics with regard to this case study are to rehabilitate heritage areas, to regenerate transitional areas by establishing new land uses and to consolidate small areas of expansion.

In this context, Alcântara has an important role to play at various levels, including (1) the ecological network and the Green Plan for Lisbon, (2) Lisbon's strategy to revitalise its centrality within the metropolitan system and (3) the development of soft mobility (pedestrian and bicycle routes) and public transportation networks by reinforcing multimodality (railways, tramways, buses).

Considering its role in enhancing the connectivity of the Lisbon Metropolitan Area, the planning instruments and respective policies/measures applied to Alcântara are analysed considering an increase of *connectivity* as pivotal in the *adaptive capacity* that further urban interventions might bring to the area.

The *connectivity* attribute was chosen in recognition of importance of improved accessibility for Alcântara, which demands an understanding of how the envisaged modification will affect the plan area. *Adaptability*, on the other hand, was seen as a key attribute in the transformation of the area that could lead to social and urban diversity. Its selection is illustrative of the conjugated processes between the social diversity, the multiplicity of urban fabrics dating from different periods and built for different purposes and the severe shrinkage dynamics.

9.3.1   Connectivity as a Goal from a Polycentric Perspective

Connectivity is not widely accepted in literature as an attribute of resilience, being considered by some authors as paradoxical. It has been argued that connectivity eases communications between systems and is a prerequisite to spatial resilience and ecologic memory (Andersson 2006) in allowing the exchange of information, capital and goods (Cumming et al. 2005). Additionally, it has been argued that should a certain system remain isolated or with few links to other structures, it might be more protected against epidemic catastrophes, economic shocks or other systemic risks. At the same time, this isolation enables the development of local capacity, diversity and innovation oriented towards daily needs (Cumming et al. 2005; Andersson 2006). Cumming et al. (2005) developed a study based in the *connectivity* of an isolated area in the Amazon, where resilience increases whenever endogenous and exogenous factors reach equilibrium and, as a result, a medium level of infrastructural *connectivity*.

However, other authors share a different viewpoint that is more favourable towards the increase of *connectivity* in the context of resilience. Guevara and Laborde (2008), for instance, propose a *connectivity* model between biosphere reserves as a protection increase factor in the long term. Dale (2007) and Brondizio et al. (2009) share also this positive vision of *connectivity* with an application to

adaptive governance. These authors consider *connectivity* not only in its physical sense but also in the realm of social and institutional relationships. Such relationships are fed by resources of knowledge related to the system's dynamics, allowing for the mobilisation of social memory. This process facilitates access to previous experiences and responses to disturbances, easing the adaptation and innovation of solutions when facing difficulties and allowing the creation of platforms that are able to deal with rapid and broad-scale change.

In this sense, taking into account the contribution of land-use policies to the increase of resilience in urban areas, which may also be seen as a final goal of sustainability, it would appear that an increase of *connectivity* in an urban environment that is based on public transport networks implies an increase in urban resilience.

This argument can be deemed valid at various levels, such as in the case of network redundancy, which is fundamental in the event of natural or technological disasters in reducing the possibility of compromise in key connections or even by decreasing the time proximity between institutions, people and goods networks, contributing to a larger diversity of these channels (CSIRO et al. 2007).

In a globalisation context, whenever interventions into the system result from urban conurbations or contiguous urbanisation processes, diversity dynamics, innovation and local capacities are associated with local functional specialisation. These circumstances require high levels of *connectivity* – consistent knowledge networks with proper infrastructural support – to ensure maximum effect.

The evaluation of *connectivity* in Alcântara takes into account the preliminary proposal of the Development Plan (Plano de Urbanização/PU) for the area, which defines a new link between the Cascais railway and the Ring railway lines, together with the planned Alvito Station on the Southern railway line across the Tagus.

Coming to underground connections, two alternatives were considered: an interface of the Yellow Line with the Alcântara-Mar railway station or the creation of a new station between the Yellow and the Red Lines in Fonte Santa (between Campo de Ourique and Alcântara Valley) connected to the Southern railway line (Manuel Fernandes de Sá. Lda 2010).

Both alternatives were considered in the application of the evaluation methodology. As a result, travel times of 10 min were analysed in three different settings: before the intervention (present time); according to solution (I), having the Yellow Line as its terminus in Alcântara-Mar; and to solution (II), at the junction of the Yellow and Red Lines in Fonte Santa.

