

Daily Mobility in Metropolitan Areas

The case of higher education students and urban spatial development in the Valparaíso Metropolitan Area

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Metropolitan Area

Marcela Soto Caro

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Daily Mobility in Metropolitan Areas

The case of higher education
students and urban spatial
development in the Valparaíso
Metropolitan Area

Dissertation

for the purpose of obtaining the degree of doctor
at Delft University of Technology
by the authority of the Rector Magnificus prof.dr.ir. T.H.J.J. van der Hagen
chair of the Board for Doctorates
to be defended publicly on
Tuesday 4 June 2024 at 10:00 o'clock

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Dr. C. Neilson	The University of Manchester, has, as editor, contributed significantly to the preparation of this dissertation.
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Glossary

- VMA:** Valparaiso Metropolitan Area
- NBI:** Unsatisfied Basic Needs (for its acronym in Spanish)
- PSU:** The University Selection Test (for its acronym in Spanish)
- SPSS:** Statistical Package for the Social Sciences
- ICT:** Information and Communications Technology (ICT)
- PIG:** People, Information and Goods
- CMR:** Central Macro Region
- GDP:** Gross Domestic Product
- HE:** Higher Education
- HEI:** Higher Education Institutions (HEI)
- UV:** Valparaiso University
- PUCV:** Catholic University of Valparaiso
- UPLA:** Playa Ancha University
- UTFSM:** Federico Santa María Technical University
- FNDR:** Regional Capital Funding (for its acronym in Spanish)
- GIS:** Geographic Information System
- IDW:** Inverse Distance Weighting
- MERVAL:** Metro Valparaiso

Summary

This study seeks to understand the interrelationship between daily mobility and the spatial structure of an emerging metropolitan urban system. It is concerned with the daily mobility of a specific group of inhabitants, higher education students, living in a contemporary metropolis and experiencing urban living. The study's main aim is to better understand aspects of this complex urban spatial structure through the students' lives and through their daily mobility to explore specific urban spatial dynamics and trends. This study therefore considers the effects of an accelerated urbanisation process and the development of an increasingly fragmented and segregated socioeconomic environment. In doing so, it highlights the ways in which rapid urban expansion in developing countries has tended to reproduce or maintain a range of inequalities.

The study is built on the assumption that daily mobility can be understood as the sum of individual movements in the city. This socially enabled practice allows individuals to access people, places, and activities through urban space and time. This way of understanding mobility responds to the recent "mobility turn" within the social sciences. This change in thinking posits that 'movement' is a significant actor of change. It explores changes to the urban spatial structure and their impact on the inhabitants. It tries to understand how changing urban structures are experienced by those living in those urban spaces.

In this study, how the student population lives, works, studies, and spends its leisure time within the Valparaíso Metropolitan Area (VMA) proves to be dependent on a complex of structural factors. These include, for example, the locations where these activities are performed, the socioeconomic background of those performing such activities and the distribution of university facilities within a metropolis which has a particular and distinctive topography. Such day-to-day activities are further shaped by more dynamic and perhaps more subtle influences such as the changing functions of the urban space, increasing socioeconomic fragmentation and segmentation and the inequitable provision of public transport across what is a topographically complex area.

The collection and analysis of data, including empirical surveys and interviews, was informed by Kaufmann's three conditions for mobility, *Competence*, *Appropriation* and *Access*. Competence covers an individual's physical abilities and the skills they acquire, *Appropriation* encompasses the range of mobility strategies used by

individuals and Access, a condition that refers to the variety of potential mobilities that confront an individual according to place, time, and other structural constraints (Kaufmann, 2012). Kaufmann argues that together all three conditions determine the capital of mobility that students have as they go about their daily lives but also defines how an individual or groups of individuals take advantage of existing mobility options and uses them to create a lifestyle (Kaufmann, 2012).

A range of research methods has been used to examine the student's daily mobility patterns in this study. In order, these methods include: (1) Documentary and other secondary data which has been used to understand changes to existing metropolitan structure over three decades; to understand urban spatial conditions related to urban mobility, higher education and urban development, and explain the spatial distribution of Traditional Universities within the VMA; (2) Empirical methods including face-to-face structured interviews with higher education students and an extensive internet survey have been use to enrich the data gathered in the first phase, finally (3) data drawn from the initial survey work, together with data gathered from the in-depth interviews have been combined with mapping other secondary data to confirm and extend existing sources.

The internet survey results (824 students) provided further essential data on a range of individual's travel patterns from different parts of the metropolis. Three primary patterns of mobility emerged from this study of the student daily mobility: those related to local, regional migrant, and national migrant students. The three mobility patterns can be explained first by looking at the residential conditions, whether individual students are locals or migrants, and from which region they are coming. This latter condition influences the choices of migrant students when it comes to housing location. During the study, it was discovered that regional migrants tend to live around central areas whereas national migrants prefer to be nearer the university campus. By contrast, local students are not so free to choose, and consequently, they live all around the metropolitan area.

The daily mobility patterns of local students (70%) consisting mainly of long trips to the centre tend to mirror general trends in the structural development of the VMA. A range of influences have tended to promote peripheral growth and conversely, the increasing abandonment and decline of the historic urban centre. Running counter to this socially polarised outward flow, characteristic of neoliberal economic policies and post-Fordist processes, there are signs of a returning flow towards the historic centre. This weak but increasingly visible return to the centre is a perhaps a consequence of the policies actively pursued by the area's traditional higher education institutions. The daily mobility patterns of the migrant students surveyed (39%) demonstrates the presence of this weak but important returning flow.

Their preference for living in near to their places of study highlights the relationship between the (re)development of central metropolitan spaces and the comparatively higher levels capital for mobility available to migrant students.

Finally, even though it is recognised that travel times are longer for all local students independent of their socioeconomic condition, the data for local low-income students provides some important qualifications. The low-income groups of local students who live in high-hill areas with limited connectivity to central areas of the VMA notably must endure extended trips between their homes and their study places. It is therefore demonstrated that levels of capital for mobility for this specific group is associated with significant social differentiation. The research has further revealed that a lack of a comprehensive infrastructure network in the metropolis's interior means that a significant population living above 100 m.a.s.l by necessity often must develop distinctive and complex daily mobility strategies. The paradox in these cases, lies between the growth rate and the infrastructure deficit.

Another critical problem revealed by the study is the continuing deterioration and underuse of central historical areas. The research suggests that higher education institutions might now play an essential role in reversing these trends particularly if supported by robust public policies. More broadly, the extent literature has tended to reduce the scale of analysis of daily mobility to neighbourhoods. This research within this study however demonstrates that a better understanding of an individuals' daily mobility can make visible urban trends that have previously been left undisturbed by the existing traditional origin and destination surveys. The research therefore serves to highlight the social and economic flows that continue to shape the metropolitan spatial structure.

Samenvatting

Dit is een onderzoek naar het verband tussen dagelijkse mobiliteit en de stedelijke ruimtelijke indeling van een opkomend grootstedelijk systeem. Het onderzoek richt zich op de dagelijkse mobiliteit van een specifieke groep bewoners, namelijk studenten in het hoger onderwijs, die in een hedendaagse metropool wonen en leven. Het belangrijkste doel van dit onderzoek is om meer inzicht te krijgen in aspecten van de complexe ruimtelijke indeling van de stad via het leven en de dagelijkse mobiliteit van studenten, om daardoor specifieke ruimtelijke trends en ontwikkelingen in de stad te kunnen verklaren. Dit onderzoek richt zich op de effecten van een versneld urbanisatieproces en het ontstaan van steeds meer gefragmenteerde en gesegregeerde sociaal-economische omstandigheden. Dit toont aan hoe een snelle stedelijke groei in zich ontwikkelende landen vaak verschillende systemen van ongelijkheid reproduceert of bevestigt.

Het onderzoek gaat uit van de aanname dat dagelijkse mobiliteit kan worden begrepen als de som van individuele verplaatsingen in de stad. Deze sociale handeling biedt toegang tot activiteiten, mensen en plekken via stedelijke ruimte en tijd. Met deze kijk op mobiliteit, met name dagelijkse stedelijke mobiliteit, wordt rekening gehouden met de relatief recente 'mobiliteits-ommekeer' binnen de sociale wetenschappen. Deze nieuwe zienswijze heeft als focus dat 'verplaatsing' als actor van verandering wordt beschouwd. Veranderingen in de stedelijke ruimtelijke structuur en de gevolgen daarvan op inwoners zijn onderwerp van onderzoek. Het doel is om inzicht te krijgen in hoe veranderende stedelijke structuren worden beleefd door degenen die deze stedelijke ruimtes bewonen.

Uit dit onderzoek blijkt dat de manier waarop de studentenpopulatie in Groot-Valparaíso (VMA, Valparaíso Metropolitan Area) woont, werkt, studeert en haar vrije tijd doorbrengt, afhangt van een complex van structurele factoren. Dit zijn bijvoorbeeld de locaties waar deze activiteiten plaatsvinden, de sociaal-economische achtergrond van degenen die deze activiteiten uitvoeren en de spreiding van universitaire faciliteiten in een metropool met een bijzondere, eigen topografie. Dergelijke dagelijkse activiteiten worden daarnaast beïnvloed door meer dynamische en mogelijk subtielere factoren zoals de veranderende functies van stedelijke ruimte, toegenomen sociaal-economische fragmentatie en segmentatie, en de ongelijke beschikbaarheid van openbaar vervoer van wat een topografisch complex gebied is.

Het verzamelen en analyseren van onderzoeksgegevens, inclusief empirisch onderzoek en interviews, gebeurde op basis van de drie voorwaarden voor mobiliteit die Kaufmann formuleert: competentie, toe-eigening en toegang. Competentie ziet op de fysieke mogelijkheden en opgedane kennis van een individu, toe-eigening gaat over de bestaande opties voor mobiliteitsstrategieën waarvan individuen gebruikmaken en toegang betreft de mogelijkheden voor mobiliteit die een individu ter beschikking staan, afhankelijk van plaats, tijd en stedelijke beperkingen. Kaufmann stelt dat deze drie voorwaarden bepalend zijn voor het mobiliteitskapitaal waarover studenten kunnen beschikken voor hun dagelijkse verplaatsingspatronen. Hij beschrijft hoe een individu of een groep individuen profiteert van bestaande mobiliteitsopties en deze inzet om een levensstijl te creëren.

Voor het bestuderen van de dagelijkse mobiliteitspatronen van studenten zijn in dit onderzoek verschillende onderzoeksmethoden toegepast. Dit zijn achtereenvolgens: (1) documentatie en andere secundaire data die zijn gebruikt om inzicht te krijgen in veranderingen in de bestaande situatie in de metropool gedurende drie decennia, teneinde inzicht te krijgen in stedelijke ruimtelijke voorwaarden met betrekking tot stedelijke mobiliteit, hoger onderwijs en stedelijke ontwikkeling, en om de ruimtelijke spreiding van traditionele universiteiten te verklaren; (2) empirische methodes inclusief face-to-face-, diepte-interviews met studenten in het hoger onderwijs en een speciaal hiervoor ontworpen en uitgevoerde internetenquête ter verrijking van de in de eerste fase verzamelde data; tot slot (3) werden gegevens uit de enquête en de ongestructureerde interviews gecombineerd met plattegronden en registratie van niet-bestaande informatie om bestaande informatiebronnen te bevestigen en uit te breiden.

De onderzoeksresultaten (van 824 studenten) leverden belangrijke data op over een scala aan reispatronen van individuen uit verschillende delen van de metropool. Uit dit onderzoek naar dagelijkse mobiliteit van studenten kwamen drie primaire mobiliteitspatronen naar voren: van lokale, regionaal gemigreerde en landelijk gemigreerde studenten. Deze drie mobiliteitspatronen zijn in de eerste plaats te verklaren door te kijken naar de herkomst van studenten, of een student een local is of een migrant, en uit welke regio de migrant afkomstig is. Dit laatste is van invloed op de keuzes die gemigreerde studenten hebben wat betreft woonlocatie. Uit het onderzoek bleek dat regionale migranten vaak in centrale wijken wonen, terwijl nationale migranten de voorkeur geven aan een woning dichterbij de campus van hun universiteit. Studenten die locals zijn kunnen daarentegen veel minder zelf kiezen en wonen dan ook over de hele gemeente verspreid.

De dagelijkse mobiliteitspatronen van studenten die locals zijn (70%), met lange ritten naar het centrum, zijn vaak het gevolg van de algehele ontwikkeling van de stedelijke structuur. Door verschillende oorzaken vindt de groei vooral aan de randen van de stad plaats, en raakt het historische centrum van de VMA steeds meer verlaten en vervallen. Deze naar buiten gerichte uitstroom is kenmerkend voor een neoliberale economisch model en Post-Fordistische processen, maar er zijn ook tekenen van een stroming in tegengestelde richting, weer naar het historische centrum toe. Deze bescheiden, maar steeds zichtbaardere terugkeer naar het centrum is wellicht een gevolg van het actieve beleid van de 'traditionele' instellingen voor hoger onderwijs. De dagelijkse mobiliteitspatronen van 39% van de gemigreerde studenten zijn een bewijs voor deze bescheiden maar belangrijke terugkeer, vanwege hun wens in de buurt te wonen van de plek waar ze studeren. Daarnaast toont dit het verband aan tussen de grootstedelijke ruimte en het mobiliteitskapitaal van de gemigreerde studenten.

Tot slot blijkt, hoewel de reistijden voor alle studenten die local zijn langer zijn, ongeacht hun sociaal-economische positie, dat er enkele belangrijke conclusies te trekken zijn uit de data voor studenten uit een milieu met een laag inkomen. Bepaalde studenten moeten aanzienlijk langere ritten maken naar hun studielocaties. Dit zijn de studenten uit een milieu met een laag inkomen die local zijn, en die wonen in gebieden hoog in de heuvels waar het openbaar vervoer tekortschiet. Daaruit is dan ook af te leiden dat het mobiliteitskapitaal van deze groep verband houdt met sociale differentiatie.

Uit het onderzoek blijkt dat een gebrek aan een omvattend infrastructuurnetwerk in het hart van de metropool ertoe leidt dat een aanzienlijk deel van de bevolking die boven een hoogte van 100 meter boven zeeniveau woont een bijzondere en complexe dagelijkse mobiliteitsstrategie moet ontwikkelen. Er bestaat een paradox tussen de groeisnelheid en het tekort aan infrastructuur. Een andere belangrijke kwestie die het onderzoek aan het licht brengt, is de aanhoudende achteruitgang en verwaarlozing van centrale, historische wijken en de mogelijk belangrijke rol die instellingen voor hoger onderwijs kunnen spelen in het omkeren van deze trend, met name met de steun van krachtig overheidsbeleid. De bestaande literatuur keek voor de analyse van dagelijkse mobiliteit vaak niet verder dan het niveau van buurten. Het onderzoek in het kader van dit proefschrift toont aan dat door meer inzicht in de dagelijkse mobiliteit van individuen stedelijke trends zichtbaar kunnen worden die eerder niet aan het licht kwamen in de traditionele onderzoeken die uitgaan van vertrek en aankomst. Onderzoek naar dagelijkse mobiliteitspatronen maakt het mogelijk meer te weten te komen over de stedelijke stromen die de ruimtelijke structuur van de metropool voortdurend vormgeven.

1 Mobility in Urban Studies

1.1 Mobility in Urban Studies

The significance of mobility within contemporary society has often been discussed by researchers interested in all areas of urban sociology. The study of spatial mobility has therefore attracted contributions from researchers working in a variety of disciplines. Of particular interest here are those arising from the social sciences, design, engineering, and planning. Early studies of spatial mobility concentrated on the effect of transport technology on movement and urbanisation (Carmona, Soto, Rodríguez, Cortés, and González, 2017; Graham and Marvin, 2001). Studies from the mid-20th century onwards instead tended to emphasise the solution to the mobility challenge as being the constant production of transport infrastructure to meet an apparently changing but always growing level of demand and consumption.

In doing so, these previous studies tend to ignore or downplay the underpinning trends and patterns that influence and alter spatial behaviour through mobility and therefore its power to alter activity location. Consequently, the dominant emphasis on taking a technical approach to transport infrastructure has arguably led to an exacerbation (not improvement) of the functional aspects of infrastructure network, which in turn led to the neglect of deep interrelationships between transport and infrastructure networks, the individual and the formation of the conditions of city production. (Herce 2009).

The best-known version of the so-called 'traffic models' tends to reinforce private car ownership, foster urban sprawl, and increases demand for mobility demand. Writing in the mid 1990s and looking back to the 1970s, Zahavi suggested that all travel components interact with each other and with the transport system through a simultaneous dynamic feedback process (Zahavi, 1994). Zahavi argued that to

overturn the orthodoxy of causality it was necessary to establish a dialectic that would adequately describe the reciprocal relationship between city, transport, and mobility (Zahavi, 1994). By the early 2000s, Miralles-Guash was arguing that there should be no doubt that transportation, urbanisation, and mobility are closely related, intertwined, influencing, and evolving together.

Such commentaries have inspired some to propose that this view of mobility and its role in social organisation amounted to a new paradigm (Sheller and Urry, 2006a; Urry, 2007). Under this emergent paradigm, mobility becomes a generalised necessity that is often associated with accelerated urbanisation processes and fragmented or segregated conditions that create stress amongst those populations inhabiting these evolving urban spaces (Bauman, 2000).

Based on this understanding of mobility, Kaufmann argues that spatial mobility refers to the geographic travel of entities described in terms of time and space. Such entities might be physical entities (e.g., products, machinery, or people) or abstract entities (e.g., information, ideas, or norms) that move from an origin to a destination along a specific trajectory. Kaufman suggests that nature of such entities means that they can influence the points of departure, travel passage, or destination (Kaufmann, 2006).

Thus, Kaufmann argues, spatial mobility is not only a liaison between an origin and a destination, a perspective that references earlier conceptions of mobility but is instead, a structuring dimension of social life (Kaufmann 2006). Written from a social science perspective, these more recent commentators have insisted that prior understandings of mobility have not addressed critical role of mobility, the way in which mobility permits and responds to the conduct of socially patterned activities (Hannam, Sheller and Urry, 2006; Kaufmann, 2012; Urry 2007). Sheller and Urry (2006) explored the ways in which all forms of mobility impact the organisation of contemporary everyday life. Central to the 'mobility turn' within the social sciences, under this new paradigm the study of everyday urban life becomes all about 'socioeconomic conditions' and 'historical and policy dimensions' (Cresswell 2006; Hannam, *et al.*, 2016; Sheller and Urry 2006a; Sheller and Urry 2006b; Urry 2007).

Despite the persuasiveness of such arguments, some studies of mobility have continued to focus on the empirical dynamic relationship between mobility and patterns in the distribution of uses, densities, morphology, and urban design. Such associative studies tend to assume a rational decision-making process based on behavioural models. This assumption is combined with empirical data to reach generalisations about an individual and group movement patterns. Kaufmann argues however that such transport based spatial mobility studies assume that a person's behaviour is purely related to rational economic decisions contingent on money and time (Kaufmann 2012).

Kaufman has therefore complained that such transport centred research continues to neglect the social processes associated with travel; the expectations, experiences, and effects of trips on people's lives (Kaufmann, 2012). Notably the research about which Kaufmann was complaining was commonly conducted in North American and European built environments. This meant that the outcome of such research is strongly orientated towards the mobility needs and demands of those populations.

In contrast to the way in which these studies depend on observations of mobility in the global north, Dureau (2002) and Figueroa (2005) have argued for a socially informed approach to the study of mobility in Latin America and the global south. Such an analysis would need to similarly focus on the spatial and social dimensions of mobility within the urban areas of the global south. In the light of the 'mobility turn', such research would require a similar appreciation of the potential demand for mobility, income differences, the need for accessibility, socioeconomic conditions, together with the historical and political aspects of mobility within such spaces. Aside from these structural differences, Kaufmann has a variety of individual factors including habits, routines, age, and values that together serve shape an individual's mobility choices which must also be considered (Kaufmann 2006).

Although the commentaries by Dureau (2002), Figueroa (2005) and (Kaufmann 2006) have highlighted differences associated with different economic, social, and cultural conditions, perhaps the primary determinant in shaping the different mobility patterns is the urban structure's physical constraints and spatial characteristics. This observation is central within a mobility paradigm that does not dissociate time, space, or the identities of individuals or groups. Accordingly, it follows that within a given population with specific traits, it is both possible and useful to analyse mobility at a particular time of the day, under specific urban conditions, with the same spatial distribution of services, public transport supply, and infrastructure (Tarrius 2000; Kaufmann, 2002).

Given the critical role that daily mobility patterns play within modern urban society Flamm and Kaufmann (2006) have argued that a sociology-informed exploration of urban space demands an in-depth analysis of the wider role of mobility. Accordingly, Flamm and Kaufmann (2006) have proposed a conceptual tool that encompasses the ways that mobility shapes an individual's social differentiation and their integration within urban space. Flamm and Kaufmann argue that 'Capital for Mobility' serves to describe how an individual or group takes possession of the realm of possibilities for mobility and builds on it to develop their personal projects (Flamm and Kaufmann, 2006).

Flamm and Kaufmann suggest an individual's capital for mobility, can be best understood through three conditions for mobility. According to Flamm and Kaufmann these are:

- *Competence*, a condition that relates to the physical abilities and acquired skills related to the rules and regulations of movement.
- *Appropriation*, a condition which refers to mobility strategies and options shaped by the needs, plans, aspirations, motives, values, and habits of the population.
- *Access*, a condition refers to the range of possible mobilities according to place, time, and contextual constraints (means of transport, the spatial distribution of the population, public services, and infrastructure)

Flamm and Kaufmann's 'Capital for Mobility' and these three determinate conditions for mobility serve to define how an individual or group takes advantage of existing mobility options and uses them to create a specific lifestyle (Flamm and Kaufmann, 2006). An illustrative example of how the three conditions for mobility create capital for mobility is the seen in the selection of housing location by older members of the urban population. The elderly population have, for example, increasingly been concentrated in cities where there is a good quality of life and easy access to public services.

For this population, physical conditions are dominant concerns when choosing their home (*Competence*), proximity to services, places to walk, and allowing them to have health care services in central areas (*Access*). Housing location can therefore serve as capital for designing strategies for the daily movements of the entire family related to specific urban constraints, allowing access to activities, people, and places. Thus, conditions for mobility or capital for mobility needs to be incorporated into current planning policies, planning policies in turn, will have a critical impact on how urban mobility patterns develop (Kaufmann, 2012).

This focus on access to activities, people, and places seems to relate to Urry's claim that social life requires moments of physical proximity and co-presence that make physical travel necessary (Urry, 2002). Perhaps based on this premise, more recent mobility studies have tended to highlight to the importance of coalitions or groups of inhabitants, such as "mobile communities" (Ascher, 2004). This designation explains the complex compromises made by individuals to generate the many different mobility strategies evident in contemporary cities. For example, the "metropolitans" described by Soja are coalitions of immigrants living in central areas with a lack of investment in public transport to help them travel to multiple job sites in the metropolis throughout the day Soja (2004).

The daily mobility patterns of the particular ‘mobile community’ studied in this thesis, higher education students, are equally shaped by travel; distance and time, but in line with ideas of Urry and Kaufmann are assumed to encompass their differing social expectations and experiences. The aim here is therefore to understand both the student’s daily mobility patterns and the impact that such mobility patterns have on the lives of the students. The challenge in this research study is therefore to take a wide range of socio-economic factors into account when considering the daily mobility pattern of higher education students in the Valparaíso Metropolitan Area (VMA).

1.2 Problem Statement

As noted previously, daily urban mobility patterns have become a key focus of academic research into the urban space. Methods for understanding of daily urban mobility, exclusion and spatial inequality within cities have tended to emerge from small-scale analyses carried out from an anthropological perspective, especially those related to ethnography (Imilan, 2014; Jirón, 2007; Jirón and Imilan, 2016; Jirón and Mansilla, 2014). Such ethnographical studies reveal – graphically and in writing – both the positive and negative characteristics of a mobile lifestyle within cities. Although such methods have provided for a most illuminating discussion on mobile culture in such contexts, a medium-scale method or instrument is needed to better understand larger urban conurbations.

To measure mobility in larger metropolitan areas, governments have tended to rely on general mobility data to understand the mobility routines of a given community. Notably this data has tended to be gathered from origin and destination-based surveys conducted amongst travellers. Although there are advantages to this macro approach when trying to understand mobility within large populations, the results have perhaps inevitably tended to highlight only those daily movement patterns are associated with the highest concentration of housing locations and labour centres in the city centre. Such studies have therefore tended to track tidal movements from the periphery to the city centre and back (De Mattos, 2004; Jirón and Imilan, 2016; Carmona *et al.*, 2017; Alvarez *et al.*, 2019; Vecchio, *et al.*, 2020).

Unfortunately, measuring metropolitan mobility in this way renders the diversity of metropolitan population groups invisible, an obscuring of complexity that primarily affects those that organise their lives around the historic centre of the metropolis.

Yet ideally, no group of the population should be invisible to the public policies of the state or the instruments used by urban planners or the designers of transportation networks. There is therefore a need to design a method or instrument (survey) that can reveal the interrelationship between a given population group's daily mobility and the spatial structure of an emerging metropolitan system like the VMA.

The approach taken in this thesis is to use research methods or survey instruments capable of studying larger urban environments such as the significant metropolitan urban areas often found within Latin America. The ideal would be to craft a study at scale that yields the kinds of detailed socio-spatial insights that are characteristic of smaller scale studies on daily mobility patterns. A study conducted at metropolitan scale would however mean working with a massive amount of data with a 90 or 95% reliability. Furthermore, the proposed method or instrument would need to offer more than the sum of trips made during the day by specific population groups. Instead, such a study would need to respect broader social influences, motivators and drivers that are crucial to the identity of individuals living within these larger metropolitan spaces. The latter requirement encompasses both physical capacities and but also the aspirations that inevitably shape the lives of both individuals and the group.

Any study of the daily mobility patterns must therefore seek to understand the reasons behind their choices of tools and destinations. Perhaps more practically, a mid-scale survey instrument to study daily mobility would instead need to focus on a specific group of people with similar potential for daily mobility practices and some easily identifiable collective commonalities such as age, education, or work and social aspirations. This study therefore investigates the interrelationship between a specific population group's daily mobility and the urban spatial structure of an emerging metropolitan system like the Valparaíso Metropolitan Area (VMA) in Chile.

Rather than attempting to study the daily movement patterns of many populations in a small space or looking at daily movement patterns through the macro lens provided by large scale destination/origin-based surveys, this research study focuses on the daily mobility pattern of one population group as they organise their lives amongst the multiple spaces and varied opportunities associated with large scale metropolitan areas. Compared to other population groups, higher education students are of interest here mainly due to the intensity of their mobility (Dubet, 2005; Dureau, 2002; Bonvallet and Dureau, 2002; Alvarez *et al.*, 2009). The daily movement patterns associated with higher education students typically consist of a high number of trips throughout the metropolitan area as opposed to the regular push and pull tidal patterns associated with other population groups.

More interestingly, the journeys associated with higher education students through the metropolitan area often are undertaken outside peak hours. This population group is hugely diverse and focusing on them allows for an in-depth discovery of how young people with different socioeconomic backgrounds in segregated contexts move throughout the metropolis. This study however assumes that this population group does share some homogenous characteristics which allows for an understanding and a study of their differences.

The aim of this study is therefore to understand how the mobility patterns of the student population are influenced by the urban spatial structure, such as the location pattern of various services, the spatial layout determined by topography, and the urbanisation pattern but also how the structure of the metropolitan area influences the mobility patterns of the students. Although there have been significant attempts to understand the lives of individuals and groups of inhabitants with similar daily mobility practices in metropolitan areas, in the past three decades, those urban lives have been subject to significant economic, political, social, cultural, and technological change. Such changes have resulted in significant lifestyle challenges that in turn that are likely to be reflected in the daily movement patterns of metropolitan populations. In this instance, such unintended consequences are evident in the urban-centric development of Chilean higher education institutions. It is therefore argued that the study of a specific population and their associated daily mobility patterns addresses a knowledge gap in the study in the spatial structures of emerging metropolitan areas such as the VMA.

More broadly, rapid urbanisation often creates increasingly fragmented and segregated conditions that serve to either reproduce or maintain different systems of inequality, yet the existing analysis seems only to capture a limited part of this highly dynamic urban phenomenon. This is a particularly significant point given that many developing countries in the global south have experienced a notably accelerated rate of urbanisation over a relatively short period. The rapid expansion of Latin American cities since the middle of the 20th century, for example, has created urban regions nearly ten times greater than they were during the first 400 years of their development (Rojas, Muñiz and Pino, 2013).

Alvarez has argued that the rate of this unprecedented expansion has meant that there have been fewer urban interventions that would have boosted regional urban development and helped meet needs of the new much larger urban populations (Alvarez *et al.*, 2009). Where there have been more deliberate urban inventions, there have been unintended consequences. In Chile in the 1980s, for example, public policies are associated with the development of new social housing areas in the periphery with no nearby public services and poor or non-existent public

transportation, perhaps as consequence of the relatively lower population density of such areas – often an average of fewer than 80 inhabitants per hectare (Bertaud and Malpezzi in Rojas 2004).

Changes in the lifestyle preferences of those population groups with higher incomes has further increased the significance of the periphery, alongside the effects of government interventions such as the regularisation of informal settlements located in areas of geological vulnerability. Such interventions though changes in public policy together with the shifting preferences of higher income individuals have created high levels of private car dependency for some population groups. In contrast, the most disadvantaged populations groups now make long trips to access jobs and essential services by public transport, which is of low quality, frequency and is often non-existent. Together these drivers and influences have helped promote the peripheral growth of metropolitan areas. This growth has however been at the expense of the more central metropolitan areas where a decline in economic activities has caused an increasing abandonment of city areas and a subsequent deterioration of the real estate assets they contain.

The increasingly complex socio-economic inter-dependencies between the city and the periphery inspired by the social-economic interplay between different population groups has highlighted the need for a more nuanced understanding of the ways which metropolitan populations move and interact. Crucially, it has become increasingly important to identify the diverse ways that populations move within the city and the different strategies they use to access urban services. Yet, as noted previously, there have been very few studies that have considered metropolitan daily mobility patterns in terms of lifestyle.

In Chile, the general criteria for mobility transport-focused studies have tended to place less importance on different types of mobility or on specific groups with different mobility patterns relative to the general ones. Earlier transport studies have tended to only to measure the mobility portion responsible for transport infrastructure demand at peak hours. As suggested in the previous paragraph, the reasons for 'travelling' within metropolitan areas have become less focused on moving to and from work (Ascher, 2004; Herce, 2009; Kaufmann, 2012). This societal shift towards ever more complex socio-economic driven movement amongst urban populations therefore tends to undermine the value of earlier less complex flow-based studies. An observation that is confirmed by researchers such as Dureau (2002) and Figueroa (2005) who have emphasised the need for a more sophisticated approach to questions such as those arising from potential demand, income differences, accessibility, and the socioeconomic, historical, and the political dimensions of mobility.

1.3 Research Question

The central aim of this thesis is to test the hypothesis that the daily mobility of a specific population group as higher education students can serve as a proxy through which a connection can be made between the complex urban spatial structure of a metropolis and the socio-economic interactions of that population that were previously invisible to the earlier big data metropolitan analyses. The central research question for this study therefore needs to follow three primary contexts of analysis: the spatial characteristics of the VMA, the location pattern of the area's traditional universities and other Higher Education Institutions (HEI), and the daily urban mobility pattern of Higher Education (HE) students.

First, the analysis needs to consider the wider urban spatial changes related to population growth, changes in the socioeconomic distribution, production transformation, the redistribution of services, the accelerated development of transport infrastructure, and public transport in the metropolis. Secondly, the analysis needs to focus on the location pattern of traditional universities as defining points around which the behaviours of the students are now configured. Established at the beginning of the 20th century, these 'traditional' institutions now serve students from a wide range of socioeconomic backgrounds. Most are located in central areas where the consequences of the urban transformation process dating from the 1970s have been felt most. Finally, the analysis needs to consider the daily urban mobility patterns associated with the higher education students that attend these institutions.

In particular, the aim here is to understand what the daily urban mobility practices of this population group reveals about their behaviours relating to housing conditions and incomes. The VMA was selected for study because there is a significant repository of data from several prior national surveys on student's daily mobility patterns. The VMA has a relatively high number of traditional universities, most of which were established within a short time frame. Although the areas in which they are based have a comparatively short history of significant economic and political change, like other Latin American metropolitan spaces, the VMA as whole has undergone an extensive urban transformation in that time. Figure 1.1 highlights the current position of the traditional universities relative to the wider Valparaíso Metropolitan Area.

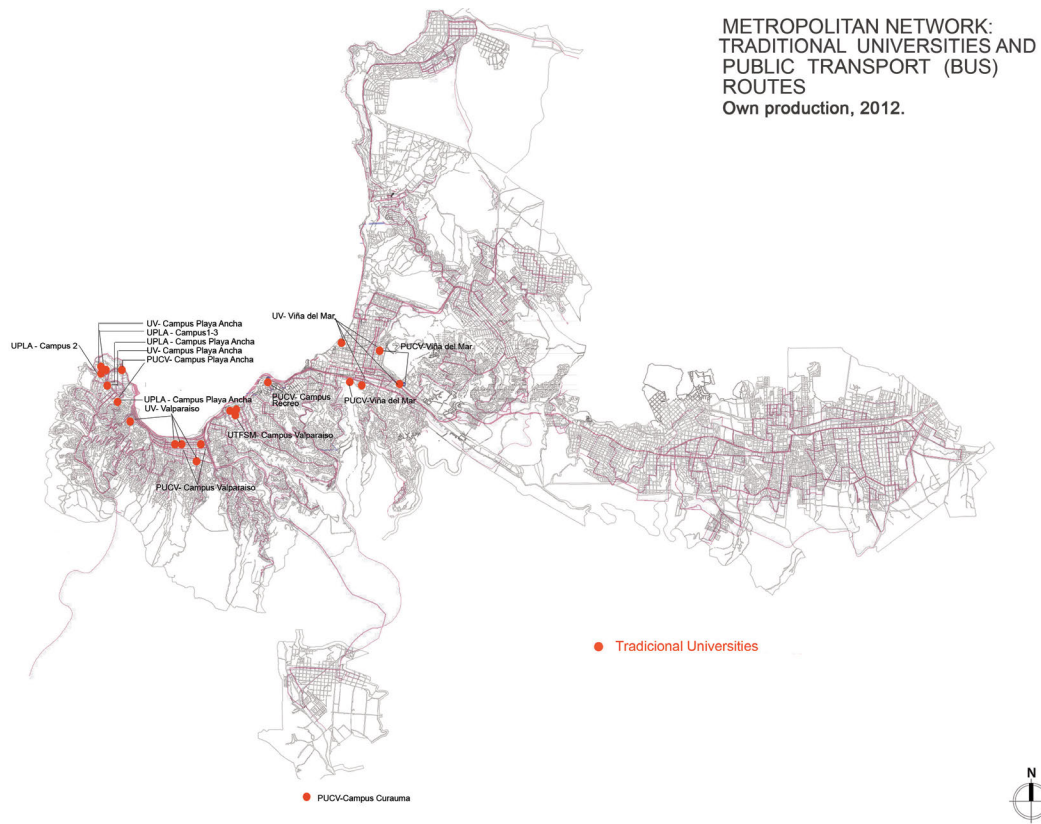


FIG. 1.1 Valparaíso Metropolitan Area with the location of the traditional universities marked. Source: author

Based on the earlier observations about the nature of Latin American urban metropolitan development and specifically the VMA, the ways that the urban spatial structure shapes travel experiences, and the behavioural characteristics of this population group are important. The overall research question for the project is therefore 'How do changes in the VMA's urban spatial structure influence the daily urban mobility pattern of HE students, and how do changes in these students' daily mobility patterns influence the VMA's urban spatial structure?' The first research objective is therefore to understand how do wider changes in the VMA's urban spatial structure since the 1980s influence the general urban mobility pattern, and how do broader changes in urban mobility patterns influence the VMA's urban spatial structure? The second research objective is to reduce the observation scale by focusing more narrowly on the locations of universities and the question of how political, economic, and social variables influence their spatial distribution.

The priority is perhaps to analyse the administrative organisation of universities, government, and their historical location because these aspects influence the spatial distribution model of the universities. A key question will therefore be how have the spatial distribution of traditional universities changed throughout the years, and how has the various conditions of the institution, the government, the administrative origins, and historical location pattern influenced those changes?

The university and its surroundings are where students remain a good part of the day, and most of them spend more time on campus than at home. Understanding the traditional universities' urban location model is to understand why students live in the city's historical centres. In answering this question, it will be important to consider how the spatial distribution of traditional universities changed throughout the years, and how has the various conditions of the institution, the government, the administrative origins, and historical location pattern influenced those changes?

The last research objective focuses more on the daily mobility patterns of higher education students together with the diversity of experience evident within this group. Kaufmanns' capital of mobility model suggests that for a given population group, there is a need to consider analysing three variables, the first being residential condition which refers to the place of origin (family home) and their housing location during their university studies. The second variable relates to their travel routines throughout the city. Daily travel is made up of the components of mobility and permanence that are quite complex in the organisation of daily life.

The third variable is the socioeconomic condition of the students. This is perhaps the most complicated to assess, as a few people want to share their private information through research tools such as interviews or internet surveys. Despite the difficulties, however understanding socioeconomic condition is critical in this study since socioeconomic condition is considered a capital for mobility. As such, it serves to determine many mobility practices according to daily mobility experts (Alvarez *et al.*, 2009; Greene and Mora, 2005; Jirón and Mansilla, 2014; Landon, 2013). To achieve this objective, it will therefore be necessary to understand not only the HE students' typical daily mobility patterns, but also to identify the key variables or conditions that influence these patterns of behaviour.

1.4 Background: Daily Mobility in the Valparaíso Metropolitan Area

Most large Latin American cities underwent a period of rapid industrialisation between the 1950s and 1980s. In part, this change was connected to the wider influence of globalisation but also was driven by endogenous factors. The Chilean government, for example, began to follow a neoliberal economic model as early as the 1970s. Such ideas were associated with a post-Fordist reliance on new more flexible production methods that induced dramatic changes within the structure and character of Latin America's cities (De Mattos, 2002).

In spatial terms, Latin American cities underwent a number of transformations that were associated with the influence of neoliberal thinking. There was, for example, a shift from relatively compact urban structures around a historical centre towards a more dispersed development pattern in which growth tended to occur more frequently on the outskirts of cities (Hidalgo, De Mattos and Arenas, 2009). This restructuring of Latin American urban space in turn meant that areas such as the Valparaíso Metropolitan Area in Chile were increasingly associated with social and physical interventions designed to address the needs of an ever-increasing but now more widely dispersed urban population.

The provision of social housing in Chile provides one such example. An acute housing national shortage in the 1908s led to a series of interventions by the Chilean government from the second half of the 1970s onwards that were inspired by the increasing influence of neoliberal thinking. The national strategies adopted in this period sought economic growth through deregulation and an openness to foreign trade and investment, a socio-economic ideology that holds firm today. Such thinking led the Chilean state to transfer practically all the housing management functions to the private sector during the 1980s (Tapia Zarricueta, 2011). While in the short-term such an interventionist approach eased an acute housing shortage, in the longer term, such an intervention created new residential developments of low-quality housing in areas with lower land values and surplus value.

The long-term application of such a model has therefore impacted both the socioeconomic and spatial arrangement of large Chilean cities. The transformation process evident within Chilean urban areas since the late 1970s is however also apparent in many other Latin American countries. The extent and scale of such changes in Chile but also more widely, attests to the both the prevalence and

tenacity of neoliberal ideas. One of the consequences that now stands out in these Latin American territories for example, is the degree of social segregation in many Latin American cities. The imposition of free market-based development policies meant that peripheral locations became the only option for new social housing provision. As a result, many areas of new social housing provision suffered from a lack of public services and remain poorly connected to central areas. The spatial consequence of such policies was a transition from conurbations of small settlements towards much more contiguous metropolitan areas.

The promotion of private owned mobility means was one of the main drivers of this 'metropolitanisation', further accelerated in the last three decades with the growing investment in urban and interurban concession highways. The above, among other factors, leads to the creation of larger urbanised territories characterised by extensive urban growth, with significant longer travel distance and time used for transport for the population. Such changes are characterised by: (1) a functional fragmentation, (2) residential segregation, (3) social polarisation, and (4) accelerated investment in urban or inter-urban transport infrastructure. These socio-spatial dynamics are seen as common to several Latin American metropolitan areas (De Mattos, 1999; Janoschka, 2002; Rojas *et al.*, 2013).

In the VMA, such characteristics are accentuated by the geomorphological fragmentation of the territory with random variations in the land's slope (Soto and Álvarez, 2012). Such abrupt and irregular variations have and continue to impact building characteristics, accessibility, and property divisions. In the case Valparaíso, more than sixty hills extend from the central areas of the city (with an elevation of roughly 25 meters) up to an elevation of approximately 450 meters above sea level (m.a.s.l.). Against this complex topographic context, informal neighbourhoods have developed in the peripheral hills of the metropolis (+110 and +200 m.a.s.l.). The streets in such areas of informal development are firmly based on pedestrian access and have only limited access adequate public transport networks and therefore poor connections to central downtown areas. All of this tends to reinforce existing and persistent inequalities and the socio-spatial segregation that is often identified as typical of larger Latin American city spaces (De Mattos, 1999; Janoschka, 2002; Rojas *et al.*, 2013).

Despite such limited acknowledgements of the difficulties facing people living in such areas, overall, there is a lack of research on mobility and urban development that addresses the question of how different population groups move through these fragmented, segregated and often polarised metropolitan areas. Identifying the daily mobility patterns of a group of people is however vital for creating an understanding of lifestyle and, through it, the spatial configuration of the city. However, the

assumptions currently used when intervening in urban space based on big data, such as origin-destination surveys, are insufficient and unable to capture how these sometimes-transient urban populations travel and live in the metropolis (De Mattos, 1999, 2002; Jirón and Imilan, 2016).

Accordingly, it seems that better understanding the daily mobility patterns of an easily distinguishable and highly mobile population such as higher education students, may well reveal new knowledge of the urban conditions related to functions, transport networks, and transport planning. Higher education students are of interest when considering the VMA, both due to the significant number of students who now migrate to study within the VMA but also because together they make up the country's second-highest concentration of HE students. The size of the student cohort within the VMA is not however solely due to local factors such as geography or the vagaries of university governance.

As a whole, the Chilean university sector has expanded substantially since the 1980s. Educational reforms in the 1980s associated with the imposition of free market principles generated an unprecedented privatisation and unregulated expansion of higher education provision. During the following decade, there was a massive growth in student enrolment (almost 100%) much of which can be linked to a diversification of the student population. For a decade or so from the middle of the 1990s, a second wave of university expansion occurred, largely fostered by distance education programs. This increased demand for distance learning can be associated with broader changes in the world economies as tertiary sector enterprises such as medical provision, educators and financial services gradually moved from a secondary to a primary position in which information and knowledge became essential to the production of value (Castells, 2003). An urgent need to improve the skills of the labour force became central to the rapid and dynamic development of Chilean higher education sector, something that now is seen as crucial at both regional and significantly in this context, at metropolitan levels (Orellana, 2011).

In focusing on the daily mobility patterns of HE students within metropolitan areas such as the VMA with their inextricable connection to the area's social and geospatial structure, it is essential to explore the nature of the institutions that now shapes their behaviour. There is a need to look at how they have developed and what factors determined the locations of their facilities. This is because the location of university facilities plays a fundamental role in student's daily life. The university campuses and their surroundings are after-all spaces where students remain a good part of the day, and most of them spend more time on campus than at home. But also, because students preparing to migrate to the VMA to study consider, among other things, the location of their place of residence in relation to its distance to the university

campus. The central question to be answered in this study is therefore how have broader urban transformations influenced the development of such institutions within the urban space and vice versa.

1.5 Methodological Approach

As noted previously, the work of researchers such as Dureau (2002), Figueroa (2005), Cresswell (2006), Sheller and Urry (2006a), Sheller and Urry (2006b), Urry (2007), Herce (2009), Hannam (2016) and many others has highlighted the need to understand mobility as a social practice rather than simply as being related to physical movement. In this study this sociological approach will be applied to the study of daily urban mobility patterns amongst a population group with high levels of individual and group mobility – higher education students who choose to live and study within the VMA. To this end a preliminary survey of higher education institutions within the VMA was undertaken.

It was found that the VMA has at least ten universities (both private and traditional schools) and as such, a significantly higher number of Higher Educational Institutions (HEI) than other similarly sized Chilean metropolitan areas. In particular, this study focuses on the daily mobility patterns amongst students who attend the traditional HE universities within the VMA rather than the other types of HEI represented in the area. This focus on the area's traditional universities depends on the assumption that studying a more socioeconomically diverse student body would yield a richer dataset, for example, covering a broader range of residential and study locations than might be expected from the generally less socioeconomically diverse population of students that attend the area's newer institutions.

This assumption was dependent on the preliminary observation that there was a comparatively higher level of diversity both in relation to the locations of student housing and the location of facilities used by the students but also in terms of their socioeconomic condition. It was hoped that referencing a potentially greater variety of spatial and other data would yield significantly more useful information about how students enrolled in area's the traditional universities interact with the metropolitan space they move through it each day. A range of survey methods and tools were used to further enhance this dataset including GIS registrations, data sources, the analysis of data through SPSS, together with detailed information acquired during qualitative interviews conducted with a representative sample of 31 students.

Despite the potential offered by such a varied dataset, employing such a complex mixed method approach requires a particularly robust conceptual framework against which to conduct the analysis. As it turns out, Kaufmann (2002) offers some operational concepts that turn out to be particularly helpful (Chapter 2). To demonstrate the applicability of Kaufmann's ideas in undertaking this study, Kaufmann's ideas will first be applied to findings from the Sixth National Youth Survey and the transcriptions from the in-depth interviews of 31 students. Used in association with literature studies of the history of the local and national context, media interviews, use of existing national surveys, mapping and registrations on maps, Kaufmann's methodological constructs help identify individuals' mobility potential or capital for mobility and how individuals can transform this potential into travel (Kaufmann 2002).

Building on this methodical foundation, a key research instrument within this study is perhaps the purpose designed internet survey that serves to confirm and extend data obtained in other ways. Based on the insights provided by smaller scale surveys and the other confirmatory secondary research methods, this larger scale survey brings together the responses of almost 2,000 students, with 824 students. As whole, this study is therefore based upon a mixed method research methodology. Background studies were undertaken into the changing urban spatial conditions within the VMA. The emphasis was on conditions related to urban mobility, higher education and urban development, and spatial distribution of the area's traditional universities. The empirical support comes firstly from in-depth interviews with a smaller group of higher education students and secondly, from a larger scale internet survey of higher education students designed and conducted for the purposes of this study. Alongside these principle means of inquiry, further data was collected and analysed from for example, unstructured interviews with university officials or obtained through mapping which served to extend existing sources of information.

1.5.1 The Qualitative Interviews with 61 Students

In chapter 3, findings from in-depth interviews with student are used to illustrate Kaufmann's concept of *Appropriation*. The empirical support for this chapter comes from interviews conducted (first-hand data) in September 2016 and September 2017. The 61 interviewed students from UTFSM were asked to draw their daily mobility during Tuesday and Thursday in a diagram. The students were asked to consider all transport modes they used to get to their different destinations, and the time they spent in each place. Furthermore, the students were asked to write a short essay in which they analysed their mobility strategies (immobility was counted as a strategy)

and their travel experience. The short text produced by the students should answer five main questions: Who moves? How do they move? Where? Why? and for What?

1.5.2 GIS-based Analyses

The methods used include examining primary and secondary sources of information, fieldwork, and computer-based modelling undertaken in the ArcGIS software, a geographic information system (GIS). This part details the three forms of analysis that together can provide information about: services patent, public transport supply and public transport use. This will form the basis for co-relating the information with daily mobility of higher education students.

Core Density

The data in this section is generated by means of an interpolation technique that calculate a magnitude per unit area (km²) from point map features (business license plates) using a “kernel function” to fit a conical surface around each point, identifying, for example, through adjustable intervals, the level of concentration of services patent and intensity of public transport supply around the metropolis’ coastal flat area.

Inverse Distance Weighting (IDW)

From a map of points developed from the centroid of the urban units O-D of the 2014 survey, values contained in this map of points are interpolated, such as: the number of trips completed using public transport in each “zone O-D” or the number of minibus routes that each “zone O-D” accommodates. The interpolation of these values develops a surface that zones the VMA, indicating by means of intervals, the value that this zone has according to the data that is being represented that are trips from some O-D zones.

An analytical tool in ArcGIS called Inverse Distance Weighting (IDW) was used to understand how public transport affects students’ housing locations. These tools developed a zoning area by interpolating values. The intensity values of microbus lines (transport supply), taking the Origin-Destination Survey data (2014). The map tracks the areas with the highest intensity of public transport supply around the metropolis’ coastal flat area. The same tool in ArcGIS, IDW is used to measure the concentration of trips using public transport. The tool makes it possible to map trips made using public transportation within central areas of the two border cities. As such, it becomes possible to qualify the concentration of trips on public transport in the VMA.