The underground and railway stations located 10 and 20 min from Alcântara were identified, with 500 m radius[2] buffers joined to the Information Reference Geographical Database (BGRI).[3] These analytic processes allowed for the

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[2] Value considered as acceptable for trips on foot to large-capacity transport stations.

[3] INE – Instituto Nacional de Estatística/National Institute for Statistics. On this basis, the minimum unit is the statistic subsection, which corresponds, most of the time, to an urban block. Statistic subsections hold alphanumeric information sourced from the 2001 Census. Whenever the stations' influence area limits do not coincide with statistics subsections, the resulting values were weighted according to census results for that subsection.
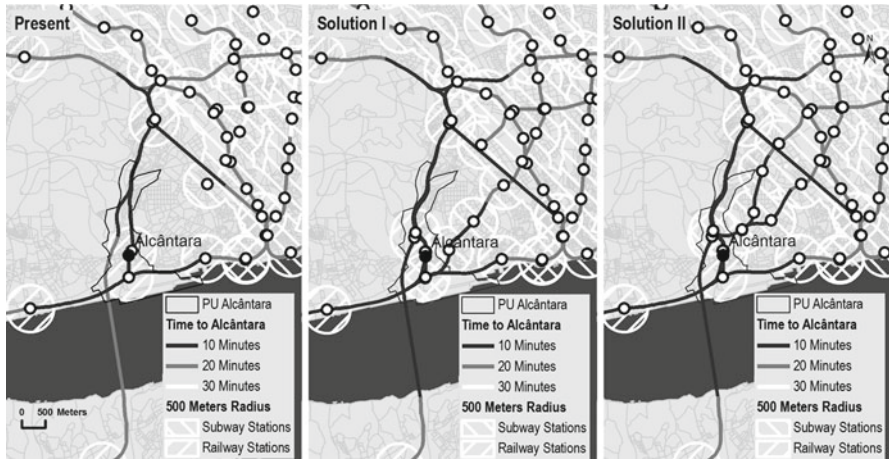
Fig. 9.2 Time travel to Alcântara. Present, solution I and solution II (Source: FA-UTL 2010, with information from CML, INE, REFER, Metropolitano de Lisboa and PU Alcântara)

quantification of several socio-economic indicators regarding the populations located at a given time/distance from the centre of Alcântara from both before and after the intervention, whatever the chosen solution (I or II). Results related to the effects of *connectivity* in the *adaptive capacity* of the Alcântara Plan were obtained (Fig. 9.2).

Connectivity dynamics were assessed using two groups of indicators. These were taken only from the Development Plan perspective, since this is the one that best defines the mobility measures undertaken and the restructuring of the transport networks.

The first group of indicators is based on the policy/measure "increase of centrality/polycentricity" in the light of the social changes that may occur should the Development Plan be implemented. The indicator is defined as the resident population by education level living less than 10 min from Alcântara using the underground or train network within a 500 m radius from the stations. The analysis focused on the area before and after the hypothetical implementation of the plan, aiming to understand the increase of *connectivity* of the educated population level living a certain time/distance from Alcântara. From the results, some positive changes in the demography of residents might be inferred as being a consequence of the expected changes (Table 9.1).

Following a similar strategy of examination, indicators of building functions (divided into residential and non-residential) were obtained for time/distances of 10 and 20 min from Alcântara. The results allow deeper insight into the relationship between the changes of time/distance using public transport, verifying whether Alcântara, with an increased *connectivity*, will have a stronger linkage with other tertiary centres. In this way, economic factors are also factored into the evaluation (Table 9.2).

Table 9.1 Indicators used to evaluate the connectivity attribute in the social dimension and under centrality/polycentricity policy/measures

| | Phases | | |
| | Before the plan | Expected results | |
Indicators	Present	Solution I	Solution II
Inhabitants per square km	5,311	7,098	8,084
Resident population with basic education 1st cycle (%)	34.8	29.9	29.0
Resident population with basic education 2nd cycle (%)	11.9	10.8	10.7
Resident population with basic education 3rd cycle (%)	17.9	18.3	18.6
Resident population with high school education (%)	17.4	19.5	19.9
Resident population with bachelor degree or above (%)	18.0	21.5	21.8

Sources: INE (Instituto Nacional de Estatística/National Institute for Statistics), PU Alcântara (Plano de Urbanizaçao de Alcântara/Alcântara Urban Plan) and FA-UTL (Faculdade de Arquitectura da Universidade Técnica de Lisboa/Faculty of Architecture – Lisbon Technical University)

Table 9.2 Possible outcomes of increasing connectivity under centrality/polycentricity policy/measure

| | Phases | | |
| | Before the plan | Expected results | |
Indicators	Present	Solution I	Solution II
Area at 10 min from Alcântara (km^2)	4.01	7.62	8.50
Exclusively residential buildings (per square km)	666	694	773
Mainly residential buildings (per square km)	173	249	226
Mainly non-residential buildings (per square km)	16	33	31
Area at 20 min from Alcântara (Km^2)	21.88	32.77	35.22
Exclusively residential buildings (per square km)	613	581	580
Mainly residential buildings (per square km)	231	216	212
Mainly non-residential buildings (per square km)	33	29	27

Sources: INE (Instituto Nacional de Estatística/National Institute for Statistics), PU Alcântara (Plano de Urbanização de Alcântara/Alcântara Urban Plan) and FA-UTL (Faculdade de Arquitectura da Universidade Técnica de Lisboa/Faculty of Architecture – Lisbon Technical University)

9.3.2 Adaptability as an Outcome to Achieve

Despite witnessing a progressive decline, Alcântara can be considered as an urban centre with high potential, given its central location both in Lisbon and in its metropolitan area, and its high level of infrastructure and services.

Throughout the last decade, different research and implementation projects were made in a bid to fight the loss of population and economic potential, with policies aimed at maximising its centrality capacity. This approach has actually become the main goal of the Alcântara Plan, according to the municipal plan of Lisbon (PDM).

Table 9.3 Indicators used to evaluate adaptability attribute in the environmental dimension and under rehousing policy/measure

Indicators		
	Phases	
	Formulation	Implementation
	(1995)	(2004)
Families	≈ 1,200	1,152
Persons	≈ 4,500	3,916

Sources: CML (Câmara Municipal de Lisboa – Lisbon Municipality)/GEBALIS (Gestão dos Bairros Municipais de Lisboa/Management of Municipal Districts of Lisbon)

With the aim of developing a comprehensive outline of the land-use policies that gave rise to the current configuration of the area of the Alcântara Development Plan, other documents were studied, including the municipal Medium-Term Intervention Programme (PIMP) and the National Special Programme for Housing (PER). Despite their different territorial and intervention spheres of focus, both promoted the eradication of the shantytown areas and the respective rehousing of the local population, especially in the Casal Ventoso area.

Another relevant project worth considering is Alcântara XXI, approved in 2005 by the municipal council and revoked in 2008, in which the public realm and housing were considered specifically under an urban regeneration strategy. Great consideration was given to the reconversion of industrial plots in a bid to kick start an economic revitalisation of the area.

The application of the evaluation methodology with regard to resilience includes various programmes and projects (PIMP, PER, Alcântara XXI and the Development Plan) with policies/measures aimed at rehousing, urban regeneration, an increased centrality in the sphere of metropolitan polycentrism.

The evaluation of the attribute *adaptability* is based on a definition of indicators, bearing in mind the policies/measures of urban reconversion and rehousing after the completion of PER, Alcântara XXI and the Development Plan (approved by municipal council in 2010), in which different dimensions and components of resilience are considered.

The first group of indicators focus on policies/measures relating to rehousing, having as a basis the implementation of the PER and PIMP Programmes and factors related to the built environment. The selected indicators from the period before the implementation of the programmes in Alcântara comprised the number of families and inhabitants involved in the Casal Ventoso rehousing process. As for the implementation, consideration was given to the number of new dwellings and, consequently, the number of families and people rehoused under the scope of these programmes (Table 9.3).

The goal of the analysis is to verify the level of coverage of the rehousing programme and the population in the Urban/Urban II Programmes.

The second group of indicators is based on the policies/measure of urban reconversion, seeking to assess the changes resulting from Alcântara XXI and the Development Plan, with consideration of the economic issues raised by the plans.