Weighted Overlay

With the previously developed surface zoning maps using IDW it is possible to reclassify through the number of intervals that each one must zone its values (in this case, each map has 10 intervals). The reclassification consists of assigning a value from 1 to 10 to each interval to represent, depending on the magnitude of the value, which area is more suitable or meets better conditions, according to the criteria to detect the intensity of the “public transport service” that is equal to: number of trips on public transport + number of minibuses routes, in each zone O-D. Comparing mapping showing the intensity of public transport use with that revealing the concentration of student housing it becomes possible to understand the housing locations favoured by the different groups of higher education students.

1.5.3 Principal Survey Method

The design of the primary survey instrument was based on a methodology developed by Sampieri, Fernández, and Batista (2004). The aim was to create a survey instrument that clearly defines a vertical structure capable of recognising variables or concepts broken down into dimensions, indicators, and question items (see Table 1.1). This instrument allows the research to quantitatively categorise and interpret the gathered data required to spatialise the daily lives of higher education students. This was central to the development of a useful research framework that would allow the analysis of daily mobility patterns associated with group of metropolitan inhabitants with distinctly similar identity characteristics.

	1	2	3
VARIABLE	DAILY MOBILITY	SOCIOECONOMIC CONDITION	RESIDENTIAL MOBILITY
DIMENSION	TRIP ROUTINE	AIDS AND CHARACTERISTICS	RESIDENCE ADDRESS
INDICATOR	NUMBER OF TRIPS BY DAY	NUMBER OF AIDS	NUMBER OF RESIDENCE ADDRESS AND TIME
Item 1 (QUESTION)	Indicate the trips (commute) for studying and work you have made during the last month in the following days of the week. You may suppose your routine of usual activities in the city?	Do you currently have any of the following aids?	Indicate your last three residence addresses in the academic period of your current career and the time you lived there, including your current place of residence?

TABLE 1.1 Vertical Structure Survey of Sampieri, et al., (2004). Source: author

The primary survey relies on the database constructed over seven years by Federico Santa Maria Technical University (UTFSM). This is based on the results of free performance testing throughout the country from 2003 to 2013 in the form of the University Selection Test (PSU). The database contains answers from more than 200,000 HE students from the traditional universities in the Valparaíso region. To identify only those students still enrolled in the university, the courses of study with the shortest duration were chosen in order forming the sample (Teaching majors [4 years]). As a reference for the subsequent internet survey, the sample data was selected from 2008. Therefore, the sample contains a selection of 39,000 students. Finally, it is essential to note that almost 2,000 students responded with 824 providing complete data, together these represent a significantly reliable (90%) statistical sample.

Following the traditional student survey delivery procedure, the randomness of the answering process was not under the researcher's direct control. It depended on each individual and the independent decision-making of those surveyed (Batista, Silva, Santos and Marino, 2013). The research has the characteristics of simple random or probabilistic sampling. Thus, the delivery of e-mails to the recipients, portions of the population had the same probability of being chosen, and the selection was random. The reliability of statistical quantity of answers is between 90% and 95%, an acceptable level for an investigation with 824 responses. More broadly, online survey respondents tend to be younger and more skilled in using the internet than the older part of the population, but this is not considered a statistically significant concern given the relative youth of the respondents.

In design terms, the survey had to be quite direct and precise, mainly because student attention spans are typically no longer than 10 minutes (National Educational Council, 2016). Therefore, relatively fewer variables could be measured. In this case, they were classified into three categories:

- The first set of variables within the survey relates to the respondent's travel routines through urban space and time. The aim was to establish that daily mobility has components of mobility and permanence that are comparatively complex in the organisation of daily life. Therefore, this variable was measured in four dimensions: travel time and distance, transport mode, and origin-destination locations.
- The second set of variables relate to the residential condition, which considers whether students migrate to study and the relative distance to their housing locations. For some students, residential locations vary during their study period (a precise time), even though some stay at their family homes. The students' dwelling history reflects choices and is associated with life cycles. Some dimensions of this set of variables are the place of origin (family home) and academic housing locations.

- The socioeconomic set of variables is the last and most complex – because it is not easily expressed through an internet survey nor is doing so simple. The principal socioeconomic condition is related to government scholarships (Alvarez, Silva & Soto, 2009). Even though government or university scholarships promote enrolment of lower-income students with good grades in high school, students at traditional universities are mainly from middle and upper-class families since tertiary education in Chile requires the payment of tuition fees.

1.5.4 GIS Registrations and SPSS Method Analysis of Mobility Routines

The internet survey results were registered into GIS (Geographic Information Systems Software), along with the information previously collected in the case study chapters. The information gathered in the survey is thus georeferenced, i.e., the obtained residential location data was registered and georeferenced. Those cases identified as having wrong addresses or incorrect or incomplete residential data were eliminated in the registration process. The student respondents enrolled in traditional universities submitted 94% of these answers (total 824 cases).

The high number of valid responses received is crucial to this investigation, allowing a mid-scale urban analysis of a group of inhabitants (valid sample) with certain similarities and collective identities. Thus, the range of residential locations associated with this specific student population is fundamental, revealing general spatial trends but also the relationship between mobility patterns, the location of urban functions and various places bounded by the socioeconomic data obtained. The use of GIS data yielded further insights about residential conditions throughout the VMA and information regarding travel distance (between home and university campus areas) and commuting times, which as noted previously is fundamental in analysing daily movement patterns.

Statistical information provided by those parts of the survey associated with students' daily urban mobility practices supported the second part of the analysis. This information helped us describe specific general mobility patterns and ascertain general information about travel routines. The third part of the analysis correlated data (SPSS) extracted from the survey and analysed the socioeconomic variables that emerge from Access as a condition for daily mobility patterns. Together, the information that emerged from this survey work was used to build a narrative that seeks to explain individual mobility practices, which has been difficult to obtain with pure statistical data.

Further analysis was carried out using SPSS. SPSS facilitated working with large databases and to correlate variables. This ability to associate variables is crucial because as noted previously preliminary studies were performed to verify the database's suitability. A normality test conducted in SPSS (guided by a statistician) yielded nonparametric results because the data did not follow a standard distribution curve. Thus, the analysis was performed with the Mann-Whitney correlation test (Field, 2005). This test compares differences between independent groups where the dependent variable is either ordinal or continuous but not normally distributed (Field, 2005). To analyse the data and compare variables, they must be grouped. The results helped to make initial conceptual grouping decisions and revealed some relationships between variables and groups of students that yielded valuable data about daily mobility routines.

The socioeconomic condition grouping was carried out based on scholarship amounts, high school type (private, public, or subsidised or partly subsidised) and means of transport. This last element was transformed into numerical data that reflected each student's relative use of each means of transport, where the minimum was zero, and the most frequently used transport mode determined the maximum (less than one). Another important transport-related decision had to do with bus (interurban transport) data, which accounted for a lower use percentage in the model. By removing the bus transport data, a better correlation value was obtained. The problem lies in how that data was obtained. There was no distinction between interurban and urban buses, which is why students were separated between living inside and outside of the VMA. Finally, based on the SPSS results for group selection, the different socioeconomic groups' results and the mobility pattern characterisation were highlighted. Each group is analysed according to the following factors: residential location in the VMA (residing in the VMA, students from elsewhere in the region and students from elsewhere in the country), commuting distance (residence/campus location), travel schedule (to school, to work and leisure locations) and transport mode.

1.5.5 Socioeconomic Condition in SPSS (Grouping Decisions)

Because questions about family income, expenses, and type of secondary institution attended are difficult to deal with in online surveys, questions about the socioeconomic condition of individuals within the sample could not be addressed directly. Consequently, another strategy had to be employed to gather specific data and create a range of socioeconomic groupings. Therefore, inquiries were made about the type and amount of scholarship/grant, transport mode, work and type of housing, and home-sharing and rental conditions. Although employment was considered as a variable at this stage, subsequent analyses performed with

SPSS showed that (whether a student was employed or not) this variable was not regarded as a determining factor. Instead, it altered the results and rendered them inconclusive. Although such variables are essential to understanding how students live in metropolitan areas, these variables were not counted as a determinant of an individual's socioeconomic condition given the instability and flexibility associated with university study. Thus, information on scholarships/grants and means of transport were instead used as discriminants when grouping respondents.

The primary variable that helps distinguish groups is therefore taken to be scholarships/grants. Comparable in all the area's the traditional universities, there are seven scholarships schemes to consider. These include two based on academic merit that covers the annual school fees, two scholarships awarded to students from lower-income families that also cover the fees, two supplementary grants for meals and living expenses, and, finally, a state credit system. The second variable considered was the means of transport used by the students – generally minibuses (urban public transport buses). In contrast to the situation for almost all citizens in most European cities, in Latin America public, public transport is not accessible to everyone due to both its quality and supply.

Finally, it was possible to identify five socioeconomic groups (see Table 1.2) for the analysis, split into upper, upper-middle, middle, lower-middle and lower groups, which were comparable but not necessarily identical. To the socioeconomic groups defined based on census data (ABC1 (high income), C3 (middle income), C2 (low, middle income) and D (low income) (considering that E, the most vulnerable sector, never attains HE). The upper and upper-middle groups fall readily into the ABC1 and C2 income groups, while the middle group (or 70% of the surveyed students) are mainly associated with C3. The lower-middle and lower groups fall most readily under C3 and D income groups. Starting with high-income students, the criteria for the creation of groups are High Income, Upper-middle-income, Middle-income, Lower-middle income and Low-income (Table 1.2)

Group	Scholarship	Transport means
High-Income	scholarship <= 1	Car as Driver > 0
Upper-middle-income	scholarship <= 2	Car as Driver = 0 & Car as companion > 0
Middle-income	scholarship <= 2	Car as Driver = 0 & Car as companion = 0
Lower-middle-income	scholarship <= 3	Car as Driver = 0 & Car as companion = 0
Low-income	scholarship > 3	

TABLE 1.2 Methodology for the socioeconomic classification of the students surveyed. Source: Author

1.5.6 Cluster Analyses of Students used in SPSS

The analysis performed in SPSS by Mann Whitney's correlation test established some categories by which to understand Access as a condition for mobility. These categories allowed for a comparison between groups in two dimensions resulting in: a map with residential locations of specific socioeconomic groups of students, differentiated according to residential condition, that is, local, national migrant and regional migrant students (Figure 1.2), and (B) two tables with correlation variables – (1) migration condition and travel time and distance and (2) correlation between transport modes and travel time and distance (Figure 1.2). These variables are fundamental to understanding how the researcher worked with the software as shown in Table 1.3 (Field, 2005).

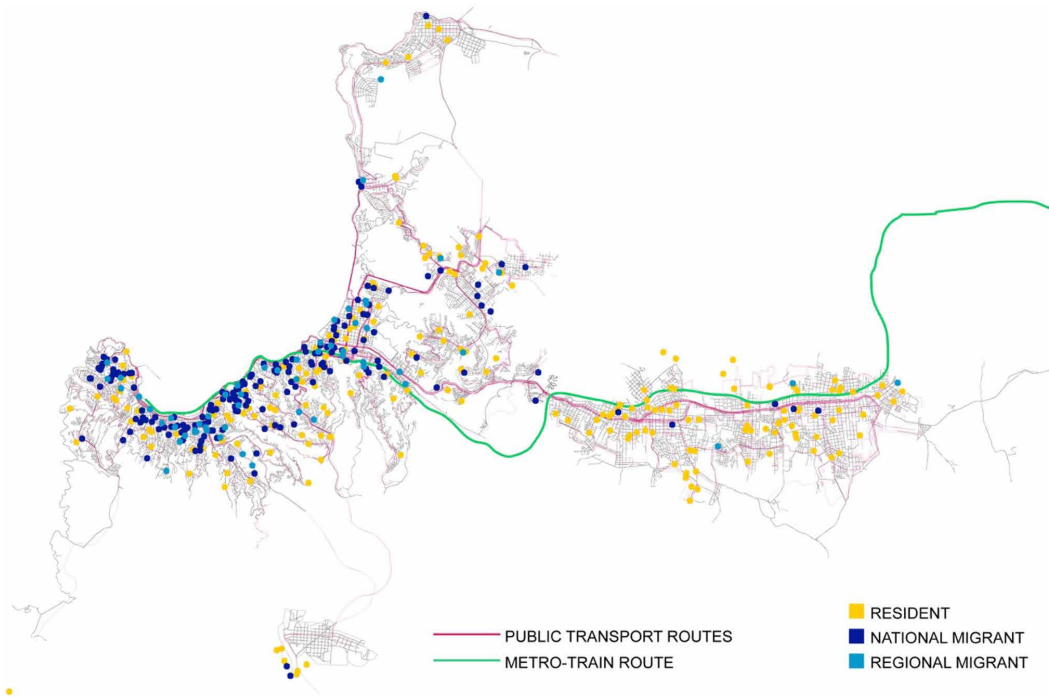


FIG. 1.2 Distribution according to socioeconomic condition for middle-income students. Source: Author

a) LOCAL AND MIGRANT'S STUDENTS PERCENTAGE		
Local	Regional Migrants	National Migrants
43,7	12	44,3

b) MIGRATION, DISTANCE AND TRAVEL- TIME CORRELATION		
	COMPONENT	
Rotated Component Matrix	1	2
Travel Time to Campus	0,722	
Travel time to Leisure Activities	-0,695	
Travel time Places of Study	0,788	
Travel Time work		0,758
Travel Time Leisure Activities		0,674

c) DISTANCE, TRAVEL- TIME AND MEANS CORRELATION				
	COMPONENT			
Rotated Component Matrix	1	2	3	4
Campus- Residence Distance	0,754			
Study travel time	0,798			
Work Travel Time				0,646
Leisure Travel Time		0,774		
Microbus			-0,75	0,436
Bus			0,849	
Metro	0,554			
Shared Taxi		0,65		
Walk		0,491		

TABLE 1.3 SPSS analysis results for the mobility patterns of middle-income students. Source: Author

1.5.7 Important Data Sources

The best current data at a national level related to young people is the secondary information from the regional report of Valparaíso's Sixth National Youth Survey (INJUV, 2009). This establishes which are the main places where college students meet their friends and how far they travel to do so, together with other leisure related travel patterns. It is an instrument survey with almost 7.570 cases, with a margin sampling error of 1,15% nationally and up to 5% in regions with fewer cases, and a 95% confidence interval assuming maximum variance (INJUV, 2009). It consists of a multiple-choice questionnaire that offers an objective assessment in which respondents were asked to select one answer from the choices. Once the responses were totalled, each category was given a percentage (0% to 100%) based on the respondents' number. This secondary data provides further insight into this population group and helps in the interpretation of the results obtained from the SPSS analysis in Chapter 7.

1.6 Thesis Structure

This thesis is structured as follows. Chapter 1 explains the research problem that arises from the existing literature, sets out the overall aim, justifies the research question and sets out some objectives for the research. The chapter reflects on the selection of the VMA as a study area but also why higher education students population group were selected as being most relevant to this agenda. Finally, the chapter reflects briefly on the data collection methods and modes of analysis used within this study.

Chapter 2 examines the conceptual framework that underpins the study in more detail by examining the meaning of daily mobility patterns and writings associated with the mobility. The focus is strongly on commentaries on and about mobility in contemporary daily life. Due to the context-dependant nature of this thesis, the chapter first considers metropolitan development more widely within Latin America, where mobility issues are primarily a manifestation of a rapidly emergent metropolitan system. The second part of chapter 2 highlights specific writings on social practice and the daily mobility patterns of populations as a constituent part of daily life in contemporary metropolises. The chapter aims to reveal the conditions for mobility as they create an individual's 'Capital for Mobility' or 'potential of movement' in metropolitan areas. This will be used to support the subsequent analysis of the empirical data gathered on the mobility higher education students within the VMA.

Chapter 3 tests some of the ideas presented in chapter 2 on empirical data drawn from a national mobility survey for students in Chile. The purpose is to demonstrate the effectiveness of these concepts. The focus is on identifying student characteristics, who they are, what motivates them, and their mobility needs or aspirations. This chapter contrasts this data from the national youth survey with data obtained through students' interviews undertaken for this study. Four examples of types of HE students are identified and described in this chapter.

The ideas about generic characteristics of youth and HE student identities that emerge will be discussed in the light of the framework developed by Kaufmann, that is: (1) Competence, the physical abilities and acquired skills as they relate to the rules and regulations of movement, (2) *Appropriation*, which refers to existing mobility strategies that are informed by the needs, plans, aspirations, motives, values, and habits of the population. The last characteristic is (3) Access, referring to the students' general economic conditions (Kaufmann, 2012). This discussion

will be supported by further bibliographic material, the transcriptions from some of the 61 interviews conducted during this research and secondary information taken from the regional report of the Sixth National Youth Survey (2012).

Chapter 4 explores the spatial structure of the Valparaíso urban area and its development. The focus will be on understanding how changes in the VMA spatial structure has influenced the general urban mobility pattern within the area and how do changes in urban mobility patterns over time influence the VMA's urban spatial structure? First, the main complexities of the metropolis will be described and how it fits within Chile's central macro-region. Second, the main historic urban processes evident in the metropolis since 1810 are used as foundational framework against which the city's further development phase that began in 1980 can be properly understood. The third part is a case study analysis – using ArcGIS to map specific endogenous factors – the maps were generated using an interpolation technique, further explained in the following method section.

Chapter 5 focuses on the political and socio-economic processes that have influenced the development of the Chilean higher education system. In particular, the analysis will focus on how these processes have impacted on those institutions considered in this study. This chapter first explains the functional factors that drove an unprecedented privatisation and subsequently, an unregulated expansion of the higher education sector in Chile. The latter affected both the country's 'traditional' universities and its much newer private institutions equally. Mostly, occurring in just one decade, this rapid expansion profoundly affected the governance of higher education institutions within the VMA and in particular, the area's 'traditional universities'.

It should be remembered that the location of higher education institutions of all types serves to determine the key variables that shape this study, including for example, the location of university facilities within the urban space, the socioeconomic level of the area and the public transport supply within a given area. Thus, destinations and environments that most affect a given student's daily mobility patterns are strongly associated with the organisation of university facilities within the metropolitan space. Therefore, the factors and conditions that affect the organisation of the area's traditional universities from 1980 to 2012 will be analysed in chapter 6. This chapter will focus on the question of how the spatial distribution of traditional universities changed throughout the years, and how has the various conditions from the institutional government, administrative organisation, and historical location pattern influenced those changes?

As a starting point, it is assumed that there are three key determining conditions that determine the location of such institutions: the administrative origins of the university, their historical location patterns, and university policies and strategies (Caravaca and Feria, 1995). For the VMA's higher education institutions, the first factor has to do with whether the university is private or public and how its resources are managed. The second factor deals with the pre-existence of historical location patterns that have always shaped each university's growth. The third determining condition is highly linked to the first and deals with university governments and the policies. This condition affects short-, medium- and long-term real estate decisions that significantly support the continuity of each institution's plans. All the factors highlighted by (Caravaca and Feria, 1995) result in the three types of urban locations that were later identified by Bellet and Gutiérrez (2011).

Chapter 7 focuses on daily mobility pattern and begins to answer the overall question research question; How do changes in the VMA's urban spatial structure influence the daily urban mobility pattern of HE students, and how do changes in these students' daily mobility patterns influence the VMA's urban spatial structure? Previous studies have stressed that "...[daily] mobility is one of the most complex phenomena" of contemporary spatial configuration and organisation (Jirón, Lange and Bertrand, 2010; Kaufmann, 2002). Despite or perhaps due to the complexity associated with the phenomena of daily mobility, specific data related to daily mobility is almost non-existent in Chile and other Latin American countries.

Chapter 7 therefore focuses on the information gained through the empirical survey work. The internet survey proved to be perhaps the most suitable format for collecting large amounts of information on daily mobility patterns mainly because this less direct method encouraged the participation of a significantly high number of higher education students (824 responses). The level of response means that the survey work could fully encompass Kaufmann's concepts of *Access* with the two other conditions for mobility *Competence* and *Appropriation*. The latter factors account for the significance of 'youth' within this population group as 'youth' is strongly associated with the acquisition of skill, the development of habits, motivation for change, ambition and aspiration (Kaufmann, 2012). Kaufmann's ideas therefore provide a foundation for a detailed description of different patterns of daily student mobility. This helps to explain both general spatial layouts of VMA and the specific dynamics of the HE system within the metropolitan area.

Chapter 8 reviews, compares, and discusses the themes addressed in chapters 4 through 7. It focuses on how the study of daily urban mobility can capture and explain both general and specific metropolitan trends. As noted previously, urban planners and policymakers often neglect these mobility drivers in considering the urban inventions in large cities or metropolises like the VMA. These consequences are significant. They can render the complexity of everyday life in urban spaces invisible. They often fail to explain the way urban mobility becomes an essential manifestation of urban segregation in areas of complex topography. Finally, they obscure the importance of sociologically informed constructs such as capital for mobility and their role in furthering social integration.

Adopting such a conceptional framework represents an opportunity to reveal invisible urban trends previously overlooked by earlier general urban mobility surveys. Chapter 8 thus explores the implications of capturing public knowledge through the design and use of an instrument that falls between mobile ethnographies and general urban mobility surveys like origin-destinations studies. Chapter 8 therefore finally considers the broader implications this type of research has for urban and transport infrastructure planning, particularly those relating to the identification of potential in deteriorated or underused urban areas such as historical centres and the importance of daily mobility in ensuring responsive urban planning. The chapter concludes with some recommendations for further research into what else might be revealed by adopting a sociologically informed approach to daily urban mobility patterns.

2 Towards a Conceptual & Operational Framework to Understand Daily Mobility in Metropolitan Areas

2.1 Introduction

There are many ways to study urban mobility. The traditional origin-destination approach (O-D studies) depends on objective variables such as the point of origin or destination and encompasses fixed locations such as dwellings, working or study places. The measurements tend to cover trips between the highest concentration of housing locations and labour centres, from the periphery to the city centre. While such studies have some value, this approach is too narrow when exploring broader questions about mobility and urban populations.

The problem is that in looking at those people who primarily organise their lives around movement between their place of residence and the historic centre of the metropolis, this way of understanding mobility renders the diversity of the metropolitan population invisible. This is particularly true in cities such as those commonly found in Latin America where there is a high degree of socioeconomic variation within and between populations. In such cities, socioeconomic factors can determine both where and how people live by for example, determining an individual's daily mobility routines and but also their access to public services in topographically complex urban areas.

In contrast to the more traditional O-D studies, more recent explorations of daily mobility have been written from urban anthropological or sociological perspective depend on broad assumptions about the relationship between mobility and 'contemporary' society. The use of the ethnographic method however tends to result in an analysis conduct at a low scale. This occurs because by their nature they are based on individual experiences rather than exploring the mobility and experiences of larger groups of people. Conversely, the biggest challenge in studying daily mobility in metropolitan areas from an urban sociological perspective is that the processes associated with citizens and their identity, time routines, and the organization of the built environment all influence each other. Although such methods do perhaps encourage more detailed discussion about mobility, mobile culture and its place in society than O-D studies, they are unsuitable in the present context as the aim of this study is to evaluate daily mobility amongst a specific population group.

Kaufmann argued that that in a mobile society the lessons of mobilities should focus on the actor's movement practices *and* how those practices connect to other aspects of their lives (Kaufmann, 2012). This study therefore builds on Kaufmanns' contention, analysing mobility within a specific population group at specific times of the day, and under urban conditions, where the population group under

consideration must access services and infrastructure via a limited range of public transport networks. If it is assumed that groups and the individuals that make up those groups have different types of mobility that relate to specific economic, social, and cultural conditions, then daily mobility amongst a given population group will be both a spatial and social phenomenon. These two phenomena, under the lens of 'mobility', are therefore understood here as being shaped by the urban structure's physical constraints and spatial characteristics.

Concentrated on the Chilean example, the discussion will first consider the processes of 'metropolisation' as it affected and affects a contemporary Latin American society. From this perspective, 'metropolisation' is associated with large-scale restructuring that finally integrates economic activities, changed spatial forms, and the functional integration of services. This will be taken to be a long-term process, boosted in Chile's metropolitan areas by a significant investment in transport infrastructures at a regional scale that promotes a mobility model based on the automobile. The final consequence of this long-term urban (re-)organisational process are boarder changes in the institutional-political arrangements for the administrative integration of cities and intra-urban spaces. Such changes enabled by various government bodies, civic networks and cultural authorities contribute to a cities' urban identities and place perceptions (Cardoso and Meijers, 2020).

Although the research will focus on the daily mobility within these metropolitan spaces, based on Kaufmann's understanding of mobility (2002) it is essential to extend the different theoretical steps descending the study scale to consider the actors behind movement practices within urban spaces (Kaufmann, 2002). As such the analysis will first need to explore some theoretical approaches to urban mobility through three changing factors that almost all current writings recognise: increased travel distances and time, increased flow and diversification, and increased car ownership. All these changing factors are rooted in contemporary capitalist society, the post-Fordist structure of contemporary cities that arise from changes in production, and increasingly, from determinants such as changes to patterns of consumption. From a whole city perspective, these are most evident in for example, operation of the local real estate market or in the incremental improvements in transport and telecommunication technology.

While the more familiar transport studies do assist the researcher by for example capturing some of physical movement associated with, for example, longer term changes in production and consumption, they tend to neglect the whole city perspective by ignoring the *relevance* of daily travel patterns to urban lives. Thus, although the sophistication of transport modelling to better understand aggregated travel patterns has improved, predictions arising from such models about future

travel behaviour are often less convincing as such models depend on an incomplete understanding of urban living practices. As such, it is important to understand that transport and mobility are not synonymous terms. Transport studies tend to focus on optimisation perhaps by using more energy to speed a movement or by creating specialised infrastructure to lower the cost of the trip. Mobility studies on the other hand, directs attention towards the most autonomous form of 'movement' by focusing on its actor.

This study will thus focus more on those daily mobility studies that have attempted integrate the factors of time, space, with the identities of individuals or groups of citizens. First, it is assumed that all different mobility forms such as migration, residential, travel, and daily mobility impact on each other and on the human actors involved. Even with more extended temporalities, some forms of mobility like national or regional migration have a systematic impact on shorter temporal forms like daily mobility. An observation that highlights the need for an integrated approach when studying the forms of mobility and their impacts.

This leads to a second assumption, that it is the interrelation of all mobilities measured in time, city constraints, and identity that constitute the capital for the mobility of the population (Flamm and Kaufmann, 2006; Lévy, 2000; Urry, 2007). This implies that potential for mobility deals with the abilities and capacities to move or choose the way and extension (time-space) of that movement to preserve a lifestyle or configure one. Flamm and Kaufmann in particular have argued that an analysis of daily mobility patterns and through such an analysis, building an understanding the potential for mobility must consider three different conditions *Competence* – which refers to skills and abilities, *Appropriation* – which refers to mobility strategies and options shaped by the needs, plans, aspirations, motives, values, and habits of the population, and *Access* – which refers to place, time, and urban constraints (Flamm and Kaufmann, 2006).

The final assumption is strongly connected to identity. Although the needs of the collective have been acknowledged in some studies such as those by Soja (2004) or Ascher (2004), the prevailing view tends to privilege individual accounts and individual decision making. Yet the needs of the collective and individual identities are often not divisible in the city. Understanding that rather than being only a matter for individual decision, mobility is more of a collective choice that often relates to the needs and expectations of the strangers, peers, friends and families on which an individual's identity depends. This deep connection between mobility and individual identity means that in contrast to the dominant orthodoxy, it is perhaps more valuable to study groups of people who share broadly similar mobility characteristics.

2.2 Metropolitan Development in a Latin American Context

When looking at city development from a Latin American perspective, the literature tends to highlight those urban processes that drive the move from urban conurbation to emergent metropolitan spaces. Such studies seek to explain how urban processes induce change in mobility and attempts to account for how expanding transport networks and mobility facilitate these processes. Most urban writings therefore aim to understand how over time, various political, societal, economic, and cultural changes, combined with technical interventions, have affected the changing ways in which daily mobility patterns play out within urban areas. This narrative relies on the belief that ‘metropolitan mobility’ forms a specific paradigm in which circular change or dialectics, under which all urban processes influence each other (Miralles-Guasch, 2002).

Latin American cities are of particular interest under this paradigm because in these contexts, complex urban processes such as ‘metropolisation’ seem to have (re)structured cities more rapidly than in the global north. One important driver in many Latin American countries, has been catalytic changes in governance. In Chile and elsewhere, for example, the actions taken by dictatorship governments during the 1980s have caused significant and rapid socio-economic change. From a Chilean perspective, the strongest influence on its urban transformation and mobility within its urban spaces has been the imposition of a neoliberal inspired free market model from the early 1970s but also post-Fordist endogenous changes.

For researchers interested in the urban space within Latin America, the changes induced that such profound shifts in policy have created an interest in the relationship between mobility and metropolitan processes. Ideas about Latin American urban sprawl phenomena have often highlighted endogenous factors such as metropolitan expansion, suburbanisation, polycentralisation, social polarisation, residential segregation, and consequently, fragmentation of the urban space. Under such conditions, urban sprawl tends to be associated with higher costs of supply and leads to patterns of mobility that are more reliant on the private car (De Mattos, 1999).

This literature tends to highlight causal factors such as adoption of new models of production, the development of specific transport infrastructures, and socio-demographic transformations. For the most disadvantaged groups, the factors identified by, for example, De Mattos (1999) have made access to employment

and public services problematic in suburban areas even without the geological vulnerability of more peripheral urbanised areas. Together these factors have had a direct, indirect repercussions on mobility and the new territorial model that they bring about. Although their effects on mobility are complex and asymmetric, the trend points towards an unsustainable model, increasing journeys, distances, times, and, above all, an expansion in private transport use. These are now significant concerns affecting Latin American focused academic research but also planning practices within countries such as Chile (Herce, 2009; Martens, 2017; Vecchio, Tiznado-Aitken and Hurtubia, 2020).

Together, the processes associated with 'urban sprawl' in Latin American are with complex, isolated, and dismembered urban structures, which can only be recomposed and reunited by an ever-increasing demand for mobility. There is an expanding debate about flows and a significant increase in travel since the fragmentation and spatial imbalance create a growing need for interconnection (Fischer, 1995). Almost all metropolitan areas in Chile, for example, are now characterised by an opposing and contradictory logic: concentration and dispersion, with different intensities (De Mattos, 2002). There are many such clusters at a global scale that together make the metropolis a significant player in globalisation processes related to economic, social, and cultural issues (Rojas *et al.*, 2013).

In making the argument for the demand for urban dispersion, some authors point out an ideal of permanent suburban life (equally applicable to other Latin American countries), which refers to the elites' preferences, who have tried to distance themselves from the narrowness, crowding, and misery of the city centre. This new urban model of physical expansion was named at the beginning of 1950 by Whyte¹ (1958) as 'urban sprawl'. In Europe, Francesco Indovina opened the debates of the 1990s over the expansion of urban space with the idea of a diffused city or *città diffusa*. Whyte described a consistent city volume, not only in population but also in services and productive activities, in which there was high levels of mobility encouraged by a multitude of connections between the different regions and between urban areas (Whyte, 1958).

The phenomenon of decentralisation explained by Garreau (1991) is quite direct; it is related to the third wave of life. First, people moved their homes out of what traditionally constituted a city, searching for a new existence away from the city's ills, especially in the United States after World War II. Poverty, pollution, marginalisation, insecurity,

¹ SPRAWL appeared in "Fortune" magazine in the introduction to the article "Urban Sprawl" by the sociologist William Whyte, in January 1958.

stress, or loneliness made the city a lousy life symbol. An image of the city crisis was spread, and families and individuals abandoned their homes for the countryside's bucolic image. A new type of capitalism arrived, with new industries and technologies that support the suburbanisation process with car producers and oil companies.

The suburbanisation of America led to a growing desire to recover the urban life surrounded by all kinds of services. The result was to move marketplaces to suburban areas, and then the jobs - what Garreau named the essence of urbanism - have moved to where some communities have lived and shopped for two generations. Activities and companies were partly driven out of the city as large production units, and other services accompanied the population in the form of consumption and leisure. Garreau explained that the suburbanisation model forced the city's development to the limits, outside a traditional downtown in what had previously been a residential or rural area. The 'Edge City' (Garreau, 1991) concentrates on business, shopping, and entertainment well connected by freeways and accessible by private cars.

From a productive point of view, 'urban spawl' develops first from the emergence of productive processes. It depends on the Fordian idea of an industrial apparatus, whose functional optimisation located the unit of production approximately in the territorial centre - an area which in turn was determined by labour localisation, the availability of raw materials and proximity of a consumer market. These Fordian processes meant that productive units were often configured in places where people lived and worked. Indeed, the productive activity firm often provided housing for their workers and families to ensure that labour remained local, perhaps loyal, to the productive unit. As of the economic foundations of the nascent metropolitan area moves away from Fordian industrial production, towards tertiary activities (such as finance, commerce, and services), urban change depends more on the deterritorialization² of productive activities and their independence from supply centres of the workforce, raw materials, and consumer markets becomes apparent.

The longer-term effect is the loss of the direct territorial bond that the production processes had with the urban surroundings. The liberation process of production that industries are experiencing, concerning the location of their raw materials, outsourcing services, and consumer market - is supported by a massive network of infrastructure that permits the widespread adoption of the "just in time" production model, a phenomenon that is directly related to growing mobility in peripheral areas.

² Deterritorialisation is a concept created by Gilles Deleuze and Félix Guattari in *A Thousand Plateaus* (1980), as well as Paul Virilio's *Speed and Politics* (1977). It describes any process that decontextualises a set of historical relations, rendering them to new actualisations. In this context has become to signify the relationship between local entities and global processes.

The current literature on Latin American suburbanisation and urban sprawl attributes these phenomena to two different causes (Heinrichs, Nussli and Rodríguez, 2009). One line of reasoning focuses on demand and argues that urban sprawl reflects families' preferences and aspirations to live a suburban life. From this point of view, suburban developments appear primarily due to planners' and investor's actions, aiming to satisfy that demand. The idea of a permanent suburban life in Chile is strongest amongst the elites who tried to distance themselves from the narrowness, crowding, and misery of the city centre (De Ramón, 2007). This process manifests first as relocations from the old urban centre to the nearest central districts, but in the last two decades, high-income residents expanded the urban boundaries, building new luxurious homes on the urban periphery and even beyond.

These processes were supported by what De Mattos (1999) calls new urban artefacts (urban highways) capable of reorganising the metropolitan space, making physical proximity to centrality increasingly less attractive (De Mattos (1999). The growing perception of the urban environment as unsafe and potentially violent has led to the proliferation of gated communities from the 1990s (Hidalgo *et al.*, 2009; Jirón *et al.*, 2014). But the protection of homes and public spaces against crime have always been seen as important within Latin American countries. In Chile, this has led to a considerable demand for housing in gated communities located on the urban periphery. Satisfying this continuing demand has created considerable national and international real estate capital.

The other equally important line of argument holds that the phenomenon of urban sprawl is not a result of individual households' demand for suburban housing or suburban life but a lack of urban and territorial planning policies (1985). During the 1970s, a radical economic liberalisation began to be applied in Latin American countries, based on principles of subsidiarity and neutrality of the state, which included various measures of deregulation, privatisation, external openness between others. This combination leads to patterns of urban development and land use that are strongly driven by the alliance of private interests and relevant public policies (De Mattos, 2002; 2004).

As such, social housing developers become another major actor behind the cities' dispersion process. An example is the drive to develop new large-scale social housing during the 1980s. The new social housing developments were most often constructed on low-cost land with low connectivity to centralities and away from public services. Intended to offset a lack of social housing such developments were dependent on unbalanced stakeholder decisions at a territorial level that finally consumed urban and rural land on a large scale. This consumption of land to meet the expanding demands of urban populations meant that the "outer city" becomes central element of a new urban-territorial organisation (Hidalgo and Borsdorf, 2005).

The main reason that such ‘metropolisation’ processes are not widely discussed within the literature on the United States and European contexts is because such ‘dispersion’ processes exist within a context of population stagnation (Rojas *et al.*, 2013). On the other hand, for the Latin American context, the processes associated with ‘dispersion’ assume a much greater significance given that in Latin America populations are still growing. In such contexts, the spatial changes associated with ‘dispersion’ are associated with the reorganisation of both residential and productive space. This results in a net balance that encourages higher levels of lands consumption. Thus, if population growth is taken as a given and is associated with higher levels of land consumption, the term “urban growth” becomes more usual. If what is given is taken to be the functional annexation of peripheral areas, the term ‘metropolisation’ should be used (Rojas *et al.*, 2013).

The two dispersion processes identified earlier have served to shape the evolution of many Latin American cities. In this respect, the forms found in some Latin American metropolises correspond with those found in dispersed cities in the United States (Rojas *et al.*, 2013). Notably however in some Latin American countries rural-urban migration has slowed and population growth within some metropolitan areas has stayed below land consumption rates. This means that it is perhaps better to label continuing ‘urban growth’ and development in such areas more precisely as dispersed ‘metropolisation’ since the processes of ‘metropolitanisation’ are most apparent in specific or dispersed peripheral areas (Rojas *et al.*, 2013).

Perhaps a consequence of the dispersed metropolitanisation that appears to have shaped many Latin American cities, Montezuma observed that Latin American cities often have more complex mobility structures than other cities (Montezuma, 2003, p.177). This complexity often increases in settings that are continuously under expansion since they often have a low quality of public transport and limited infrastructure to support mobility (Vecchio, *et al.*, 2020).

Rojas *et al.*, (2013) distinguished three common types of urban configurations in Latin America. In the first group are countries with more than 80% of the population living in urban areas, such as Argentina, Chile, Uruguay, and Venezuela. The second group comprises 50% to 80% of the population living in urban centres like Mexico, Brazil, Ecuador, Colombia, Cuba, Bolivia, and Peru. The third group includes countries with less than 50% of the population, such as Paraguay (Rojas *et al.*, 2013).

Falling into Rojas' second group most Chilean cities are mid-sized, with almost 89,9% of its population (15,619,074 people) living in urban areas (Census, 2017). In Chile 'metropolitanisation' is usually taken to mean a cities' conurbation, a view promulgated by the State during the 90s and labelled 'Greater cities' (a group of cities). Under this definition, three such metropolitan areas exist in Chile, Greater Santiago, Valparaíso, and Concepción. Of these, the first two are situated in the central macro-region concentrating 48.3% of the Chilean population.

Brazilian-born Rodrigo Cardoso (2016) focused more on the dynamic nature of metropolitanisation, defining it as the visible process of expansion, coalescence, redistribution, networking of urban forms and functions and finally evolving political-institutional changes (Rodrigo Cardoso, 2016). The latter, Cardoso suggested, involves symbolic cultural changes such as the re-scaling of urban identities and the perception of place (Cardoso and Meijers 2020). Cardoso further claimed multiplexity to be a key difference between metropolisation and other forms of urban expansion. A perspective that associates the visible spatial-functional dimension of metropolisation with transformative political-institutional and cultural-symbolic changes. These temporal and spatial dimensions, Cardoso suggests, can be a stimulus or a barrier to the process of metropolisation (Cardoso, 2016).

In Chilean metropolitan areas, there is no central metropolitan administration. Therefore, there is not a single director leading the municipalities that together form metropolitan area. This means that municipalities do not work together but rather compete for public funds which leads to urban reorientation and specialisation. The reorganisation and development of the metropolis under such condition therefore takes on a multifocal character such as in the case of the Valparaíso Metropolitan Area (VMA). For the VMA, its five constituent cities are loosely associated with specific forms of activity; Valparaíso tends to concentrate on the state administrative structure and tends to emphasise port activities. Viña del Mar tends to concentrate on tertiary services, housing, and tourism. Quilpué and Villa Alemana are mainly residential, with subsidiary programs for state housing, creating a bedroom community, and Concón, as a newly developed city, specialises in high-rise housing developments for second homes.

While the transformation of metropolitan processes is one of the most relevant factors in urban change, some contrary developments seem to converge as the central city's new boom. In Europe, the central areas of major metropolitan cities often reinforce their role as being 'central' through their strategic value (García Palomares 2008). The attributes and strategic advantages of a central location raise the possibility of an eventual return to consolidated cities in such locations, which would then allow populations to take advantage of all the benefits that centrality

allows. Viewed from the global north, the dominant framework of urban change seems to be a homogenising global urbanisation. As such, it becomes essential to discern which of these changes are attributable to general urban spatial trends and the inherent evolutions of each city or metropolis. The persistence of each city's particular identity is reflected in people's culture, in its configuration, and primary morphologies, in its architecture, and the urban landscape (De Mattos, 2002).

In Latin American countries by contrast, there are only few examples of this 'centralist' city model (Carrión and Hanley, 2005; Contreras, 2011). It is true that some Latin American cities do have good connectivity at a metropolitan scale, with various urban services and suitable public spaces and urban facilities. More generally however, Latin American cities of different sizes and geographic locations with historic central areas are often deteriorated or underused. These central areas are well equipped with infrastructure and public spaces but contain many decaying buildings in varying degrees of abandonment or underuse. The everyday use of urban assets with ample development potential in the central area contrasts with urban sprawl on the outskirts and neighbouring cities. Changes in the preferences of higher-income population groups have also tended to promote peripheral growth and the growing abandonment and decline of the historic centre. This general assessment fits the VMA where recent urban developments in Chile have affected metropolitan agglomerations' external appearance and internal organisation.

2.3 Urban Writings on Mobility in a Metropolitan Context

Most recent commentaries from an urban perspective on mobility do not deal with clear cause-effect relationships but depend on the criterion of circular chance or dialectics between transport and urban development. The key reason is that too many of the factors associated with mobility are very closely interrelated to one another. It is also important to recognise that context is equally significant given the broader socioeconomic, political, local territorial settings and cultural issues involved in mobility. Notably from a temporal point of view, these commentaries most often discuss mobility in the light of the many societal, urban, and technological changes over the previous 30-70 years (Cardoso *et al.*, 2020; Cornut *et al.*, 2014; De Mattos, 2004).

Mobility is not a univocal concept but rather has several different meanings. It can refer, in one context, to physical movements, in another context the virtual, or another the imaginary or ideas (Castells 1996; Sheller and Urry 2006a). Kaufmann understood this to mean that physical or spatial mobility refers to the geographic travel of entities, from an origin to a destination along a specific trajectory described in terms of time and space (Kaufmann, 2006). Kaufmann further explained that entities could be concrete (e.g., products, machinery, or people) or abstract (information, ideas, or norms), and they can influence the points of departure, the passage of travel, or destination. In an earlier analysis, Graham and Marvin had focused on the way in which even within complex transportation infrastructures, it remained possible to find a small number of specific movements that are individual (Graham & Marvin, 2001). Later however Ascher (2005) highlighted the way in which people, goods, and information together constitute a system. All such 'systems' have the capacity for mobility due to the presence of technologies or infrastructures designed to move and store people, products, information, and energy (Ascher, 2005).

This latter commentary highlights the ways in which the mobility of people, information, and goods in metropolitan areas are affected by multiple factors. Older work tended to focus more on the impacts generated by transport network development, more recent work has instead highlighted less tangible factors such as broader changes in the mode of production, the impact of ICTs, together with wider socio-demographic and cultural transformations. These all have direct and indirect repercussions on mobility and the new metropolitan model they generate.

In Latin America, the territorialisation, decentralisation, and fragmentation of productive activity intensifies mobility and favours the dispersion of populations and the use of private cars, but at the same time, they increase local travel. The same happens with the development of Information and Communication Technologies (ICTs). Many authors see an element of rupture with the growing mobility needs in them, eliminating the effect of the spatial separation of activities (Miralles-Guasch, 2002, p. 120). However, the relationships between ICTs and mobility are substitution, induction, and even complementation effects with paradoxical results. Although such influences and their effects on mobility are complex, the trends point towards an unsustainable model, with increases in journeys, distances to be travelled, travel times, and, above all, private vehicle use.

Socio-demographic structures for example affect mobility in metropolitan areas. Examples of this are the increase in the active population or changes in households, which contribute to growing mobility, or a more significant number of the elderly could mitigate. Also, the increases in mobility due to higher levels of income or new life habits in large population groups are partly offset by the growing social division and the existence of increasingly numerous groups with reduced mobility (García Palomares, 2008).

No less complicated is the emergence of the new territorial structures. Expansion, dispersion of the population, and territorial specialisation imply the need for more significant travel. Furthermore, low-density urban developments and discontinuity encourage longer trips and, consequently, mechanised modes of transport, which the diversification of travels leads to the automobile. Nevertheless, the new decentralised structures and the creation in the peripheries of self-sufficient nuclei or nodes of residence-employment (edges-cities) induce, in principle, more local trips in the periphery.

Urban development has also been driven by continued growth in mobility demands facilitated by new information and communication technologies which characterise the current 'Information Age' (Castells, 2003). These advances provide considerable potential for speed, signified by an increase in physical and virtual travel in all forms, such as longer or shorter journeys, by foot or by plane, or meetings mediated by mobile phone either during the working week or at weekends. The extensive use of technology has now induced a new era of time-space compression that has social and spatial consequences that are much debated.

In David Harvey's terms, "...we have been experiencing, these last two decades, an intense phase of time-space compression that had a disorienting and disruptive impact upon political-economic practices, the balance of class power, as well as

upon cultural and social life" (Harvey, 1989, p. 284). Although Harvey's comment suggests a social, economic, and cultural revolution related to time-space compression, May and Thrift (2001) have argued that space and time are inevitably linked, and one does not suppress the other. May and Thrift (2001). Perhaps for this reason Harvey acknowledges that the annihilation of space refers more to a transformation than its elimination (Harvey, 2009).

For Herce (2009), new mobility-based infrastructures, mostly related to constant production from so-called demand approaches, reinforces private transportation's development, fostering urban sprawl, creating ever-increasing mobility demands. These new patterns also include trips for a broader range of purposes and in more directions, moving beyond the pendulum-like trips characteristic of Fordist growth (García Palomares, 2008). Whereas earlier transport surveys have reflected the influence of commuting for work or studies (commuting) in metropolitan areas, within these new mobility-based infrastructures, travel destinations from the periphery towards the centre still prevail, they are being replaced by new and diverse directions, like periphery to periphery or centre to periphery, among others (Rodríguez, 2008).

2.3.1 Increased Travel Distance and Travel Time

Since the 1980s, the distance between the locations associated with an individual's daily activities have continued to grow. The extended footprint of Latin American cities and urban metropolises provides clear evidence of this increased distancing. Latin America is a highly urbanised continent with four major metropolitan areas, all of which are examples of large cities that have experienced extensive expansion of their footprint (Hidalgo and Huizenga, 2013).

Ten years ago, the average travel by a person in Latin American metropolitan areas that did not reach one million people reached 7 kilometres. Today's average is more than 18 kilometres in areas with a population that barely surpassed one million inhabitants (Soto and Alvarez, 2012). Adding the region's persistent inequalities due to structural imbalances such as a continuing unevenness in the distribution of inhabitants, opportunities, and access to the public transport system means that distance and time present significant structural challenges to everyday life in many Latin American metropolitan areas (Vecchio, *et al.*, 2020).

Travel time, both the distribution of daily trips and the time that the metropolitan population spends on them, is of particular interest here. Mobility studies have begun to assume that the time used in commuting is not reduced, despite the improvements

that occur in means of transport. In his attempt to develop a transport model that better understands improvement in qualities of life related to city growth, Zahavi finds that increases in speed offered by the improvement of travel technologies offer no time gain for family life (Zahavi (1979)). From this perspective, it is often assumed that primary purpose of transport improvement is to reduce a families' travel times and, with it, their quality of life. Yet, if such improvements are only focused on the reduction of travel time, the role of travel activities within an individual's live remains relatively stable.

What in fact arises from improvements to transport systems is that people have a greater choice of where to live and use that time gain in new areas of housing developments. Increases in travel speed and, therefore, reductions in travel times are offset by new trips or longer distances. If the population travels faster, the time saved is spent traveling more or traveling further (López, Monzón, Ortega and Mancebo, 2009). Whitelegg at García Palomares however suggest that the speed increase did not translate into a decrease in travel times, but more choices for being mobile (Whitelegg at García Palomares, 2008). This latter finding implies that transport improvements are connected to more choice within urban lifestyles. The changing role of mobility, travel distance and travel time within emergent metropolitan areas has in turn led to the emergence of metropolitan regions that that surpass the size of areas previously labelled as 'metropolitan' (Olivier, 2013).

This restructuring has led some commentators to revisit traditional ways of thinking about 'the city' in which an identifiable urban centre is surrounded by mainly residential suburban areas (Olivier, 2013). Olivier (2013) notes that Castells preferred to think in terms of 'the space of places' and 'the space of flows'. Castells explains that the former connects the familiar space of the historic centre as a material precondition of social interaction. The latter is associated with the spatiality of social interaction as modified by advances in communications technology. Regardless of physical distance, it is characterised by simultaneity and depends on technological infrastructures such as information systems, telecommunications, and transportation lines (Castells, 1996).

Castells's ideas highlight how the spatial structure resembles the architecture of informational networks and the 'space of flows.' Under this paradigm, distance is no longer simply functional but a 'technological' distance that is related to 'the space of flows' (Castells, 1996). As such, Castells argues that 'technological distance' in the 'network society' provides an interesting lens to view the processes of urban change at a local, city, regional, and international level (Castells, 1996). Imilan has subsequently argued that Spaces of flows can be seen and comprehended as places, not only in electronic or communication lines (Imilan, 2014). Under Imilan's

re-interpretation of Castells' ideas, flows also need to be understood as a physical space. Through the focus of movement practices, distance and time are related to travel and related to diverse and uneven ways of life in the city (Imilan, 2014).

Turning to the Latin American context, increasing travel times and travel distances are strongly associated with the segregated spatial structure of the metropolis which are in turn is deeply rooted in the dispersed development of residential areas occupied by different socioeconomic groups. Rodriguez's 2008 study of commuter behaviour in some metropolitan areas of Latin America highlighted contrasting differences in travel behaviours evident in lower-income and higher-income municipalities within such segregated cities (Rodriguez, 2008).

Rodriguez found that an individuals' economic condition and geographic location are closely inter-related. Rodriguez demonstrated that there was a relationship between improvements in an individual's socioeconomic condition and the likelihood that their workplace would be in a different municipality to that of their place of residence (Rodriguez, 2008). Running counter to this observation, Rodriguez noted that the poorest municipalities seem to have higher numbers of people who daily commuting for work. This appears to depend on the distance between low-income residential areas and the concentration of employment opportunities within Central Business Districts and other wealthy areas. According to Rodriguez, the expressions of segregation in mobility are to be found in the significant distances from the poorer residential areas to places of employment and the inadequacies of public transport which is typically slower and less evenly distributed than the infrastructure that supports private car usage (Rodriguez, 2008, 2006a, and 2006b)

Janoschka (2002) adopted a similar approach when studying Buenos Aires urban areas in Argentina but chose to focus on different socioeconomic groups. Janoschka argues that the Argentine Nordelta in Buenos Aires has a pattern of urbanisation that is typically of many other Latin American cities and "[does] not reveal new trends in the metropolitan structuring" (Janoschka, 2002, p.6). This Janoschka suggests is because there is no reduction of residential segregation, decreasing polarisation differences between the wealthy city and the impoverished city, and the increased dispersion that finally extended mobility in time and distance between different metropolitan areas.

According to Janoschka (2002), the new urban forms are distinctly insular because they are structured as relatively homogeneous socioeconomic islands. This insular model in between others is characterised by installing private colleges and universities in the vicinity of new private residential suburban areas with highway connectivity as a structural axis and with few or no public transportation options.

On the other hand, the increasing isolation of low-class neighbourhoods means they are distant from the other insular suburban developments and mainly isolated from services and workplaces (Janoschka 2002).

There is some agreement between the work of Rodriguez and Janoschka. They both identify trends relating to the structural role of travel time and travel distance within Latin American metropolitan areas, albeit in opposing forms (Rodriguez, 2008, 2006a, and 2006b) and Janoschka (2002). The second trend is linked more strongly to globalisation, technological and infrastructural developments, which point to polycentrism as emergent form of operation. This duality is echoed in urban forms found in the US where a good quality accessible transport system is scarce (Vecchio, *et al.*, 2020). In some areas however socio-territorial inequalities, the character of the local labour market and the service economy's dynamism tend favour the development of a more monocentric system (Soto and Alvarez, 2012).

Despite this last observation, Rodriguez's work highlights the need for further research into intra-metropolitan labour migration Rodriguez (2007). The processes described by Rodriguez highlights the paradoxical greater intra-metropolitan daily mobility among recent migrants. It seems that their relocation did not seek an "approach to work" but probably meets other dimensions of their welfare function like space, comfort, and safety amongst others. Motivation for mobility is quite diverse and is not only connected to the city's essential functions. Conversely, the diversifications of travel in different directions that have been highlighted in the work of Castells, Rodriguez and Janoschka demands further consideration.

2.3.2 Increased Diversification in Travel Destinations and Motives

People's daily and leisure activities seem increasingly less dependent on specific urban areas or physical and administrative boundaries. Citizens usually tend to live in one place, work in another, and enjoy their recreation periods in a third one (Ascher, 2004). Ascher's observation suggests that mobility has not only increased in terms of quantity. It also means that the range of travel spaces considered attractive by citizens has widened to include, for example, peripheral areas of cities. Despite such spatial changes, travel for work or study (normal mobility) is still dominant in traditional urban areas with concentrated travel patterns in one direction (centre-periphery). Nevertheless, other types of travel patterns associated with different and new motivations and directions are now more significant in Latin American metropolitan areas partly due to changings socio-economic conditions but also the possibilities created by individual choice.

The spatial transformation processes evident in Latin American metropolitan areas are however not only linked to individual motivations and choices. From a productive perspective, there is an increasing fragmentation of production and with it a spatial separation of tasks. Industrial concerns are more often abandoning the central city to relocate in the urban peripheries or even outside them. The transition from a Fordist system - from the extensive factory - to a post-Fordist organisation - numerous dispersed units - increases transportation needs and labour mobility (Gutiérrez, 2009). The mobility model is thus wholly transformed from mass mobility to singular mobility. The first is concentrated on two motivations for travel (work or studies), according to the travel direction (periphery-centre) or in the temporal dimension (peak hours and off-peak hours).

The post-Fordist organisation of travel for productive purposes is characterised by a diversification of the reasons for travel. This in turn means that more individuals are travelling at different hours during the day compared with the more traditional daily movement patterns. Further, the changed spatial dispersion of productive activity tends to increase trip distance and diversifies destinations in a tangle of multiple origins and multiple destinations, many of which are increasingly distant from the central city. This complex of unique mobilities needs requires individualised public transport policies and services referred to in the Anglo-Saxon literature as one-to-one mobility (Seguí and Martínez, 2004).

The research related to social and spatial inequality however suggests a territorial mismatch between workplace and residence area that affects travel destinations (Rodríguez, 2008; Jirón, 2007; Soto and Alvarez, 2012). For example, some informal workers travel within a very restricted compass near their resident location. These are informal workers that can operate in the same household or their immediate surroundings. Although this pattern of behaviour can be read positively as such individuals spend less on transport time, it can also be read negatively, as the “encapsulation/isolation” of the poor.

On the other hand, the encapsulation of the wider municipal community perhaps through a lack of public transport does not seem significant for members of the elite (higher income groups). Janoschka (2002) writes about completing the circle of territorial segregation of residence-schoolwork. Although they must leave their commune to attend school and later work, they eventually complete the circle by moving to the nearest areas and within their historical niche. Rodríguez highlighted that amongst the richest metropolitan populations there was a high level of encapsulation (Rodríguez, 2008).

These processes are dependent on the increasing diversification of society in the last 50 years with a consequent effect on mobility. Some changes have to do with increases in income levels in some populations. An increase in income offers more opportunities and greater mobility capacity which inducing new motivations and consequently a more diverse range of travel needs than before. Leisure time, for example, is often re-imagined. For individuals, this can mean an increase in the number of activities that are undertaken or an increase in the range of leisure activities in which they participate. Often such changes mean that the leisure activities that individuals undertake take place in increasingly distant spaces.

Cultural change, associated with a higher quality of life, also affects new motivations for travel. Trips to the doctor or those related to body care and beauty, for example, are increasing. Some of the new choices can be personal services related to leisure and consumption and a variety of choices. According to Ascher "...the more mobile we are, the more choices we have; the other side of the coin, though, is that we are also obliged to move in order to be able to choose" (Ascher, 2004, p. 356).

With a greater mobility capacity, travel times are reduced, allowing one to take several trips during a day or a week. An increase in disposable income is therefore associated with greater demand, a wider range of needs and more complex travel motivations than before (García Palomares, 2008). The pursuit of individual autonomy associated with new lifestyles is often reflected in changing household size, accompanied by a growth and diversification in new types of family arrangements which further introduces new mobility needs (Jirón *et al.*, 2016). Consequently, according to Ascher "mobility is both a consequence and an instrument of this societal diversification" (Ascher, 2004, p. 362).

2.3.3 Increased Car Ownership or Car Use

In recent years, the global rate of motorisation increased exponentially, especially in developing countries (Trouve, Lesteven and Leurent, 2018). In such countries, metropolitan areas are associated with the development of transportation networks that have expanded quickly in response to rapid population growth and demographic change. Typically, however the increasing demand for transportation has been through an increasing reliance on use of motor vehicles within metropolitan mobility systems. As Cornut, Madre, Boucq and Hivert have shown, increases in car ownership coincides with changes in the general socio-economic conditions typically experienced by urban populations in developing countries (Cornut, Madre, Boucq and Hivert, 2014).

Although socio-economic changes and their effect on specific urban populations are significant in shaping mobility systems, wider changes in the urban spatial structure inspired by other social, economic, and political developments are of fundamental importance. Growing urban sprawl, for example, not only requires the development of expanded transport networks but changes the cost of supplying public services, takes over spaces with elevated agricultural, ecological, or landscape values, and often to lead to a model of mobility based on the automobile (Rojas, *et al.*, 2013).

The ability of many Latin American cities to absorb this exponential increase in vehicle use –in terms of fossil fuel consumption but also the development of new transport infrastructure – is quite worrisome given the growing prominence of the automobile in many such metropolitan systems of mobility. For example, Cervero (1998) refers to OECD data that estimates that urban travel increased more than 50% between 1990 and 2005. As another example, in 1981, 8% of the world's population owned a car and 59 of the world's poorest countries – containing more than 60% of that population – together owned fewer cars than Los Angeles residents. Today there are about 1,3 million private cars in Santiago, one of the ten most populated metropolitan areas in Latin America. By 2025 this figure is expected to double, reaching 2,650,000 vehicles. This year nearly 360,000 new vehicles were sold in Chile. That is a thousand cars per day. This is likely to rise in the coming years. From current base of U.S. \$15,000 per capita annual income, average income is projected to grow to U.S. \$22,500 in 2025 (Franco and León, 2010).

In a consumer society, mobility becomes a factor of distinction and difference. In a society where the car is present in most households, car ownership is not in itself a significant differentiator. Instead, the car model becomes the most significant factor of social differentiation, whilst the number of vehicles per household relates to the level of autonomy and mobility available to individual household members. This is important in modern society because the definition of collective identities and the distinction between groups are marked by the symbolic content of consumption, which in turn expresses shared meanings and reinforces identity and social position (Tavares and De Oliveira, 2010).

Thus, the ability to consume is essential to identify the middle class's formation, and its diversity redefines its differentiator role. The new peculiarity of Latin America is its tendency to generate a massive lower-middle-income group whose members historically have had limited access to goods and services previously reserved for higher income population groups. Some social researchers have argued that the breadth of this income group amounts to a distinctive low-cost society (Franco, León, and Atria, 2007). One of the critical elements of consumption amongst the members of this low-cost society is the private car. Car ownership and appetite for this privilege within this middle-low strata is largely dependent on changes in income.

Franco and León (2010) studied Latin America's socioeconomic changes from a middle-class perspective. In the last 30 years, the middle-class grew from 40% of the households – during the 1990s – to 57% in 2007. During the same period, the lower-income families reached a higher salary group – from less than \$5,000 per year to \$15,000 (Franco and León, 2010; Franco, *et al.*, 2007). This low-cost society therefore now demanding a means of mobility that for decades was unattainable. In cities where large transport infrastructures designed for private cars is the most significant investment, the car quickly becomes the only way to access some neighbourhoods. Conversely, some research on mobility has shown that the focus on access to lower-middle class areas means that other populations saw a significant increase in their travel time when not owning a private car (Franco and León, 2010).

2.4 Developing a Framework to Understand Mobility in Complex Metropolitan Areas

As many of the writings on mobility discussed so far have suggested, urban mobility in metropolitan spaces has become far more complex over the last decades. Individual trips are becoming more abundant, increasing their number; the motives for moving are becoming more diverse, and the distances involved in daily mobility patterns are growing longer due to the expansive growth of cities. How then can a conceptual framework to understand mobility and daily mobility patterns in increasingly complex metropolitan areas such as those found in Latin America developed?

Mobility researchers from the social sciences have linked the right of movement or the possibility to choose how to move to 'social mobility' or 'vertical mobility'. The right to move is related to access to the range of services that an individual needs to develop their life within contemporary metropolitan spaces (Kaufmann, 2012). Ascher has more precisely defined the other 'rights' that are associated with the right of movement. Ascher argues that the way in which constant urban dispersion and the diversification of mobility needs that now shape metropolitan life mean that for many people around world, the right to work, to have a place to live, and the right to an education now depends on the right to mobility (Ascher, 2004).

Movement or the possibility of movement is strongly connected with several crucial individual freedoms (the freedom to travel anywhere at any time, the freedom of residential location, the freedom to exist in between and amongst others) (Sheller & Urry, 2006b). It is for this reason that John Urry (2007) argues that today the most important social phenomenon is urban mobility. Urban mobility facilitates social mobility because it means that individuals can choose to have greater access to services, business, work, social networks, or consumer offerings. Access to movement or the possibility of movement within the metropolitan areas however can be highly unevenly distributed which explains why spatial mobility can often be highly valued in some metropolitan areas.

2.4.1 From Transport to Mobility Studies

Herce argued that observing such phenomena from the perspective of transport management can imply a constant need for constant production of transport infrastructure. This observation refers to research methods that focus on analysing demand and consumption to develop so-called traffic models (Figure 2.1) (Herce, 2009). This approach emphasises the quantitative analysis of future network solicitation and the estimation of the amount of interrelation that urban activities will require in a determined spatial location to identify trends that might be used to support new urban planning initiatives.

Such a perspective is strongly linked to the twin imperatives of economic development and the functional role of such networks. This approach does not however pay sufficient attention to the interrelation between different networks, thus losing sight of their existence as conditional in the formation of the city's productive capacity and the lives of its citizens (Herce, 2009). Herce explains this territorial model by highlighting the way in which continued investment in large network infrastructure ends only with higher energy consumption and increased social exclusion (Figure 2.1)

The territorial model of urban sprawl and its consequences

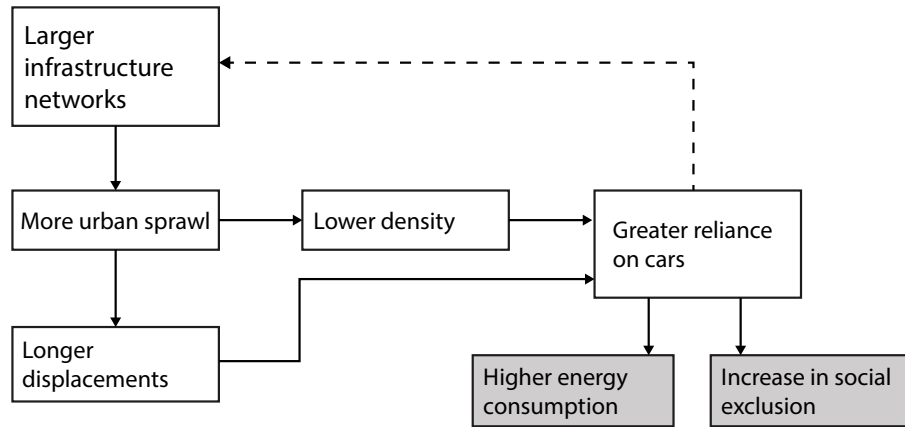


FIG. 2.1 Territorial Model of Urban Sprawl by the constant production of infrastructure. Source: Herce (2009).

Herce's intervention leaves no doubt that transportation and urbanisation processes are closely related, intertwined, influenced, and evolve together. Miralles-Guash (2002) however highlights the way in which almost all early mobility research was limited to a causal analysis, where each factor in the analysis becomes either cause or effect. Under this paradigm, transportation infrastructure becomes an element inserted into the territory becoming an agent or a consequence of such urban paradigms.

Zahavi (1979) explained that causality in modelling travel behaviour is normally a priori. In such models, it is assumed for example, that the availability of cars within a household increases the number of trips taken. In this case, car ownership is the cause, while the number of trips is a consequence or effect of the cause. It is however possible to conclude from modelling a group of individual's travel behaviour that an increasing need for travel is the cause and growing levels of car ownership is the effect (Zahavi, 1980, p 2). Zahavi's work cautions against making assumptions about the nature of causality when attempting to understand and model travel behaviours. Zahavi suggests that since travel components all interact with each other and the transport system, causation and effect must be seen in the context of a simultaneous dynamic feedback process in which each element can be both a cause and an effect (Zahavi, 1980).

This causal relationship model depends on two assumptions. The first is technological determinism, which, as an explanation of the urban spatial structure, appears early in urban studies and refers to urban transport. According to this approach, the evolution, and changes in the urban structure, both formally and functionally, depend on technological advances, responsible for organising human activity and structuring social relations. The city's growth in volume and density could be explained by the increased speed of various transport technologies. The main result from this analysis can be the optimum relationship between means of transport, public policy support, and the city dimension (Yago G. in Miralles-Guash, 2002).

Once such technological determinist ideas are left behind, the focus within urban research has been dominated by classic economists who tend to focus on minimum costs (Miralles-Guash, 2002). According to this economically centred approach, the factor that initiates and explains the urban space structure will be the rational option developed by consumers to balance different transport costs: land value and transport. The urban transit models were a direct and measurable operation of the urban function model and, therefore, land use generated them (Hall, 1993).

From this perspective, the relationship between transport and land takes priority. The activity's location was the primary variable and all the other variables were derived from the traffic models. After that, they changed the unique axiom to one biunique, where the activities' location might also be analysed due to the transport model. The lack of reciprocity mentioned by Alan Altshuler (in Miralles-Guash, 2002) was a product of the methods used in that analysis. If the phenomena are contemplated quickly, it seems indisputable that traffic patterns, volume, and transport result from spatial distribution activities. A more detailed analysis however reveals that transportation becomes a representative factor of the form and urban functions, particularly if accessibility is seen as a vital consideration in deciding the location.

More broadly, as the foregoing suggests, the models that are now used to analyse and understand travel behaviours within transport systems have tended to become more sophisticated over time. As such, these models have become more and more useful in understanding aggregated travel behaviours and predicting future travel patterns. These models are however still based on an incomplete understanding of urban lives. The challenge of the emergent metropolitan spaces is perhaps that it became necessary overturn the earlier paradigm of causality and adopt a dialectic which implies a reciprocal relationship between city, transport, and mobility. This suggests that the demand for transport means could be attributed to the creation of a social structure linked to an economic system.

From this foundational idea, transport must be an integral element in the modern city's overall public infrastructure requirement. Consequently, urban transport analysis must not be understood as an historical reflection on an introduced technology or a technical element. Instead, it is a social construction. Paul Krugmann (in Ascher, 2004) explains that it is the only possibility, given that technologies are themselves social objects and as such not independent from society, but rather rooted in it. Under this paradigm, the temporal, spatial, and social or identifying characteristics of the population are highlighted (Miralles-Guasch, 2002).

Krugmann's argument suggests that researchers interested in transport and mobility need to broaden the scope of their analysis and the kinds of questions that they seek to answer. Rational decision making is a central concern within more traditional modes of analysis, but if the relationship between the city, transport, and mobility is to be fully explored then it becomes necessary to also consider other decisions that are not always rational to properly understand the character of individual and collective daily movement patterns. Such ideas are linked to the development of a school of thought that connects daily mobility experiences with questions related to lifestyle, equity, mobility, and transport. Such studies have tended to be focused on the European context but there are now a few studies that have begun to look at these associations from Latin America (Vechio *et al.*, 2020; Rodríguez, 2008; Jirón, 2007).

2.5 Towards A Conceptual Framework Based On Social Science Studies

The preceding section outlined the changing ways that researchers have considered the expansion of metropolitan areas over recent decades and the effects on spatiality, mobility, transport infrastructure development, productive transformation, and socio-demographic change. Almost all these texts recognise to a lesser or greater extent, the relationship between increased travel distances and time, increased flow and diversification, and though socio-economic change particularly amongst a specific population group, the impacts of increased car ownership. Notably, more recent texts are constructed around the criterion of circular change or dialectics; all urban processes influence each other and are both cause and effect. A conceptual perspective that emphasises the reciprocal relationship between city, transport, and mobility (Miralles-Guasch, 2002).

Kaufmann, in contrast sees spatial mobility not as only a liaison between an origin or destination points but as a structuring dimension of an individual's social life (Kaufmann, 2006). Jirón believed that from this perspective, the idea of mobility connects to all the ways in which people as social beings relate to a change of place (Jirón, 2007). For Jirón, mobility is the sum of travels made and the distances of that movement, but also the expectations, experiences, consequences, and impacts that travel has on people's lives and how they affect mobility practices and daily living in urban spaces (Jirón, 2007). For a growing body of research that have been influenced by 'the mobility turn' in the social sciences, this new interpretation of 'mobility' demands a fresh approach to the study of urban environments.

This new agenda is most clearly seen in those works that focus on the inevitable impacts of all types of mobility on the organisation of contemporary everyday life (Hannam *et al.*, 2006; Cresswell 2006; Sheller and Urry 2006a; Sheller and Urry 2006b; Urry 2007). For Sheller and Urry (2006) this new perspective rejects the analysis of urban phenomena as static and unchanging. Instead, it attempts to understand how an individual's life does not occur in fixed localities but is played out in different places through the city. As Urry subsequently writes this new understanding is "...transformative of social science, authorising an alternative theoretical and methodological landscape" (Urry 2007, p.18).

Previously urban mobility studies had tended to focus on space-time movement rather than on the interactions between actors and their context. For Kaufmann (2002), this new approach to mobility meant looking at time and space, but also the identities of individuals and population groups. As Kaufmann writes: “Thus, we can assume that all mobility has repercussions on identity and, inversely, that identity is built on mobilities” (Kaufmann, 2002, p. 21). Kaufmann, Bergman and Joye later argued that under the hand of social science, spatial mobility should be seen as dependent on socio-structurally embedded actors within contexts that delimit, determines, conditions, or makes possible that movement (Kaufmann, Bergman and Joye, 2004).

This altered understanding led Kauffman (2002) amongst others, to seek a set of methods and conceptual tools that would enable research that would respect the role of actors within this new understanding of spatial mobility. Kauffman choose to focus on four main forms of mobility (Figure 2.2): *daily mobility*, *travel*,³ *residential mobility*, and *migration*. These forms of mobility are developed in specific social temporalities: days and weeks for daily mobility, the month and year for travel, the year and life course for both residential mobility and migration (Kauffman (2002).

These four temporalities have a specific context where mobility occurs, daily and residential mobility in urban areas and travel along with migration near the outside of the living area

Daily mobility - the focus of this thesis - is the study of the various daily trips people make to specific places in the city or specific territories to satisfy their economic or social needs. It is the form of mobility in which spatiality is the living area and reflects the spatial structural conditions at a specific time on the day. This daily movement reflects the population's lifestyles and characterises different living conditions in a specific urban context.

Travel or mobility for leisure - ‘tourism’ - occurs in a short period near or outside the living areas. Travel or leisure-based mobility activities are considered as the individual's need to escape from daily routines to have new experiences, and a desire for novelty and change is finally the driving force behind it. This last form of mobility is growing exponentially worldwide and is one of the most significant economic forces changing historic urban contexts related to the World Heritage Institution, amongst others.

³ V. Kaufmann used travel mobility until his last book in 2012, where the concept changes to tourism, trying to distinguish the differences between daily and travel mobility in a more precise way.

Residential Mobility is a longer-term form of mobility that is connected to ideas such as the course of a lifetime and has a similarly long-term effect on change within urban areas. Kaufmann (2012) understands residential mobility through changes in housing location changes within a given geographical area, focusing primarily on its causes, links, and consequences (Kaufmann (2012)). On the other hand, Bonvalet and Dureau (2002) pointed out that some of the leading causes of housing geographical location are related to three key factors: habitation mode, housing type, and location as a polysemic variable. This variable can be determined by economic factors or family networks, or friendships amongst others (Bonvalet and Dureau, 2002).

Studying the transformations of social life, places of work, leisure activities, family, and social relations that such choices produce provides an opportunity to understand the many ways of living that co-exist within the city. For Latin American cities, often the most crucial variable associated with residential location is the socio-economic condition of the individual and their family. Aside from its association with residential location, socio-economic condition serves to determined the range of opportunities available to an individual or a group of people. Although notably influential within many societies in the global south, socio-economic condition often gives rise to the fourth significant of form of mobility - migration.

Migration is another form of mobility measured by long temporalities, in a context outside the living areas that can be another city or country. Migration is crucial for understanding the transnational perspective of groups of families that have utilised spatial migration strategies to accumulate different forms of capital within the family unit (Flamm and Kaufmann, 2006). This form of mobility takes several forms including migration for studies, migration to find new employment opportunities, or migration to escape violence or war.

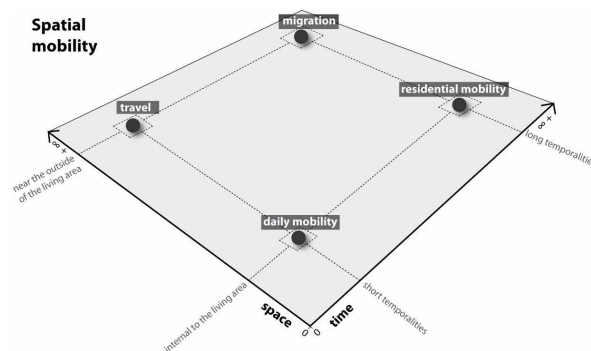


FIG. 2.2 Illustrates the four main forms of mobility identified by Kaufmann and highlights the form of mobility that is the focus of this thesis (Kaufmann, 2002, 2012). Source: Author

Flamm and Kaufmann (2006) argued that these different forms of mobility impact on each other. Those forms with extended temporalities exert a systematic impact on forms with shorter temporalities and consequently, an integrated approach is needed when trying to understand them. An example might be migration; a person or family that migrates to another city or country inevitably generates travels to see friends or family members left behind. Also, students who migrate to study in for short periods of their life, which can be 4 or 5 years, will invariably travel to visit family or friends, while parents may travel to see the places where students live.

The interaction of all forms of mobility presented by Kaufmann creates a system, and all of them are central in explaining the formation of an individual's social identity within a specific environment. Crucially Kaufmann's ideas conceptualise 'mobility' as a series of related processes that do not dissociate time, space from identity related to lifestyle (Tarrius in Kaufmann, 2002). This conceptualisation suggests that identity is inherently linked with mobility and such, mobility acts as a flux or the foundation for a mobile society. Kaufmann (2012) explains that many earlier spatial mobility studies assumed that an individual's behaviour is simply a consequence of rational economic action (Kaufmann (2012).

The 'mobility turn' in social science research therefore provides commentators with a new lens through which it becomes possible to see the ways that economics mix with many other factors like habits, routines, convictions, age, and even values affect mobility choices Urry (2000). Sheller and Urry (2004) have suggested that through this lens the convergence and blurring of time and space related to work, leisure, travel, and home might produce new pressures on individuals as they sought to manage fragmented time budgets and dispersed social contacts in more complex ways than previous work had allowed (Sheller and Urry, 2004). Such pressures are most evident in the ways that households increasingly have to develop and arrange several overlapping and sometimes competing mobility strategies to address a range of mobility needs within the household.

This which often results in more frequent and complex movements as generational needs vary within families. Such pressures become particularly relevant as these increased familial movements now more often take place over longer distances than previously. Alongside such changes in frequency and scale, people also seem to at the same time intensely local lives based on repeated movement between home, public transport, stations, and work. One of the significant characteristics of different mobility strategies employed by populations is that mobility is related to identity characteristics and contextual constraints all of which are strongly connected to their movement potential. The variable of identity therefore is characteristic of their mobility and the conditions of the city where people develop their lives and constitutes their mobility capital (Flamm and Kaufmann, 2006; Lévy, 2000; Urry, 2007).

2.5.1 An Operational Framework for Daily Mobility Research in Metropolitan areas

If as some commentators now suggest, spatial movement should be recast as a phenomenon that can take alternative forms, there is a need to take a more systematic approach to the study of mobility. Kaufmann (2002, 2012) has argued that an integrated approach is needed to reveal the nature of mobility in all four forms. As Kaufmann writes: “Such an approach rebuilds unity where different research fields and disciplines have previously scattered the pieces of the puzzle” (Kaufmann, 2002, p.40).

Kaufmann does however acknowledge the difficulty of working with all four mobility forms in operational terms (Tarrius cited in Kaufmann, 2002). Accordingly, in establishing a operational framework for this study, it seems sensible to focus only on the form of mobility that connects most closely to changes in the spatial structure at a metropolitan scale – daily mobility. This form of mobility is characterised by a specific temporality and usually develops in relation to living areas, which provides for a clear scope that encompasses both time and context. As such, the operational framework for this study is concerned with the daily mobility of individuals, communities or groups of people within the metropolis.

What is revealed from these approaches on daily mobility studies is that it is almost impossible to separate a person’s mobility from the mobility of others in a population because the one turns out to be entirely interlinked with the many. This interdependency, the ‘mobile communities’ suggested by Ascher (2004) and the “metropolitans” introduced by Soja (2004) confirms that groups of inhabitants share broadly similar daily mobility characteristics. Soja (2004) highlights that coalitions or groups of people recognise their social condition in how they move in the metropolis. This provides for a territorialisation based on shared mobility. A group of immigrants in a metropolis in the USA, for example, experience mobility differently compared to the native population. Soja found that such groups tend to concentrate in spaces with high densities and services but low investment in public transport (Soja, 2004).

Soja’s work highlights the potential for insight by undertaking studies of groups of people rather than trying to understand metropolitan mobility through the actions of an individual. This potential has been confirmed in more recent research into the labour-related mobility of a specific group of inhabitants. Considered in more detail in Chapter four, this work found that by moving the focus from the singular to the mass, it becomes evident there is not a variety of unique travel habits for labour purposes, but instead, the mobility of low-income group studied depends on a series of travelled directions (periphery-periphery, periphery-centre amongst others) (Soto and Alvarez, 2012).

2.5.2 Daily Mobility

Even though interest in other forms of mobility such as sporadic international or long-distance travel continues to grow, daily mobility; whether physical, virtual, or imaginary, remains the most significant form of mobility within urban analysis (Sheller & Urry, 2006b; Urry, 2007). Although virtual and imaginary mobility should not be entirely overlooked, for most people, social existence is still shaped by sporadic encounters between individuals that take place during physical trips (Offner, 2006). This intermittent co-presence and its effect on social identity means that physical daily mobility can provide insights into different aspects of urban life quality and characteristics. As Miralles-Guasch (2002) points out, mobility by itself does not permeate the city of qualitative assessments but gives it another dimension in terms of timing. The factors that will positively affect perceptions of the city however are determined by how mobility is planned, organised, and executed (Miralles-Guasch (2002).

In *City and Transport*, Miralles-Guash defined daily mobility as the sum of individual movements. She argued daily mobility is one of the most complex and relevant phenomena associated with contemporary spatial urban organisation (Miralles-Guash, 2002). As Jirón (2010) later pointed out the spatiality of daily mobility has been disarticulated by planners who are most often unaware of the sociological aspects of daily mobility patterns (Jirón (2010). Unlike earlier attempts to understand movement patterns within urban spaces, this approach to daily mobility tries to connect the social, economic, cultural, and spatial consequences of daily mobility to its actor's socio-economic identity. Under this framework, individuals support the different spatial-temporal dimensions produced by daily mobility in an urban metropolitan structure (Figure 2.3). This is evident in the social segregation and physical fragmentation commonly found in Latin American metropolises.

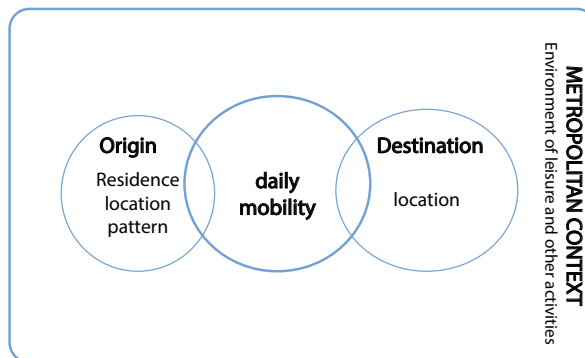


FIG. 2.3 Basic components of daily mobility. Source: Author; based on the scheme of mobility by Canzler, Kaufmann and Kesselring, 2008.

2.5.3 Spatial Dimension of Daily Mobility

Daily life and by extension, daily mobility has been changing dramatically since 1980. Flamm and Kaufmann, for example, have identified three critical changes in contemporary daily life which require different mobility strategies:

- A Having a flexible approach towards mobility has become essential to many forms of employment. Some researchers have noted, for example, the increasing role of informal work which has demanded both extensive and intensive changes to daily mobility patterns in metropolitan areas such as those found in Latin American countries.
- B The daily life of households has become more complex. It accounts not only for the differing needs of members of the household but also the greater variety of activities undertaken either individually or as a unit. The aspect of daily mobility must also encompass the difficulties encountered when everyday life spaces are located far apart from each other (García Palomares, 2008; Larsen *et al.*, in Kaufmann, 2006).
- C Technological and social innovations have constantly increased transportation and communication possibilities and in doing so have demanded new travel strategies.

To deal with these evolutionary changes to an individual's life and study their larger effects on spatial mobility, Kaufmann distinguishes actual mobility from possible actions of movements in the territory and named it *mobilité* or mobility potential (Kaufmann (2002). This departs from traditional ideas by scope of an individual's potential for mobility and how that potential is organised and translated into movement. As indicated in Figure 2.4 the spatial condition of mobility is related to the 'potential of movement' for individuals or groups of people. It is about how these individuals take ownership of the possibilities for mobility and builds on them to further enrich their lives (Flamm and Kaufmann, 2006; Lévy, 2000; Urry, 2007).

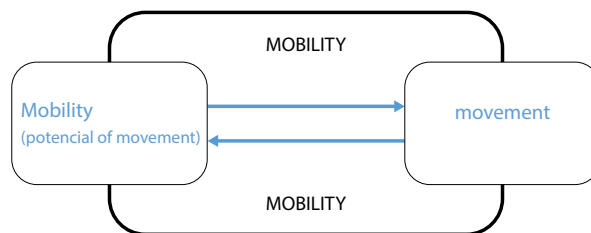


FIG. 2.4 Conceptualising mobility: scheme. Source: Author based on the scheme Canzler, et al., 2008.

The notion of mobility potential has an interesting paradox in that sometimes the action of people ends in immobility, although that outcome is also part of the process and strategies of mobility. An example might be the social routines of workers or students who end their labour time at the same hour of traffic jams and decide to stay in cafes (after an hour) or bars to circumvent such times. These are decisions of mobility and choice (not everyone can do it). Such examples of immobility might be labelled 'strategies of mobility', which in increasingly complex urban spaces may become another regular influence on the mobility potential of individuals.

For the young population, such as teenagers or university students living mainly in suburban and peripheral residential areas, the location can be an essential constraint for their young life (Cortes, 2014). With rising motivations for mobility farthest to their residence or different social networks created during their time at university, it often creates a dependence on the automobile. In this case, students dependent on their parents to drive them around. It spatially feeds a cycle that keeps the conduct of activities in the neighbourhood because they mainly decided not to move or moves once a day, encouraging with this decision the consolidation of urban forms that suffer from spaces for coexistence (Kaufmann, Jemelin, & Guidez, 2001).

2.5.4 **Conditions for Mobility as a Capital (Potential for Mobility)**

For some researchers, the capital for mobility – 'potential of movement' or 'motility' as Kaufmann labelled it, has become a decisive intervention in shaping an individual's social capital and may reduce, limit or promote it (Kauffman, 2002, 2006). Alternatively, Urry (2007) preferred the idea of 'network capital', which he defines as "...the capacity to engender and sustain social relations with those people who are not necessarily proximate, and which generates emotional, financial and practical benefit" (Urry 2007, p.197). The ideas of these two commentators coincide in Urry's belief that 'capital network[s]' are a "product of the relationality of individual with others and with the affordances of the environment" (Urry 2007, p. 198).

This forms the third element in the framing of this study - Capital for Mobility. This is the potential for mobility that encompasses all abilities and capacities to move or choose the way and extension (time-space) of that movement to preserve a lifestyle or configure one. Also, the concept of freedom deals with the potential for mobility. As Ascher has pointed out "...the more mobile we are, the more choices we have; the other side of the coin, though, is that we are also obliged to move in order to be able to choose" (Ascher, 2004, p. 356).

In some ways, Ascher is writing about freedom to select different forms of movement, but other researchers have instead claimed that the potential for mobility is fundamentally ambivalent (Bauman, in Kaufmann, 2012). Curiously perhaps organisations that defend private car usage have promulgated the car as an unequivocal vector of personal freedom, perceiving it as a positive value (Cervero, 1998). It can be said however that in some areas private car usage has risen because users have no chance to choose alternative means of transport and as such, private car use in such cases has nothing to do with freedom.

As Kaufmann (2006) has explained, the idea of 'potential for mobility' emerged during the 1970s from research into accessibility, a line of inquiry that had arisen from the transportation studies of the period. Written from an economic standpoint, Goodal regarded the minimisation of the disutility of travel maximises the satisfaction of a place or site, which sometimes means that a given site or place of interest offers a relative advantage over other options in terms of its accessibility (Goodal, 1977). But later Ben-Akiva and Lerman claimed this approach to accessibility was mainly developed as evaluative measure of a place's attractiveness and was concerned with the potential to offer opportunities and the resources necessary to obtain such advantages (Ben-Akiva and Lerman in Kaufmann, 2006).

In another sense, for Kaufmann, indicators of accessibility integrate the perception of accessible opportunities (Kaufmann *et al.*, 2004). The differences between 'accessibility indicators' and 'capital of mobility' or 'motility', are that the latter focuses more on an actor's actions or a group's action, mainly the reasons behind choices of tools and locations, without being concerned with the maximum utility of a given action. As such, 'capital of mobility' concentrates on how an actor builds his/her relationship with space or strategies for a specific lifestyle rather than just the possibilities and potential offered by a given territory ('accessibility indicators') (Kaufmann, 2006). If as Kaufmann argues, 'Capital of mobility' encompasses all the conditions that influence it, then Kaufmann has redefined the potential to be mobile in space as being dependent on physical capacities, aspirations, existing transportation, and their accessibility and acquired knowledge (Kaufmann, 2006).

Some of these conditions have also been addressed by other commentators, for example, Lévy (2000) or from Latin American perspective, researchers such as Figueroa (2005) and Jirón (2010). The studies of Le Breton, mentioned by Gutiérrez (2009), have for example, suggest that social marginality may also act as a condition of mobility in that for some individuals, marginality serves to define urban constraints, since those with more extensive access to the city are open to more opportunities.

Le Breton's perspective supports the view of researchers such as Gutiérrez, who have argued that an individuals' social-economic characteristics are relevant when exploring the potential for mobility in Latin American cities, (Contreras, 2011; Jirón *et al.*, 2010; Rodríguez, 2008). While the elements described above are interrelated and must exist to generate capital mobility, socioeconomic conditions are one of those elements that most directly determines the amount of capital that families, economic agents, or people provide for distribution. Research has clearly demonstrated that mobility increases as income increases (García Palomares, 2008).

The primary condition for mobility identified in these Latin American studies is the location of housing because in cities with segregated development patterns there is an association between socioeconomic conditions and spatial structures. As such, these studies reveal that the low-income population in Latin America is typically located far from the city centres without all the essential services in their vicinity, with low accessibility and public transport frequency. Housing location therefore plays a vital role in mobility capital in Latin America because mobility depends on the geography of opportunities and access to other territories where everyday life unfolds (Figueroa, 2005). In some cases, residence location is not consistent with the family's aspirations or decision-making but is instead imposed by aspects of the real estate market, something that affects both private and social housing. Individuals and household location strategies are generally based on strong travel mode preferences related to the general daily mobility context and to an extent, on opportunities and constraints associated with the real estate market.

The opportunities and difficulties associated with housing location in Latin America provides one reason as to why Kaufmann's construct 'Capital for mobility' provides perhaps the most useful way of exploring daily mobility within Latin American cities. Kaufmann considers an individual's 'options' to be the entire range of means of transport and communication, available range of services and equipment accessible at a given time. Kaufmann however particularly focuses on those options that are the conditions for mobility. As such, it is the options for accessibility that an individual has in terms of location-specific cost, logistics, and other constraints that are most foremost in his analysis. Kaufmann defines three main conditions for mobility, these are *Competence*, *Appropriation*, and *Access* (Kaufmann, 2006).

Competence includes skills and abilities that may directly or indirectly relate to *Access* and *Appropriation*. It means the physical ability and the acquired skills that together reveal the rules and regulations of the movement. Youth can be seen as a Competence for mobility and the importance of past experiences

Appropriation refers to how individuals, groups, or networks interpret and develop strategies for accessibility. *Appropriation* describes that which agents deem appropriate and lay behind the selection of specific options

Access refers to the range of possible mobilities according to place, time and urban constraints, depending on the spatial distribution of the population, and urban infrastructure, spatial policies (e.g., transportation and accessibility), and socioeconomic conditions influenced by options and conditions

Focused on the Latin American context, this study emphasises Kaufmanns' view of *Access* as a necessary condition for mobility, based on factors such as housing location, and socioeconomic conditions. It is important to highlight however that Kaufmann identifies a multitude of factors serve to shape an individual's conditions for mobility. Looking at the function of travel, for example, there are many essential factors, such as independence, cost, safety, reliability, comfort, and quality of service. Kaufmann also identified a series of more subjective factors such as travel routine or daily mobility, regularity, and temporal flexibility as significant factors in shaping the 'conditions' of mobility (Kaufmann (2006).

2.6 Conclusions

Earlier Latin American research on mobility within metropolitan areas focused on the quantitative analysis of movement to facilitate and anticipate future need in particular locations. This approach is consistent with the territorial model of urban sprawl but as one consequence highlighted the need for constant production of transport infrastructure. This thesis aims to show that for the Latin America context, the metropolis's urban spatial and structural characteristics are reflected in the form of daily mobility of their inhabitants and through their mobility, and in particular forms of lifestyle. It aims to overcome the dominant causality paradigm of transport in order to introduce a dialectic perspective, one which demonstrates a reciprocal relationship between the city, transport, and mobility. In revealing this relationship, the temporal, spatial, and social or identifying characteristics of specific populations are highlighted (Mirallas-Guasch, 2002).

Despite past European influences, the urban spatial structure of Latin American cities now seems to owe more to North American ideas about urban spaces. Unlike the North American model, Latin American metropolises are often characterised by physical discontinuity and segregated spatial structures leading to a degree of fragmentation between different territorial units based on leapfrog developments. Further, unlike its North American counterpart, suburban development in Latin America is affected by differences between low and high socioeconomic conditions, being mainly differentiated by their location, density, and accessibility, among other essential features. Fischer has suggested that this has resulted in an urban structure which is isolated and dismembered, that can only be recomposed and reunited by an increment of mobility since fragmentation and spatial imbalance generate a growing need for interconnection (Fischer, 1995).

The discussion therefore centres on two characteristics of Latin American urban sprawl, that together influence mobility: the generalisation of low-density suburban development and the limited ways in which land is used in peri-urban areas. In such a scenario, urban movement within such metropolitan spaces have continued to multiply. Individual trips have become more abundant than before, increasing in their number. The motives for moving are becoming more diverse, and the distances travelled are increasing due as cities expand into previously rural areas.

The notion of mobility as related to urban studies has previously tended to focus on travel flows, measuring time and distance. This form of mobility study focuses on the various daily trips people make from the highest concentration of housing locations to labour centres, mainly from the periphery to certain places in the city or specific territories, to satisfy their needs. The problem is that such studies do not tend to recognise the diversity of population groups in the city, primarily those that organise their lives around the historic centre of the metropolis. Also, those studies do not focus on the characteristics of these actors that move into, out of and through cities.

Yet, as more recent sociological studies have suggested, daily mobility is not only a liaison between an origin or destination point but a structuring dimension of social life in all the trips a person does during the day. Latin American researchers have since added to this model arguing that for the Latin American context, the social-economic conditions of individual have a particular significance. As such, factors that influence 'access' such as housing location and socioeconomic condition of the specific group being studied should be considered (Contreras, 2011; Jirón *et al.*, 2010; Rodríguez, 2008). In this study, this argument will be addressed through the study of daily mobility patterns using the mobility paradigm suggested by Kaufmann which places a particular emphasis on the notion of access but does not dissociate time, space, and identity in the way that earlier mobility studies did.

Kaufmann's 'Capital for Mobility' be used to assist in the analysis of daily movement patterns associated with specific groups of people. 'Capital for Mobility' is concerned with the abilities and capacities to move or choose the way and extension (time-space) of that movement to preserve or configure a lifestyle. This conceptual and operational framework references primary three conditions for mobility that together create an individual 'Capital for Mobility'. These are *Competence* that deals with physical skills, and *Appropriation* related to strategies for movement influenced by motives, aspirations, and needs and finally and perhaps most importantly in a Latin American context, *Access*, a condition that is strongly connected to the constraints of a particular urban setting – in this case, the Valparaíso Metropolitan Area.

3 Urban Mobility in Metropolitan Development

The Case of the Valparaíso Metropolitan Area

3.1 Introduction

One of the most critical determinants behind the daily mobility patterns of higher education students is the metropolitan spatial structure in which they move. Therefore, it is important to acknowledge the specific characteristics of the Valparaíso Metropolitan Area and the mobilities that its spatial structure creates. Although there are some features of the Valparaíso Metropolitan Area that make it significant per se, the area has some characteristics that are reflective of its position within the wider region.

The Valparaíso Metropolitan Area is part of the country's central macro-region and is located near one of Latin America's ten largest metropolitan areas, Santiago. As such, it is important not to view the Valparaíso Metropolitan Area in isolation, but to recognise that some of spatial and structural challenges are echoed in other Latin American metropolitan areas. Although perhaps not a complete list, De Mattos (1999) has identified aspects of metropolitan expansion, polycentrism, suburbanisation, social polarisation, residential segregation, and fragmentation of urban structures as being particularly important in the Latin American context (De Mattos, 1999).

This study will consider three key dynamics: production transformation, changes in the population's socioeconomic distribution, and the accelerated development of transport infrastructure within the region. All three dynamics have been shaped by the area's history but are maintained on endogenous factors related to a range of economic, political, and social urban pressures. These internal and external pressures and influences, together with specific spatial and topographical challenges have underpinned the development of a complex pattern of interconnected and interrelated mobilities. This raises the question, how do long-term changes within the spatial structure of Valparaíso Metropolitan Area influence mobility within the area, and conversely, what affects do changes in urban mobility have on the spatial structure of the Valparaíso Metropolitan Area?

3.2 Mobility and Urban Development in Complex Topographies

In approaching this Janus-faced question, the first consideration is perhaps the complex topography of the territory. Across the Valparaíso Metropolitan area steep slopes and a generally hilly terrain have tended to exacerbate the spatial discontinuity and physical fragmentation of its urban spaces. This has had a profound effect on mobility within the metropolis (Peters and Skop, 2007). The extended coastline of Valparaíso Bay forms a narrow strip of flat land that contains the majority of the metropolitan transport network. This concentration of transport resources highlights the relative absence of transport infrastructure networks connecting the hills of the metropolis at different levels and tends to concentrate mobility along the coastline. In many Latin American cities progressive urban expansion has occurred in areas of high agricultural, ecological, and landscape value but also geological vulnerability (Soto and Escobar, 2016).

The fragmentation, residential segregation, and social polarisation which result from such growth are often compounded by the very complex topographies within which they are located (Soto and Álvarez, 2012). Latin American cities and metropolises like the Valparaíso Metropolitan Area are often located in areas of high topographical complexity, which can be understood as one that integrates diverse constituent elements of the landscape morphology – plains, hills, plateaus, ravines, cliffs in between others – and where the essential characteristic is a discontinuity. Pérez de

Arce has highlighted the way in which the geomorphological conditions in such areas can create abrupt and irregular variations in slope, alter the character of buildings, affect property divisions, and make access more difficult (Pérez de Arce, 2009).

Once consequence of such conditions is that poorer housing is frequently located on the metropolis' outskirts in areas where land is cheaper than more favoured territories and access is more problematic. The social differentiation that results is often reflected in a spatial organisation associated with a centre-periphery opposition, since poorer areas tend to become progressively more isolated due to poor connectivity with thoroughly degraded central areas. Such conditions are now notably characteristic of many Latin American cities (De Mattos, 1999; Janoschka, 2002; Rojas *et al.*, 2013).

Herce has drawn attention to the way in which the pace of change in such areas since the 1950s has been influenced by adoption of new communication and information technologies. These technologies have both inspired and facilitated a continued growth in the demand for improved mobility. New infrastructure, mostly related to private transportation's rapid development, has fostered urban sprawl, creating further ever-increasing appetite for mobility (Herce, 2009). The new mobility patterns that have grown up include trips for a broader range of purposes and in more directions, moving beyond the pendulum-like trips (García Palomares, 2008). This technologically led expansion in mobility within geomorphologically difficult and discontinuous landscapes also leads to an increased reliance on the automobile, which is expensive and environmentally unsustainable and offers unequal access to jobs and services (Calatayud, Roca, and Martínez, 2006).