Fig. 9.3 Changes in building areas in Alcântara (Sources: FA-UTL 2010 (Faculdade de Arquitectura de la Universidad Técnica de Lisboa/Faculty of Architecture – Lisbon Technical University), with information from CML (Câmara Municipal de Lisboa – Lisbon Municipality)/ GEBALIS (Gestão dos Bairros Municipais de Lisboa/Management of Municipal Districts of Lisbon) http://www.gebalis.pt/, (Information obtained from http://www.gebalis.pt/site/html/vale_alcantara.html in 15/07/2010) PU Alcântara (Plano de Urbanizaçao de Alcântara/Alcântara Urban Plan) and Alcântara XXI)

In a way, Alcântara XXI has led to some of the issues covered in the Development Plan. With its approval, certain rights and duties were passed to private sector promoters, which led other private investors with an interest in investing in their own urban plots to request official information from the Municipality of Lisbon (C.M.L. 2006, 2008) (Fig. 9.3).

In this sense, it was important to verify the territorial impact of the expectations of the private sector during the binding period, in spite of the restrictions of Alcântara XXI. This examination aimed to evaluate the level of private sector interest, for which a simple indicator was established that enabled a comparison of the built area from before the project (1997) to near the end of its binding period (2007). Areas that had been subjected to broad demolitions were also quantified in both periods. Within this second group of indicators, but only for the Development Plan, the existing and foreseen built areas were analysed. These areas were subdivided according to use – whether housing, offices, facilities or shopping – so as to allow an understanding of the plan's effects upon the local economy and the prevention of shrinkage (Fig. 9.3; Table 9.4).

The third group of indicators relates to the policies/measures aimed at urban reconversion, drawn from the impact of the Development Plan on the social fabric. The ongoing process of shrinkage can be blamed on various factors; however, the decrease in population can be considered as one of the most important (see Chap. 5 for more details). The implementation of the Development Plan allows an anticipation of demographic change, and for this reason, indicators related to the available projections in the plan were also included (Table 9.5).

Table 9.4 Indicators used to evaluate adaptability attribute in the economic dimension and under urban reconversion policy/measure

Phases	Indicators		40% of new gross areas for habitation	60% of new gross areas for habitation	Sources
Before the plan	Area of implementation in square metres (1997)		186,751		FA-UTL[a]CML[b]
After the plan	Area of implementation in square metres (2007)	Maintained	127,850		
		Demolished	58,901		
		New constructions	16,764		
Before the plan	Gross area of construction for non-residential uses (2010)			550,730.5 m²	PU
	Gross area of construction for housing (2010)			423,421.5 m²	Alcântara[c]
Expected results	—		40% of new gross areas for habitation	60% of new gross areas for habitation	
			m²	%	m²	%
	Gross areas of construction for non-residential uses	737,006.5	+33.8	702,665.5	+27.6
	Gross areas of construction for housing	575,356.5	+35.88	609,697.5	+43.99

Sources:

[a]FA-UTL (Faculdade de Arquitectura de la Universidad Técnica de Lisboa/Faculty of Architecture – Lisbon Technical University)

[b]CML (Câmara Municipal de Lisboa – Lisbon Municipality)

[c]PU Alcântara (Plano de Urbanizaçao de Alcântara/Alcântara Urban Plan)

Table 9.5 Indicators used to evaluate adaptability attribute in the social dimension and under urban reconversion policy/measure

Phases	Indicators		Sources
Before the plan	Inhabitants (2001)	8,755	INE[a]
Expected results	Inhabitants – hypotheses 1 (40% of new gross areas for habitation)	11,873	PU
	Inhabitants – hypotheses 2 (60% of new gross areas for habitation)	12,480	Alcântara[b]

Sources:

[a]INE (Instituto Nacional de Estatística/National Institute for Statistics)

[b]PU Alcântara (Plano de Urbanizaçao de Alcântara/Alcântara Urban Plan)

9.4 Main Findings

The redevelopment of the public transport system notably the underground and rail networks will change the connectivity and accessibility levels of Alcântara. Ridership from the underground and train stations located within a 10-min ride of Alcântara will increase as a result of the intervention. As a consequence, the influence area[4] of the stations will increase from 4.01 to 7.62 km² or 8.5 km², depending on the selected solution. This reduction of time/distance means increased connectivity to Alcântara for the denser areas in the metropolitan realm, with impacts on the population density[5] in surrounding areas of stations within a time/distance of 10 min from Alcântara, which will increase from 5,311 inhab/km² to 7,098 inhab/km² or even 8,084 inhab/km², depending, once again, on the selected solution.