Although this iniquitous association between technology, mobility and access to jobs and services is relatively common within Latin America metropolitan areas, there is a relatively little literature that addresses this problem. One possible reason for this lack of research is that urban expansion processes in Latin America tend to be with associated uncontrolled, unplanned and therefore largely undocumented urban development. An absence that is perhaps surprising given that it is well-recognised that such undocumented urban development often leads to severe social exclusion problems, degradation, and a lack of necessary infrastructure in the emergent informal settlements, something ultimately affects the entire metropolis, (De Mattos, 2002; Oviedo Hernandez and Titheridge, 2015).

More broadly, the process of expansion and consolidation of urban space within geomorphologically difficult areas depends on the establishment of accessible infrastructure networks. Indeed, as Hillier, Greene, and Desyllas have suggested "... spatial and locational factors, especially the layout of a settlement and its relation to

the urban context, play a major role in the pathway of development for settlements and the different degrees to which they have become consolidated” (Hillier, Greene, and Desyllas, 2000, p. 62). Herce pointed out, this complex of dynamic and interlinked processes begins to restrict accessibility from outlying settlements, an unintended consequence that disproportionately affects underprivileged groups, continued urban growth, and the population density of the inner metropolis. At this point, individual and collective mobility becomes more difficult and unattainable instead of an urban right (Herce, 2009).

This highly contingent process of urban expansion and development is however equally dependent on periods in which no significant investments in urban infrastructure are made. As the pressures for improvement grow to the point where action is thought necessary, the scale of the eventual intervention along with the level of technology necessary to execute it, becomes far more significant. This substantially increases the cost of updating the infrastructure and therefore puts the possibility of a holistic approach to urban development farther out of reach. As León has argued, the topographic complexity of the territory can eventually exhaust the urban-infrastructure development cycle, pressing some of these factors so hard that it becomes tough to re-energised it (León, 2013).

3.3 Valparaíso Metropolitan Area: Geographical and Historical Influences

Part of the Valparaíso Region, the Valparaíso Metropolitan Area is located on the Pacific coast of Chile, some 110 km west of Santiago, the Chilean capital. According to the 2017 census, the Valparaíso Metropolitan Area has a population of 951,311 inhabitants. In terms of its topography, the metropolis takes the form of a large natural amphitheatre set along an extended bay and surrounded by hills. These hills are largely autonomous territorial units, not all of which reach the low-lying area; those that do descend abruptly, forming a sort of continuous “cliff face” with a height of around 50 meters (Salinas, 1967, p. 7). Some hills have elevations of approximately 40, 110, and 200 m.a.s.l. (meters above sea level) (Sánchez, Bosque, and Jimenez, 2009).

Now holding the status of a World Heritage site, the development of Valparaíso was profoundly influenced by the topography of the area (Figure 3.1). The Valparaíso Metropolitan Area is one of three metropolitan areas in Chile, the largest of which is Santiago, with almost 7 million inhabitants, followed by Concepción, with a population of more than 2 million. With a population of almost 1 million inhabitants, it is the third-largest metropolitan area (2017 census). The Valparaíso Metropolitan Area comprises five communes – Valparaíso, Viña del Mar, Concon, Quilpué, and Villa Alemana (Figure 3.2) – the first three coastal cities.



FIG. 3.1 Geography of the VMA. Source: Google Earth Images

The city of Valparaíso is the historic centre of the metropolis based around what has become the central Chilean port. Today services such as housing, and tourism are concentrated in Viña del Mar; Quilpué and Villa Alemana (interior cities). These interior cities are mainly residential in character, whilst Concón is a newly developed city space largely dependent on speculative activity and contains many second homes.

More broadly, the Valparaíso Metropolitan Area is part of the Central Macro-Region of Chile, which is composed of three contiguous regions between which there is an intensive economic exchange. These are the Valparaíso (5th region), O'Higgins (4th region), and Santiago (Figure 3.3). The Central Macro-Region currently accounts for more than half of Chile's population and almost 60% of its GDP. As such, the Central Macro-Region has an important role in the Chilean industrial and service sectors (63% and 75%, respectively) and generates more than a third of national agricultural and mining production (Central Bank of Chile, 2017). The Santiago Metropolitan Area and the two adjacent regions concentrate 47,9% of Mercosur exports (Figure 3.4), leading Daher (2003) to assert that the Central Macro-Region is the Chilean Mercosur⁴ economy (Daher, 2003).

The proximity of the Valparaíso Metropolitan Area to the capital city (115 km) encourages the development of multiple political and economic interregional relationships within an area that since 1992 has seen significant state intervention. Such interventions have included significant investments in road infrastructure. Designed and developed at a regional level, this new transport infrastructure brought Santiago Metropolitan Area and the Valparaíso Metropolitan Area closer – areas that together account for over 40% of the country's population. The nature of the interventions made and designed at regional level have led to suggestions that certain urban developments in the coastal cities are essentially meant to fulfil the needs of Santiago residents. An example of such externalities is the strong market for second homes all along the coast of the Valparaíso Metropolitan Area, which according to Borsdorf, Hidalgo, and Sánchez has become "...the favourite place for the second homes of rich Santiago citizens" (Borsdorf, Hidalgo, and Sánchez, 2007, p. 371).

⁴ The Southern Common Market (Mercosur) is composed of Argentina, Brazil, Paraguay, Uruguay, and Venezuela. Its partner countries are Bolivia, Chile, Colombia, Ecuador, and Peru. The Mercosur establishes free movement of goods, services, and production factors between countries, a common external tariff, free movement of people, the adoption of a common trade policy, coordination of macroeconomic, and sectoral policies among all interested parties and the harmonisation of laws in order to strengthen the integration process.

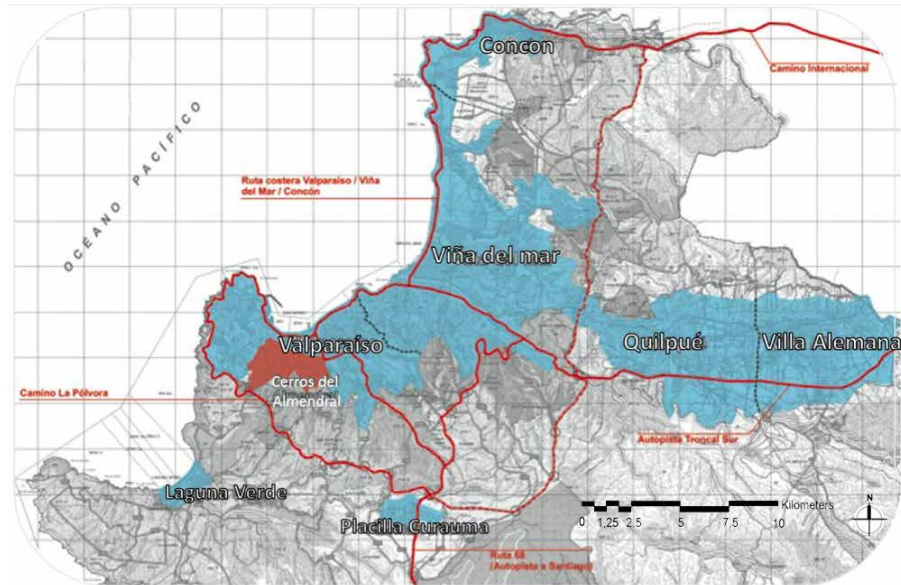


FIG. 3.2 Valparaíso Metropolitan Area and its five communes. Source: León, 2013.

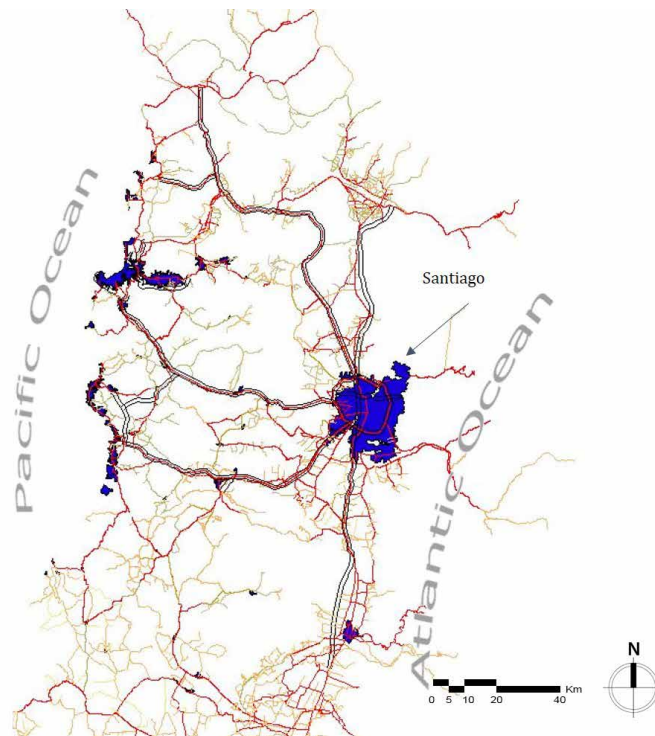


FIG. 3.3 The Central Macro-Region of Chile. Source: Alvarez, 2006.

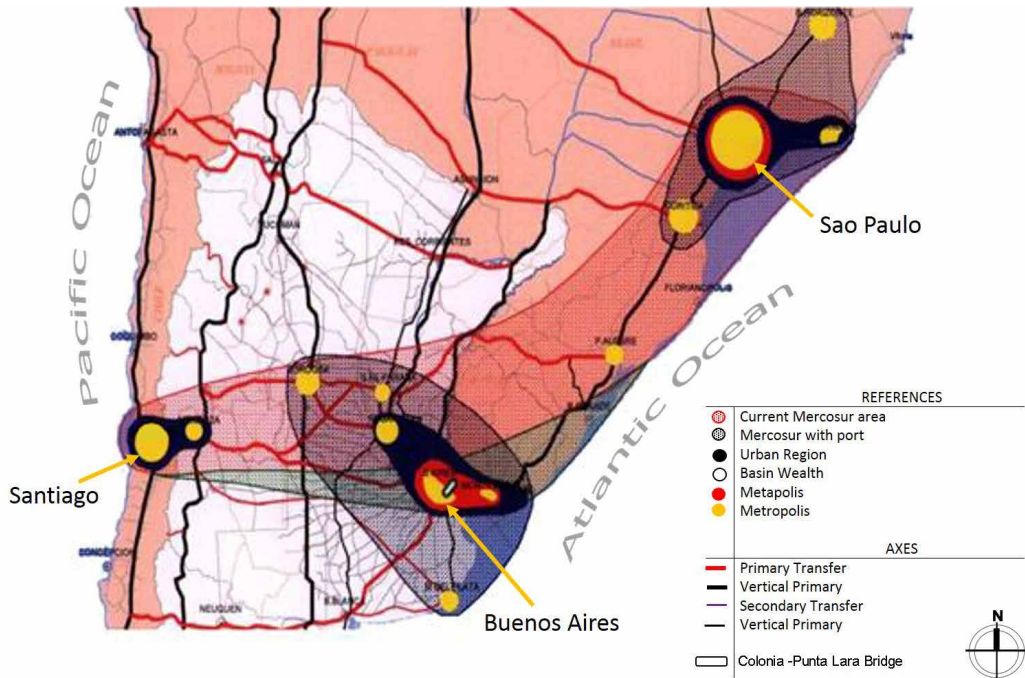


FIG. 3.4 Mercosur trade routes, with Santiago and Valparaíso forming the node on the Pacific Ocean. Source: Author

Despite such regionally inspired and relatively limited external interventions, the Valparaíso Metropolitan Area is associated with several historical urbanisation processes beginning with expansion around the original port city at the beginning of the 19th century. More recently, changing demand for internal urban mobility and macro-external influences such as economic globalisation has had a much greater influence on Valparaíso Metropolitan Area. In terms of the areas' infrastructure, there are three key periods of development that are associated with specific changes. These are a period of implosion or concentration (internal urban growth) in the pre-industrial period, an explosive development phase that was associated with industrialisation and a period more associated with post-industrial urban expansion which has led to the emergence of the current metropolitan system.

3.3.1 The Pre-industrial City: Urbanisation by Implosion (1810-1914)

One of the most distinctive features of urban development within the Valparaíso area is its apparent spontaneity. As an urban space, the city Valparaíso does not have a recognisable foundation point, or even a layout typically created by colonial authorities as was the case in many other Chilean and Latin American cities. Instead, Valparaíso has grown up through the opportunities and resultant economic activity provided by its port. Growth was timid and sporadic in the early years⁵, but following the country's independence in 1810, development around the port has proceeded with an overwhelming force that has brought about exponential population increases and economic growth (Ortega, 1987).

Another distinctive characteristic of Valparaíso is the site where it is located, something that sets Valparaíso apart from other port cities that have undergone similar historical cycles. A bay surrounded by a chain of 42 hills that form an amphitheatre, the slopes of which are bound by a narrow strip of flat land bordering the sea. This unique topography held many advantages for the early development of port activity (namely, abundant water and wood, the protection of the bay from the prevailing southwest swell, the depth of the water, allowing large ships, and the ease of installing batteries in the hills to protect the bay from pirates in between others).

This topography however also served to slow or prevent the establishment and development of other activities within the nascent city space, from more general industrial activities to the construction of housing. The city was initially agglomerated and organised in such a way that its inhabitants were able to live near each other and to their place of work. During the eighteenth and nineteenth centuries, 'in-place' population growth served to determine the form of the area. Those who lived at the top of the hills were connected to the hillsides' workers and the ravines. The hill was a socially stratified area; inhabitants of modest means occupied the ravines and the hillsides, while the top belonged to a wealthy, segregated social group, most of whom were immigrants, which needed the workforce below (Alvarez *et al.*, 2009).

⁵ Valparaíso was founded in 1536, and with the onset of shipping routes around Cape Horn in 1616, it became a flourishing world port for navigation between Europe and Asia.

Therefore, with respect to daily mobility patterns within this city of ‘implosion’, everyone walked, going from the house at the top of the hill to the hillside where the stables, small farms, and informal workers’ houses were located. Draft animals and people on foot were central to activities of within the early city of Valparaíso. The city’s nature did not allow any other transport system, and generally the population found it unnecessary to travel much outside the city of Valparaíso. For example, going to the flat area (Almendral) was an exceptional event, not an everyday occurrence because daily life unfolded on a reasonably small scale. Therefore, the residents’ daily activities tended to unfold within a radius of 1,7 kilometres, the maximum distance from their homes to the city’s commercial area (Alvarez *et al.*, 2009).

In pre-industrial Valparaíso, manufacturing within the city space was relatively primitive as trade and related commercial activities were more dominant. Founded in 1536, early Valparaíso was originally only composed of the port infrastructure. Those people who had decided to live in the area around the port of Valparaíso who tended to settle in the hills, far away from each other. When Chile’s independence was finally proclaimed in February 1818, the country’s policy of trade liberalisation helped to boost economic activity in the area around the port of Valparaíso as the new authorities in Santiago preferred to raise funds through taxes on foreign trade.

The urban and commercial clutter brought about by the sudden increase in activity in and around the port of Valparaíso forced the approval of ordinances in 1822, 1823, and 1824 covering the installation of new private cellars and bonded warehouses. The designation of these new spaces meant goods could be deposited pending sale within interregional or international markets (Vásquez, Iglesias, and Molina, 1999). These actions brought order to the commercial activities of the city and served to attract more ships and more trade. This then laid the foundation for the “spontaneous” urban growth that would turn Valparaíso from a small creek town to a major port and eventually, one of the foremost commercial centres within the country.

The port infrastructure in Valparaíso was somewhat precarious during the eighteenth century, but in 1840 two ships weighing 700 tons arrived in the port which together would form the backbone of the Pacific Steam Navigation Company’s operations. By 1860, this single company would own 23 ships and cover the entire Pacific coast, a commercial dominance that would consolidate shipping routes around Cape Horn. Pacific Steam Navigation Company’s growth also meant that city of Valparaíso became an essential point for loading and unloading goods, not only for domestic consumption but also for neighbouring countries like Argentina (in its western and northern provinces), Bolivia, and Peru (Vásquez *et al.*, 1999).

Although Vásquez, *et al.*, (1999) have highlighted the importance of implosion as crucial to the development of Valparaíso at the beginning of the nineteenth century, there was also an incipient process of urban expansion. This expansive process was supported by the growing influence of the steam engine. The second stage, up to the end of the nineteenth century, was marked more by urban consolidation. This was manifest in a range of technical and commercial advancements which tended to concentrate the population in specific areas, changes that were supported by new public services many of which were enabled by the new steam locomotives. The use of steam engines therefore added a new kind of energy to the city's development.

By 1850, some key transformations had taken place. The most substantive spatial change in this period was the increasing influence of European ideas on urban planning. These included ideas taken from the European Garden City movement (Figures 3.5, 3.6, and 3.7). In organisational terms, the city had taken a significant step by beginning the construction of the Valparaíso and Viña del Mar railway in 1857. This line was later extended to Santiago in 1863. The new railroad encouraged and enabled the colonisation of distant areas and construction in the suburbs. During that period in Chile, there were suburbs in three cities: Valparaíso (with Viña del Mar as its suburb), Santiago (with Providencia), and Concepción (with Pedro de Valdivia). Viña del Mar (the nearest city to the bay) had only three streets – Valparaíso, Quillota, and Limache – the names of which referred to their end destinations, meaning that they did not make up an agglomerated area, but instead were just toponyms.



FIG. 3.5 Valparaíso 1888. Source: "Album: Views of Valparaíso," Félix LeBlanc.



FIG. 3.6 Valparaíso 1882. Source: Painting, Thomas Somerscales.



FIG. 3.7 Valparaíso 1888. Source: "Album: Views of Valparaíso," Félix LeBlanc

3.3.2 Transportation Systems and Urban Development

As the construction of a railway between Valparaíso and Viña del Mar demonstrates infrastructure investments have historically played a central role in the expansion of urban Valparaíso. Not least arising from the difficulties associated with the complex topography of the area, the importance of such investments is reflected not only in the creation of the area's technical networks and services but also in the way such investments shaped the daily activity patterns of its residents. Valparaíso's robust economic activity depends on the frenetic daily movement of goods and people through a what quickly became a convoluted transport infrastructure network. Urban mobility in Valparaíso was therefore shaped by three influences, a period of explosive urban expansion followed by a perhaps inevitable period of concentration through mechanisation and a continuing period of optimisation.

Public transport within the city of Valparaíso was introduced in 1855, with the opening of the first stretch of railroad to Santiago, between Baron Station (at the port) and El Salto in Viña del Mar. The arrival of the railroad in El Salto would be the starting point for the rapid development of Viña del Mar. As Dupuy (1998, p. 48) points out, such networks are first installed where they find their technical or economic justification, but they then become capable of inducing new urbanisation patterns and creating higher property values. Tarr (1984) agrees with Dupuy, highlighting the way that urban infrastructure development is a non-linear process of increasing technological progress.

According to Tarr (1984), modifying a given place's natural conditions will contribute to adequate living standards to an increasing number of inhabitants. From an historical perspective, Tarr suggests that this process is expressed in successive, overlapping stages of development. Tarr first highlights the need to provide primary hygiene conditions to the population (drinking water networks, sewerage, and rainwater and urban waste disposal) before citing an increasing desire to achieve adequate levels of mobility for people and goods (above and below-ground railroads, streets, and highways) Tarr (1984).

Two significant infrastructures were needed during the nineteenth century that were critical to the form of urban space in and around Valparaíso, those relating to mobility and the comparatively hidden infrastructure relating to health services (León, 2013). The first and most notable step in the development of these two inter-related infrastructures was the reclamation of land from the sea (Figure 3.8). During the nineteenth and early twentieth centuries, systematic in-filling was conducted using a large amounts of material extracted from the hillsides. The origins for this reclamation activity lay in the growing economic significance of the port, which triggered an explosive demand for new urban land well located for trade port activities and increased mobility in and around the port all of which served to expand the city's narrow "plan" by about 65 hectares (Texidó, 2009).

The second significant step was the creation of a sanitation infrastructure during the second phase of industrial development between 1897 and 1928. The provision of drinking water for the hills (from the Peñuelas reservoir) starting in 1901 was achieved by a culvert between the "plan" (flat area) and the future Camino Cintura (the horizontal road that crosses the city through the hills at the height of +100 m.a.s.l., opened in 1927). This new infrastructure connected the hills between the ravines, where the rainwater flowed, a process concluded in the construction of avenues that connect the hills with the flat area of Valparaíso. This proved was crucial to the formation of the city's incipient road network.

Urban growth and consolidation rely heavily on the establishment of such infrastructure networks and the increasing scale and coverage of technological interventions. These tend to have positive effects on different aspects of the city space. The development of integrated transport (Figures 3.9 and 3.10) during the early 20th century for example created transport modes that enabled the development of new land mass reclaimed from the sea. Alongside such functional changes, new spaces were created. Inspired by the European garden city movement, the new spaces were shaped for example, the planting of palm trees along Brazil Avenue - today one of the leading educational corridors in the downtown area.

Although the city's perhaps most significant economic activity took place close to the shore, smaller-scale industrial activity developed in the flat areas near the hills; thus, people worked in the flat area and lived in the hills. This lifestyle was promoted even further by the introduction of funiculars beginning in 1883 that used steel cables. This was made possible by counterweights created from remnants from the railroad (Figure 3.12). This novel mode of transportation created a new relationship between the hilltops and the flat area, in which port activity was concentrated. The funiculars' upper stops show how far the city had grown in the early 20th century, growth that was consolidated by eventual installation of 31 funiculars running throughout the city.

By the beginning of the 21st century, nine funiculars continue to operate, while the Ministry of Public Works (Nº 30126535-8) is carrying out a restoration project to restore nine of the remaining 16 funiculars, which would benefit 39,000 inhabitants (Figure 3.11). The funiculars are therefore perhaps not only emblematic of city's heritage but also important as current mode of transportation for a substantial portion of its population. The integrated public transport network that eventually grew up, as seen in Figure 3.9, was composed of (1) the train that connected the cities of the bay (interurban rail), (2) the funiculars that connected the flat area to the first urbanised hilltops, and then (3) the tram that ran throughout the residential areas of the hills and the flat area of the city, called Almendral.

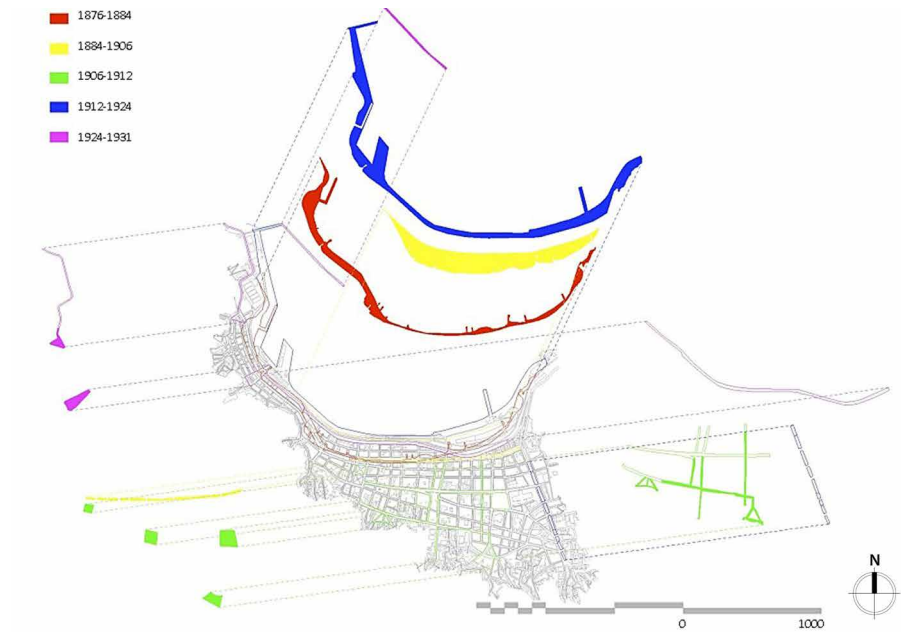


FIG. 3.8 Waterfront developments in Valparaíso. Source: Alberto Téxido, 2009.

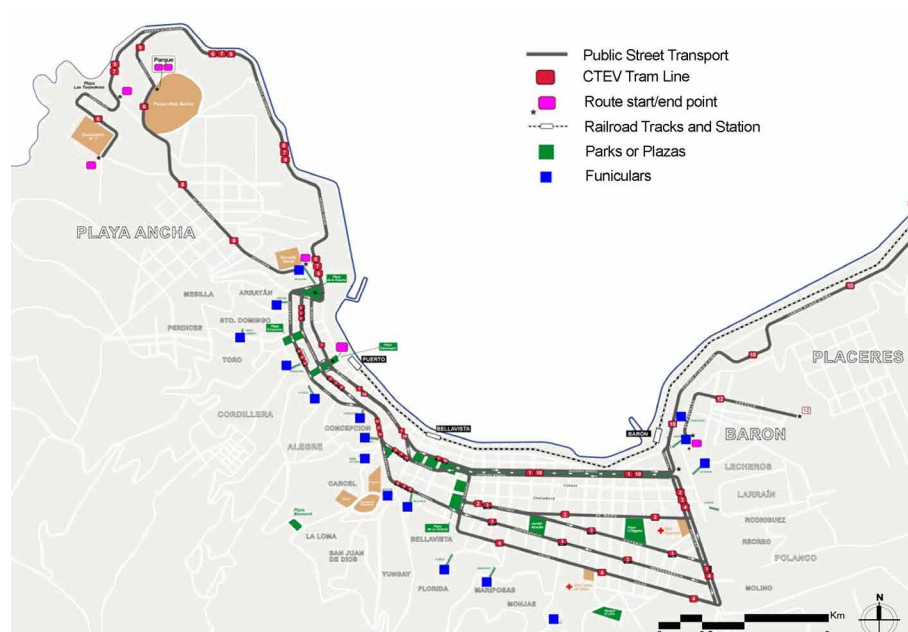


FIG. 3.9 Valparaíso's Public Transport Network, 1910. Source: Author, based on the Map of the International Publishing Society (1992).



FIG. 3.10 Public Transport Network, Viña del Mar, 1910. Source: Author, based on the Map of the International Publishing Society, 1992.

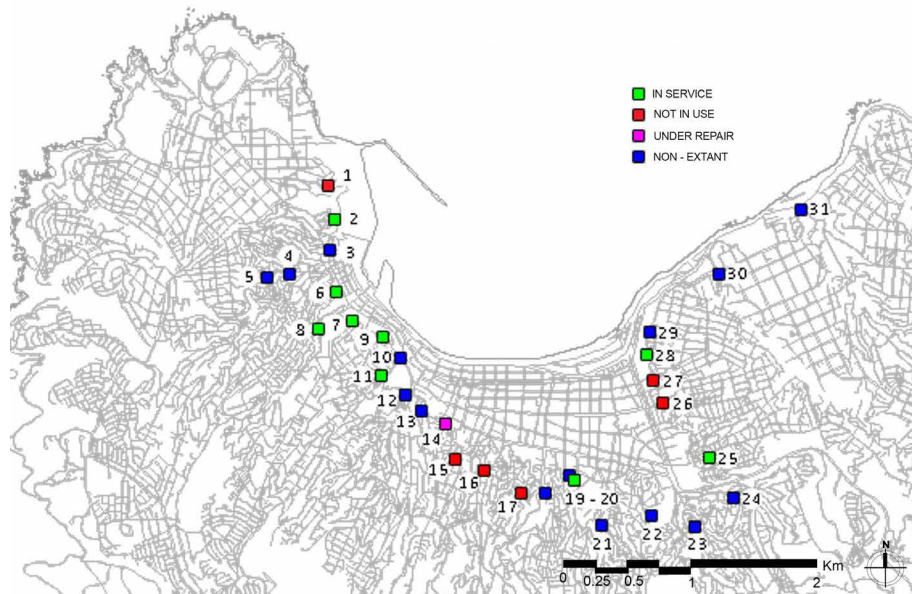


FIG. 3.11 Funiculars in the first half of the 20th century, reaching the first plateau of the Valparaíso hills. Source: Author, based on "Funiculars" (PHP), 2010.

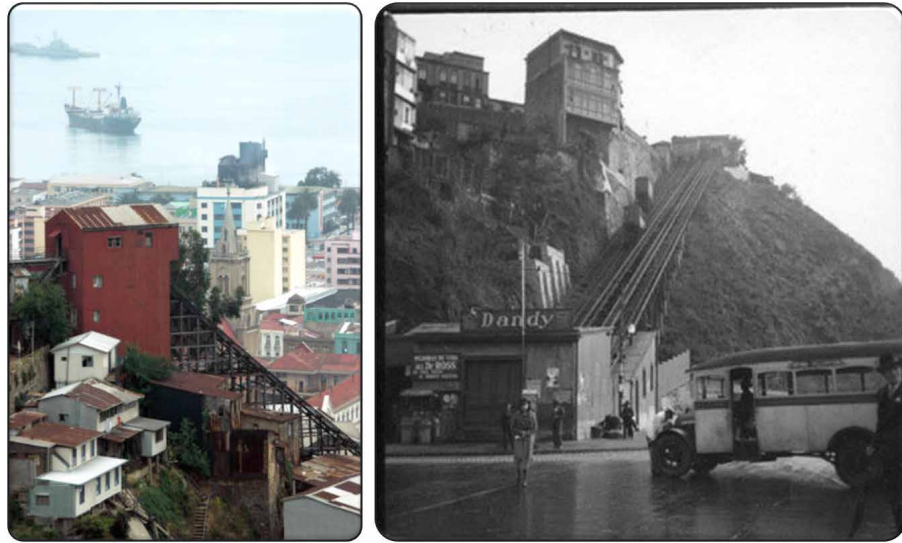


FIG. 3.12 Funiculars of Valparaíso: Monjas (current photo), built in 1912, and Artillería (1938 photo), built in 1892. Source: Historic Volume 2010.

3.3.3 Industrial City: Urbanisation by Explosion (1914 -1980)

In 1920, Patrick Geddes coined the concept “conurbation” to refer to residential suburbs in London. Similar urban growth patterns had occurred in Chile by 1881, but the result was considered an industrial suburb (Ortega, 1987). The complex topography and economic focus of early Valparaíso meant that the city had not reserved land for industry. Thus, Viña del Mar, the neighbouring city, which had been made up primarily of haciendas became an industrial suburb of Valparaíso in 1855. Since the late 19th century Viña del Mar had been considered part of the port, but the completion of a railway between Valparaíso and Viña del Mar in 1857 meant it became more of an industrial suburb.

The new railway provided a relatively reliable pathway between Valparaíso, the residential area and Viña del Mar, the industrial workplace. Considering that the train could not travel through hills, it represented a linear conquest of the territory. Valparaíso provided the labour while Viña del Mar provided the territory for new industrial development, although by this time, Valparaíso had also developed some industrial areas on the waterfront and in lowlands between the hills.

In terms of daily mobility however, the first pendulum movement therefore was between the two cities, and this polarised pattern of mobility had become firmly established by 1881. The development of the port not only goods brought but also external cultures and ideas for the new residential developments. Again, inspired by the European garden city movement wealthy families attempted to fulfil a European-inspired idyll of living in places distant from the city surrounded by nature (Figure 3.13). Through into the first half of the twentieth century, the economy of Viña del Mar shifted decisively from its foundations as a suburban industrial area towards a future which it was more dependent on residential developments and tourism. This shift in which Viña del Mar became a residential and tourist hub was based on further improvements to train and road infrastructure that served to connect it more firmly to Valparaíso, Santiago and the rest of the country.

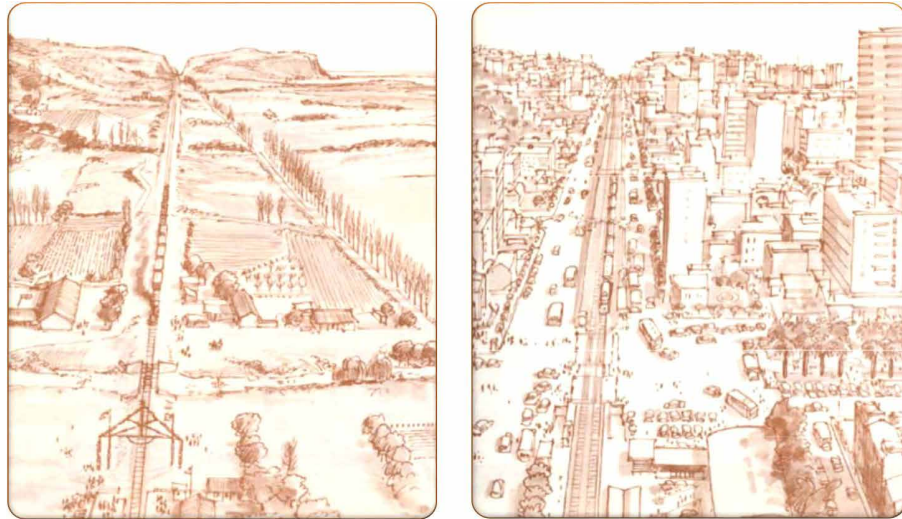


FIG. 3.13 In less than a century Viña del Mar changed from an industrial suburban area of the port to a mid-sized tourist city characterised by a rapid urbanisation process. Source: Silva, 2007

The Great Depression of 1929 affected the economy of Chile badly, becoming one of the most affected economies in Latin America. As Bravo (1987) states, the country's foreign trade fell by 71%, and all its production sectors (agriculture, mining, industry, construction) deteriorated. As a port city and almost entirely dependent on trade, the effects of the Great Depression on Valparaíso were acute. Not only did trade fall, but nationalist policies implemented in response to this global crisis now replaced the earlier import-centred policies that had encouraged the rapid growth and expansion of the city of Valparaíso.

Despite such nationalist interventions in the outward looking economic model that had first inspired the city's expansion, during the nineteen-thirties, largescale infrastructure interventions that started with the railroad continued. These included the first paved road in Chile, "El Olivar," between Viña del Mar and Quilpué (Guzmán and Jerez, 1990), and new manufacturing facilities amongst the emerging housing settlements in the Viña del Mar conurbation. Heavily associated with the further development of the area's railway network, the new industrial conurbations that had arisen around Valparaíso eventually became dormitory communities within the emerging metropolitan area. During the 1930s, for example, Quilpué and Villa Alemana, cities in the Marga-Marga Valley had grown to 26,066 and 14,303 inhabitants respectively, while Viña del Mar had 91,908 inhabitants (National Census, 1934).

The 1960s mark a decisive milestone in the growth of the emerging Valparaíso metropolitan area. Firstly, the earthquake of 1965 triggered a housing deficit in the city. Almost simultaneously, in 1968 the Las Vegas aqueduct began to operate. This aqueduct brings water from the Aconcagua River, located about 20 km north of the city. The opening of the aqueduct meant sanitary services could be substantially improved in the areas through which it runs. The primary beneficiary of this development was the neighbouring city of Viña del Mar, which benefitted from state building incentives. These state incentives were used to develop most of the neighbourhoods in the upper plateau (Miraflores Alto, Achupallas, Santa Inés, and Gómez Carreño), where 75% of its population now lives (Figure 3.14).

These developments meant that Viña del Mar became the commune responsible for obviating most of the housing shortage in Valparaíso. In fact, in just one decade between 1960 and 1970, the population of Viña del Mar increased by over 50%, reaching 198,971, while in the same period, that of Valparaíso fell by 0.9%, to only 257,284 residents (1992 Census). In contrast, while the port city of Valparaíso maintained its dependence on port and industrial activity, it increasingly began to serve as an administrative and service centre for the region, with population growth rates gradually decreasing (Alvarez *et al.*, 2009).

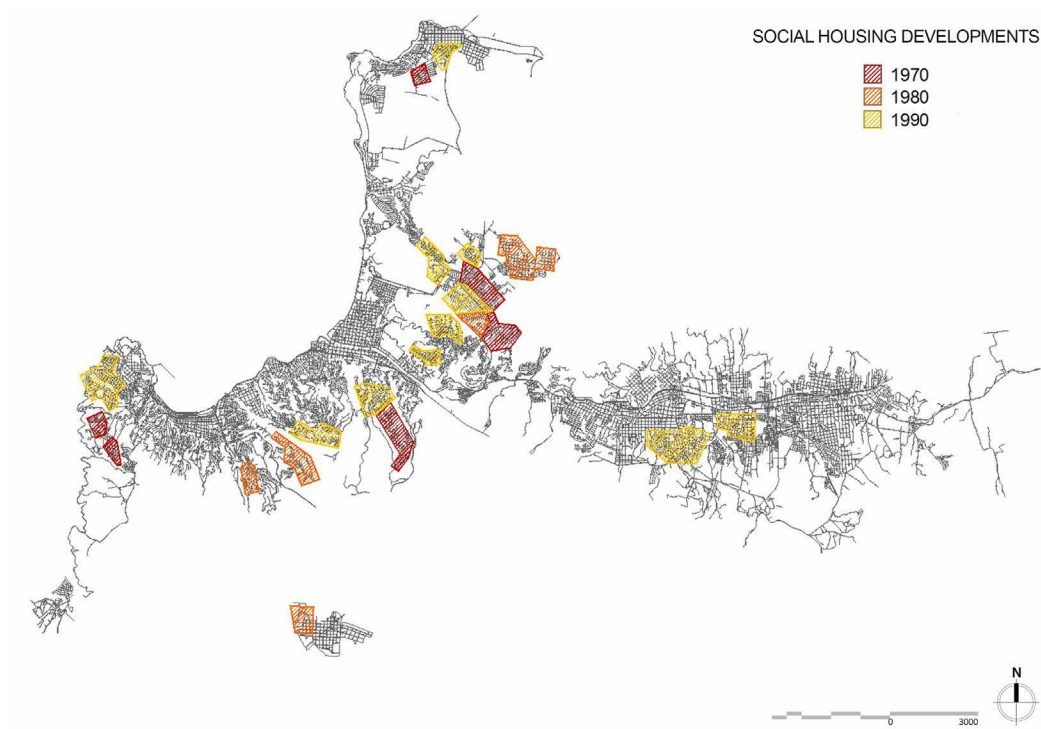


FIG. 3.14 Social housing program developments from 1970 to 1990. Source: Author, based on a document from the Ministry of Housing and Urban Development.

3.4 Metropolisation (1980-2014)

As in other Latin America countries, Chilean cities underwent a period rapid industrial change between the 1950s and 1980s mainly because of the increasing pace of globalisation. In the Chilean case, this influence was exacerbated by other endogenous factors. In 1973, the military took over the Chilean government, introducing radical changes to public policies and adopting the neo-liberal economic model in a literal and robust way without any mitigating measures. In 1979, for example, a new Urban Development Policy was introduced. This was founded on the belief that land in urban areas was not a scarce commodity that required careful control, but one that could be traded freely. This meant that profit would increasingly determine the uses to which that land could be put. The new Urban Development Policy established new more efficient procedures for the trading of land but also removed earlier restrictions on its use. This meant that increasingly market trends would lead a more organic growth of urban areas (Daher, 1991).

Despite such new efficiencies, the new market in urban land created by the Urban Development Policy had several serious flaws and the free competition it aspired to was far from perfect (Trivelli, 1981). Externalities and speculation in urban land meant that its assumed property homogeneity, a lack of transparency, and spatial mobility of resources led to new problems. Hidalgo *et al.*, 2009 found that the new market-based approach created a fundamental transformation in the more compact structures that had been associated with the earlier developmental models. The new policy instead, they suggest, contributed to the development of urban sprawl on the outskirts of cities toward which further urban growth is attracted (Hidalgo *et al.*, 2009).

Tracing the growth of the Valparaíso Metropolitan Area from its historical origins in the port city of Valparaíso towards its predicted position in 2020 several spatial patterns become apparent (Figure 3.15). Urban development through the later 1800s had occurred mainly in and around the cities of Valparaíso and Viña del Mar, but during the early 1920s Quilpué and Villa Alemana had begun to develop. By 1925, the initially separate city spaces of Valparaíso and Viña del Mar were becoming less well defined through a process of integration, a process which has continued into the present. The economic and political restructuring of early 1980s, accentuated not only the expansion of urban sprawl but also a territorial fragmentation. This is apparent in the development of urban units on the outskirts of the metropolis that are spatially disconnected from the historical urban settlements around the bay.

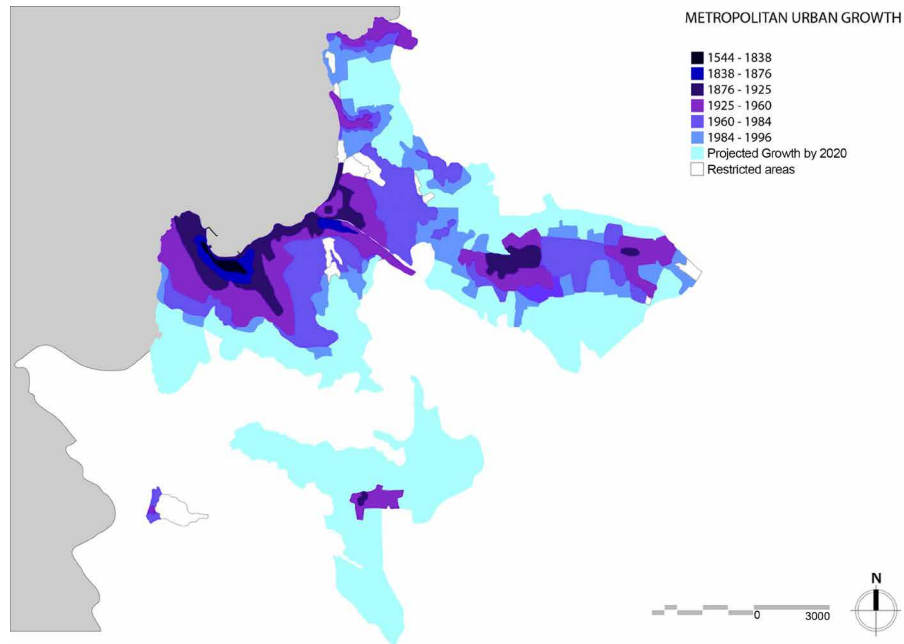


FIG. 3.15 Metropolitan urban growth of Valparaíso and its projected growth by 2020. Source: Author.

More broadly and based on observations by Patrick Geddes, one of more critical transformations in urban Latin America through the twentieth century has been the transition from ‘conurbation’ to ‘metropolitan area’ during which changes in mobility stimulate new types of spatial configurations. Geddes’ definition of the term ‘conurbation’ was based on his observations of urban change in the UK the early 1920s. He observed that cities began to integrate nearby urban developments, based on the systems theory, which proposes that “cities tend to form systems of cities” (Geddes, 1923). A similar pattern to that observed by Geddes in Europe, is evident in the cities of the Valparaíso area where the seaside cities and interior cities of the area gradually became more integrated during the first half of the 20th century.

The Chilean ‘National Urban Development’ project of the 1980s however helped to shape the modern form of the Valparaíso conurbation. It transformed the city of Viña del Mar from being an industrial suburb of Valparaíso, to a residential and tourist-based seaside city, while the transformative urban policies of the mid-twentieth century, mainly those relating to housing, turned the urban units of the interior into dormitory communities. Beginning in 1979, the processes behind the ‘conurbanisation’ of the Valparaíso area underwent a fundamental change.

During the 1980s, the Chilean economy was restructured in response to global economic challenges but also in response to domestic political and economic change. This brought new approaches to the further development of urban space. As new policies were enacted new interrelationships between the areas communes developed. The reimagined role of the state in shaping urban development, the consequent interest of private equity and these new interrelationships between communes all resulted in the significant transformation of Chilean urban spatial form and function. In combination, the external and internal pressures that perhaps ended the 'conurbanisation' of the Valparaíso area, instead gave rise to the birth of the Valparaíso metropolis as urban sprawl spread to new territories beyond previously accepted boundaries.

The main reason that such 'dispersion' has not been considered previously as an agent of 'metropolisation' within the Latin America context, is that in both the United States and Europe, such dispersion or sprawl is assumed to exist within a context of population stagnation (Rojas *et al.*, 2013). Such spatial changes have been therefore more often associated with the reorganisation of residential and productive space against a static population, the net balance of which entails a higher consumption of land. If, however, there is both a growing population and increased land consumption, the term "urban growth" is more commonly used. The term 'metropolisation' has tended to be reserved to describe the functional annexation of peripheral areas. With this distinction in mind, it should be recognised that the urban forms evident in some Latin American metropolises are very similar to cities in the United States that under the commonly accepted nomenclature qualify as dispersed or sprawling cities rather than deserving the designation of 'metropolises'.

An example of such a city in Chile is Santiago, in which increased dispersion or sprawl is more often associated with an increase in per capita income. Such dispersion does however similarly generate social polarisation and segregation and is often exacerbated or caused by consequent political and economic restructuring. Rojas has noted that in some Latin American countries and particularly in Chilean cities, rural-urban migratory processes have ceased and the population has remained below increasing land consumption rates (Rojas *et al.*, 2013). This suggests that in many Latin American urban areas 'metropolisation' is not related only to dispersion but also to the multifunctional interdependence of every commune in the territory (Soto and Alvarez, 2012).

For the Valparaíso Metropolitan Area, the spatial transition from conurbation to metropolis was characterised by a redistribution of services and population, inversely proportional to the historical centrality of the city of Valparaíso within the Valparaíso conurbation plus a concentration of investments in cities, with cumulative advantages such as accessibility at a metropolitan scale, tertiary services, and higher

land values. This ‘metropolisation’ was of an acephalic nature. In this metropolis, there is no single metropolitan administration. Therefore, there is no common executive. An absence that means the municipalities that make up the metropolitan area do not work together when competing for public funds.

Cardoso and Meijers (2020) have highlighted the importance of the intertwined relation between the spatial-functional dimension of ‘metropolisation’ and its association with a political-institutional and cultural-symbolic transformation processes. They suggest that the interaction of these dimensions in space and time may be a stimulus or a barrier to the process of ‘metropolisation’ as an integrated perspective of planning instruments (Cardoso and Meijers, 2020). The processes highlighted by Cardoso and Meijers seem to be evident in the emergence and development of the Valparaíso Metropolitan Area.

The multifunctional interdependence of every commune in the territory meant that the reorganisation of former conurbation into a nascent metropolis took on a multifocal character. This created reoriented the area as whole but also created city specialisms within the new metropolis. Valparaíso, for example, began to concentrate on the state administrative structure, with a continuing emphasis on port related activities. Viña del Mar with its higher residential population began to concentrate on tertiary services, housing, and tourism. Quilpué and Viña Alemana have become mainly residential, with state housing subsidiary programs tending to recreate the cities into a system of dormitory cities. Finally, Concón, as a newly developed city, now specialises in high-rise housing developments, mainly for use as second homes.

3.4.1 Production Transformation

Overall, three key factors seem to explain the conditions that have underpinned the transitioning urban spatial structure of the Valparaíso Metropolitan Area and how these dynamics have influenced changing patterns of urban mobility and vice versa. The factors that influence suburbanisation, social polarisation, residential segregation, and spatial fragmentation are: (1) production transformation, (2) changes in the socioeconomic distribution of the population and population growth and, (3) accelerated development of transport infrastructure (De Mattos, 1999).

Whilst in the latter half of the twentieth century other areas of the nascent metropolitan area have seen substantial changes in their fortunes, the port city of Valparaíso’s share of production as a function of the industrial GDP of the region has been decreasing since 1960 (De Mattos, Riffo, and Reyes, 2000). This change

in economic activity is also evident in a decline in the labour force as secondary activities have become more important, the number of head of households who work as labourers has fallen and the area's now high unemployment rate.

Taking such structural indicators together, it seems that the severe economic adjustment resulting from the implementation of the neo-liberal model starting in the 1980s has shaped the production transformation in three ways. Large investments in port mechanisation resulted in job losses in Valparaíso. As previously noted, industrial centres have shifted away from the city centres (Valparaíso and Viña del Mar) and mostly out of the region. These departures have allowed new activities to emerge, energised by the areas geographical setting, such as tourism-driven real estate development along the coastline of the Valparaíso Metropolitan Area.

In these ways, changes in technology, urban transformation and changes in the demand for labour have cost Valparaíso its historical status as a city of economic and social importance. The liberal-bourgeois republic that ended the existing import based economic model in Chile, meant that key Chilean ports lost their essential purpose (import and export of goods), a shift in public policy that brought about the beginning of the 'contraction.' Despite the political significance of this narrative, the political changes of the 1980s provide only a limited explanation for the relative decline of the port city of Valparaíso.

Valparaíso's weakened position seems to have begun with the progressive decline in port-related production that had previously underpinned the development of Valparaíso as an industrial conurbation and later, the development of the Valparaíso Metropolitan Area. This decline in port-related activity is something that begun in 1914 with the opening of the Panama Channel. This resulted in an absolute decline in shipping from the United States to Europe around Cape Horn.

The decline in the port city of Valparaíso's fortunes was perhaps initially obscured by protectionist policies which were systematically promoted by the Chilean state until 1979, when the first aggressively neo-liberal, free-market policies were implemented. No longer the subject of state-led protectionist policies, subsequent investments in port mechanisation led to increases in productivity and cost reductions but also resulted in substantial job losses. With consequent revisions in working practices through the adoption of new technologies, the previously strong ties between the city and the port was weakened. This changed relationship resulting from the implementation of a neoliberal model in the early 1980s would eventually result in the dismantling of the entire industrial conurbation system of Valparaíso-Viña del Mar (Section 3.4).

The extensive industries that had grown up in Viña del Mar persisted until 1983, when the sugar refinery went bankrupt. The disappearance of non-competitive industries in this new context and the loss of the sugar refinery led the associated candy factories to relocate. Instead, Santiago, the capital city of the region, became an attractive pole for development. Over time, more industries within the Valparaíso Metropolitan Area began to gravitate towards Santiago, whilst the tobacco industry went to Casablanca⁶, an interior city between the capital and the coast. Now following four decades of what might be called a 'transformation in production', the leading industrial areas within the Valparaíso Metropolitan Area are in Concón (oil refining), Valparaíso (the port), and whilst secondary industrial activities are located mainly in Viña del Mar.

These changes to the areas industrial production have brought about a territorial redistribution of industrial centres. New activities have appeared, intensely energised by the geographical setting, such as tourism-related real estate development along the coastline of the Valparaíso Metropolitan Area. These activities account for more than 65,5% of investments (in the communes of Concón and Reñaca, as part of Viña del Mar). Another new activity in the Valparaíso region are the Vineyards in the Aconcagua Valley and Casablanca, which depends on the services (such as technologies, knowledge, expertise, and seasonal workforce) provided by the nearest cities, such as those in the Valparaíso Metropolitan Area. These new productive activities go along with the revitalisation of the metropolitan economy, and the fundamental territorial manifestation of it is mobility. The city of Valparaíso therefore has become the service centre for peripheral and suburban metropolitan dynamics.

3.4.2 Socioeconomic Distribution of the Population and Population Growth

One of the significant challenges when conducting socioeconomic research at the level of the state in Chile is each government agency has its data-gathering methodologies and they do not discuss or share these with one with another. To understand the current local services patent concentration, data was collected from five municipalities. The information provided was notably disaggregated since each municipality labelled the same elements of the economy in different ways. The first step was therefore to homogenise the information and then register it in ArcGIS.

⁶ Casablanca is a quiet interior city between Santiago and Valparaíso. It specialises in vineyards and has a population of almost 22,000 inhabitants.

This resulted in a map that explained the formal distribution of economic activities within the Valparaíso Metropolitan Area. The highest concentration in relative terms is in Viña del Mar, where 47% of activities occur. Conversely, the lowest concentration is in Concón, accounting for only 3% of the business licenses (Table 3.1). Turning to the number of households in each city, the two most significant concentrations are in Viña del Mar and Quilpué. This situation developed during the 1980s and has since relegated the City of Valparaíso to fourth place in terms of economic importance (Table 3.2). This is perhaps unsurprising given the role of Valparaíso as the seat of local and regional governance.

Communes	Total Comercial Licences	Percentage
Valparaíso	8,076	26
Viña del Mar	14,666	47
Concon	989	3
Quilpue	5,495	17
Villa Alemana	2,233	7
Gran Valparaíso	31,459	100

TABLE 3.1 Municipal business licenses per commune. Source: Author.

Total Licenses of commercial activities	Households	Rate: activities per household
14,666	85,130	5.8
5,495	37,529	6.8
989	9,060	9.2
8,076	78,642	9.7
2,233	27,485	12.3
31,459	237,846	

TABLE 3.2 Commercial activities per household. Source: Author.

In socioeconomic terms, the historical spatial arrangement of the area in which Valparaíso was the centre of the metropolis, has been reconfigured. Now the geographical centrality of Viña del Mar within the wider Valparaíso Metropolitan Area provides more favourable conditions for development and growth of enterprises. This is apparent when looking at commercial activities in terms of topology. This reveals quite clear territorial units strongly linked to major transport networks, which generate better accessibility to the Valparaíso Metropolitan Area as a whole (Figures 3.16 and 3.17). The highest business license densities are in Viña del Mar, mainly around its historic centre which seems connected to its pivotal geographic centrality within the Valparaíso Metropolitan Area ⁷ (Figure 3.2). This is geographical centrality is compounded by Viña del Mar’s long held association with the main infrastructure corridors that run across and through the Valparaíso Metropolitan Area.

⁷ The centre of Viña del Mar at the metropolitan level is a crucial distribution area of all the metropolitan flows. The population coming from the interior and coastal cities arrives in this area to continue to Valparaíso or other parts of the metropolis. It is an area that functions as the fulcrum of all internal metropolitan flows.

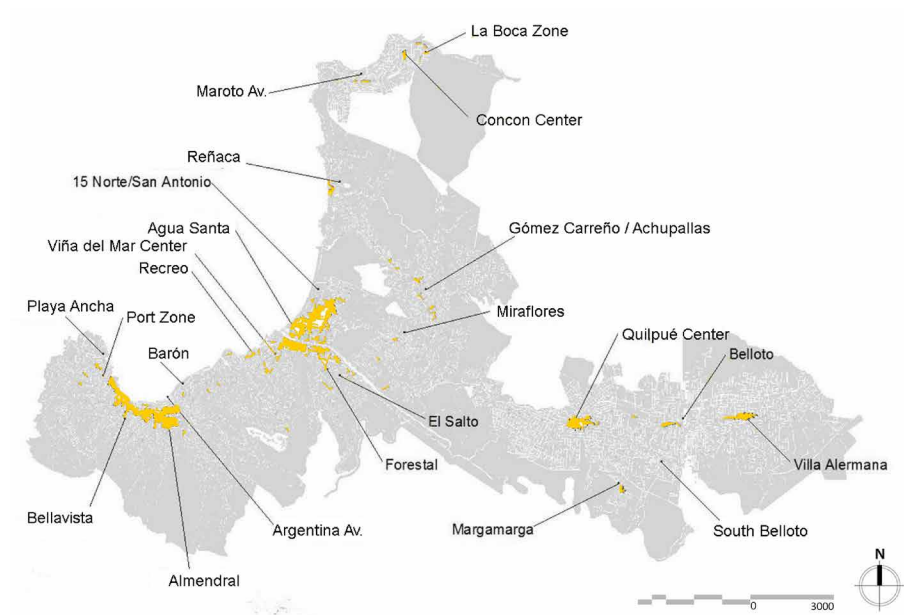


FIG. 3.16 Business license densities. Source: Soto and Alvarez, 2012.

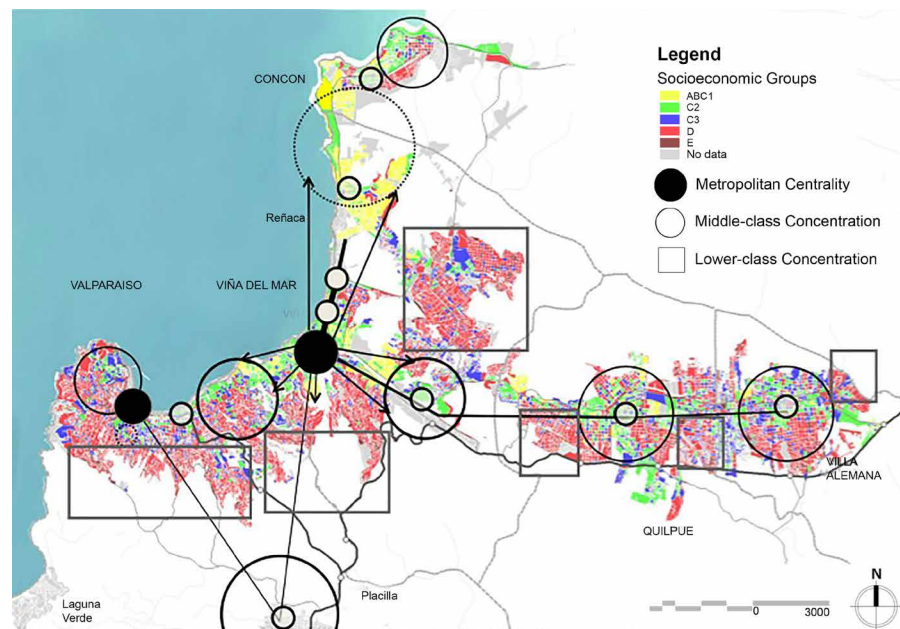


FIG. 3.17 Metropolitan centralities and socioeconomic structure of the VMA. Source: Atisba S.A.

The second most dense unit within the Valparaíso Metropolitan Area is the historic centre of Valparaíso, covering the city's low-lying area, Almendral. This highlights that while the city centres (Valparaíso - Viña del Mar) have different economic and service concentrations, they are both located in low-lying areas of the Valparaíso Metropolitan Area. This topographical relationship transforms the two city centres into an extended downtown area lying between Valparaíso a Viña del Mar. The concentration of services and business licenses within low-lying areas suggests that the region is more than a simple polycentric structure, a characteristic of other metropolitan areas in Latin America. In practice, the Valparaíso Metropolitan Area is monocentric in character, something that is entirely connected to the geographical configuration of the bay (De Mattos, 1999; Janoschka, 2002).

3.4.3 Population Growth and Changes in the Socioeconomic Distribution

For the Valparaíso Metropolitan Area, globalisation, the adoption of a neoliberal model and post-Fordist production processes were expressed in the development of new spatial forms. Within these new spaces and driven by relative differences in their socioeconomic condition, the population is now unequally distributed across the metropolitan area. Two points are relevant here. Firstly, the nature of the changes in the spatial distribution of the population between 1982 and 2012 and secondly, the associated changes in the socio-economic structure of the area since the 1980s.

According to data from the 2012 census the population of the Valparaíso Metropolitan Area is 930,220, which is 53.97% of the regional population and 5.61% of the national population. The Valparaíso Metropolitan Area is the third-largest metropolitan area in Chile, with a concentration of 350,553 homes equivalent to 6.12% at the national level. As one of the five municipalities that form the metropolitan area, Viña del Mar has the largest population, with 330,110 inhabitants, followed by Valparaíso, with 292,510. It is important to note that population growth rate was higher across the Valparaíso Metropolitan Area than in other areas of the county. The exception however is commune of Valparaíso, which had a population growth rate of only 0.61% compared to 0.93% nationwide (Census 2012). This census data bucks the historical trend within Valparaíso since 1982, particularly given that in the 1992-2002 period, Valparaíso's population shrank by 2.39%, with a negative annual growth rate of -0.24%.

One of the characteristics of an urban spatial structure in transition is a city's cumulative advantages (accessibility, infrastructure, higher land values, and population). The number of inhabitants in Viña del Mar has grown since the 1980s, while the population of Valparaíso, especially among high-income groups, has decreased. Viña del Mar saw an increase in population growth in the previous period, with 44,173 more inhabitants, accounting for 15.45% of the population (Figure 3.18). Although Concón maintained a growth rate of 18.69%, this figure contrasts with the previous period (1992-2002), in which there was an explosive increase of 74.4%.

Concón, is a newly developed city space that is dominated by residential and tourist developments which had been driven by speculative real estate activity, largely associated with the development of second homes (Figures 3.18 and 3.19). Concón also presented a greater comparative growth rate in terms of households than the rest of the Valparaíso Metropolitan Area (Table 3.3). This difference can be explained by the decrease in inhabitants per household, which went from 3.6 in 1992 to 2.7 in 2012, along with the construction of many new high-rise residential buildings. In part through such developments, the number of households in Concón and Villa Alemana grew by over 40% in recent years, these communities are now the fastest growing residential areas in the Valparaíso Metropolitan Area.

The dormitory communities, Quilpué and Villa Alemana have in contrast exhibited a decline in growth rates in 2012 compared with previous periods. However, these Valparaíso Metropolitan Area communes had previously grown exponentially over the past 20 years, a period of growth that underpins the territorial expansion that the metropolitan area has undergone since 1980. Although in recent years the population growth in these dormitory communities has tended to remain steady, In Valparaíso and Viña del Mar, the population has begun to grow particularly on the outskirts of the two cities, with new residences being constructed in the form of apartments within downtown high-rise buildings but also within single-family dwellings. Overall, the census data shows that population growth has accelerated in these two communes whilst decelerating in the three others (Table 3.3).

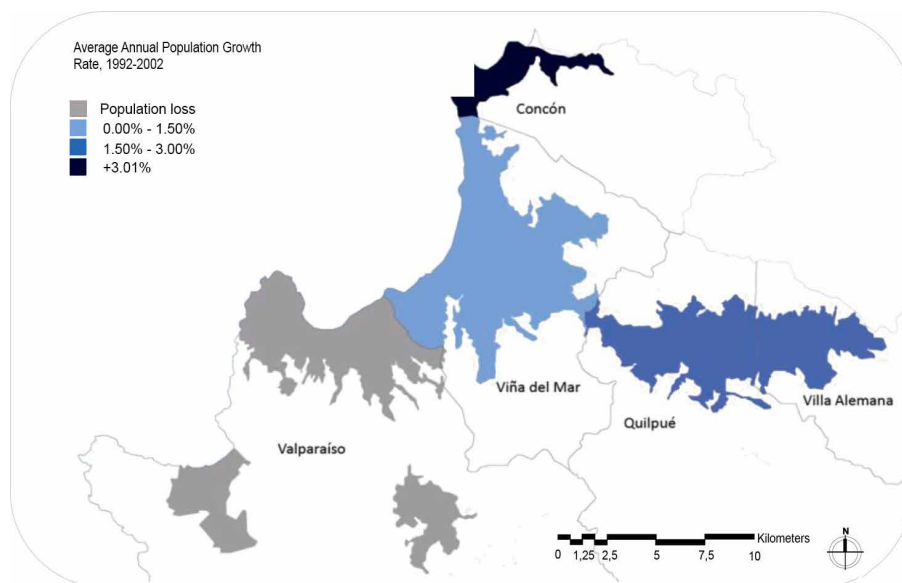


FIG. 3.18 Average annual population growth rate, 1992-2002. Source: Ministry of Housing and Urban Development.

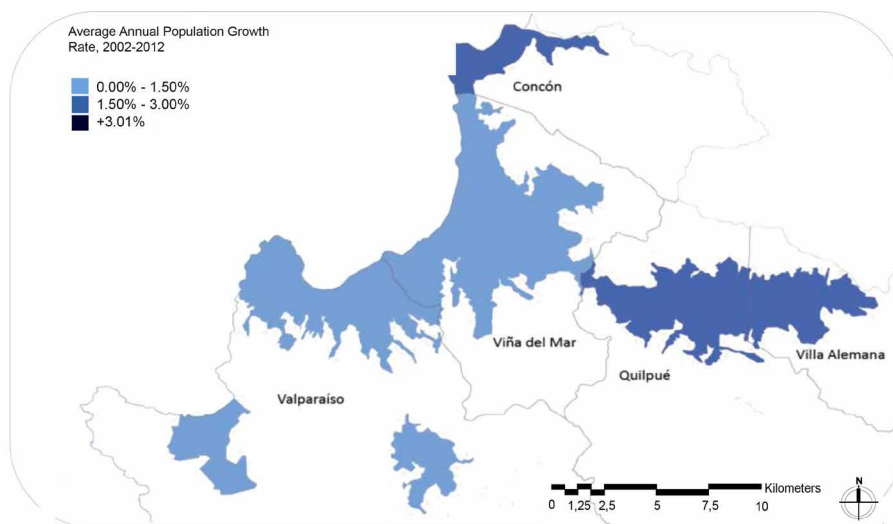


FIG. 3.19 Annual average population growth rate, 2002-2012. Source: Ministry of Housing and Urban Development.

HOUSEHOLD GROWTH TRENDS BY COMMUNE										
Nº	commune	1992 census	2002 census	pre-2012 census	2002 increase	2012 increase	92-02 rate	02-12 rate	Rate difference	Trend
1	Valparaíso	73,425	81,083	107,111	10.4%	32.1%	1.04%	3.20%	2.16%	accelerate
2	Concón	6,239	11,561	16,548	85.3%	43.1%	8.53%	4.31%	-4.22%	decelerate
3	Viña del Mar	83,589	99,619	132,969	19.2%	33.5%	1.92%	3.35%	1.43%	accelerate
4	Quilpué	27,967	39,559	53,437	41.4%	35.1%	4.14%	3.51%	-0.63%	decelerate
5	Villa Alemana	18,818	28,646	40,488	52.2%	41.3%	5.22%	4.13%	-1.09%	decelerate
	TOTAL	210,038	260,468	350,553	24.01%	34.60%	2.40%	3.46%	1.06%	

TABLE 3.3 Household growth trends by commune, 1992–2012 census. Source: Author, with information from the National Institute of Statistics.

More broadly, the development of new towns has underpinned much of the urban growth seen in Chilean cities. These are often sited in low-density peripheral areas, a choice of location that is in part a function of lower land values but is also associated with higher levels of private automobile ownership amongst the inhabitants. Gated communities in Chile have a high proportion of single-family homes and are expected to house between 150,000–200,000 inhabitants in the future (Hidalgo and Borsdorf, 2005; Muñiz, Galindo and García, 2003).

Within the Valparaíso Metropolitan Area, the most extensive low-density suburban development is in the city of Valparaíso. This accounts for more than 15% of dwellings at the last census, which translates as approximately 26,028 households. Curauma is both one of the most significant real estate projects in the country and the largest in the region with a surface area of 4,300 ha. It is an upper-middle-class private neighbourhood located on a former forestry site with strong infrastructure links in terms of mobility (10 km from Valparaíso and 90 km from Santiago, with high road standards) and good environmental qualities (an artificial lagoon surrounded by green areas).

Despite the scale and quality of such developments low-density housing construction has been overtaken by high-rise buildings in various metropolitan areas (Tables 3.4 and 3.5). High-rise buildings in the Valparaíso Metropolitan Area tend to be concentrated in locations with Pacific Ocean views. These are located coastal terraces in Viña del Mar, Reñaca and Concón and continue along the upper levels of these areas. The shortage of sites with sea views has therefore tended to result in a predominance of high-rise condominiums in seaside locations. Although the main developments are in Concón and downtown Viña del Mar, Valparaíso also has some middle-class high-rise housing developments on the outskirts of the city perhaps due to the area's good connections to the interurban road network.

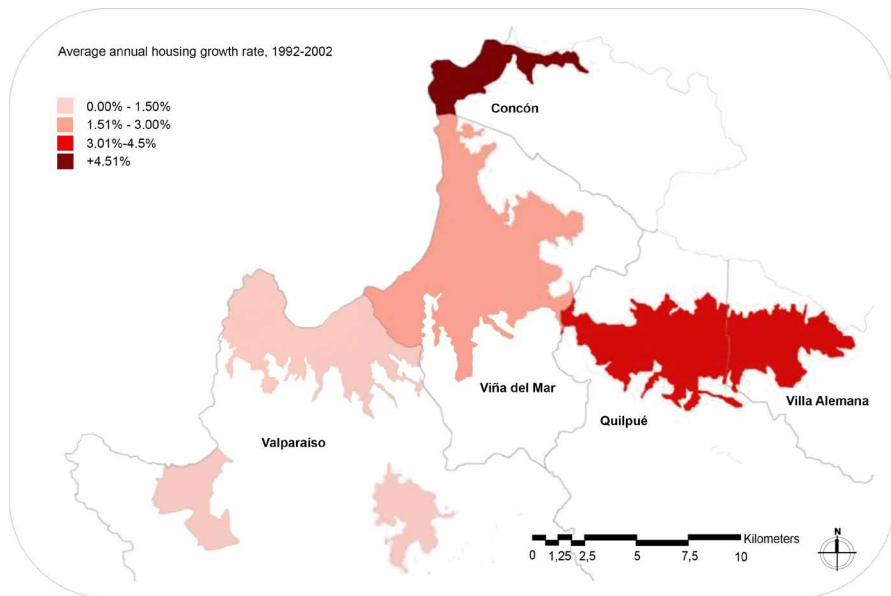


FIG. 3.20 Average annual housing growth rate 1992 - 2012. Source: Ministry of Housing and Urban Development.

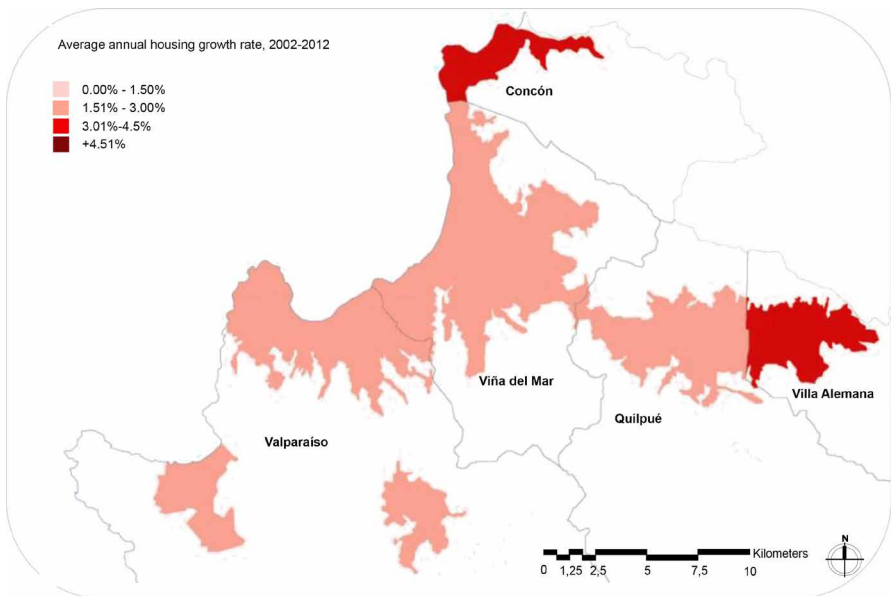


FIG. 3.21 Annual average housing growth rate 2002-2012. Source: Ministry of Housing and Urban Development.

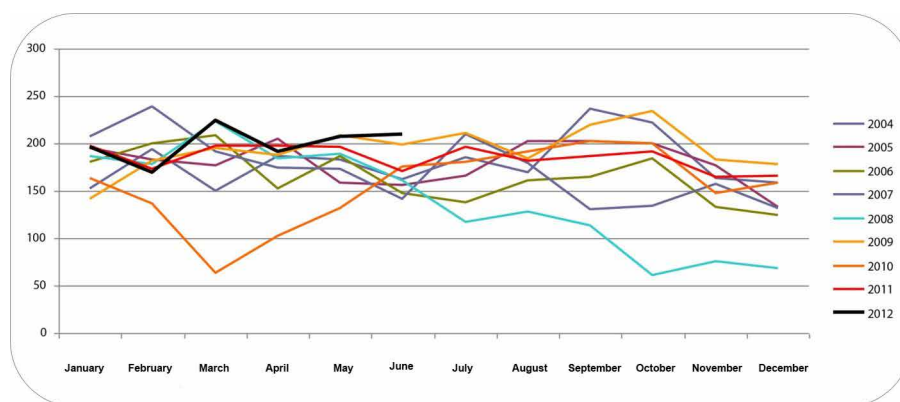


TABLE 3.4 Apartments. Source: Chilean Chamber of Construction, 2012.

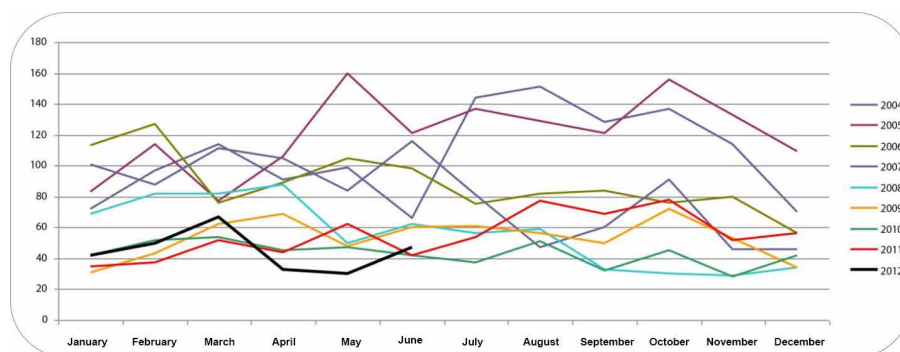


TABLE 3.5 Houses. Source: Chilean Chamber of Construction, 2012.

As the census and other data makes clear, the socioeconomic structure of the Valparaíso Metropolitan Area has changed over time due to several internal and external pressures. This has led to uneven patterns in terms of population type, population density, access to infrastructure and economic activity. In this way, reviewing the way in which urban sprawl within the Valparaíso Metropolitan Area has developed over time serves to demonstrate the way in which urban sprawl in Latin American cities often accompanies or accentuates human phenomena such as social segregation.

For Latin American cities, the notion of urban informality has been the subject of many studies usually involving the term 'informal settlement' (see for example Clichevsky, 2000; Cortés, 2000; Roy, 2005; Roy and AlSayyad, 2004). While no universal definition yet exists for this phenomenon, 'informal settlements' are generally described as a neighbourhood that has come about due to illegal land

occupation that lacks at least one leading urban public service (Secretaría Ejecutiva de Campamentos, 2013). For the Valparaíso Metropolitan Area, most of the area's informal settlements are in the peripheral hills of the metropolis (+110 and +200 m.a.s.l.). The complex topographies within these areas and the geologically vulnerable nature of such areas further adds to the difficulties that the face the low-income inhabitants of such settlements as they try to access downtown areas where all the goods and urban services are concentrated (Figure 3.22)

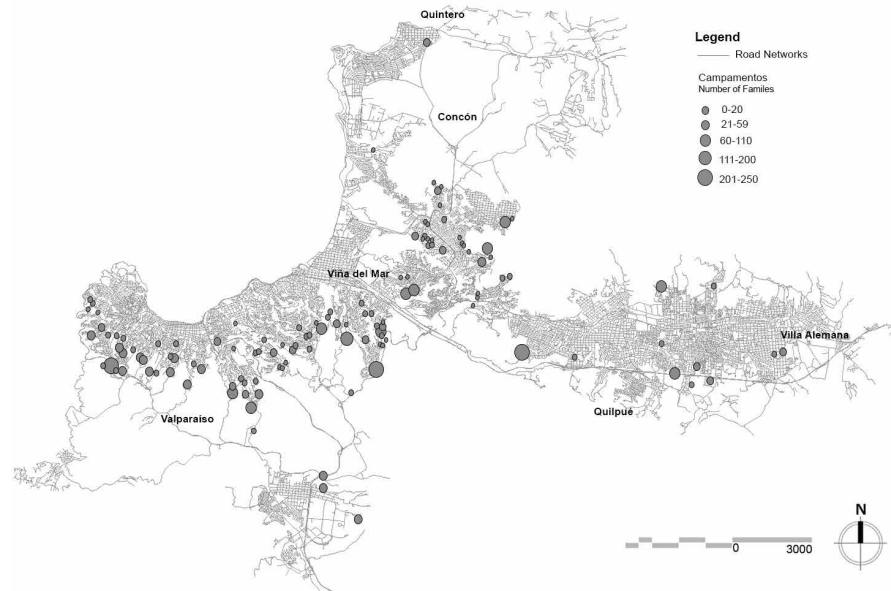


FIG. 3.22 Informal settlements. Source: Un Techo para Chile Foundation, 2012.

Although the socioeconomic make-up of the population across the Valparaíso Metropolitan Area is relatively consistent there are differences among the communes. Valparaíso, as seen in Figures 3.23, 3.24, and 3.25, is almost devoid of middle (C3) and upper-income (ABC1) groups, who left the commune in the eighties in search of new private subdivisions or detached houses in Viña del Mar, Quilpué and, to a lesser extent, Villa Alemana. In these two last communes, the possible disadvantage of these peripheral locations was compensated by the supply of low-cost land prices for low-density housing projects.

Several commentators such as Roitman (2003) have highlighted the way in which social segregation is often reflected in the separation of the different social groups across a given urban space according to ethnic, religious, or differences in income. From Roitman's perspective it becomes possible to visualise the different districts in a city as a tapestry in which each social group has its own specific space (Roitman, 2003).

Differences in income, for example, means that high-income groups are often detached from other population groups because they are free to choose their housing location, whereas low-income groups are usually more dependent on the social housing supply (Roitman, 2003). This perhaps explains why the inner communes of Quilpué and Villa Alemana now has a large middle-class population. The growing number of gated communities in both high rise and single-family housing areas provides a further demonstration of the phenomenon described by Roitman. The source of further fragmentation within the urban fabric, these self-determined island populations are highly dependent on private cars. This dependency means that these island populations tend to interface with other functional units of the urban space (retail and medical units, colleges, and workplaces) largely without encountering other population groups (Vidal, 1999).

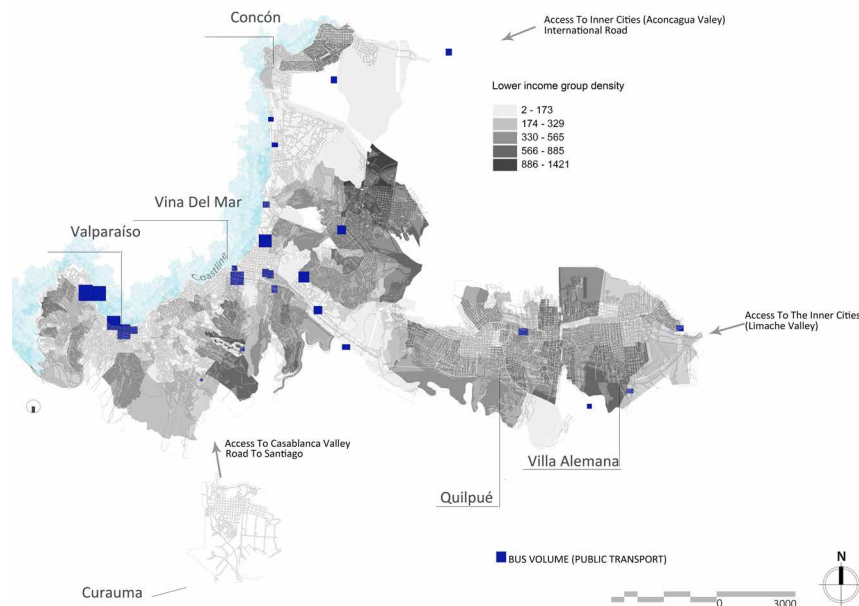


FIG. 3.23 Lower-income group (shading associated with the density of socioeconomic group). Source: GIS, Alvarez, with data from 2012 census.

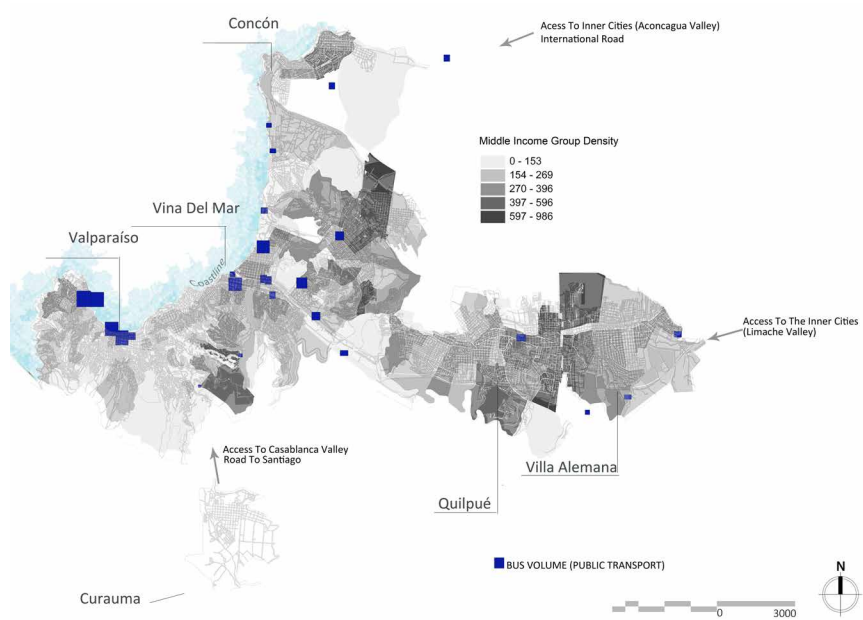


FIG. 3.24 Middle-income group (shading associated with the density of socioeconomic group). Source: GIS, Alvarez, with data from 2012 census.

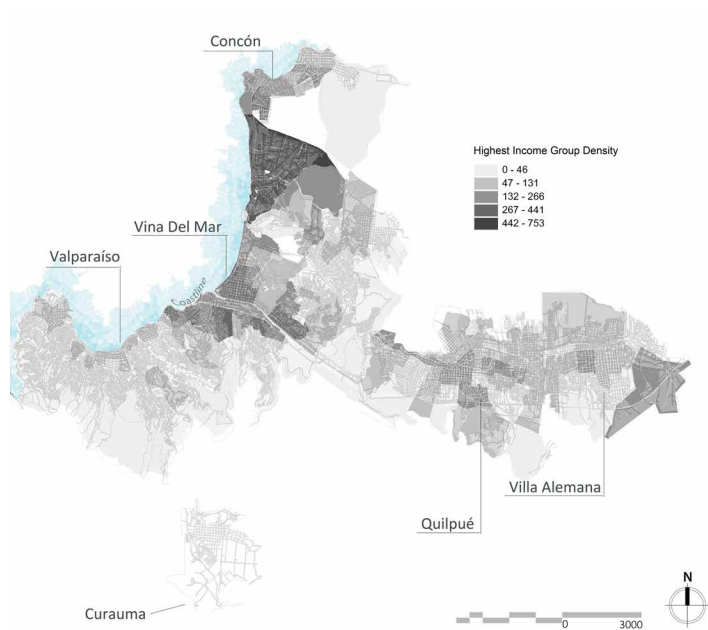


FIG. 3.25 Highest-income group (shading associated with the density of socioeconomic group). Source: GIS, Alvarez (with data from 2012 census).

3.4.4 Accelerated Development of Transport Infrastructure

Before 1979, public policies in Chile tended to be more closely aligned with a Fordist industrial model which emphasises an association between the availability of stable work and its proximity to housing. During the 1982 to 2002 census period however travel for study or work purposes increased to 22% (2002 census). This change in the level of individual mobility seems to be related to the neo-liberal policies that were in the ascendancy from 1979 onwards. Through the 1980s, comparatively poorer employment rates have been connected to weak job creation in the manufacturing sector. The tertiary sector in contrast has grown in importance, a change that has led to a greater reliance on more precarious forms of employment. It has not proved possible to return to the benevolent combination that characterised Chilean industry during the decades before 1980 when there was strong job creation and a steady increase in average labour productivity (De Mattos, 2002).

Such changes in residential and work patterns within the Valparaíso Metropolitan Area seems to have influenced both the development of new inter-communal roads and improvements to the existing road network. These improvements have become a significant driving force behind the transformation of Valparaíso Metropolitan Area. Graham and Marvin (2001) have highlighted the way in which infrastructure and technologies do not have simple, definite, and universe territorial 'impacts', but instead are related to more contingent effects in different times and spaces.

Graham and Marvin argue that changes in road infrastructure, improving both communication and mobility flow, can serve to restructure territory. In this way, nodes and connections are often more critical than zones, borders, and physical limits (Graham and Marvin, 2001). This is perhaps evident in the MECSA-INECON project which served to restructure parts of the Valparaíso Metropolitan Area. This project was part of a transport infrastructure network for the Central Macro-Region proposed by Marcial Echeñique in 1993 and served to both improve communication but also lay behind a wave of real estate speculation and property development (Allard, 2003).

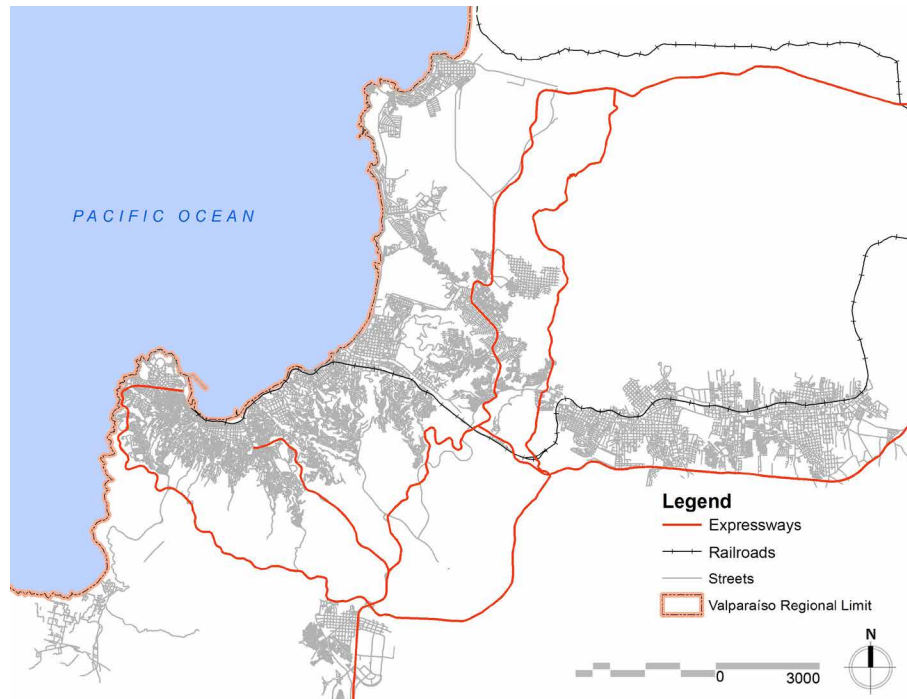


FIG. 3.26 1993 Regional Urban Plan, road infrastructure development. Source: Author

In support of Graham and Marvin's point, socioeconomic changes resulting from such larger-scale projects in Latin America has more to do with the connections between poles of production and distribution on a regional scale than a real land-use organisation or planning instruments (Soto and Alvarez, 2012). Counting only the four-transport infrastructure works linking the Santiago Metropolitan Region and the Valparaíso Region (Route 68, Route 78, Troncal Sur, Central Coast Highway) the Valparaíso Metropolitan Area has had the highest concentration of private concession investment in the country since 1997. Between 1997 and 2007, these projects generated significant changes in the modal distribution of passenger transport flows.

One such example, the 'Regional Urban Plan' was concerned with the development of intraregional ring roads and was aimed at integrating otherwise disparate territories. The coastline's urban system and the new ring highways constructed along the peripheral border of the city under the 'Regional Urban Plan' served to further decentralise the urban growth of Valparaíso (Figure 3.26). These transport routes provided alternative interconnection paths among all the communes, establishing significant changes in passenger trips' modal distribution. A consequence of such improvements, the private car usage increased from 15,85% of daily trips in 1998 to 29,4% in 2014 (SECTRA, 2014).

Such investments at local and regional scale increased a culture of car dependence within the Valparaíso Metropolitan Area and other metropolis in Chile and throughout Latin American. Within the Valparaíso Metropolitan Area, investments in road infrastructure have, for example, improved accessibility, increased land values and given rise to significant zoning changes. Authorisations to change the zoning from agricultural and rural to urban have grown increasingly. From 1987 to 1997 in the 5th Region alone, 1,121 zoning changes were enacted in the municipalities of the Valparaíso Metropolitan Area. This was driven in part by the implementation of the Law of Concessions and Services in 1992 under which 39,435 peri-urban hectares were activated and ready to be used (Soto and Alvarez, 2012).

Soto and Alvarez have identified several pivotal impacts of these investments in the area's infrastructure and the re-zoning with which they are associated. These include new large, private urban settlements that have been built on peripheral areas of the Valparaíso Metropolitan Area and along the coastal areas of the region. Real estate investment in these coastal areas now accounts for 71% of national real estate investment (second homes). There have been new agricultural developments near those big metropolitan areas that have been favoured with new or improved transport infrastructure (urban neo-agriculture). Port activities now extend beyond the immediate vicinity of the port as 'dry ports' storing containers and port equipment have been established in new peri-urban areas. Finally, a new range of urban provisions have been established with the development of facilities such as waste dumps and treatment, recycling, cement, and dry commodity plants (Soto and Alvarez, 2012).

Looking at the total investment in road infrastructure over the ten-year period within which the concession law of 1992 had some effect, more than 89% was privately funded, compared with 11% which was publicly funded. Until 2010, thirteen road projects awarded to private companies; four roads alone (Route 68, Route 78, Troncal Sur, Central Coast Highway) involved an investment of around 795 million dollars, an amount close to that of all public investments in all types of infrastructure over recent decades. The transformational significance of such investments made clear, when measured against the accelerated construction rate, most of which took place in less than ten years.

The interurban road network in the Valparaíso Metropolitan Area now extends some 10,357 km, a figure that is greater than other similar Chilean metropolitan areas. With its relatively more developed road network a robust peri-urbanisation process (real estate development) has been associated with the (re)structuring of the area's interregional networks. Road infrastructure within the Valparaíso Metropolitan Area has therefore tended to accelerate the expansion of urban

sprawl largely through weak territorial planning and poor housing policies (1980). Regulatory plans in Chile are inflexible instruments, some of which have taken more than 30 years to update; thus, arguably they have failed to keep pace with urban changes triggered by private interests or informal urban settlements.

From an urban planning perspective, an analysis of a mainly regulated city instead of a planned one is of particular interest. Graham and Marvin (2001) have argued that before World War II, infrastructure networks were considered as proposed, integrators of urban spaces. As such, infrastructure networks bound cities, regions and nations into functioning geographical or political 'wholes' (Graham and Marvin, 2001). Landon noted the way in which such systems were assumed to require public regulation so that they would be capable of adding cohesion to territories and as such provide a vertical structure with a clear hierarchy between the pole and its hinterland (Landon, 2013). Although Landon found that in general infrastructure operators guided and helped define the identity and development of the newly accessible territories, Landon was clear that since all the interurban highways in Chile are planned by the State but designed and constructed by private companies they were never considered as mechanisms to integrate territory (Landon, 2013).

In contrast to its expansive privately constructed road network, the public transport network in the Valparaíso Metropolitan Area is a metropolitan design but implemented with a regional vision. The network as a whole and particularly the project to enable southern access to Valparaíso meant that an expanse of the available public space was devoted to public mobility (Figure 3.27). This project, called Stage IV, consisted of the renovation of the regional train (MERVAL) that connects Valparaíso and Viña del Mar to the interior cities, with new routes totalling 43 km, transforming it into a metro train, with new operating technology, 20 renovated or new stations and all-new train cars.

This linear route project was responsible for the development of 5,2 km of underground track through downtown Viña del Mar, allowing public spaces along the city's main corridors to be recovered. The metro train connects Valparaíso to the interior cities of the region (east-west). The new southern access to Valparaíso resulted in a new public coastline, even though the project's primary purpose was to allow direct access to the harbour zone without passing through the downtown area (Figure 3.27). The implementation supports the ring road connection that links the port to its local region and the rest of the country.

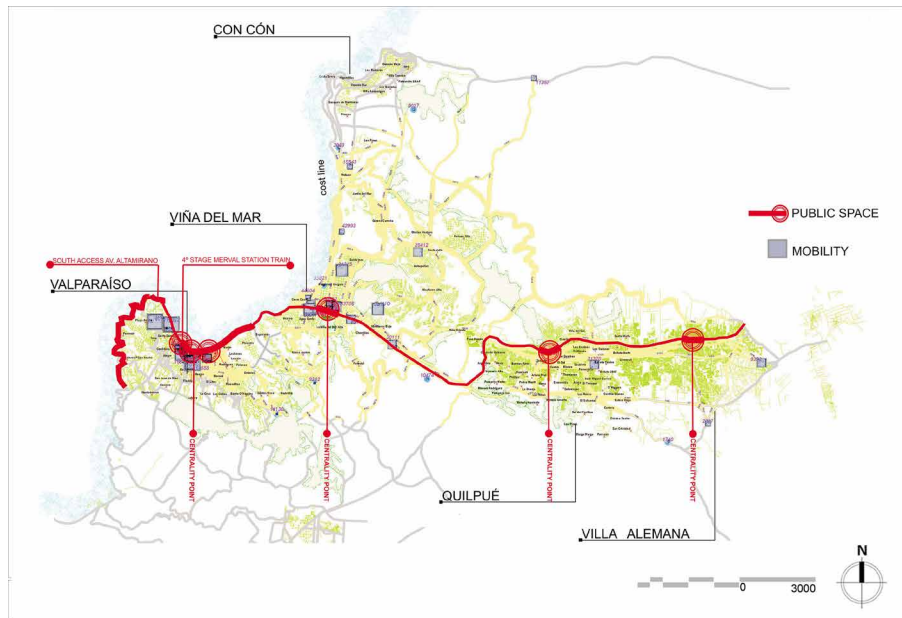


FIG. 3.27 Southern access to Valparaíso with Metro train project, and the development of public spaces related to them. Source: Author

Implemented mainly at a regional scale and taken together with investments in inter-urban roads, the now expanded infrastructure network did not however include improvements to intra-commune roads between hills at a metropolitan (between communes) scale. This lack of investment in those sections of the Valparaíso Metropolitan Area lying between the hills became particularly apparent in 2014 when a fire destroyed 3,000 informal and formal homes. The problems caused by a lack of transport infrastructure in these areas could have been obviated by the development of a transport link in the form of a ring road could connect the city at the height of 100 m.a.s.l.

Currently Valparaíso has only one road that traverses part of the city at a height of 100 m.a.s.l. A project to build a better access road to Valparaíso was stopped twenty years ago and remains unfinished. Figure 3.28 demonstrates the paradox of the growth rate and infrastructure deficit between the urbanised area (10,200 ha) of the VMA, and the area regulated by the Metropolitan Master Plan for Valparaíso (51,845 ha). This map shows that although in theory the use of statutory planning instruments has increased the developable urban area by 41,000 hectares, the lack of infrastructure of all kinds and particularly access infrastructure, means that in practice the amount of territory available for future urban development remains stagnant.

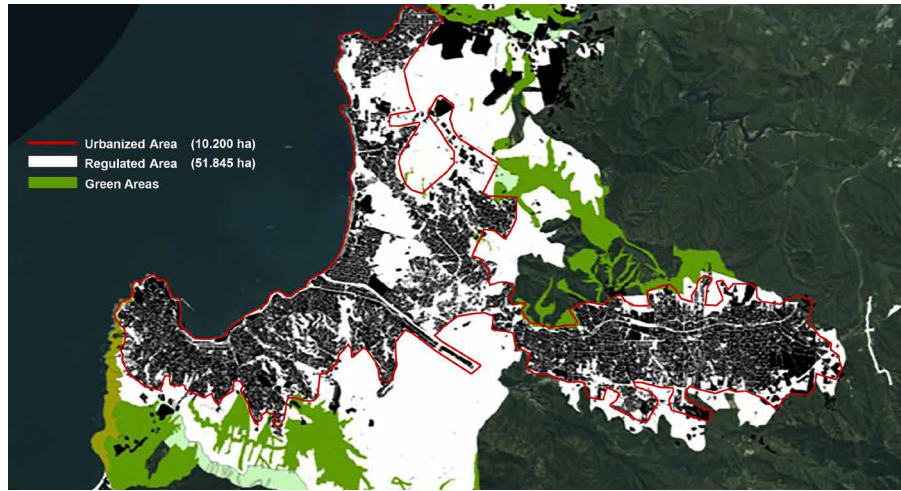


FIG. 3.28 Urbanised area versus regulated area projected by the Metropolitan Master Plan for Valparaíso.
Source: Author

The process of expansion and consolidation of urban space in Valparaíso Metropolitan Area seems heavily reliant on establishing new or expanded infrastructure networks capable of meeting of increasing complex technological challenges. This is particularly true in the Valparaíso Metropolitan Area where the topographic conditions create a set of very particular problems. The hills extend from the city plan level (with an elevation of roughly 25 meters m.a.s.l) to approximately 450 m.a.s.l. Created by marine abrasion eons ago, this rise is broken horizontally by three distinct terraces at 40, 110, and 200 m.a.s.l and periodically by deep ravines. These geomorphological conditions create abrupt and irregular variations in the land's slope which in turn impacts building characteristics, accessibility, and property divisions. (Alvarez *et al.*, 2009; Soto and Alvarez, 2012; León, 2013).