By effectively promoting Alcântara as a central location, and the future availability of services, facilities and shopping areas, a rise in the education levels of the resident population is also envisaged. This may be especially true in a distance/time range of 10 min after the introduction of changes to the public transport networks. Another positive synergy to consider corresponds to a stronger polarisation of services and facilities.

As for the development in the surrounding areas of the stations (within the 10-min time/distance range), the density of buildings or parts of buildings for activities other than housing will increase significantly. This effect corresponds to the reduction of the time needed to travel between Alcântara and the traditional business centre of Lisbon or other important areas, such as the Expo' 98 site (Parque das Nações) or the International Airport. This close proximity and ease of travel between centres will increase the potential of the agglomeration economies.

Within the time range of 20 min to Alcântara, the analysis shows a rather relevant decrease of density following the decrease of activities resulting from a low density, or even lack of buildings, in close proximity to the stations. Future trends may include urban expansion or, oddly enough, urban dispersion.

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[4] Within a 500 m radius.

[5] In Lisbon, the population density in 2001 was 6,673 inhab/km2 (INE 2001).

According to the available data, almost the entire population of Casal Ventoso was rehoused in Alcântara, corresponding to 30% of Alcântara's population (C.M.L 1995), which can be considered as highly relevant from a social perspective. This kind of project presents a considerable challenge in terms of the social insertion of this population, which was supported by the EU Programme Urban II.

At the same time, a strong private initiative was undertaken in the urban reconversion process, which became evident particularly after the approval of Alcântara XXI. Over 58,000 m² of buildings were demolished, clearing an area of more than 16,000 m² for the construction of new buildings, thus helping to sustain the private sector interest in the reconversion process.

The Development Plan for Alcântara strongly supports new built areas for non-residential use, with two possibilities of occupancy rates (40 or 60% of total new buildings) for the total area. Regardless of the selected solution, both residential and non-residential areas may see a considerable increase in the near future.

In this regard, the growth in area of non-residential activities ranges from 27.6 to 33.8%. Housing will increase from 35.8 to 44%, depending on the chosen solution, corresponding to a demographic estimation rate of 11,873 (+35%) or 12,480 (+42%) inhabitants respectively (Manuel Fernandes de Sá. Lda 2010).

From this it can be deduced that by increasing housing, facilities, shopping centres or service areas, Alcantara's centrality will see a marked increase, bringing together new production factors and inhabitants, allowing for the reversal of the current shrinkage process and promoting intensification within the area.

By providing modern housing, socio-economic diversity levels will also rise, which may have a positive impact both on Alcântara and its surrounding areas in promoting rehabilitation and reconversion processes.

9.5 Conclusions

The process of evaluating resilience in the Metropolitan Area of Lisbon follows a methodology in which the dimensions of resilience, policies and measures, and attributes were examined in a case study of Alcântara. This Alcântara area was chosen due to its particular form of space production and due the existent plans and policies, considered as relevant in the global context of urban planning in Lisbon.

In Alcântara the *adaptive capacity* was analysed for different dimensions of resilience (environment, economic and social) and for different phases of the planning process. The results of the analysis show that Alcântara is undergoing an infrastructural redevelopment process and urban reconversion, with impacts on both the built environment and the social fabrics, both of which have consistently contributed to a shrinkage trend.

Drawing upon the adaptive cycles coined by Holling[6] and Gunderson (2002), it can be said that Alcântara is in the middle of a "renewal or reorganisation" phase,

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[6] The adaptive cycles are the characterisation of a given system in a given time through four sequential states. These states are designated as (1) growth, (2) conservation, (3) release and (4) reorganisation.

and from this perspective, it would seem that the implementation of the Alcântara Development Plan will promote a shift to a phase of "rapid growth".

Supported by a planning process based on previous experiences and solid know-how, this will boost the area's *adaptive capacity* to cope with new challenges (Folke et al. 2002), sustained and potentiated by the intensification of *connectivity* in Alcântara, which will encourage economic changes, social diversity and innovation trends.

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