The topographic complexity of the areas means that apparently simple urban forms must by necessity be reconfigured. This is reflected in the increasing need for technological interventions such as construction of bridges, special retaining walls, or other protective civil works for building transport infrastructure when developing new infrastructure or improving existing routes (MINVU, 2015). Investments to overcome such complexity can induce positive multiplier effects but it can also it can exhaust the urban-infrastructure development cycle. Large-scale infrastructure investment took place in Valparaíso at the beginning of the 20th century, but more recently a lack of strong public investment in mobility infrastructure compared with private investments in interurban road infrastructure has had a negative effect on the consolidation, integration, and growth of the inner metropolis. Accordingly, the most developed transport supply and connectivity systems are now located in the city's low-lying areas (Figures 3.29 and 3.30)

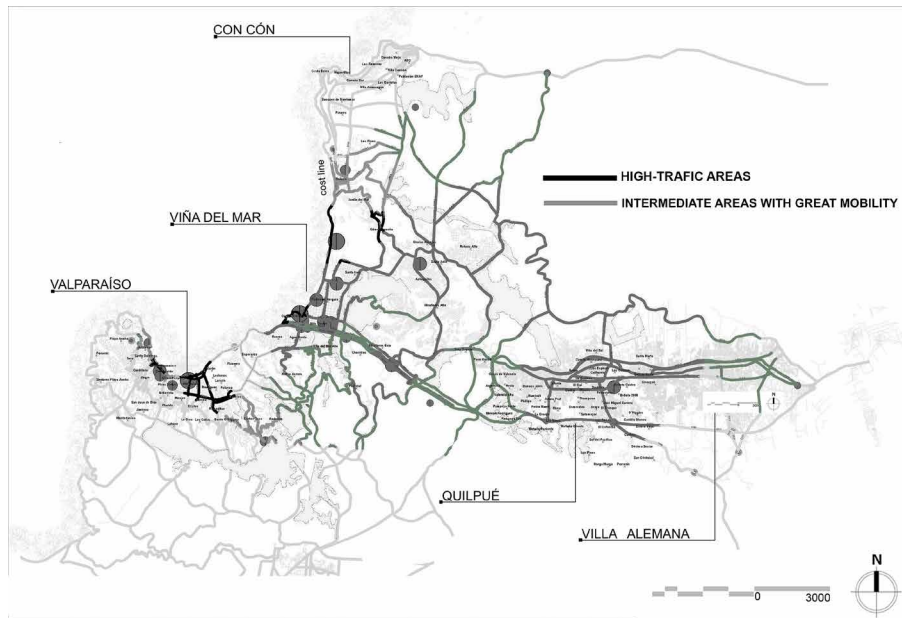


FIG. 3.29 Figure 3.29: High-traffic areas. Source: Author, based on Ministry of Transportation data.

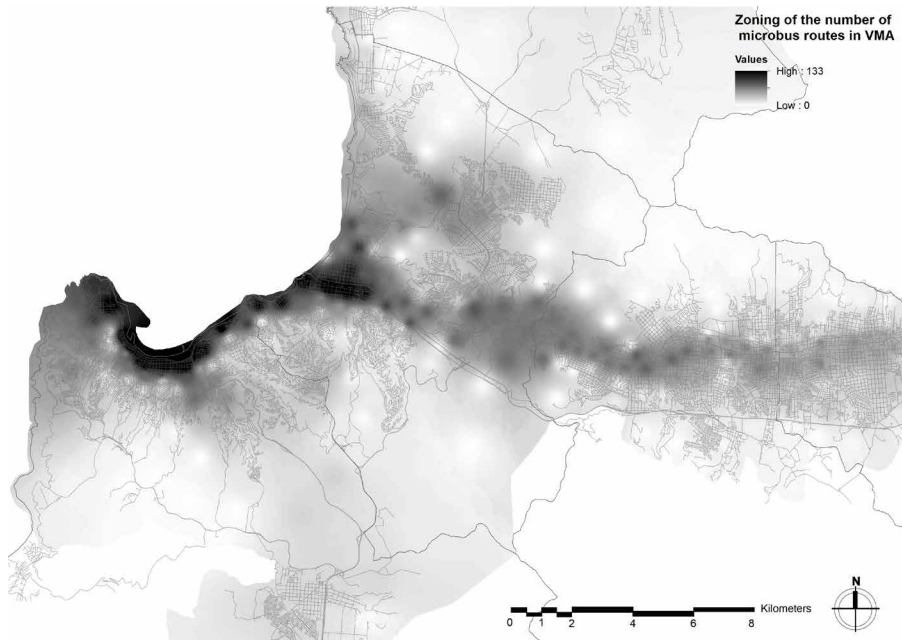


FIG. 3.30 Density of microbus lines in the VMA. Image generated using ArcGIS. Source: Author

3.4.5 Mobility and Urban Development in the Valparaíso Metropolitan Area

As part of the 2002 census, for the first time, the inhabitants of the Valparaíso Metropolitan Area were asked for the first time about their mobility practices. This took the form of the following question: “Do you work and study in the same commune where you live?” (2002 census). This was the only census question designed to measure individual and collective mobility. The answers demonstrated that almost half of the population of the Valparaíso metropolis commuted to other communes for work or study. The flow of vehicles through the different areas of the metropolis can be used to determine which are the most connected zones and which are high traffic demand areas. The data shows that the pivotal zone of the pendulum movement that is evident in the Valparaíso Metropolitan Area is in downtown Viña del Mar between the city’s borders and the coastline.

Disaggregating the information by administrative unit, the survey answers reveal that the percentage of those moving between communes for work or study rises to 72% in Quilpué and Villa Alemana whilst in some private subdivisions in Villa Alemana, it rises to over 95%. these areas become dormitory communities around 1980. In the same year, 1980, it became apparent that an asymmetry in the socioeconomic distribution of Valparaíso Metropolitan Area begun to develop. While the population of Valparaíso (1983) fell in comparison to Viña del Mar, the population in the interior, dormitory cities of Quilpué and Villa Alemana rose 17% and 22% respectively between censuses.

Herce noted that the breaking up of the continuous city during the 1980s was associated with several influences (Herce, 2009). Borsdorf *et al.*, (2007) highlighted in particular the ways in which the rise of gated communities in the Valparaíso Metropolitan Area have intensified the fragmentation of the urban fabric (Borsdorf *et al.*, 2007). As noted previously, Vidal’s research shows that such communities are not only disconnected from each other but often highly car-centred and seldom interact with other populations (Vidal, 1999). This reflects the views of Webber who noted the importance of local links and highlighted the increasing role of infrastructure as a key element of spatial planning (Webber, 1968; also mentioned by Dupuy, 1987). For the Valparaíso Metropolitan Area, between 1998 and 2014 the use of private cars increased from 15,8% to 29,4% and use of public transport decreased from 41,8% to 26,3% further demonstrating how urban expansion into new areas tend to further increase the use of private transport (SECTRA, 2014).

To understand more broadly how changes to the urban fabric affects individual mobility patterns and how changes in urban mobility patterns affect the urban fabric, there is a need to study urban units that attract and generate individual trips. Yet there is limited data on the impact of such changes available. Conducted by The Transport Planning Secretariat (SECTRA for its acronym in Spanish), there are origin and destination surveys of 1998 and 2014. These surveys form the only significant data related to trips by public transport gathered in these 16 years.

Despite the limited nature of this data, it does provide some insight into the development of urban sprawl within the Valparaíso Metropolitan Area over time and an indication of the monocentric conditions that developed within the extended low-lying central area. Figures 3.31 and 3.32 demonstrate that the urban units that attract most mobility in rush hours were the downtown areas of two principal cities of the metropolis Viña del Mar and Valparaíso. Between the two origin-destination survey periods, the coastline increasingly figures as an attractor of trips and does not show gaps in the second period, as it does in Figure 3.31 (1998 origin-destination survey), toward the commune of Concón. This change responds to the commune's significant developments in real estate, which has increased the need for non-professional jobs.

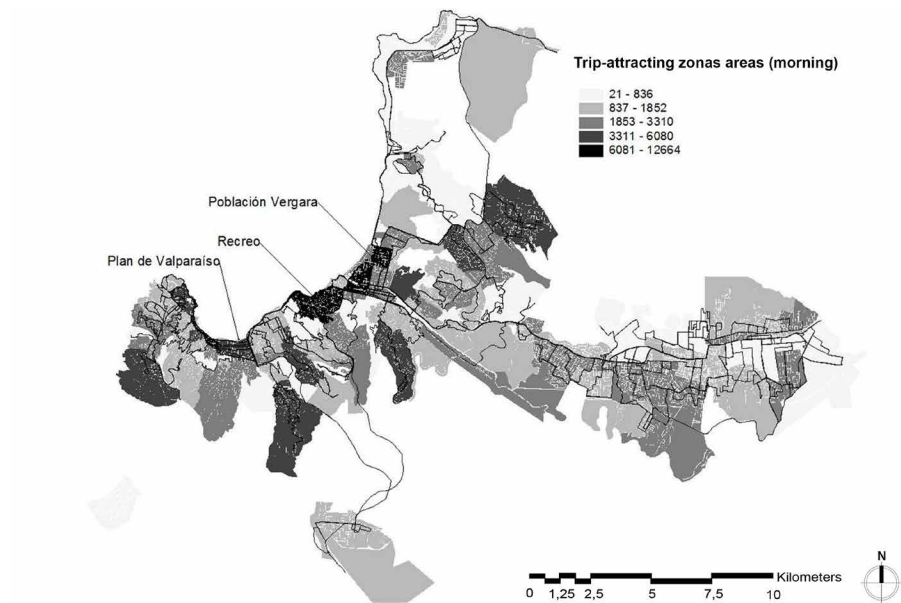


FIG. 3.31 Trip-attracting zones (morning). Source: Soto and Alvarez (2012), based on the origin-destination survey of 1998.

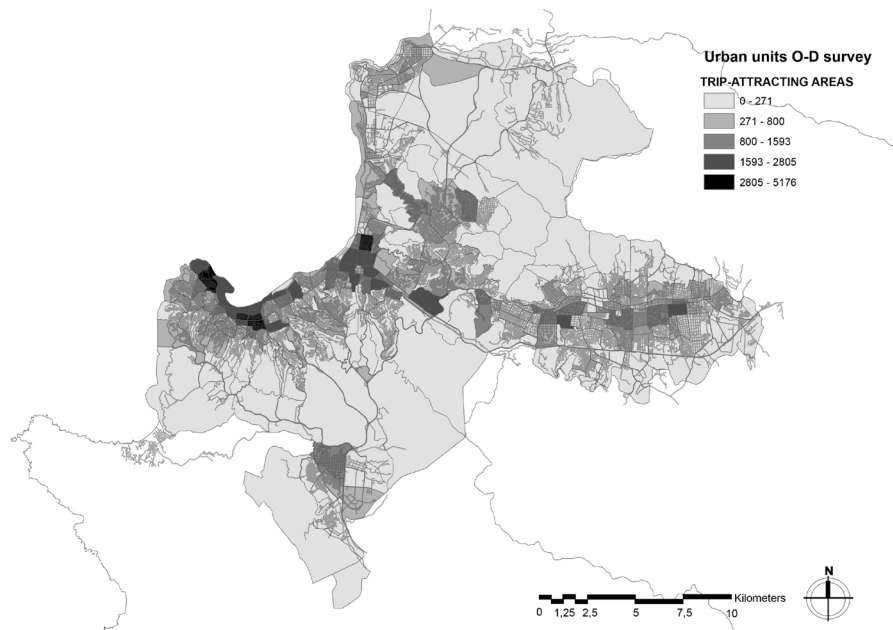


FIG. 3.32 Trip-attracting zones (morning). Source: Author, based on the origin-destination survey of 2014.

In both survey periods, the most significant trip concentrations are associated with journeys to the main urban centres of the Valparaíso Metropolitan Area. There is however an increasing number of trips at the edge of downtown Viña del Mar. This change is a consequence of the concentration of tertiary services (malls, shopping centres, workplaces, healthcare facilities) that have emerged there in the last 15 years. Another interesting data point is the increased number of trips in two parts of downtown Valparaíso that, for the most part, have good metropolitan and regional intermodal connections. The first area is the Central Omnibus Station, which provides an adequate supply of public transport. The second, which has the same characteristics, is the Central Metro Train Station.

Figures 3.33 and 3.34 show that the areas that generate trips during morning rush hours are mainly peripheral areas associated with high-density social housing developments such as Playa Ancha, Forestal, Achupallas, and Reñaca Alto. The main change in trip-generating areas between 1998 and 2014 is that the centre of Valparaíso no longer generated trips in the latter survey period. Another interesting development in the later survey is that new areas were now generating between 890 and 1406 daily trips. These new areas are related to the high-rise middle-class housing developments that start in Baron Hill and end in Forestal, an area on the eastern outskirts of Valparaíso. Meanwhile, Curauma and Villa Alemana, where several single-family housing developments are located, produce the highest percentage of trips amongst those areas that are generating activity. This is mainly due to investments made in interurban highways. The areas that account for the most daily trips however (Figures 3.35 and 3.36) are mostly located in peripheral areas of the Valparaíso Metropolitan Area. The only area that bucks that trend is downtown Viña del Mar which has seen a high-rise housing boom in the last seven years.

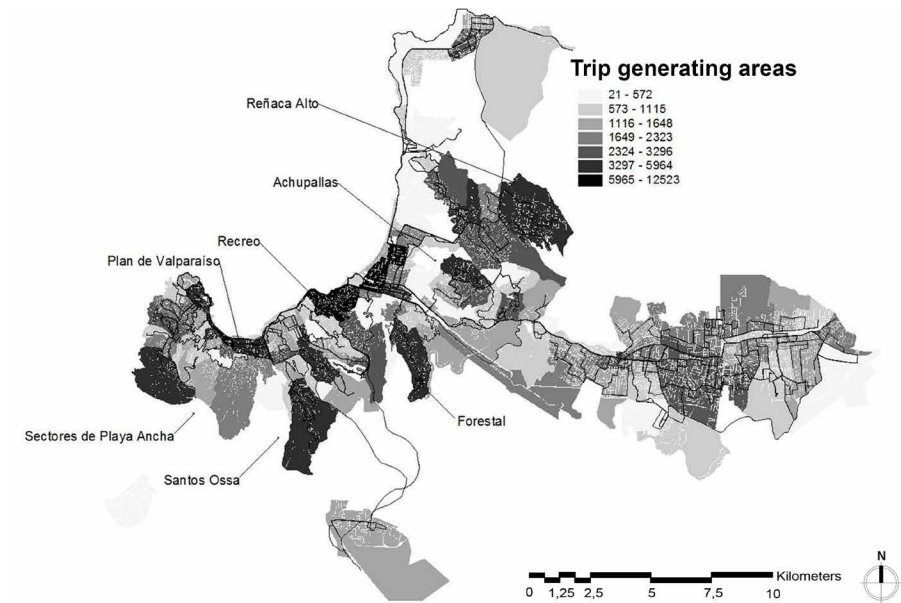


FIG. 3.33 Trip-generating zones (morning). Source: Soto and Alvarez 2012, based in the origin-destination survey of 1998

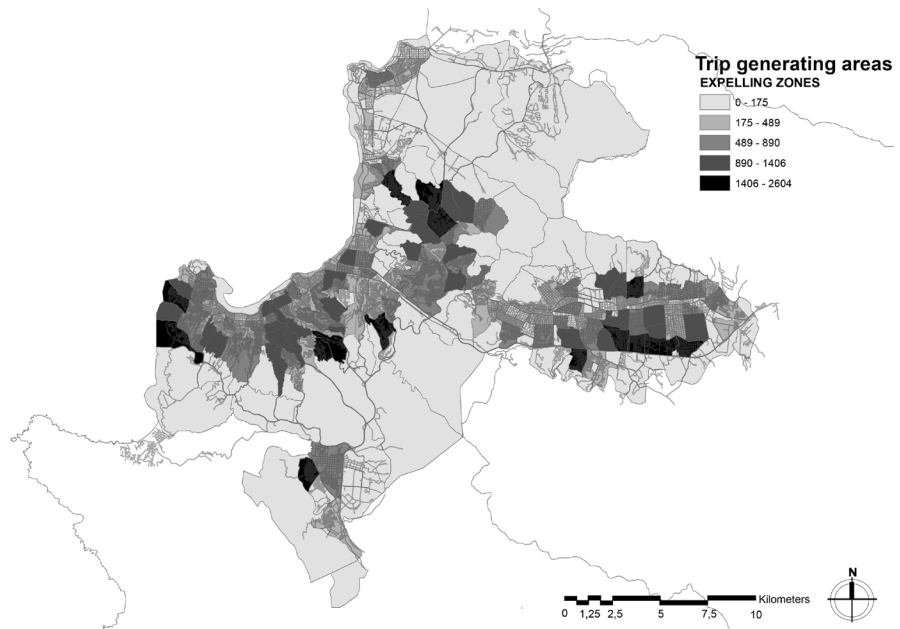


FIG. 3.34 Trip-generating zones (morning). Source: Author, based on the origin-destination survey of 2014.

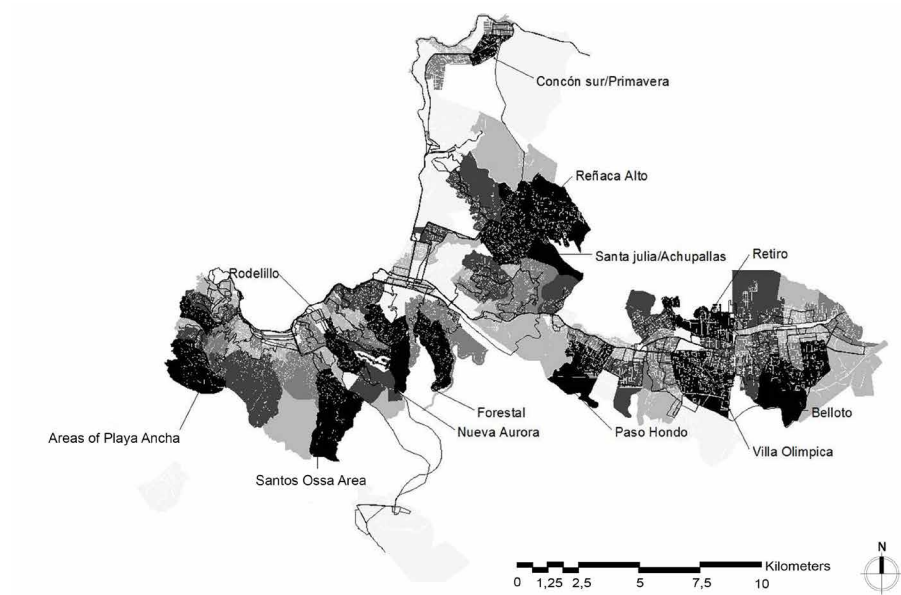


FIG. 3.35 Areas that account for the most daily trips. Source: Soto and Alvarez (2012), based on the origin-destination survey of 1998.

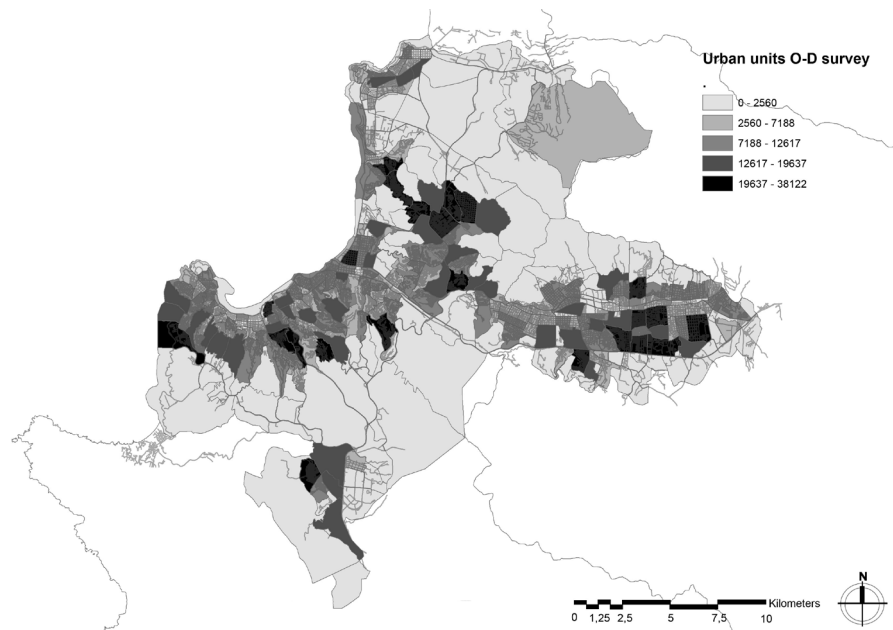


FIG. 3.36 Areas that account for the most daily trips. Source: Author, based on the origin-destination survey of 2014.



FIG. 3.37 From Polanco Hill. Source: Jens Thomas Arnfred (2004).

Looking at broader patterns of urban mobility, the leading travel directions revealed by these origin and destination surveys are from the outskirts to the centre, primarily from high-density residential developments. This runs counter to more recent research in which increased the diversification of both trips and motives is identified one of the leading contemporary characteristics of daily mobility. Soto and Alvarez have since demonstrated that changing the scale of analysis to a group of inhabitants (valid sample) with certain similarities and common identities reveals some asymmetries in general mobility patterns such as the diversification in daily trip destinations (Soto and Alvarez, 2012). This study analysed a group of low-income, non-professional workers who depend on public transport, demonstrating that low-income workers do not have one travel direction for work, but instead different travel directions in the metropolis, as reflected in movement clouds on the map (Figure 3.38) (Soto and Alvarez, 2012).

In Figure 3.38, each line shows an employment-related travel direction with a number, and the thickness of the line shows the number of trips in each travel direction. The thickest line represents the more significant number of trips between central areas of the two main cities. The other lines are travel directions from the periphery to the periphery. This diagram is dependent on a range of

methodologies for measuring mobility, and reveals data hidden in the general origin-destination surveys of 1998 and 2014. Mapped in this way it becomes possible to see an increasingly diversified set of travel patterns compared to the general mobility patterns. This is associated with a cloud of trip directions throughout the metropolitan area, although the main travel direction is the periphery's pendular movement to the centre (Soto and Alvarez, 2012).

Another critical observation offered in the study by Soto and Alvarez (2012) is related to circular movements. These are associated with a substantial portion of the population living in informal settlements in peripheral areas who do not move beyond their neighbourhoods (Figure 3.38). One such example is Manuel Bustos which is the largest informal settlement in Chile housing 1,200 families (Figure 3.38). This research highlights that urban mobility patterns within the Valparaíso Metropolitan Area depend on movements in a range of direction not only centre-periphery as might be assumed, but also periphery-periphery and centre-centre, (this shift is due to the labour mobility of low-income workers'), periphery to the centre, and finally, movement in circles (Soto and Alvarez, 2012).

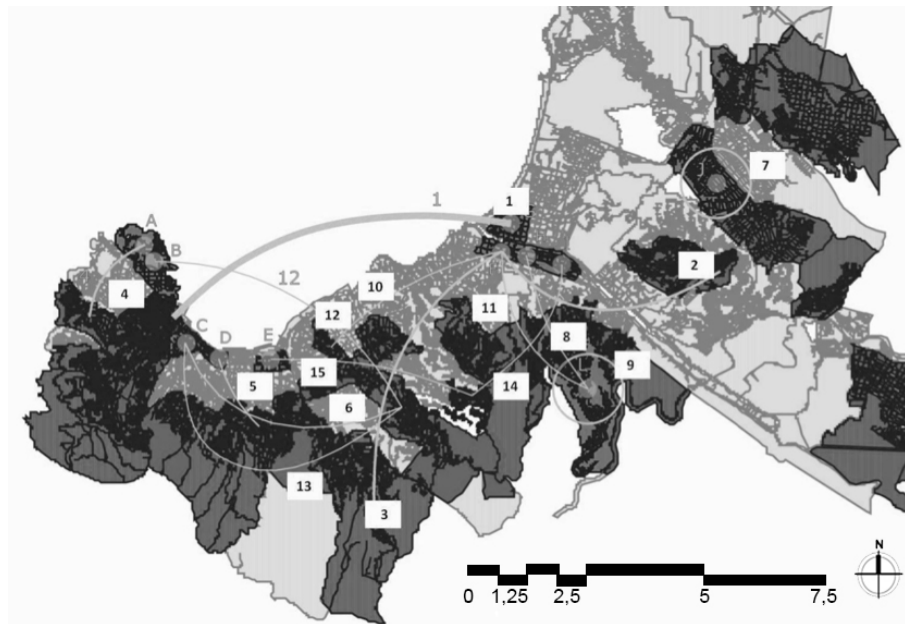


FIG. 3.38 Residence-to-workplace movement clouds of low-income groups. Source: Soto and Alvarez, 2012

3.5 Conclusions

Urban expansion in Latin American metropolises is usually characterised by dispersion and an increasing segregation of the urban system (Peters and Skop, 2007; De Matos, 1999). This expansion often takes place in territories of significant topographic complexity, where steep slopes and hilly terrain exacerbate spatial discontinuity and fragmentation trends (Peters and Skop, 2007). Driven by uncontrolled and unplanned urban development, urbanisation processes often exceed legal margins (resulting in informal settlements), which happen in unsuitable areas for urban development and even considered high-risk zones. As large informal neighbourhoods develop, often in a segregated and isolated locations, urban mobility is crucial to integrating the populations within these 'informal settlements population' by allowing these populations access to important city areas and services (Roy and AlSayadd, 2004; Roy, 2005).

In Valparaíso, urban growth, and subsequent consolidation has been heavily reliant on the creation of further infrastructure networks. Notably, increasing topological complexity further from the central areas has required the development of technologically complex infrastructures. The implementation of road infrastructure for connectivity, such as highways and bridges, can become extremely difficult in such topographically complex territory. The result is often a discontinuous road network consisting of narrow and winding streets. This poorly laid out 'network' contributes to the isolation and segregation of specific population groups (Heinrichs and Bernet, 2014).

More broadly, the topographic complexity of many Latin American urban spaces such as Valparaíso can also exhaust the urban-infrastructure development cycle, requiring technological interventions to connect fragmented populations that are so complex that it becomes challenging to re-promote them (León, 2013). Such populations become more expensive to cater for within the existing infrastructure frameworks and therefore, they become more unreachable. Such dynamics restrict accessibility from peripheral (and often informal) settlements, which disproportionately affects under-privileged groups and induces permanent changes in the mobility patterns of its inhabitants.

Although León was commenting generally on character of metropolitan areas across Latin America, many of these challenges are to be found in the Valparaíso Metropolitan Area. In many areas of the Valparaíso metropolis's hilly areas, for example, spontaneous informal urban expansion has always preceded regulations,

authorities, plans, and improvements in infrastructure. This means that frequently attempts to regulate such informal urban growth and to connect with these populations are trying to deal with something that is already established years or decades after the organic processes of urban expansion have created it (León, 2013).

Conversely, due to the same lack of investment in connectivity within the inner metropolitan area, urban growth in some areas of the Valparaíso Metropolitan Area remains stagnant even though the Metropolitan Master Plan for Valparaíso allows for the future urbanisation of three times the total hectares urbanised in 2019. The diffusion of peripheral growth accelerated and stimulated by a significant investment in regional transport infrastructure during the 1990s did however not end in 'oil stain' growth. The specific geographical and topographical conditions instead created two associated developmental patterns. The interior of the Valparaíso metropolis is notable for its stagnant formal growth due to the lack of public infrastructure investment, while its peripheral areas have been boosted by higher demand for single-family housing (suburban areas).

These two developmental features are reflected in the mobility patterns found across the Valparaíso Metropolitan Area. Such developments act to reinforce the general pendular movement from the periphery to the centre. Although the most significant trip concentrations relate to the main urban centres of the Valparaíso Metropolitan Area, other relate to an increasing number of trips conducted at the edge of the downtown areas. These include downtown Viña del Mar where a concentration of tertiary services (malls, shopping centres, workplaces, healthcare facilities, among others) has emerged in the last 15 years or in multimodal mobility areas, such as the Valparaíso Central Omnibus Station, and the Valparaíso Central Metro Train Station.

Wider changes in the socioeconomic distribution and growth of the Valparaíso Metropolitan Area's population since the 1980s have brought further changes to mobility patterns within the metropolis. There has, for example, been a social polarisation between and among populations in particular communes. Valparaíso for example, now has a greater proportion of the lower-income groups, whereas highest income groups have tended to prefer Viña del Mar and Concón. Across all the Valparaíso Metropolitan Area communes, lower-income groups tend to live mainly in peri-central and peripheral settlements on the hills, which are typically areas with low land value and single-family houses. This has meant that Valparaíso Metropolitan Area now has the largest number of informal settlements in Chile.

This compares with Viña del Mar where comparatively expensive high-rise developments have multiplied in the last decade. Developers have tended to favour Viña del Mar because of its strong centrality but also to a lesser extent, the outskirts of Valparaíso with its views of the ocean. Indeed, all the coastal border cities with Pacific Ocean views now provide second homes for high-income groups from Santiago, this is particularly evident in the commune of Concón. In response to such change, areas that now generate trips during morning rush hours are mainly peripheral areas particularly those containing high-density social housing. The other significant change with the last decade has been that the centre of Valparaíso (flat area) is no longer generating trips due to population loss.

Historically, urban mobility patterns in the Valparaíso Metropolitan Area have been pendulum trips between dormitory communities and the economic centre of Valparaíso. Although this pattern persists, high-density residential developments to the bay's extended and flat central area have produced a range of more varied trip patterns. Data associated with services and business licenses reveals that far from having the polycentric structure that has previously been seen as characteristic of Latin American metropolitan areas (De Mattos, 1999; Janoschka, 2002; Rojas *et al.*, 2013), the Valparaíso Metropolitan Area has a monocentric structure due to the geographical configuration of the bay.

This has meant that travel movements have become more varied, as people move from the periphery to the periphery or travel between different sectors of the metropolitan area. Despite this difference between the patterns identified in many Latin American urban areas and the monocentric structure of the Valparaíso Metropolitan Area, there are some relevant similarities. The Valparaíso Metropolitan Area for example, does share some of the metropolitan dynamics found in some other Latin American cities such as the social segregation and polarisation identified by León and others which disproportionately affects under-privileged population groups (León, 2013).

4 Higher Education and Urban Development in Chile

4.1 Introduction

Universities are a significant element in a student's daily mobility patterns, but universities also form a significant part of a city's structure, creating functional changes in a city's form. It is therefore important to acknowledge each institution's characteristics, how they have developed over time, and how metropolitan transformation influences the development of universities in the city and vice versa. As such, it is necessary to explore political, economic, and social processes have influenced Chile's higher education sector and how broad changes in Chilean tertiary education has affected the spatial distribution of universities within the Valparaíso Metropolitan Area.

This analysis will focus firstly on the most significant developments that have shaped Chilean higher education since 1980. Secondly, the analysis will explore how these changes have affected both student enrolment and the socioeconomic condition of higher education students within Chile's higher education sector. The analysis will then consider how these broader changes have affected the location and distribution of higher education institutions within the Valparaíso Metropolitan Area. Finally, the analysis will look at how distribution of the areas universities now relates to the daily mobility patterns of the area's student populations.

Although there have been many smaller shifts within the Chilean higher education sector, an analysis of those changes really needs only focus on one decade. During the years of Chile's military dictators (1973-1990), it was 1980s that saw the emergence of set of new models for the country's higher education sector. The prime change in what become a decade of change was an increasing horizontal diversification amongst existing higher education institutions and the incorporation of new privately funded institutions. These changes produced a vertical differentiation related both to a rapid rise in the number of new educational establishments but a diversification of higher education provision as new universities, professional organisations, and technical training centres were established.

The most immediate effect of the changes was a substantive growth in student enrolment during the 1990s but there was also an increasing diversity in the socio-economic backgrounds of Chile's higher education students. By the 2000s, deregulation and neoliberal inspired free market thinking had inspired a state of territorial competition between traditional and newly established private universities. Institutions began to mutate from being based on a single urban campus into universities with multiple campuses and differentiated structures which has now resulted in a segmented and diversified system.

Being able to recognise the differences between institutions within such segmented and differentiated system is important. As UNESCO (in Gazzola and Didriksson, 2008) has stated, in the last three decades this diversity has become so broad, that it is necessary to narrow the groups to create one that hosts similar characteristics to enable a comparison to be made. In this case, the two key characteristics that will be used to group the institutions of the Valparaíso Metropolitan Area will be based both on their origins but also their designation: whether they are private universities or traditional universities.

This grouping firstly acknowledges differences in institutional governance. Secondly, this grouping acknowledges the increased socioeconomic diversity of the enlarged population of students. Influenced by longer term development and growth trends that shaped the Valparaíso Metropolitan Area, students within this now much larger cohort now hail from very different socio-economic backgrounds. This grouping finally, relates institutions to their geographical location within the Valparaíso Metropolitan Area. This takes account of specific changes observed between 1980 and 2012. As such, private and public universities will be compared in terms of their administrative structures, the socio-economic characteristics of their enrolment, and the general location of university facilities within the metropolis.

The latter is particularly relevant in that it accounts for two variables influencing the mobility of populations proposed by Janoschka. Firstly, the socioeconomic conditions of the urban area that houses the populations in question and secondly, their proximity and therefore the extent to which populations can access to public transport (Janoschka (2002)). The latter variable includes factors such as the extent of public transport provision in urban units of the O-D origin and destination survey, the areas where traditional and private universities are located, and the road/traffic densities in different urban areas.

4.2 The Development of Chile's Higher Education Institutions (1980- 2000)

From the beginning of the 1980s, governments throughout much of Latin America and the Caribbean were increasingly influenced by a neoliberal economic model. Most often associated with the Chicago School of Economics, the spread of this neoliberal model induced significant political, social, and economic change throughout the region. For Latin America this meant the enactment of public policies based on ideas such as wholesale deregulation and privatisation.

Within the Chilean higher education system, there were two significant neoliberal-inspired shifts within the existing system of higher education governance. The establishment and incorporation of new private institutions produced an increasing horizontal diversification in higher education provision. This was allied to an increasing vertical differentiation which was related to the growth of new educational establishments, universities, professional organisations, and technical training centres. The extent to which free market thinking became the primary ideological driver for educational reform is seen most clearly in the changing number of higher education institutions. In 1980, for example, Chile had eight colleges. By 1990, that number had grown to almost 60 (Table 4.1 and 4.2).

Although the growing influence of free market ideology and deregulation were important in widening the scale and scope of Chile's tertiary education provision, such thinking induced changes in other areas of policy. The clearest consequence of political change was that university campuses became more diverse in terms of their enrolment but also physically. Now under authoritarian rule, the military junta regarded Chile's traditional universities as potential adversaries whose power had to be constrained.

The government's solution was to create new private universities while acting to limit the resources of the existing public ones by breaking them into smaller discrete units. Although associated and influenced by neoliberalist ideals, these policies were a deliberate attempt to curtail any potential intellectual and political dissent. The impositions of these policies during the 1980s, means that today Chilean universities are typically made up of small faculties spread throughout central urban areas and that Chile has 18 regional universities instead of 1 national university.

But the decentralisation of university provision was not only a consequence of efforts to quell possible intellectual and political dissent from the higher education sector. Influenced by same neoliberal model, the Urban Development Policy in Chile of 1979 posited that urban land is an unlimited good. This new approach to land ownership and land utilisation proved pivotal in bringing about the end of the Valparaíso Industrial conurbation, but also acted to re-enforce contemporaneous efforts to decentralise university campuses across Chile and within the rapidly developing Valparaíso Metropolitan Area.

This period of expansive growth that began in the 1980s was ended by an economic crisis which caused a sharp decrease in public resources given to universities. According to Brunner⁸ (1997), the military regime assumed that in the long run, a mixture of public and private funds would produce "...a greater mobilisation of societal resources than either could achieve alone" (Jones, 1992, from Brunner). An alternative view of the changing level of economic support for the higher education sector was that the new military government could no longer afford to support higher education and was perhaps more willing to freeze public provision for it than earlier administrations. In either case, Chile's publicly funded universities immediately felt the repercussions which was quickly reflected in lower or stagnant enrolment.

The economic turmoil of the 80s was followed by a significant rebound in the fortunes of the Latin American higher education sector. The number of universities as declared by UNESCO (2008) rose from 75 in 1950 to more than 1,500 today. Over the same period, the number of higher education students rose from 276,000 in 1950 to nearly 12 million today, or in other terms, enrolment has multiplied by a factor of 4.5% (Table 4.1). It is important to note the extent to which the Latin American higher education sector is now governed private.

⁸ José Joaquín Brunner, appointed General Minister Secretariat of Government by Frei Ruiz-Tagle (1994–1998), President of the National Commission on Accreditation of Undergraduate Programs, Vice President of the Higher Council of Education, member of the Science Council of National Funds for Scientific and Technological Development (FONDECYT), and director of FLACSO.

The matriculation rate has been much higher for private colleges (8%) than for public universities (2,5%), meaning that more than 50% of university enrolment in Latin America is in private institutions with the three largest percentages being recorded in Brazil, Chile, and El Salvador UNESCO (2008).

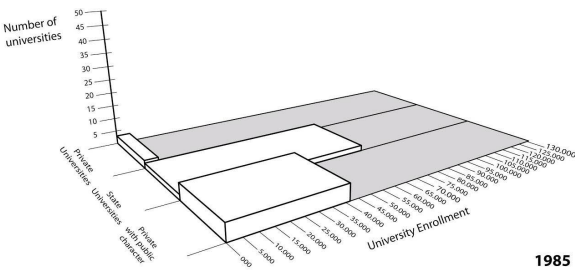
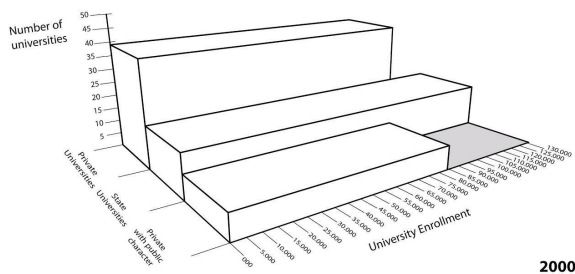
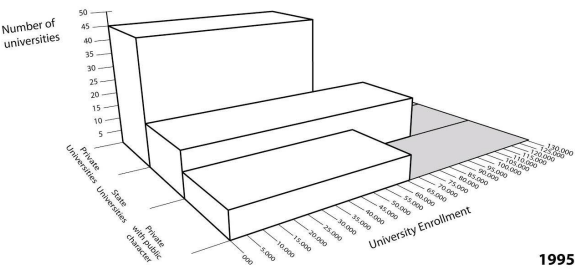
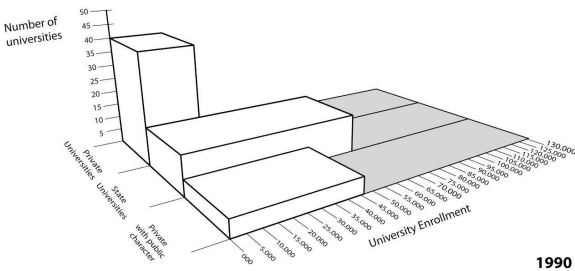


TABLE 4.1 Number of universities 1980-2000 in Chile. Source: Ministry of Education and HE Council, <https://www.mineduc.cl/>. Source: Author



For the Chilean higher education sector, the direct intervention of the military government had meant that during the 1980s there was a rapid rise in the number of private universities. The succeeding decade however was perhaps more notable for a rapid growth in student enrolments. This explosion in enrolment is not only attributable to the number of new institutions that had been created through the 1980s but also to a diversification of the student population (Table 4.2). This appears to be something that can also be attributed to a general improvement of people's socioeconomic circumstances (Table 4.3) and a consequent increasing demand higher education across the region (UNESCO, 2008).

Years	State	Private	Private	State enrollment	Private enrollment	Private enrollment
	Universities	with public character	Universities	Universities	with public character	Universities
1980	2	6	0	118978		0
1985	2	6	3	71465	41661	4,951
1990	14	6	40	65,897	46661	19,509

TABLE 4.2 Chile: Universities and student enrolment in Chile from 1980 to 1990. Source: Ministry of Education and HE Council.

University Enrollment			
	State Universities	Private with public character	Private Universities
1980	No/infor	No/infor	0
1985	71.465	41.661	4.951
1990	65.897	46.294	19.509
1995	95.949	65.899	69.377
1996	104.942	69.997	78.565
1997	111.397	72.690	85.697
1998	121.928	78.043	92.821
1999	126.030	80.542	103.805
2000	131.128	84.154	111.916
2001	227.	284*	125.740
2002	243.	593*	

TABLE 4.3 University Enrolment in Chile from 1980-2002. Source: Bernasconi and Rojas (2003). Note: for the figures labelled * the Ministry of Education did not separate data.

These were very significant steps away from the unchallenged dominance of the traditional public universities within an educational system that had previously served a socially less complex and less heterogeneous student population. This change towards a larger, more diverse, socially segmented student population, or perhaps more accurately student populations, quickly began to alter university infrastructures. The expansive changes in the student population meant that whereas institutions had typically been based around one urban campus increasingly they were based on multiple campuses or developed facilities in different regions of the country (Figure 4.1).



FIG. 4.1 Development of Traditional Universities in Valparaíso at a National Scale. Source: Author

Although neoliberal inspired free market ideology, deregulation and decentralisation had perhaps improved access to universities, there is one further impact on university infrastructure that arose from the economic and political upheaval of the 1980s and 1990s. The growing influence of private sector institutions meant that Chilean tertiary education became much more sensitive to market demand. UNESCO has highlighted the ways in which the Chilean university system experienced a new trans-nationalism through the 1980s. This trans-nationalism developed as private institutions in Chile, but also more broadly in several Latin American countries, began to offer a variety of online education programs, degrees, and certificates which were taken up by students in countries such as the United States, Canada, and Spain UNESCO (2008). This change in outlook was perhaps an inevitable product of the way in which the new private universities were often supported or wholly owned by international investors (U.S. Conglomerate Laureate Education).

4.2.1 The Growth of University Infrastructure at a National Level

Gazzola and Didriksson have highlighted the way that ownership aside, the period during which the Chilean higher education sector expanded under the continuing influence of neoliberal thinking had broader demographic, socioeconomic and political implications that were and continue to be significant not only in Chile but also in many Latin America and Caribbean countries (Gazzola and Didriksson, 2008). For Chile, perhaps the first impact on higher educational provision was a re-distribution of such institutions throughout the country. The imposition of national policies around decentralisation and market-led economic development quickly inspired significant and intense competition between the traditional education system and the private system during the 1990s and early 2000s.⁹

Whereas before a relatively low number of institutions had been established in a relatively small number of locations, under the neoliberal paradigm many more institutions were established in many more locations. The explosion in demand for tertiary education in the 1990s and the concomitant potential for profit further increased the availability of higher education as companies and other institutions became interested becoming local higher education centres. This increased appetite for local centres of education further

⁹ Traditional universities have increased their campuses from 42 in 1980 to 56 in 2003, reaching a geographical coverage of 12 of the country's 13 regions. Private university campuses have increased from 47 in 1990 to 89 in 2003 and are directly associated with full autonomy. Their expansion plans aim to increase in size and thereby in revenue, market capitalisation, and political influence are more accelerated, according to Bernasconi and Rojas (2003).

increased competition within the sector because more students were able to access some form of higher education in locations closer to their homes.¹⁰

Still evident today, this competitive tension between the traditional and private educational systems continues to influence the location of educational facilities and therefore the daily movement patterns of Chile's higher education students. Two patterns of institutional growth came to dominate. Firstly, at a national level, some institutions grew outside their region of origin by building facilities that were seen as enhancing higher educational provision in medium sized cities where higher education provision was previously scarce or mostly provided by much smaller private institutions. Secondly, institutions grew on a metropolitan scale as the numbers of institutions in a particular metropolitan area expanded to meet local demand.

Each of the universities studied within this thesis dealt with these two developmental patterns in different ways and in differing periods. The expansion of the University of Playa Ancha (UPLA), for example, was somewhat premature at the beginning of the nineties. A selective university with academic programs, UPLA was expanding at a time when the public universities were still adjusting to the educational reforms of the 1980s. This first regional level expansion occurred because of local social development reasons. Growth towards San Felipe in 1991, an essentially rural area at the time, was intended to enhance opportunities for agricultural education. Later in the mid-2000s, influenced both by the ideals of decentralisation and the new opportunities offered by the relatively untapped regional market, a Valparaíso University (UV) campus was created in the same area (Figure 4.2).

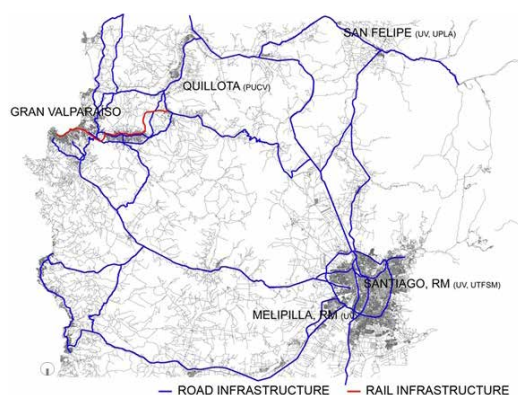


FIG. 4.2 Traditional Universities in the Macro-Central Zone.
Source: Author

¹⁰ Bellet (2011) proposed that university decentralisation processes imply, in many cases, enhancing the territorial capital of cities hosting the new institutions, but also the dangers of having second category centres that are not always fruitful; national examples will be given.

Two key changes at national level enabled fresh growth at regional level during the 1990s. The first was the application of alternative university admission methods (without national admissions tests) introduced with the clear objective of establishing a private market for education.¹¹ The second was an increasing demand for and subsequent development of new distance education programs which also relied on improvements in information communication technology. These two changes occurring at national level helps to explain the problems that some institutions had when trying to establish success campuses in areas where there was no university available. In many cases, despite the overall expansion in demand for education, social factors tend have a more significant influence on a student's academic performance and characteristics. As a result, and somewhat counter-intuitively given the apparently increasing demand for education, some university campuses were closed prematurely. Such closures were largely due to three main factors¹²:

- 1 low admission scores, which implied below excellence student performance. They are characterised as dependent on scholarships to fund their studies and the inability to achieve the required academic results to receive or maintain them
- 2 campus areas were sometimes located in isolated locations that did not suit students' preferences
- 3 decentralisation meant that university campuses sometimes had inadequate facilities and infrastructure.

Some of these problems become evident when considering Valparaíso University's efforts to expand its provision. In addition to Santiago, Valparaíso University decided to open campuses in Aysen, Rengo, and Melipilla. This series of decisions was prompted by opportunities provided by an absence of other universities (private or public) in those areas. In each area, a case was made for constructing a building with regional capital funding's (FNDR for its acronym in Spanish) in a medium-sized area very well connected by urban roads on the city's outskirts but situated outside an attractive educational market and regional development poles (Figure 4.3).

¹¹ There is a student market outside the selection system of traditional universities, for example the UV wherein 2012 of 20,000 applications, only 2,700 students enrolled (Interview with Christian Corvalán, Director of UV Planning).

¹² According to Christian Corvalán, UV's Planning and Development Director.



FIG. 4.3 UV Faculty, Rengo branch, VI Region. Source: Google Images, 2013.

The region, local society, and the Valparaíso University had expected that the successful development of these new study centres would enhance the region's recognition and help develop a new larger city (Pié, 2003). In practice however many rural students decided that if they were to stay in their home city to pursue their education, they would prefer a university with a central location than one located in more peripheral areas. This, together with the other factors listed above, ended in a collapse of the system that would leave Valparaíso University in a financial and institutional crisis. This eventually caused the rector's resignation and resulted in the closure of these campuses.

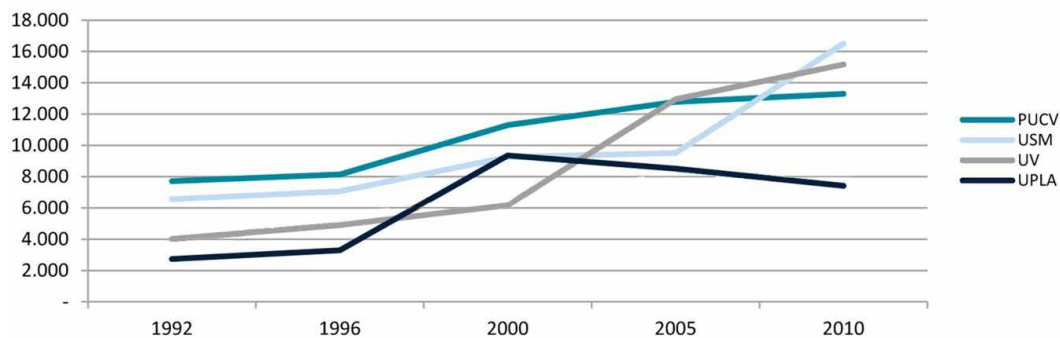


TABLE 4.4 Enrolment evolution by university. Source: Author, from the document Enrolment tendencies 1992-2010: CRUCH Undergraduates programs.

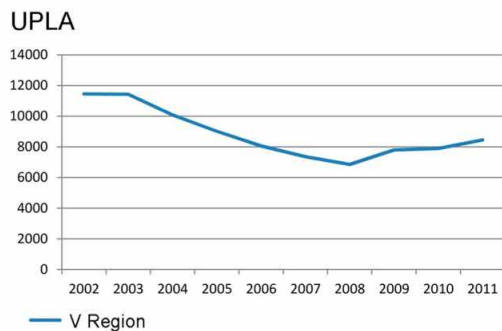
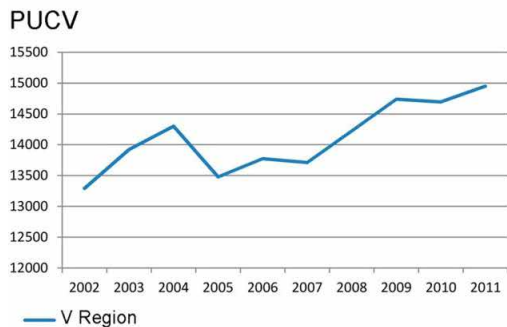
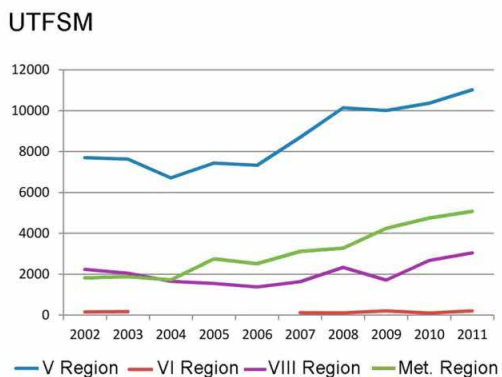
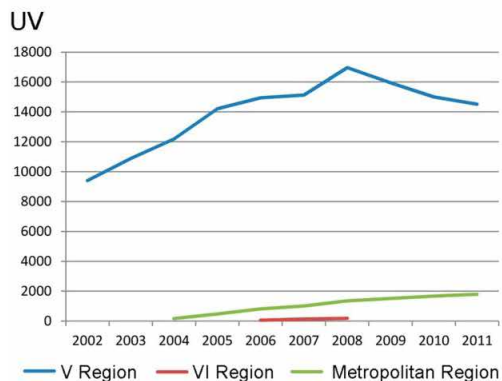


TABLE 4.5 Illustrating the enrolment evolution of universities at a national level and by region. Source: Author, from the document Enrolment Tendencies 1992-2010: CRUCH Undergraduates programs.

Valparaíso University was not alone in experiencing both success and reverses in this period of change. Two trends became apparent amongst Valparaíso Metropolitan Area's universities as they tried to expand either at national level or outside the originating metropolis (Table 4.5). The Catholic University of Valparaíso (PUCV) and the UPLA, for example, remained in the region, while the *Federico Santa María Technical University* (UTFSM) and the Valparaíso University (UV) expanded towards other regions. In the case of the UPLA, the sharp decrease in attendance is concerned with distance education programs, which allowed an enrolment increase of nearly 100%. This growth in students was interrupted in 2005 by a change in Chilean legislation, a law forbidding teacher training programs to be taught through distance learning. That meant that the significant enrolment growth suddenly stopped, and the university closed all its distance teacher training programs.

On the other hand, the growth of the UV and the UTFSM stands out. While the growth of the student body at the UV corresponds to a rising enrolment at its Valparaíso Metropolitan Area campus, the significant increase in matriculation at the UTFSM was due to the number of students enrolling both at its Concepción and Metropolitan Region campuses. The latter campus having an enrolment of four thousand students in 2010. Meanwhile, the PUCV shows steady growth, despite a decline between the years 2005 and 2007, during which time there was only an enrolment increase in the Valparaíso Metropolitan Area campus, although unlike other universities, it did not expand to other regions. This subject is mostly attributed to its status as a Catholic university. The growth of campuses into other regions was subject to the Church's decisions rather than other political or economic concerns.

4.3 Differences Between Private and Traditional Universities in Chile

The examples provided by UPLA, UTFSM, UV, and PUCV highlights some of the complexity in the region. UNESCO commentators have suggested that some aspects of this complexity are typical for Latin America as whole, but they see other aspects as being unique to the Chilean experience. Among the key influences are heterogeneity, persistent inequality, and above all, a belief in the role that public universities may have in significantly improving the lives of the country's inhabitants (UNESCO, cited in Gazzola and Didriksson, 2008). Chile's traditional universities (alternatively 'classic universities') were established in the middle of the 19th and 20th centuries. They now consist of two state universities. In terms of private institutions, three universities are Catholic, and three universities are closer to being vocational colleges.

When considering the differences between Chile's traditional universities and its private universities it is important to highlight the comparative socio-economic condition of the students enrolled in the two types of institution. This is particularly significant within an urban study because socio-economic diversity directly connects with housing provision across the urban space. Also important are differences in the historical background of university locations and subsequent changes in spatial distribution of the two sets of institutions that have been enacted between 1980 to 2012.

Amongst these two sets of institutions, there is a complex relationship between the private vocational institutions and the Chilean state that should be acknowledged. Although 'private', these institutions were generally regarded as entities of public vocation and often refer to themselves as being 'semi-public'. Writing in 2003, Bernasconi and Rojas have highlighted the way in which 1927, Chilean legislation has recognised teaching as a "...cooperative activity to fulfil the educational function of the state" (Bernasconi and Rojas, 2003, p. 214). Accordingly, the state acknowledged in law that such institutions were associated with education development and as such offered a 'public' service (Bernasconi and Rojas, 2003).

In other words, these institutions transcended their origins, instead serving as educational establishments for the public benefit. Although technically they were not part of the state, these institutions performed a 'public' function and were thus constituted by law as non-profit institutions. The term 'public' is therefore not used in this context in

an administrative or legal sense but alludes to their role as serving the nation's general interest. As such, Chilean State supported these semi-public educational establishments with financial subsidies and membership in the Council of Rectors.

In contrast to the many private and the 'semi-public' institutions were Chile's more traditional state-supported universities. These institutions were mainly defined by their greater degree of institutional autonomy with a mixture of political and professional coordination and the way in which they were publicly funded through a system of through block grants. More importantly perhaps, their students were enrolled selectively based on their academic merit. This supported by free tuition for those able students who would have otherwise been unable to pay the requisite fees.

Brunner highlights the way in which from 1980 onwards and following reductions in block grants, the country's traditional state-supported universities have needed to develop additional private income streams by, for example, commercialising some services or increasing their fees but also by seeking out philanthropic donations as well as competing for public funds (Brunner, 1997).¹³ Whereas the country's publicly funded universities are state owned, nine of the of the traditional universities represented on the Council of Rectors are constituted as institutions of private law or belong to the Catholic Church in Chile. This highlights a further point of difference is that within the public institutions, the workers (faculty and other officials) are government officials, and their assets are nationally owned.

Together, the changes enacted through the 1980s now mean that all the students who currently enrol in Chile's traditional universities must pay tuition fees. The payment mechanism can be through one or more scholarships related to their socioeconomic condition, state-guaranteed loans or grants, occasional work, or family support. Research conducted as part of this project suggests that typically, a low-income student needs three or four scholarships, one or two for educational fees, and two additional living expenses. Almost 90% of the students enrolled in traditional universities who took part in the survey were in receipt of at least one scholarship to cover their educational fees.

The direct transfer of costs from the state to students was one of the three core rules that the military government imposed when it redirected Chile's traditional publicly funded education system to a predominantly market-oriented system. The other rules imposed by the military government encouraged the creation of private colleges, a move that led to an unregulated expansion of private sector institutions.

¹³ The Indirect Fiscal Contribution (AFI, the Spanish acronym)

Initially, the system had minimal requirements for establishing private universities. Consequently, during the first years after implementing these educational reforms, eleven private universities were opened (see section 4.2).

The final core rule increased the fragmentation of Chile's public universities, by reorganising their management from a system of regional headquarters towards having a system of independent colleges by region. Accordingly, both responding to the rapid growth in matriculation but also the pressures resulting from globalisation, Chile's traditional universities have tried increase enrolment in metropolitan areas and throughout the country (Figure 4.1). In this way, the increasingly competitive market for student admission became a territorial competition. This is apparent in Valparaíso where attempts to augment matriculation rates led traditional universities to open campuses in places that did not have universities previously.

As the efforts of Valparaíso University to open campuses in Aysen, Rengo, and Melipilla demonstrate, their second objective was to capture a new type of client. They were seeking to attract students who could not previously enter traditional universities because of their weak performance in the national university selection test (PSU). This was in part an attempt to compete with the growing number private universities which were rarely concerned with grades and test scores. Within the traditional universities across Chile, the imposition of a new more competitive environment for education meant that students increasingly came from more varied academic backgrounds, something that loosely correlates with an increased socioeconomic diversity amongst their students.

The variety now evident within this socially and economically diverse and somewhat loosely defined population presents a particular challenge when conducted the research for this study of student mobility. One way to overcome this difficulty is to divide the student participants into two groups. The first group is based on an axis that seeks to distinguish between selective institutions that require a minimum cut off score of 550 points on the PSU and those that do not. This measure of differentiation is important because in Chile where higher education is a costly commodity, it is possible to use loans or scholarships or to meet the cost of tuition. Thus, the true filter between 'types' of higher education institution is perhaps the academic background of the enrolled students.

In this sense, it is possible to clearly define 'traditional universities' as those institutions that require higher PSU scores for admittance while most of the newer private universities do not require such high scores before enrolment. In addition to high PSU scores, socioeconomic diversity is also an important differentiating factor because some state grants for students depend on financial need. Regardless of their

PSU scores students from differing socioeconomic groups need loans or scholarships to enter university else students or the student's families must meet the full cost of their education.

Class segregation based on socioeconomic factors is a common determinant in many Latin American metropolitan areas such as Valparaíso. Notably, for this study, in Latin American cities, there is often a very strong correlation between a person's socioeconomic condition and the place where they live. Consequently, a valid study of urban mobility amongst the Chilean student population needs to consider attendees from a range of institutions. This ensures that the study covers a range of locations, movements, and mobility needs throughout the metropolitan area. If only one type of university is analysed, for example, a private college whose student body is mainly composed of high-income students, the study will cover students who share not only a similar socioeconomic background but tend to live in one area of the metropolis.

A second concern is the distinction between those attending traditional and non-traditional universities. Although the differences between private, semi-public, and public institutions has become somewhat diluted over time, Chile still relies on these distinctions when allocating public resources. Almost all grants/scholarships and AFI (indirect tax contributions) from the government for example, go to traditional universities to help build a diverse student population. In contrast, the government funds allocated to private universities are far lower. Mönckeberg (2005; 2007) summarised the difference, explaining that there are two types of private universities in Chile. The first group consists of for-profit businesses that charge large sums of money in exchange for educational services of varying degrees of quality. The second group comprises non-profit entities that are reliant upon large endowments and donations from businesses or private donors in exchange for significant tax cuts (Mönckeberg (2005; 2007)).

These universities are dependent upon the formation of an elite who, in the future, will most likely lead the country and be able to sustain the cycle of charitable donations back to their alma mater (Mönckeberg, 2005; 2007). During 2003, Mönckeberg noted that 17,197 million Chilean pesos (22,716,750 euros) were donated to universities, with nearly half of the funds being allocated to four institutions: Universidad Católica, Universidad de Los Andes, Universidad Adolfo Ibáñez, and Universidad de Chile (Mönckeberg, 2005). On the other hand, research from the CEFECH (Fernandez, Alencon, Cassorla and Araneda, 2014) separates the two types of private institution based on (1) the owners and (2) the undergraduate tuition fee, related to scholarships/loan and PSU scores (national university entrance exam). There was no information available from other sources like previous research, service sales, or leasing of real estate during this investigation.

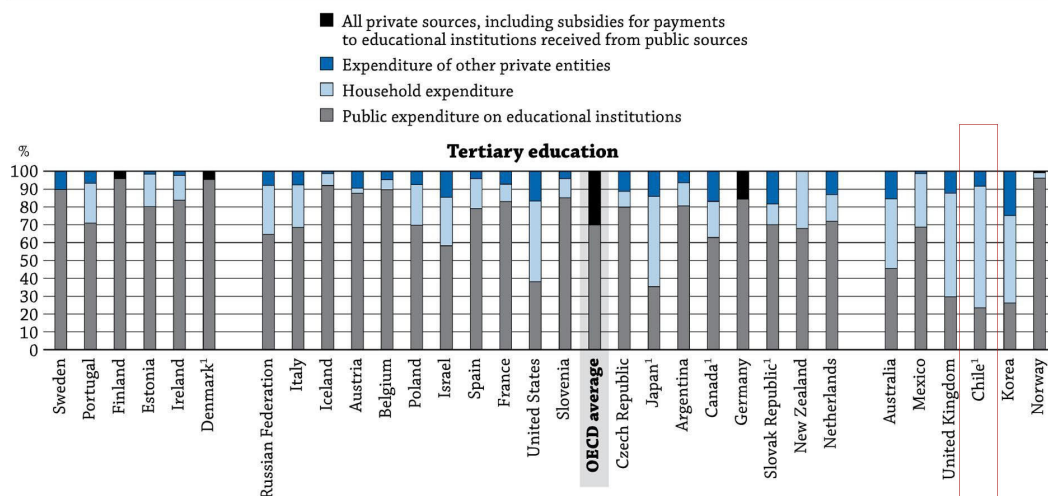
4.4 University Enrolment, Public and the Private Financing of Education (OECD)

In the current economic environment, many OECD countries are finding it challenging to provide the necessary resources to support demand for higher education through direct government support alone. While public funding in many countries still represents a substantial part of that country's overall investment in education, university funding from private sources (households) is becoming increasingly important in many countries. This however raises concerns about equity of access to education. The balance between public and private education financing has therefore become an important policy issue in many OECD countries, giving rise to policies and approaches that are dependent both on histories and political expediency.

Across the OECD private funding for tertiary education often comes from individual households, although there are exceptions. In countries such as Austria, the Czech Republic, the Slovak Republic, and Sweden, funding from entities other than households are more significant because the tuition fees charged by tertiary institutions in those countries are low or negligible. The proportion of spending on tertiary institutions by individuals, businesses, and other private sources, including subsidised private payments, is around 5% in Denmark, Finland, and Norway, where tuition fees are almost non-existent. In contrast, this figure is more than 40% in Australia, Israel, Japan, and the United States, and over 70% in Chile, South Korea, and the United Kingdom.

A 2012 OECD report notes that South Korea and the United Kingdom have the most students enrolled in private institutions. In these specific cases, the budgets of most of these educational establishments comes from tuition fees (OECD, 2012). Across OECD countries, the contributions from private entities other than households to finance educational institutions are, on average, higher for tertiary education than for other levels of education (see Table 4.6). In countries like Chile, they can be less than 10% and, previously noted, almost all are concentrated in individual universities. Australia, Canada, the Czech Republic, Israel, Japan, Korea, The Netherlands, the Slovak Republic, Sweden, the United Kingdom, and the United States typically receive 10% or more in private funds (OECD, 2012).

Distribution of public and private expenditure on educational institutions (2009) By level of education



1. Some levels of education are included with others.

Countries are ranked in descending order of the proportion of public expenditure on educational institutions in primary, secondary and post-secondary non-tertiary education.

Source: OECD, Argentina: UNESCO Institute for Statistics (World Education Indicators programme). Tables B3.2a and B3.2b. See Annex 3 for notes (www.oecd.org/edu/eag2012).

TABLE 4.6 The distribution of private and public expenditure on tertiary educational institutions (2009). Source: Education at a Glance 2012: OECD Indicators, OECD Publishing.

The main differences in university funding across the OECD countries seem to relate to the relationship between public and household contributions, Chile is one of the leading countries where households directly shoulder-high tuition costs or receive external financial aid through scholarships/grants for education. It should be emphasised that the students who enrol in specific higher education programmes in Chile often come from a particular socioeconomic group. Education is an expensive commodity in Chile and the most respected institutions (primarily traditional universities) are academically selective. For lower-income groups, the only way to participate in higher education is through public funds, not only via state scholarships but also through direct institutional support.

4.4.1 The Social Aspects of University Enrolment in Chile

Over the last 30 years, university enrolment in Chile has not been a simple transverse of the youth population but instead has reflected the social stratification that is evident across Chilean society. The 2017 census shows that those with higher income levels make up only 1.4% of the population, while the upper-middle-income make up 6% of the total. Of the balance, 6.4% are middle-income earners, 36.8% are lower-middle earners and 49.5 % fall into the low-income bracket. Of the total population, 20.3% of Chileans are considered as living in extreme poverty (Census, 2017).

As noted previously, against this pattern of social differentiation, during the 1990s, as noted previously, total university enrolment grew nearly 100%, from 112,000 to 245,000 university students (Torres and Zenteno, 2011). Those behind this rapid growth in university enrolments following the neoliberal changes of the 1980s were primarily drawn from the middle-income family backgrounds. Franco and León found that these were largely the heterogeneous middle class that profited most from the increasing influence of globalisation which tended to improve rates of income across the overall population through the early 1990s (Franco and León, 2010). Since the mid-nineties however it appears that the increasingly diverse range of private institutions have mainly drawn from the lower-middle-income classes and vulnerable socioeconomic groups rather than those populations that have historically been associated with the country's traditional public universities.

Appraising the situation in the 2000s, Orellana considers the family's social and educational background and the employment condition of the head of the household. Orellana finds that access to tertiary education in Chile remains strongly associated with the social type and family background. Young people from families of managers and professionals exhibit a virtually universal participation rate in HE of 65.1%, decreasing in lower-income groups (Orellana, 2011). Comparing the data with the percentage of higher education enrolment for specific occupational categories (Table 4.7), it seems that students from households of managers and professionals are not a majority despite the bias in coverage. They do however represent a higher percentage than their overall distribution in society (CASEN, 2009)

	Managers and Professionals	Technicians and Associate Professionals	Employees and Workers	Unskilled Workers
Coverage within the cohort (18-23 years old)	65.1%	44.3%	27%	21.4%

TABLE 4.7 Research and Sociological Studies Centre (CIES), using data from the Socioeconomic Survey (CASEN 2009) commissioned by the Ministry of Planning.

Looking at household income by group and differentiating between those who have a family member in the higher education system and those who do not, a higher average income implies a greater access to tertiary education. This data demonstrates that each group's wealthier segments have a higher concentration of students in higher education, although this group only comprises 7,9% of the total Chilean population. This last group is larger than those in lower-income segments, with Table 4.8 illustrating the social segregation associated with tertiary education.

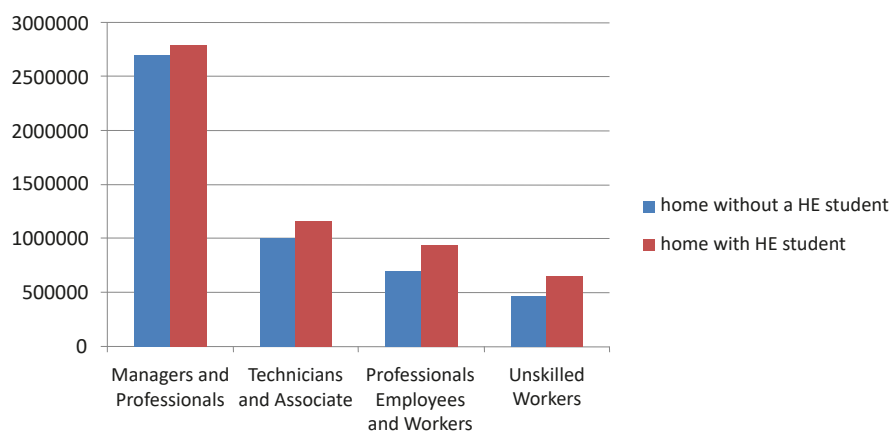


TABLE 4.8 Households average income related to higher education enrolment. Source: Research and Sociological Centre (CIES). \$100,000 pesos = €100

Turning to types of institutions that the students of the Valparaíso Metropolitan Area attend, the two lower-income groups make up almost 50% of the enrolment for professional institutions, technical training centres, and non-selective universities. The remaining 50% of the student population attend the three selective universities, research institutions, and a small percent attend military school (Table 4.9). The data shows that enrolments amongst children from families whose parents are technicians and associated professionals have both the highest diversity in the types of institutions they attend but also the highest percentage of enrolment in the first four categories. On the other hand, the category of “unskilled workers” appears to have a higher percentage of selective institution access. This data can be related to the dispersion of earnings in informal trade and the inclusion of small employers who can invest in better education for their children throughout their lives. Finally, the data indicates the diversity in the source of family income as reflected in their family’s employment type (Table 4.9).

	Managers and Professionals	Technicians and Associate Professionals	Employees and Workers	Unskilled Workers
Not classified	2,70%	2,00%	2,68%	2,91%
Research universities	23,42%	17,54%	9,03%	9,28%
Selective research universities	9,04%	14,73%	7,73%	8,20%
Selective Universities with an emphasis on academic programs and some research	20,08%	10,84%	6,71%	7,84%
Selective Universities with academic programs	14,46%	9, 88%	9,65%	13,27%
Medium-sized nonselective universities with academic programs	8,59%	9,90%	13,08%	11,60%
Large nonselective universities that mainly offer academic programs	9,02%	14,33%	18,76%	14,91%
Professional Institute	8,51%	14,82%	25,38%	25,20%
Military Academy or School	0,06%	0,94%	1,09%	0,41%

TABLE 4.9 Enrolment distribution by type of institution and occupational group. Source: Centre for Research in Social Structure, Universidad de Chile.

4.5 Comparison of Urban Location Patterns Between Traditional and Private Universities

As the data analysis has indicated traditional universities enrol students from a more diverse range of socioeconomic backgrounds when compared to private institutions. To fully understand the general distribution of private and traditional universities within the Valparaíso Metropolitan Area however it is necessary to consider several additional variables beyond socioeconomic condition, these relate to mobility, accessibility to public services, and the nature of public transport infrastructure in particular areas.

Janoschka's (2002) study of the insular model of urban development in Latin America highlights the need to also consider the underlying reasoning that motivates institutional authorities to place private colleges and universities in the vicinity of new private residential areas (Janoschka, 2002). Janoschka suggests that these decisions take in account not only the socioeconomic conditions of the urban area that will house its students but also the relative accessibility of public transport networks (Janoschka, 2002). The latter variable is determined by the number of public transport lines contained in urban units (as used in the traditional origin-destination surveys), the placement of other traditional and private universities within the metropolis, and road density comparisons in different neighbourhoods.

Figure 4.4 demonstrates Janoschka's hypothesis that private universities at a metropolitan scale are most often located in areas that have a concentration of high-income population, a choice of location that indicates that private universities prefer to be close to potential students (Janoschka, 2002). A practical example of this is the University Adolfo Ibañez Business School (2014) whose campus is located far away from urban centres and public transport, mainly because most of its students are from high-income groups. Although private universities seem to prefer being located to their potential students, other important considerations include the availability of large urban sites with both the space to develop a substantial university campus and good accessibility.

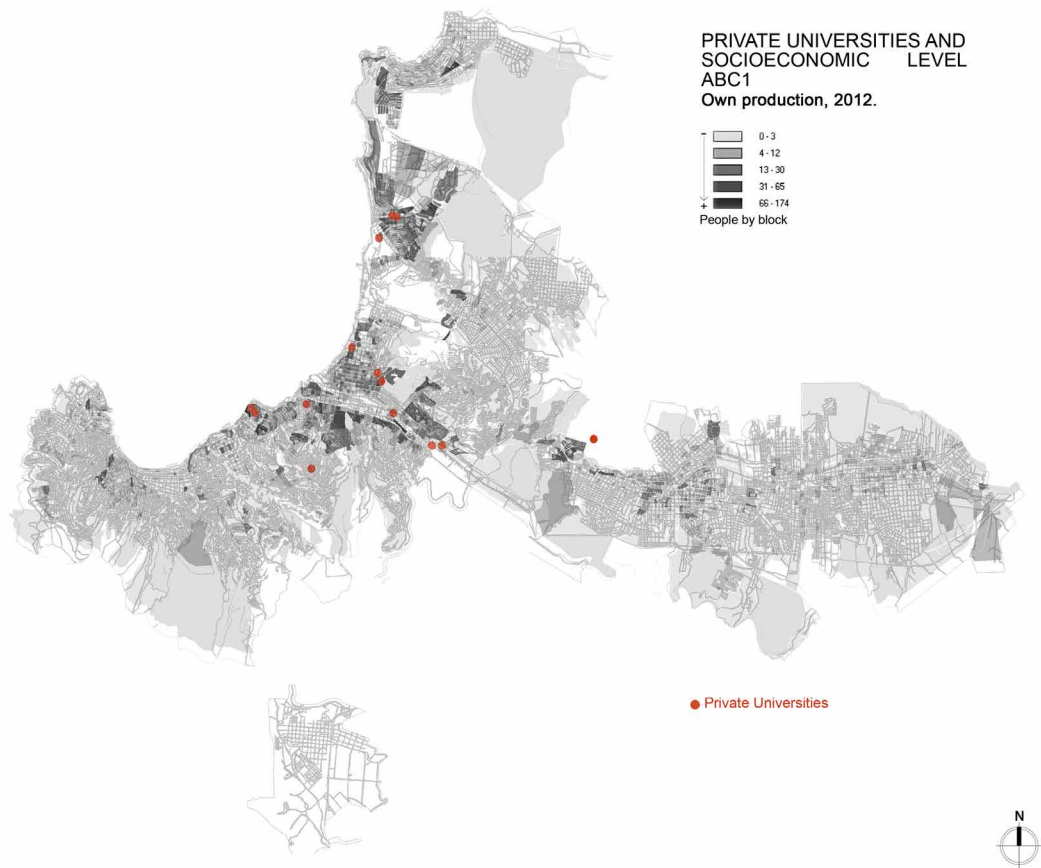


FIG. 4.4 Private universities and socioeconomic condition ABC1. Source: Author. Soto (2017)

The latter points are illustrated by the siting of the new campus of the University of Viña del Mar. This campus is located on the outskirts of Viña del Mar and depends on good connectivity and particularly with interurban routes. In contrast, the traditional universities of the VMA have more diverse location patterns throughout the metropolis concentrating their campuses in Valparaíso, where high-income groups are almost absent. Broadly, the traditional universities have tended to be content to maintain their historic urban locations within the city of in Valparaíso (Figure 4.4).

Today however, both traditional and private universities are taking advantage of wider changes in the urban spatial structures of the metropolis. They now select campus locations or buildings in areas where there is already a cluster of investments in city infrastructure, capitalising on advantages like improved accessibility, equipment, and high land-use values. Viña del Mar, for example, has a far greater concentration of the total population of the Valparaíso Metropolitan Area than the central area of Valparaíso. As such, it has a better offering of infrastructure and urban services. The UPLA therefore currently runs its postgraduate programs in Viña del Mar, in part a response to the concentration of potential students in that area of the metropolis but also due benefits of arising from the city's increasingly active and competitive commercial sector. This is perhaps one of the reasons that have led the UV to open its School of Economics and Industrial Engineering in Viña del Mar.

Private institutions whose student bodies are mainly formed from middle- and low-income students tend to be in places associated with good access to a range of public transport options. They have tended to opt for campuses in the centre area of Viña del Mar, near shopping malls or sometimes inside them. Their objective is to be surrounded by various services and to be well connected with the rest of the metropolis, making it unnecessary for these universities to invest in additional student services. Campuses located in shopping malls are particularly accessible from that perspective and but also in a position to take advantage of the positive externalities these service centres allow. It could be argued that as such private universities with their focus on attracting relatively high-income students work like social enterprises, establishing recognisable and distinct location patterns in the metropolitan area (Figure 4.5).



FIG. 4.5 The shopping mall in the centre of Viña del Mar is in an area with good connectivity at a regional scale. Source: Author

Turning to the Origin-Destination survey's urban units where traditional and private universities are located, several observations seem pertinent (Figure 4.6). Firstly, the units from N° 2 to N° 7 where traditional universities are predominantly located, have the highest amount of different public transport lines in the Valparaíso Metropolitan Area, with values between 96-138 lines. This compares with unit N°18 with 64-96 lines, an area which houses private universities attended by low-income students and being located being near shopping malls or inside them. On the other hand, units N°17 and N°18 are in areas where there is a mix of university buildings, residential areas, and businesses in the centre of Viña del Mar. In contrast, traditional universities tend to be located Valparaíso city, the historic centre of the metropolis. This location has good connectivity to different communes (see urban units N° 4, 5, and 6 in Figure 4.6). The highest percentage of journeys completed by public transport corresponds to Viña del Mar's flat area, see unit N° 17 and 18 (Figure 4.6) where traditional and private universities of low-income students are located.

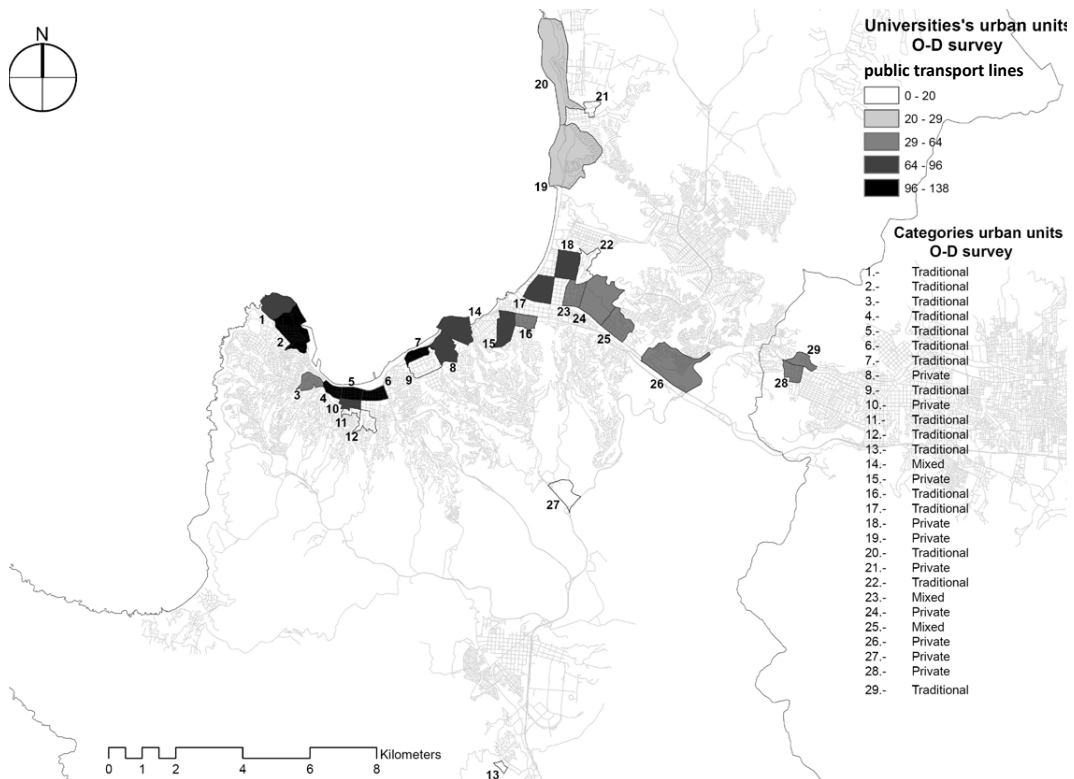


FIG. 4.6 Amount of public transport lines in urban units of the O-D survey, where Traditional and Private universities are located. Source: Author

On the contrary, private universities for high-income students tend to locate their buildings up north, in areas associated with higher-income residences. These campus locations are spread out far from the city centres, mainly in peripheral areas well served by highways but with a low-density of public transport such as seen in unit N° 24 or units N° 27 (Figure 4.6). The characteristic urban structure of the Valparaíso Metropolitan Area and particularly topographic complexity – a thin strip of waterfront surrounded by hills – make it essential to also consider road density. Figures 4.13 and 4.14 illustrate the road density within the areas where the traditional and private universities are located.

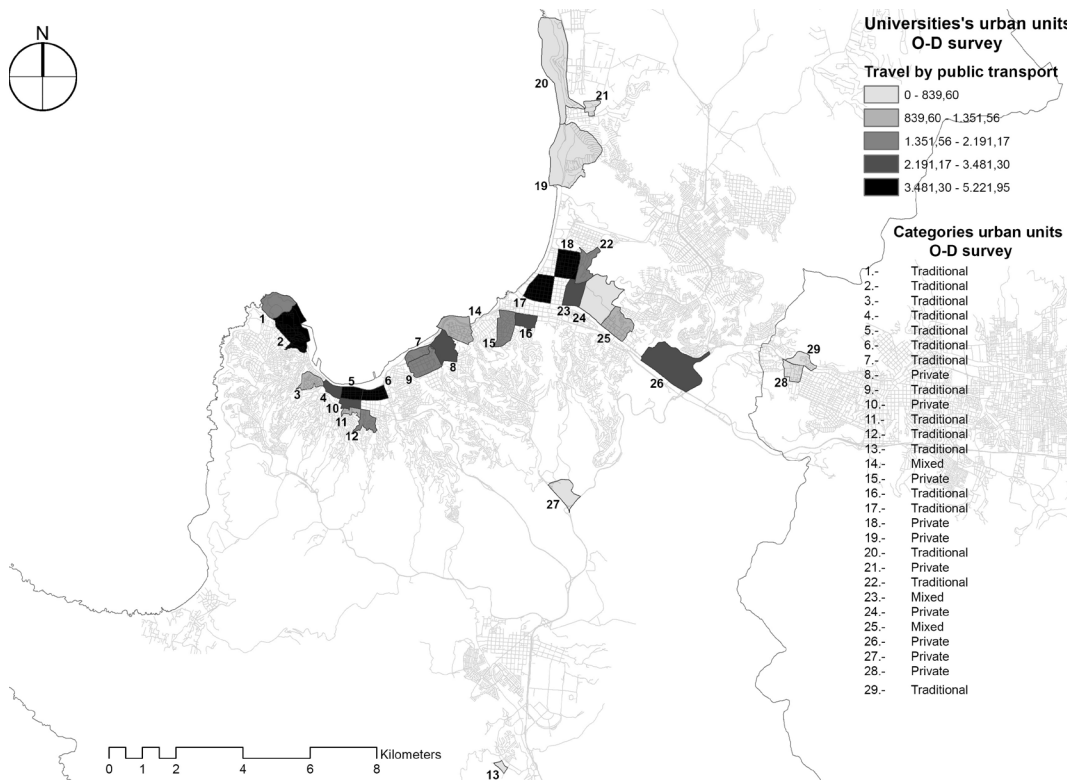


FIG. 4.7 Travel by public transport measured in urban units from Traditional and Private university's locations. Source: Author

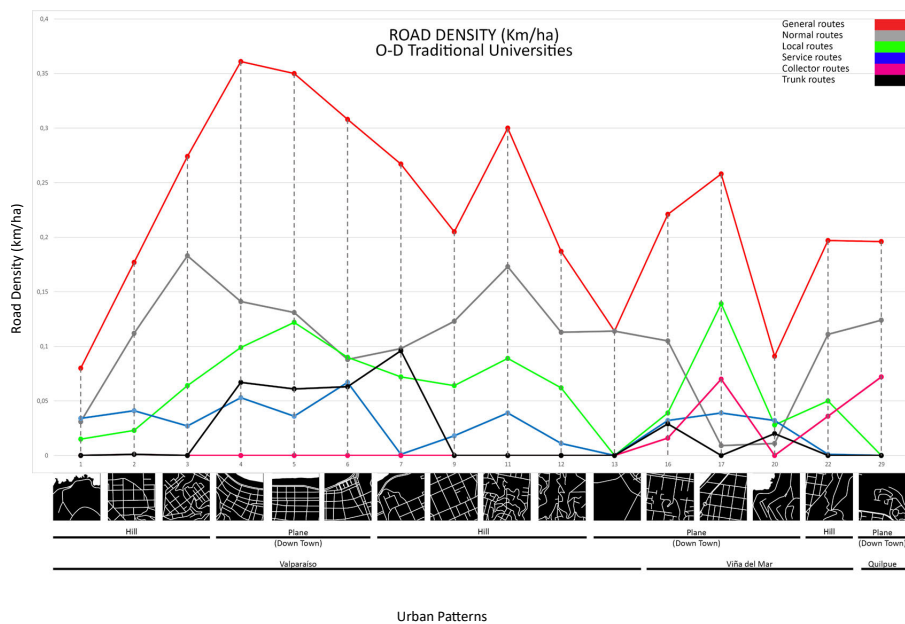


FIG. 4.8 Road density comparisons in different urban areas where traditional universities are located. Source: Author, based on León and March (2016); and Southworth and Owens (1993).

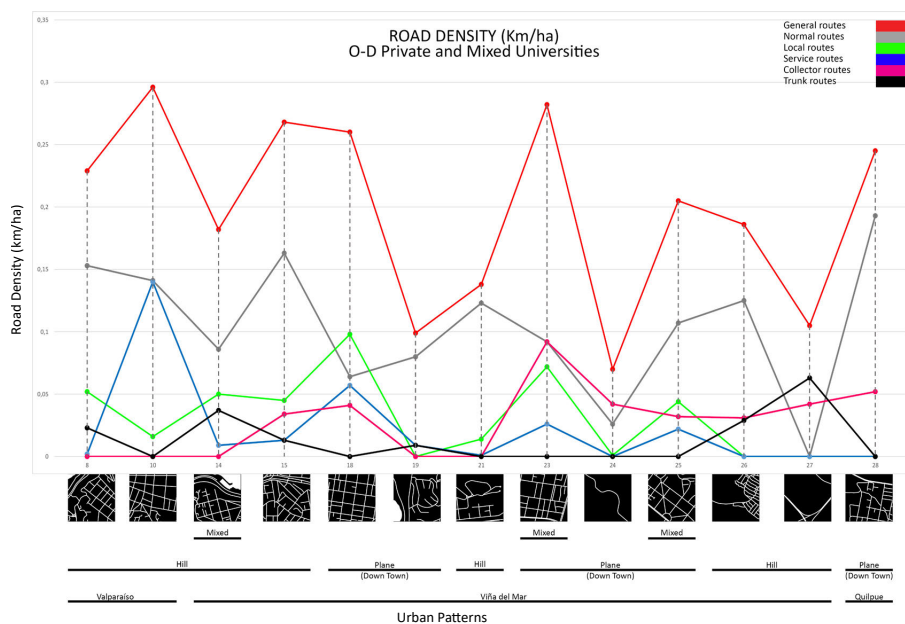


FIG. 4.9 Road density comparison of different urban areas where Private / Traditional / Universities. Source: Author, based on León and March (2016); and Southworth and Owens (1993).

The general observation from this data is that flat areas (downtown areas) of the metropolis have better road infrastructure (0,3-0,36 km/ha) and flat areas of Valparaíso where traditional universities are located there for have the highest density of primary transport routes (0,37-0, 27). Overall, together with stronger public transport links, it is apparent that where there is a higher percentage of traditional universities, there is a corresponding higher percentage of primary transport routes. This leads to the interim conclusion that compared with the non-traditional largely private institutions, traditional universities within Valparaíso Metropolitan Area, are strongly associated with urban centres, and are well-connected at different scales (local, communal, metropolitan, and regional).

4.6 Conclusions

The spatial distribution of universities within the Valparaíso Metropolitan Area and their relationship with the location of their respective student population depends on a series of distinctive historical and political events and other external influences. Under the influence of a new authoritarian military government, the 1980s saw the creation of many new universities within Chile. This was largely due to a shift towards neoliberal deregulation but also a greater reliance on free market economic principles.

Unregulated expansion of the new private sector institutions in this period led to the development of an increasingly fragmented higher education system that increasingly challenged the dominance of traditional universities with their strong ties to regional city centres. The scale of change inspired by these expansive pressures was remarkable. In the 1980s, eleven private universities were opened and twenty more opened during the 1990s. Such expansion was not limited to the private sector, Chile's public universities also increased from two to fourteen within the same period. To accommodate such rapid expansion, Chilean cities housing universities had to adapt quickly as the demand for educational building space grew.

Although other governments and cities in Latin America similarly experienced neo-liberal inspired educational reform, Chile was remarkable within Latin America for the scale of change and its pace compared to other Latin American contexts. Wider political and structural changes in the country's political, economic and social economy provided the foundation for the emergence of a new and dynamic market for tertiary education. In part a response to external globalisation pressures, the enlarged and more competitive Chilean university system began to focus on recruiting students in not only in their local metropolitan areas but also from all over the country.

In this way, the increasing competition for student enrolments quickly became a competition for territory. Whereas newer private universities tended to seek sizable urban spaces that were close to high-income populations, Chile's traditional universities first tried to establish faculties in different regions that previously had no university campus or were mainly in agricultural or otherwise isolated areas. This meant that many traditional universities went from having a single or limited urban presence to being national universities with multiple campuses and differentiated structures with diversified systems.

Although in constant competition with the perhaps more agile private institutions for both new territories and new clients, perhaps counterintuitively given the level of competition within the sector, as whole tertiary education became more expensive as student fees grew to pay for new faculties and facilities. With government support for education shrinking against rising costs, Chile quickly became one of those OECD countries where students and their families rather than government pay the largest percentage of the total costs of tertiary education.

The increasing diversity of higher education provision, the increased diverse nature of the student population and their financial arrangements brought the socioeconomic background of students to the fore. This perhaps is first seen in the new importance attached to housing options and locations for the students within the increasingly segregated and polarised cities of the Valparaíso Metropolitan Area. Consequently, the location patterns associated with private and traditional universities in metropolises such as the VMA can be understood through two key variables. First, the socioeconomic conditions of the areas that host the university and secondly, an area's accessibility to public transport measured in road density and amount of public transport lines in specific urban units.

From this it can be concluded that the private universities of the Valparaíso Metropolitan Area tend to target homogenous groups of students and locate their faculties according to where these groups live or where they can be accessed easily. The private universities that house middle-and low-income students are in locations with good access to a variety of public transport options such as those located in the central area of Viña del Mar. On the other hand, despite their early ideas about creating facilities in areas where previously there was little or no higher education provisions, on the whole traditional universities tended to be more wedded to their historical locations. For the Valparaíso Metropolitan Area, traditional universities are now mainly concentrated in Valparaíso's city central areas, areas where high-income students are almost absent but are well supported by an extensive transport network.

5 Traditional Universities

Locations, Conditions and Factors

5.1 Introduction

The changing spatial distribution of higher education institutions within the Valparaíso Metropolitan Area provides an illustration of how the location of universities can have broader implications for the metropolis and its inhabitants as whole and vice versa. The previous chapter considered how external changes such as the rise of neoliberalism, free market economics, and deregulation underpinned a period of explosive expansion and later fragmentation within the Chilean higher education sector. Between 1980 -1990, the number of universities in Chile rose from eight to sixty, a rate of expansion that was unmatched elsewhere in Latin America (Bernasconi and Rojas, 2003; Brunner, 1997; Torres and Zenteno 2011).

The follow decade was remarkable for the way in which demand for tertiary education grew year on year. This was associated both with the increased availability of educational opportunities but also an increasing diversification within the student population. The latter being perhaps connected to a neoliberal influenced economic cycle that had the effect of expanding the middle classes in Chile, but also elsewhere in Latin America (Franco and Leon, 2010).

For the higher education sector, such changes created the conditions for a transition from a centralised system of institutions serving a relatively small section of the population to much expanded decentralised education system serving the needs of wider range of people who were paying large sums of money to be able to study (Bellet, 2011). Developing from an increasing demand for distance learning

programs, a further wave of university expansion during the mid-nineties and towards the middle of the 2000s. This later period of expansive growth served to reduce the significance of location whilst stimulating growth in the administrative capacity of individual institutions (Torres and Zenteno, 2011).

Against such expansive pressures and in terms of their location relative to that of their students, the new private institutions proved more agile than the traditional universities in meeting the needs of this newly enlarged student population. By locating, for example, within shopping centres or near metropolitan transport hubs, private institutions were able to focus on middle-income group students. On the other hand, institutions drawing students from higher income groups were able to focus their resources in urban areas with higher income zones and low levels of public transport provision.

By late 2010s however the earlier rapid growth within Chilean higher education system was beginning to stabilise. Despite the creation of many new private institutions that were now serving a much wider range of the population, perhaps counter intuitively Chile's traditional institutions remained notable for the comparatively greater degree of social diversity found among their students. Torres and Zenteno have noted that in achieving their goal of maintaining a level of diversity and in doing so providing education to outstanding low-income students, the country's traditional universities were now competing for enrolments against the other types of educational establishments that now made up the higher education sector (Torres and Zenteno, 2011).

Within this new more competitive environment, Chile's traditional universities were increasingly acting as instruments of social mobility, promoting educational equity for all the country's inhabitants. From geo-spatial perspective, even as socioeconomic and political processes had driven the development of many new and expanded private universities, the specific characteristics of traditional universities positioned them as economical, technological, and business engines in the metropolitan spatial structure. To fully appreciate the challenges faced by the traditional universities in this new era however, it is important to consider internal influences in determining the locations of their facilities.

As suggested by Caravaca and Feria, three determinant conditions will be considered here: the administrative origins of these institutions, their changing location patterns over time, and the policies and strategies adopted by their governors (Caravaca and Feria, 1995). The first has to do with structural factors such as whether it is a private or public institution but must include more prosaic matters such as the way in which its resources are managed. The second condition deals with the pre-existing local patterns and influences that have always conditioned the growth of

these institutions. The third determining condition is strongly connected to the first and deals with their internal systems of governance but also changes in their strategic policies.

5.2 Determining Conditions for the Territorial Locations of Traditional Universities

Bellet and Gutiérrez (2011) have suggested that three types of urban location are typically selected for educational institutions such as those within the Valparaíso Metropolitan Area. This might be more peripheral locations, instances where institutions are deliberately choosing to locate their equipment and facilities away from more consolidated urban areas. Alternatively, institutions may elect for more central locations where they can concentrate their facilities into one or more specific areas, or they may choose to disperse their facilities throughout the city or the metropolis (Bellet and Gutiérrez, 2011). Bellet and Gutiérrez's analysis usefully highlights both the variety of possible locations for such institutions but also the vital connection between the siting of such facilities and effect on the wider metropolitan environment.

The central research question within this thesis depends on the hypothesis that the spatial preferences of the higher education institutions and the consequent daily mobility patterns of students that attend them impacts on the wider metropolitan area and vice versa. It can therefore be stated that the current spatial organisation of the traditional universities within the Valparaíso Metropolitan Area depends on historical decisions taken in response to the moment's needs. In each instance, decisions about the location of university facilities took account of the changing availability of space and the opportunities that those spaces offered. In support of that assertion, there is a need to consider the conditions that influence and guide the locational choices made by the institutional authorities as their respective organisations expanded. For the traditional universities of the Valparaíso Metropolitan Area, there seem to be three key influences on this decision-making process, these are:

- 1 the administrative origin of traditional universities,
- 2 the historical locational pattern of these institutions
- 3 the role of government and its influence on institutional strategy

5.3 Administrative Origins of Traditional Universities

Perhaps the primary determinant for a traditional university's location is its governance model. Within the Valparaíso Metropolitan Area, there are four traditional institutions: two private universities (one Catholic and one non-religious) and two public universities. In case of the former pair, the Catholic University (PUCV) is territorially limited to Valparaíso's diocese. Up to the year 2000, the growth of PUCV was dependant on its access to land and facilities donated to the institution. On the other hand, Federico Santa María Technical University (UTFSM) is a private non-religious university. Philanthropist Federico Santa María founded the university and set up the institution's foundation in his will. He stated that his wish was to contribute to the country's progress and increase the cultural horizons for Chileans during the beginning of the 20th century.

The two public universities by contrast had changed their name in 1980, a change caused by the separation of the University of Chile into two different administrative units: (Universidad de Valparaíso (UV) and Universidad de Playa Ancha (UPLA). The conditions upon which they were founded affects each university's financial management and, consequently, their access to resources which can be invested in their respective infrastructures. These funds come from three different areas: national public projects (FNDR, MECESUP), private funding, and bank loans. The latter is most widely used by private institutions (PUCV, UTFSM) because, by law, public institutions are not allowed to acquire long-term debt. This condition directly affects the size of each universities' investments in infrastructure but medium and long-term acts shapes how and where those investments have been made.

5.3.1 Historical Location Patterns

The historical development of Valparaíso, initially as a vital port and later as a significant location for industrial and commercial activity, helps to explain the evolution and location of the traditional universities in the area. Particularly towards the end of the 19th century and the early decades of 20th century, the city of Valparaíso suffered from a lack of skilled local workforce. This shortage led to the creation of technical institutes that later city's first two universities. Founded in the context of rapid urban industrial development, these institutions were a response to the needs of the elite to generate a local workforce capable of underpinning the city's further expansion.

Established in 1928, the PUCV¹⁴ served as a higher technical-business institute for youth technical and moral instruction in industrial careers, sciences or arts of business or liberal professions. The new institution was accommodated within the city plan in sizeable yet compact building to lodge all its facilities. It was located within the El Almendral area, a newly thriving but highly connected area of the city. It is located near the Baron train station and close to the routes connecting the port city of Valparaíso with the country's capital to its East and the rest of the inner cities located to its Northeast.

Three years later in 1931, the UTFSM was founded on a similar set of foundational principles. Private donations were behind the foundation of these new educational institutions. Like those that led to the establishment of the PUCV, these philanthropic donations had a few conditions attached, particularly the donation that led to the foundation of the UTFSM, which had to be built as a campus. This condition determined its urban location, as the land was purchased as a sizeable parcel according to the doner's requirements. Unlike the PUCV, which faced the industrial development of the port with the incipient city at its back, the UTFSM campus was established at the former Pudeto Fort on Placeres hill, between Valparaíso and Viña del Mar, far from the urban centres of the time and with all university activities held within its buildings.

The technical education and the further instruction of labour had seemed a crucial, or even pragmatic requirement for an increasingly industrial city such as Valparaíso. In a similar way, by 1892 the creation of the Justice Hall of Valparaíso led to a need for local lawyers. Later both universities founded new law faculties simultaneously, and law courses were implemented in two educational establishments. First, the Liceo de Hombres de Valparaíso – a secondary school for men – became the Faculty of Law at the University of Chile in Valparaíso, and the Colegio de Los Sagrados Corazones– located in the Almendral neighbourhood became the Faculty of Law at PUCV.

Just as the creation of the Justice Hall of Valparaíso at the end of the nineteenth century had led to a demand for lawyers and subsequently caused changes in the educational infrastructure of Valparaíso Metropolitan Area, government legislation created further change. In 1954, Law 11575¹⁵ was approved, modifying the Income Tax Law. This modification delivered a percentage of the total national income tax to go towards infrastructure development for existing universities at the time. In Valparaíso, it affected both UTFSM and PUCV, but also the University of Chile's campuses.

¹⁴ Now the Pontificia Universidad Católica de Valparaíso or PUCV since 2003.

¹⁵ Article 36, Law 11575, enacted in 1954, proportionally allocated “a half percent of all direct and indirect fiscal taxes and customs and export duties receivable in the next 20 years which were to be deposited in a special account as ordered by the General Comptroller of the Republic. The money was to be used for university construction and research funds” among existing universities to date.

The 1954 revision to Chile's tax system meant that universities could access state funds and established the principle that they could also request loans up to a set amount. Having been entirely dependent on private capital and individual philanthropy, the new access to public funds was underpin the further expansion of the traditional universities within the Valparaíso area at least until the years of university reform during the middle of the 20th century. The clearest example of this is in the Playa Ancha area, where new buildings to house the Pedagogical Institute and the Faculty of Science were erected – both part of the University of Chile – and surrounding them, a large urban campus was designed but never built (Figure 5.1).

Alternatively, the PUCV had already located its School of Architecture in Recreo, and its facilities in Caleta El Membrillo, are also in Valparaíso. In Sausalito, Viña del Mar, the university saw the opportunity to go ahead with a campus project that had been under consideration years before. The PUCV used Hacienda La Palma in the city of Quillota, establishing its first significant development outside the urban zone of what is today Greater Valparaíso. The development model was based around one or two low-density buildings that would later form a single faculty complex.

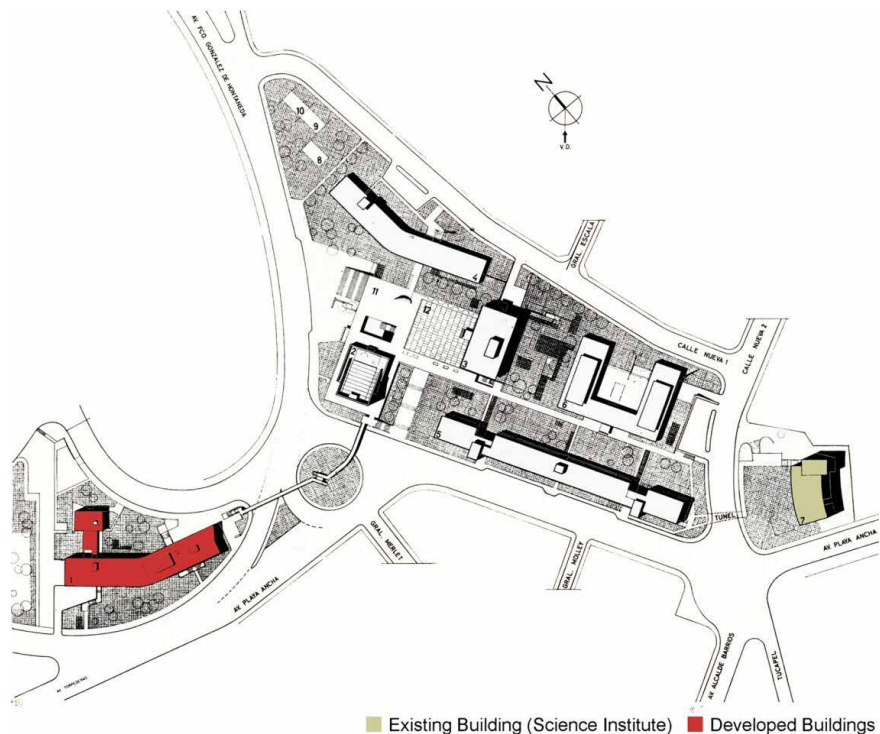


FIG. 5.1 UPLA Urban Campus Project, 1962. Source: Magazine Auca N°8, 1967.

By 1968, the progress of many regional university infrastructure projects was halted as institutions changed their priorities in response to a process that subsequently became known as University Reform. Like other student cohorts around the world, during the 1960s Chilean university students began to seek direct participation in decisions affecting them. They were demanding dialogue and participation. This led to the adoption of a three-tier university administration as the steering system in some of the country's top universities.

*“The [University] Reform dramatically altered the content and orientation of university functions, established a new structure of authority and power that enabled participation of the university community within the governance of universities and sought their better integration to achieve development and modernisation. Between 1967 and 1968 all universities were immersed in the process of the university reform. Strikes began first at the Catholic University of Valparaíso and the Catholic University in Santiago, then at the Universidad Federico Santa María and at the Technical University (now USACH), as well as in the University of Chile's Faculty of Education and the University of Concepción.”*¹⁶

Gradually, the entire Chilean university system was reformulated in ways that affected curricula and faculties throughout the country. During this period of reconfiguration, expansion projects and the implementation of new infrastructure were postponed. The PUCV, for example, froze its planned development in Viña del Mar then being used by its Faculty of Architecture and other areas such as Las Siete Hermanas, in Valparaíso or in Rodelillo where it held land assigned under INVICA¹⁷

The University Reforms that begun in the late 1960s continued to shape attitudes towards further infrastructure development until 1973 when the military coup and the interruption of democracy began to impact the entire university system in entirely different ways. New rectors were designated, professors were fired for political reasons, major educational centres, university centres were closed, and student representation groups were eliminated. More broadly, there was a gradual reduction in public spending on higher education which reached its climax with the issuance of the General Law of Universities of 1981 - legislation that was strongly influenced by the increasingly dominant free-market neoliberal paradigm.¹⁸

¹⁶ Memoria Chilena, reforma universitaria y el movimiento estudiantil, <http://www.memoriachilena.cl/>

¹⁷ A private foundation established in 1959 by Cardenal Raul Silva Henríquez to promote local development.

¹⁸ Memoria Chilena; La Universidad de Chile (1842-1990): Contrarreforma; <http://www.memoriachilena.cl/temas/dest.asp?id=uchilecontrarreforma>

The enactment of the General Law of Universities in 1981 marks a particular turning point within the history of the Chilean higher education sector. The new law enabled the creation of private universities and promoted their interests. This was based on a neoliberal inspired belief that the only way to maintain academic excellence was through increased competition. Perhaps more powerfully, the introduction of free market economic policies meant that the state was no longer fully responsible for the funding of higher education. Instead, institutions were increasingly dependent on the tuition fees paid by individual students and their families, a move that further increased inter-institutional competition within the sector.

Simultaneously, the existing network of public universities was completely dismantled, becoming regionalised and divided into several universities without much connection with each other.¹⁹ This change meant that the previous development model in which state incentives had underpinned the creation of university campuses that had a direct relationship with the host city was left behind. Instead, under the new paradigm individual institutional developmental strategies came to the fore. This in turn, meant that new faculties and university buildings were established throughout Chile's expanding metropolitan areas.

The enactment of Decree-Law DFL N° 1²⁰ for example, led to the founding of the University of Valparaíso on a site which until 1980 had been the local headquarters of the University of Chile. The newly founded Playa Ancha University of Educational Sciences (The name it would receive in 1985) took over a site that was once the University of Chile's Pedagogical Institute but would have its central administration unit located in Santiago. By 1981, increased enrolment at the University of Valparaíso meant that new spaces were developed near Van Buren Street Hospital on Hontaneda Street for the Faculty of Medicine and for the Faculty of Pharmacy opposite the former Faculty of Playa Ancha in the Almendral neighbourhood. Alternatively, in its own response to the changes enacted under Decree-Law DFL N° 1, the UPLA opened new buildings for its Faculty of Sciences on Avenue Gran Bretaña on Playa Ancha Hill, a site far from its existing headquarters.

¹⁹ Memoria Chilena; La Agrupación Cultural Universitaria (ACU): Ley General de Universidades de 1981; <http://www.memoriachilena.cl/temas/dest.asp?id=aculey>

²⁰ "Decree-Law" is a legislative act of the President of the Republic on matters outside the legal domain, held under a declaration by Congress, by a specific law that authorises and delegates to the President, for a term of one year, the enactment of provisions having the force of law, in matters expressly stated.

The location of higher education institutions within the Valparaíso Metropolitan Area was equally dependant on the Ley Orgánica Constitucional de Enseñanza (LOCE) which had been approved the previous year, one day before the end of the dictatorship. From 1990 onwards, in addition to the existing institutions (PUCV, UTFSM, UV, UPLA) several private universities were created in the region. A direct consequence of the LOCE, these new private institutions were all located in the Viña del Mar, a positioning that was unlike that of the traditional (public) universities which were mostly located in Valparaíso.

Regulatory and legislative changes such as Decree-Law DFL N° 1 or the LOCE, together with the new government's focus on neoliberal inspired free market competition, had led to the foundation of an increased number of universities and university campuses across the expanding Valparaíso metropolitan area. A primary factor in the siting of these institutions within the metropolitan space was each institution's historical location, but more importantly, its strategic response to the new more competitive market in which it was operating.

In 1932, for example, the UTFSM campus was concentrated on Placeres Hill. The campus was based around an area formally occupied by Fort Pudeto (1730) an obsolete infrastructure on the outskirts of Valparaíso. The location of the UTFSM within Valparaíso was shaped by its adherence to Anglo-Saxon model in which the institution sought to deliver all university services within the campus area's limits (Figure 5.2) (Fuentes, 2007). On the other hand, the PUCV was established in 1928 in buildings located at the intersection of the main routes that connected Valparaíso, Viña del Mar and the capital, Santiago. This gave it a strategic advantage in that the intersection was both a central location but also facilitated access from the three urban areas (Figure 5.3). Subsequently, its growth was shaped by its ability to expand into surrounding lands and buildings donated to the church and the university.

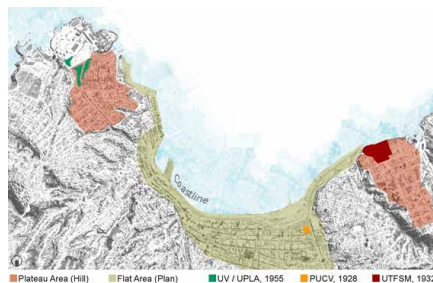


FIG. 5.2 The historical location of the traditional universities. Source: Author



FIG. 5.3 Avenida Argentina, the surroundings of the PUCV's headquarters, circa 1930. Source: <http://www.skyscrapercity.com>

The presence in Playa Ancha of the two universities corresponds to the transfer of public lands during the 1950s for the building of a modern urban campus that was never built (Figure 5.1). Since their founding in 1981, both UPLA and the UV have had a strong presence on Playa Ancha Hill (Figure 5.4). Consequently, locations such as Playa Ancha Hill, where these and the other institutions have developed infrastructure were not necessarily only a response to changes in broader urban planning priorities, regulatory and legislative change but sometimes to more pragmatic concerns such as building opportunities or specific donations.

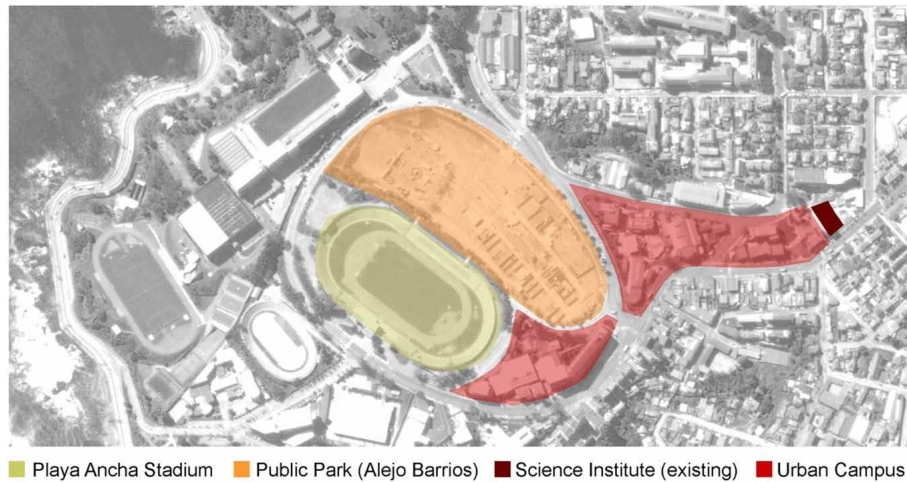


FIG. 5.4 Playa Ancha Hill, the current location of the UPLA and the UV (Playa Ancha Hill was where the UV's Law Faculty was situated during the mid-twentieth century). Source: Author

5.3.2 University Policy and Strategy

Although sometimes determined by institutional history, external factors or even the conditions attached to donations, the siting of university infrastructure within the metropolitan space is also affected by the internal governance of individual institutions and changes in their strategic priorities. Although both UPLA and the UV remain strongly associated with their respective sites on Playa Ancha Hill, for example, more generally the adoption of a range developmental strategies amongst the universities of the Valparaíso Metropolitan area have acted to create a series of dispersed and strongly differentiated, faculty-centred university campuses through the city.

Each institution's short-term, medium-term and longer-term infrastructure investment rely heavily upon their individual longer-term strategies for growth. University governance is often associated with the prevailing urban and political dynamics of the time but also depends on those appointed to govern. Term lengths of each faction vary, but generally, consist of at least eight years (four years with re-election, reaching twelve in the case of the former rector of the PUCV). Publicly accessible information on the investment choices made by each rector is however virtually non-existent. Instead, a series of qualitative interviews with Directors of Infrastructure at each university were undertaken to understand the impact of institutional governance on decisions about the location of university infrastructure. Through such conversations, it becomes possible to understand not only each university's decision-making processes but the association between a given university's growth within the metropolis and the presence of a specific rector during a particular period.

5.3.3 Other Influence

Natural disasters may appear to be the last influence to be considered when selecting the location for new university infrastructure, but in Chile natural disasters have generated urban dynamics that have substantially (re)shaped Chilean urban spaces. Earthquakes such as those that affecting Chile's Central-Southern region have significantly affected the cities in the area. Such events cause damage and threaten lives in the short term, but perhaps more powerfully change existing urban dynamics, creating new and unpredictable patterns of development.

One such example was devastating earthquake of 1906 which inflicted substantial damage to the city's building and infrastructure. This event marks the end of the so-called 'Golden Age' of Valparaíso. During this period, the city had grown substantially as it sought to accommodate an expanding population through the second half of the 19th century. The 1906. Much less destructive than the 1906 event, an earthquake ninety years later in 1996, did not generate the same kind of profound change within the city per se, but by damaging buildings and increasing the number of empty lots it did increase the number of unpopulated areas in the centre of city. This in turn led to the creation of programmes specifically intended to try and re-populate the centre of the city . ²¹

²¹ The Ministry of Housing and Urban Development proposed a 2010 Urban Densification Program with two objectives: the first, to increase the offer of housing for the homeless in areas with good connectivity and service accessibility (consolidated urban areas) and a second objective: to promote urban regeneration by repopulating urban centres in cities with average densification projects. This program meant significant natural and human-made disasters for Valparaíso; 105 vacant lots in tight areas and a concentration of buildings damaged by the earthquake in El Almendral (flat land in Valparaíso).

In the present context however a subsequent and less devastating earthquake in 2010 is perhaps of greater significance. Already perhaps in the aftermath of the 1996 earthquake, land values within the central areas of the city fell because of the further damage that had been caused to buildings that were either previously damaged, disused, or were in disrepair. This presented university administrations a welcome opportunity as they tried to accommodate their further growth and consolidate their facilities. As such, university authorities in Valparaíso began to focus more on central areas of the city as possible opportunities for further infrastructure development.

5.4 Metropolitan Universities: Urban Location Typologies and Real Estate Strategies

An analysis of urban location typologies provides an opportunity to explore the factors that can often influence the decisions made by institutions, businesses and local or central government. More immediately, location typologies offer a chance to explore the spatial dynamics associated with higher education institutions, the real estate options that result from competition for territory and the implications of such choices as they relate to student mobility within the metropolitan context and vice versa.

In this instance, the analysis will lean on definitions provided by Bellet and Gutiérrez (2011), who defined three primary urban campus typologies: (1) peripheral, (2) concentrated, and (3) dispersed (Bellet and Gutiérrez, 2011). The goal of such an analysis is to understand the territorial determinants that have influenced the choice of where to locate university infrastructure and thus help understand the operational dynamics of higher education institutions located within urban and metropolitan areas. Understanding the causes and the processes behind such change may prove useful when trying to understand wider change within metropolitan spaces that such higher education institutions inhabit but also the impact of universities upon the metropolitan spaces.

5.4.1 Peripheral Locations

Under Bellet and Gutiérrez's taxonomy, peripheral locations are defined as those university complexes where equipment and facilities are concentrated away and separated from consolidated urban areas (out of the city) (Bellet and Gutiérrez, 2011). Peripheral locations are often associated with productive activities and often provide space for technology parks, hybrid facilities or facilities characterised as mono-functional activity centres (Bellet, 2011; Campos, 2000). Such areas are typically seen as suburbanised areas with specific real estate dynamics (Rodríguez, 2008). Caravaca and Feria highlight the way in which that these peripheral locations are often “umbilically connected by large transport corridors to the central city, which seems to be the sole repository of urban values of interaction, functional complexity, and centrality” (Caravaca and Feria, 1995).

Within the Valparaíso Metropolitan Area, the location of the Curauma campus of the PUCV (Figures 5.5 and 5.6) most closely matches the description provided by Caravaca and Feria. The creation of the PUCV's Curauma campus was part of a broader university policy of developing new spaces for innovation, science, and technology related activities. In 2009 the university requested a real estate consultant to select a possible location for such activities among the lands that the university owned, for the new campus location. The decision was to locate an area of 17,5 hectares in Curauma.

The Curauma campus development project was a risk for the university, not least because it was a radical change from the institution's historical infrastructure pattern. One of the key arguments made in support of this departure from past projects, was the positive externalities of a nearby private real estate project called Curauma which is developed next to the site of the PUCV. This housing project was expected to grow to over 40,000 inhabitants. From its inception in 1996, this project was to cover 3,100 hectares and as such, constituted one of the significant suburban extensions within the Valparaíso Metropolitan Area.



FIG. 5.5 PUCV, Campus Curauma, Valparaíso. Source: PUCV's Directorate of Infrastructure.



FIG. 5.6 PUCV, Campus Curauma, Valparaíso. Source: PUCV's Directorate of Infrastructure.

Although primarily an exercise in real estate speculation, the development of this new campus space in Curauma promised substantial consequential further private and public investment in services and public transport to support the expected growth in population. The Curauma real estate project aimed was exploiting both the expected growth in the local population and the advantages offered by strengthened local services. What was not anticipated was the project's suspension at the end of 2011. The project's suspension immediately led to the bankruptcy of the Curauma developers and several other companies within the Cruzat group. Consequently, the university decided to pause the Curauma Campus at the end of 2011, largely because the state was not obliged to implement public transport improvements if the population did not reach 20,000 inhabitants.

The university had previously underwritten the costs of transportation for its teachers, students, and administrative personnel. This complex transport interconnect employed two modalities: metropolitan shuttle buses and local shuttle buses. The metropolitan shuttle buses departed three times a day from the centre of Viña del Mar and Valparaíso to coincide with the morning, midday, and evening rush hours, while the local shuttle buses that ran every fifteen minutes between the Curauma campus and the nearest connections to the wider public transportation networks. The cost of this provision was over USD 400,000 per year which soon became difficult for the PUCV to justify once efforts to develop the area ceased.

Aside from the costs of subsidizing transport for staff and students, there were other factors behind the decision to pause the Curauma Campus development project. As the university's Director of Infrastructure stated "...we have great hesitancy in teachers and students concerning the campus' location, namely the lack of essential benefits that urban centres provide, such as the proximity to services, like banks, other university faculties, residences, and goods in general." Perhaps for these reasons, faculties such as Biochemistry and Chemistry that it was expected to move to the new Curauma Campus are still housed in the city centre.

Following the suspension of the Curauma Campus project, the new rector of the PUCV decided to formally halt the Curauma Campus development and instead, invest in the city centre. This switch in strategy was made possible by the 2010 earthquake, which had not only increased the number of vacant lots in central Valparaíso but had decreased their commercial value²² Three lots were chosen along Brazil Avenue in the El Almendral area of the city. This substantive investment in the city centre meant that Brazil Avenue in the historic centre of Valparaíso became known locally as the university axis of the city (Figure 5.7).



FIG. 5.7 Brazil Avenue with PUCV's main campus. Source: Author

²² During an interview with Juan Pavez (Infrastructure director), he stated that the same lots purchased by the university in central areas of Valparaíso in 2011 were not bought in 2006 due to their high prices.

5.4.2 Concentrated Urban Locations

The development of the new university axis along Brazil Avenue within central Valparaíso serves as a reminder that while universities may occupy substantial urban space they tend to concentrate their equipment and facilities within quite small areas. In this they may appear to follow similar spatial patterns to those of peripheral campuses. Campuses in central locations, either from their foundation or as part of the further development of the surrounding metropolitan areas, are however distinct for being firmly embedded within urban infrastructure networks rather than being isolated on its periphery (Campos, 2000).

The UTFSM Campus, located on Cerro Placeres Hill falls into the former category. Previously considered a peripheral area of Valparaíso, it is now firmly integrated into its surround urban network, located between Viña del Mar and Valparaíso (Figure 5.8). Initially at least, the UTFSM campus followed the principles of Anglo-Saxon model for university campuses, where there are several buildings, patios, and gardens within closed facilities. This pattern of growth held sway until the 2000s, when as the Director of Infrastructure said; “the university was forced to expand out of its original area for lack of building land although the strategy adopted was to try and build around the existing campus within the same sector of Placeres Hill” (Figure 5.10).

The UTFSM Campus remains a concentrated campus, located in a residential area even though it is now surrounded by small, fast-food restaurants that have opened attracted by the significant number of students circulating and living in the area. In addition to such parasitic, or perhaps symbiotic commercial developments, the growing presence of UTFSM in the area has been influential in the development of several new more formal ‘off-campus’ facilities and services in the Placeres Hill area over the last fifteen years. First, by outsourcing certain services like student housing and later due to an increase in the student population, the area has seen the opening of new residences, bookstores, restaurants, shops, internet centres, ATMs and even a bank office within the university’s facilities. The UTFSM has thus maintained its historical developmental pattern whilst “intramural” growth adapts to and around the available space of the original project (Figure 5.9).



FIG. 5.8 Aerial view of UTFSM's location in Valparaíso. Source: www.megaciudades.cl, 2011.



FIG. 5.9 View from the sea of UTFSM's location in Valparaíso. Source: UTFSM

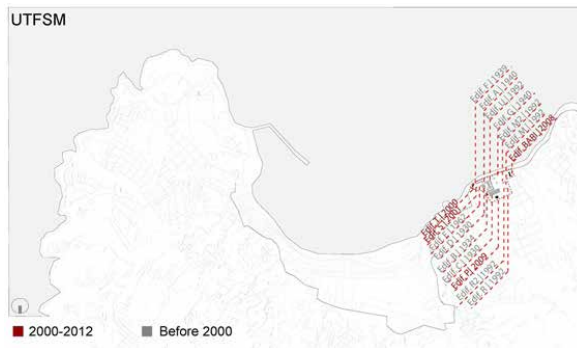


FIG. 5.10 The growth of UTFSM's infrastructure, 2000 – 2012. Source: Author

The intramural growth associated with the UTFSM notably means that both the UTFSM Campus and its surrounding neighbourhood now benefits both from a wider selection of local services but also a range of good connections to the centres of both Valparaíso and Viña del Mar. UTFSM stands out from the other universities analysed here. All four are prestigious institutions within Chile, but more widely within Latin America. UTFSM's preference for expansion at a national rather than regional level means that the university's architecture and its position within the city of Valparaíso have become a landmark that is of both local and national significance (Figure 5.8).

In similar way, the UPLA has developed an urban complex over the last ten years that is concentrated in one area, although in contrast to the UTFSM, the UPLA's enlarged footprint does not amount to a purpose-built 'campus'. After a major financial crisis and rector change in 2007, the UPLA decided to concentrate its facilities on and around Playa Ancha Hill. It's Director of Infrastructure said, "We built five new buildings around the university's historical centre creating buildings covering 4,707 m²" They developed large infrastructure projects (under construction since 2003) and closed other venues that it had scattered throughout different parts of the city, mostly in smaller, leased properties. Thus, as it expanded its infrastructure to meet changing demand, the university has shifted away from a dispersed territorial insertion model to a more concentrated one (Figure 5.12).

Different factors have served to facilitate the university's move away from a dispersed model between 1990 and 2000 (Figure 5.12) to a concentrated model between 2000 to 2012. The first factor was distance education programs (DPE) that accounted for an enrolment increase of almost 100% at the beginning of the 1990s. This administrative growth was reflected in the lease of offices in the city centre from 1993 to 2005. When subsequently, the law was changed to prohibit distance learning being used as teaching model for pedagogy programs, all its local offices disappeared (Figure 5.12).

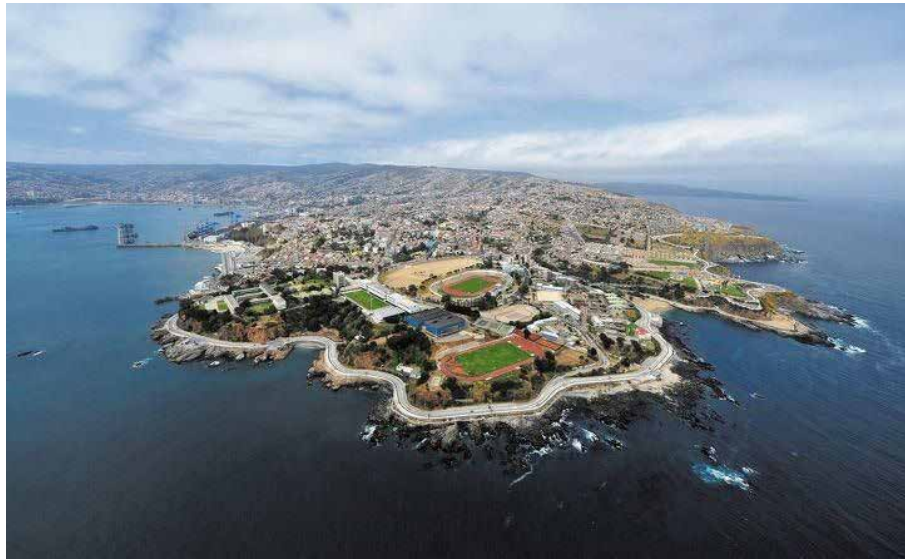


FIG. 5.11 Border of Playa Ancha Hill where the University of Playa Ancha is concentrated. Source: Terraqueoscopio, 2011.

The second factor in shaping the university's current footprint is associated with the second wave of institutional expansion in Chile but is also connected to functional constraints (Torres and Zenteno, 2011). Successive investments in its infrastructure caused the footprint of the University to grow from 16,000m² in 1999; to 32,000m² in 2003, until it finally reached around 40,000m² in 2006. Such investments caused the concentration of university's faculties in Playa Ancha whereas previously they had been scattered all over Valparaíso. This process of expansive consolidation, however, left the university in a significant financial crisis.

The strategic consolidation of university's facilities was based on the belief that the new buildings should be created around the university's iconic historic building which dated from the 1970s. In 2007, the Director of Infrastructure at UPLA developed a plan to increase the efficiency of facility use by optimising how university space was used while also increasing the quality of the buildings' infrastructure. The idea was to enhance perceptions of Playa Ancha University by promoting it as the 'local' institution, the main goal being the creation of a University of Education campus in Valparaíso's more populated hills surrounded by an incredible landscape (Figure 5.11). An interesting relationship has grown up between UPLA and the UTFSM through this programme of 'localised' investment. Whereas in many places universities perhaps tend to prefer to develop facilities with spaces that are distinctly their own, UTFSM now peacefully coexists with the UV which maintains part of its facilities in Playa Ancha Hill.

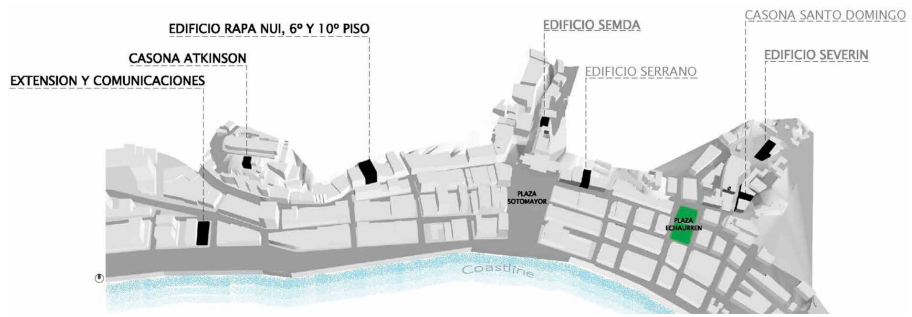


FIG. 5.14 Gravitational Port Sector. Source: University of Valparaíso Infrastructure Master Plan 2011.

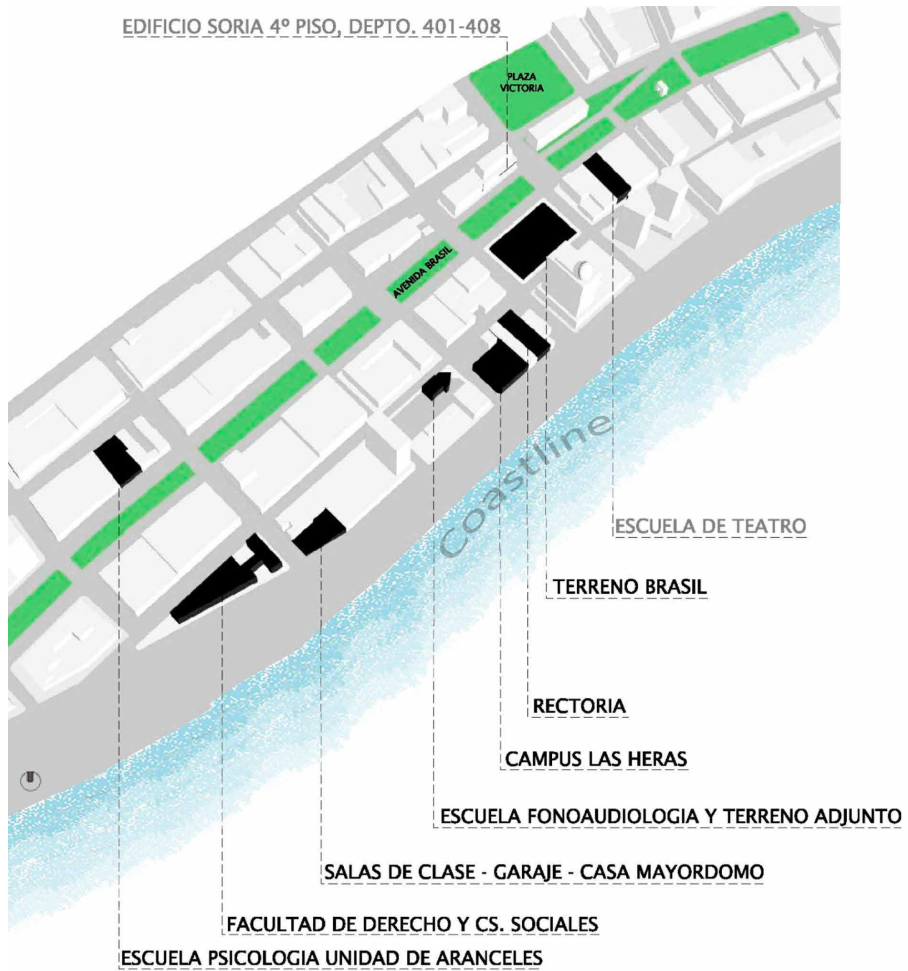


FIG. 5.15 Gravitational Centre or Development Pole of Brazil Avenue. Source: Universidad de Valparaíso Infrastructure Master Plan Study 2011.

The dispersed location pattern chosen by the UV means that its students must interact directly with the city because university buildings and facilities are in different city areas. This encourages public observation of university related activity because the endeavours and movements of the staff and students now evident in well-known city spaces and the city's transport networks. As a goal, the UV's present and future development plans aim to overlap and combine its operations with daily activities of the wider population within the city of Valparaíso. In an interview with the UV's Planning Director, it was made clear that "in the new model of action, the university aimed not only to recover but also to continue to grow and establish itself as a state university, an essential and active part in the development of the city." He said that to achieve this, these three critical actions must be compatible: infrastructural development, engagement with the city, and integration to city services.

In pursuit of this ideal, the UV decided to locate its campuses in specific areas of the city (due to their vulnerability) a decision based on the premise that the university is an agent capable of reactivating depressed zones. This model has been widely followed by Spanish universities such as the Universitat Pompeu Fabra in Barcelona (Pié, 2003) and some in Latin America, such as the Universidad Castelo Branco in Rio de Janeiro, Brazil. Although the goal of such policies is to contribute significantly to the socio-economic and physical regeneration of degraded environments often to be found in historical metropolitan centres, they should also be recognised for the opportunities they provide for universities.

For the Valparaíso Metropolitan Area, the UV has tended to position itself in significant buildings that are not interesting to other businesses wishing to settle in the city centre because they are too large and deteriorated. The UV's Director of Infrastructure stated: "...we need to build the image of a public university compromised with the city that houses it". The idea of placing investment in old buildings of different scales and urban characteristics coincide with this idea. As a public institution, the UV cannot subscribe to more than four-year credit loans, so it is challenging to build new buildings or campuses.

One of the possible ways to invest in new infrastructure under such a restriction was for the University to enter 'lease to purchase agreements' with the owners of large and deteriorated buildings. A prime example the Hucke building (Figure 5.16 and 5.17). An icon of the industrial development that the city experienced at the beginning of the 20th century, it was damaged by 2010 earthquake which it impossible to sell on the open market. The UV reached an agreement with the owners who promised to restore it to the condition it had been before the earthquake. The University then invested in the Hucke building, repurposing it to be an engineering faculty.

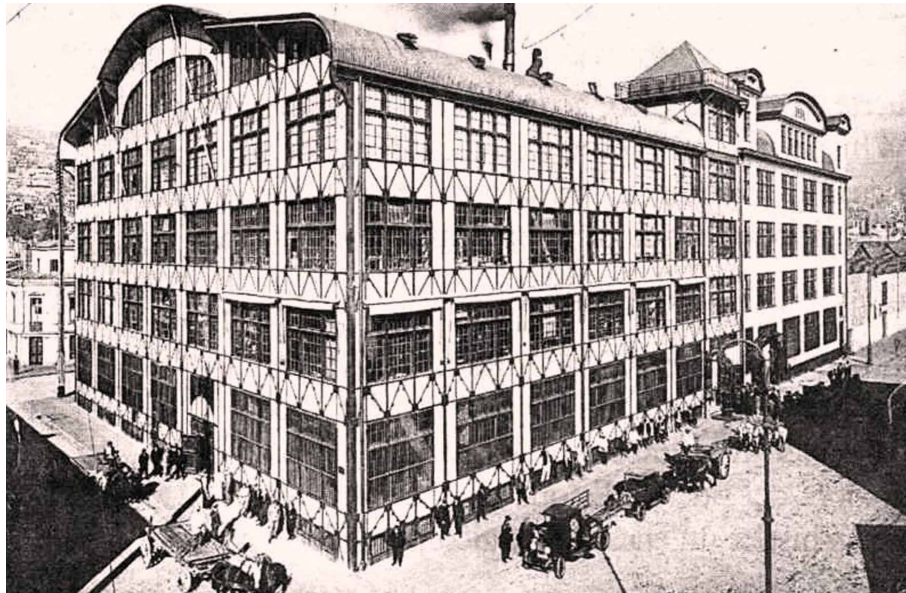


FIG. 5.16 Huckle Building, a milestone of industrial development in Valparaíso. Built at the beginning of the 20th century as the Huckle chocolate and biscuit factory. Source: EdificioHuckle<http://www.flickr/santiagonostalgico>



FIG. 5.17 Huckle Building today now the Faculty of Engineering. Source: <http://www.panoramio.com/photo/7382847>

Another such example is a building given by the municipality to the UV for the new Faculty of Humanities (Figure 5.18). The building was in poor condition after a gas explosion combined with electrical failures in the city's port area. The condition of the building was worsened by a 2007 fire that was severe enough to also destroy five other heritage buildings in the port area. The agreement reached with the municipality after the fire meant that the building was loaned to the university while its subsequent restoration was to be funded by the university. Such investments meant that UV as a public university was able consolidate its infrastructure growth more cheaply than by building expensive purpose-built campuses (Figure 5.19).



FIG. 5.18 Faculty of Humanities, UV. Serrano Street, Valparaíso. Source: <http://www.panoramio.com/photo/58948493>

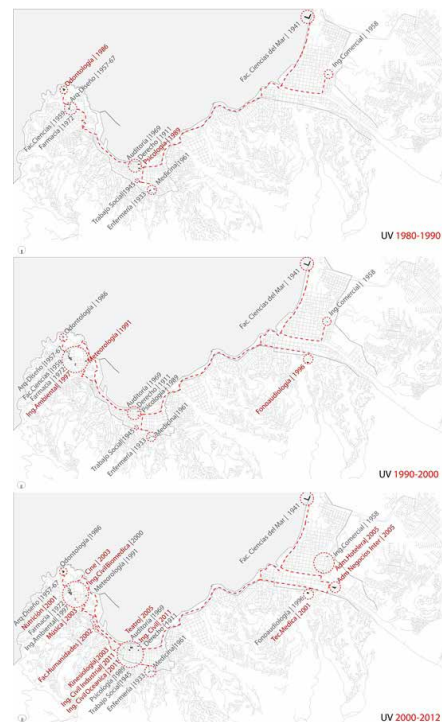


FIG. 5.19 University development infrastructure, UV from 1980 to 2012. Source: Author.

The UV's decision to follow a dispersed model of infrastructure development was in part determined by its administration but also by external economic pressures which pushed it to look for favourable investment opportunities with private and local governments. Its decision to take a role in the restoration of buildings such as the Huckle building, is therefore not based on an altruistic intention, but instead, is part of a larger and deliberate financial and administrative strategy. Such strategic thinking now shapes how the university's infrastructure has grown within the city but also how the city has changed around it (Figure 5.20)

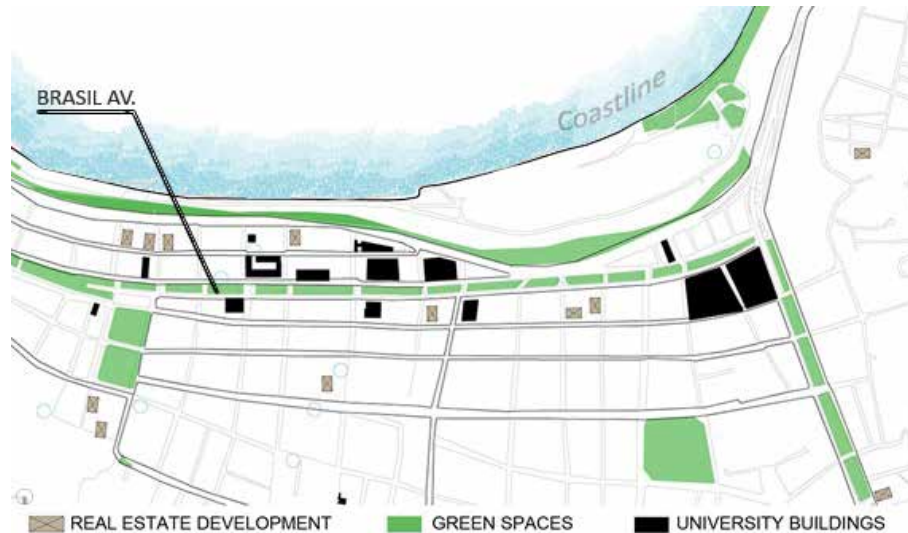


FIG. 5.20 Brazil Ave, Valparaíso axis. Source: Author

In contrast, the PUCV university used a mixed approach towards locating its buildings and facilities. It has dispersed facilities (School of Architecture in Recreo, Marine Sciences at the coast of Valparaíso, the Faculty of History in downtown Viña del Mar, among others), but also groups of buildings within the central areas and some in isolated locations in the hills (Brazil Avenue in Valparaíso, Sausalito in Viña del Mar), and the peripheral Curauma campus sector.

This more dispersed pattern of infrastructure investments unlike those of the UTFSM, UPLA or UV are both more strongly a response and an adaptation to the logic of metropolitan growth (Figure 5.21). Within these initiatives, the development of two new buildings on Brazil Avenue in Valparaíso's flat area (Figure 5.20) was intended sit alongside the university's publicly funded headquarters (the IBC Building) which

was finished in 2001. This contrasts with its plans to develop a campus at Curauma which are is currently on hold as developing sites within the centre of Valparaíso seems to offer more at present. A similar campus-based configuration does already exist in Playa Ancha, though the campus at Playa Ancha is closer to the urban centre, is sited on the structural axis of the city and as consequence, has good public transport connections with the wider metropolis (Figure 5.21).

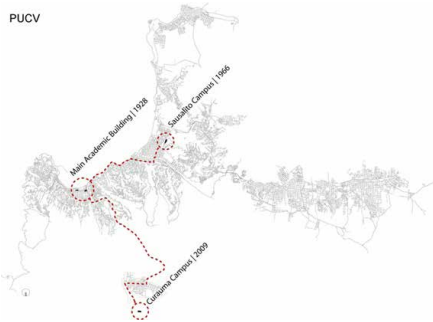


FIG. 5.21 PUCV, university campus developments.
Source: Author

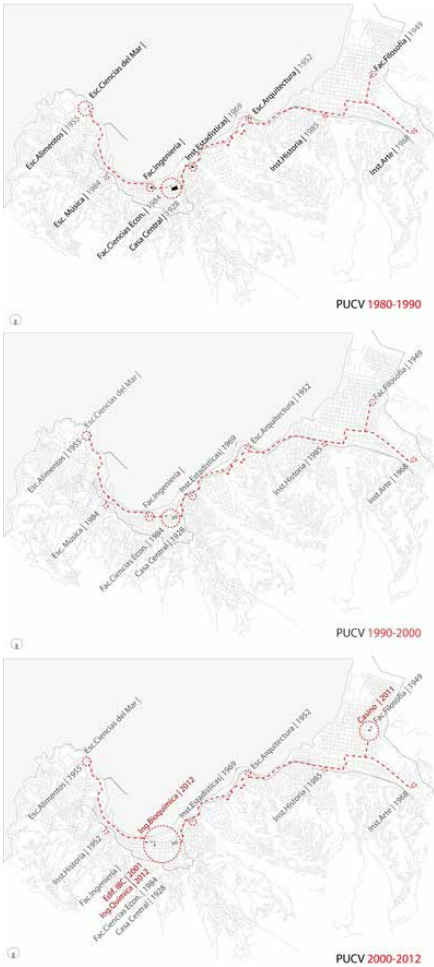


FIG. 5.22 PUCV Infrastructure growth 1980-2012, PUCV. Source: Author

5.5 University Campuses and Urban Services

Although the drivers and motives for infrastructural change are somewhat different in each case, there is a vital connection between these urban universities and local services in the surrounding areas. For the universities of the Valparaíso Metropolitan Area, that relationship between institutions and the surrounding urban area has undergone substantive change over time. Largely, such changes depend on each institution's historical foundations but also how each has responded to wider economic and political change.

University services at the beginning of the 20th century tended to be housed in well-defined campus areas or within buildings and other university-owned facilities. The educational reforms of the 1980s meant that many such services were deliberately outsourced or left to external providers usually within the local neighbourhoods. This forged a new interdependence between the universities and the city. This new interdependence is not however even across the metropolitan area but depends on the developmental strategies adopted by individual institutions.

In the case of the Curauma campus, for example, the PUCV was forced to supply the university services required by students, faculty, and staff because its location possesses neither the services nor the conditions to generate them in the short term. This is one of the reasons why the PUCV has now placed the further development of the campus at Curauma on hold. In contrast, the UV's developmental strategy of inserting faculties and buildings in specific areas of the deteriorated historical centre means that the surrounding areas possess or can generate the essential services required by its staff and students.

This goes beyond basic services such as transport connections. The creation of the Faculty of Humanities on Serrano Street for example, is associated with an increase and diversification in local food outlets and other recreational services. The same logic also works the other way around (i.e., cases in which the university generates a new or improved service provision for local populations). Historically, this kind of symbiotic interaction between an institution and its host community began to occur once universities decided to open campus services previously reserved for their students such as radio stations, theatres, cinemas, medical and legal care to the wider population (Figure 5.23).

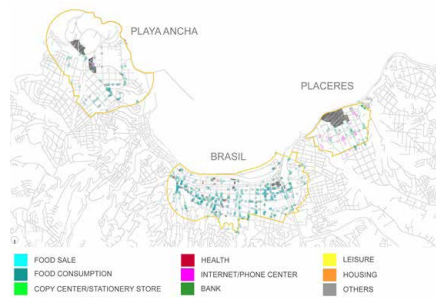


FIG. 5.23 University Environments in Valparaíso- Playa Ancha, Brazil Avenue and Placeres Hill.
Source: Author

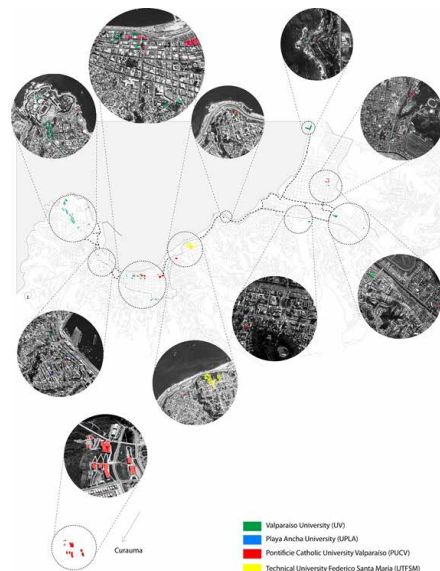


FIG. 5.24 University Locations and urban services.
Source: Author.

Such associative interactions are not limited to the improved provision of ‘city services’ in and around distinct university environments but also includes benefits that accrue from, for example, professional consultancies, the creation of technology centres and the outcomes of applied research. An example of this kind of development is the creation of the UV’s Institute of Neurosciences in a central deteriorated area near the port of Valparaíso which is expected to promote urban renewal within that area. The same applies to the UV’s Fertiliser Institute, which is located on Hontaneda Street, near Hospital van Buren. Such knowledge development activities often have a cumulative effect, improving the prospects for local businesses but also the wider metropolitan population. The presence of universities such as PUCV and the UV therefore can therefore create positive changes within the wider city. The presence of such institutions, the buildings of university faculties, knowledge institutes (often promoted by the state), and additional city services all integrate with and enhance development patterns both locally and across the metropolitan area (Figure 5.24).

Another change within the Valparaíso Metropolitan Area that has accompanied the growth of the higher education sector have been changes in the local real estate market. Increased demand for residential space has, for example, led to the development of an increasing number of high-rise buildings (Figure 5.25).



FIG. 5.25 The surroundings of UTFSM and real estate developments, Placeres Hill, Valparaíso. Source: Google Images.

This drive upward has been influenced primarily by Valparaíso's urban planning policy instrument, which permits high-density areas outside the historical conservation zone, but is also motivated by a relative lack of university owned housing for students or teachers even though many of the former hold residential scholarships. The real estate market around university facilities has therefore prospered not only due to simple proximity to a given university's facilities but also for more complex practical, economic and political reasons (Figures 5.26 and 5.27).

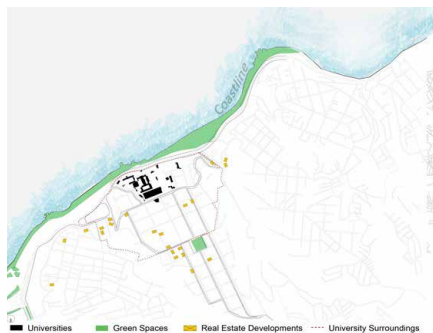


FIG. 5.26 Real estate development associated with university surroundings of the UTFSM, Placeres, Valparaíso. Source: Author.

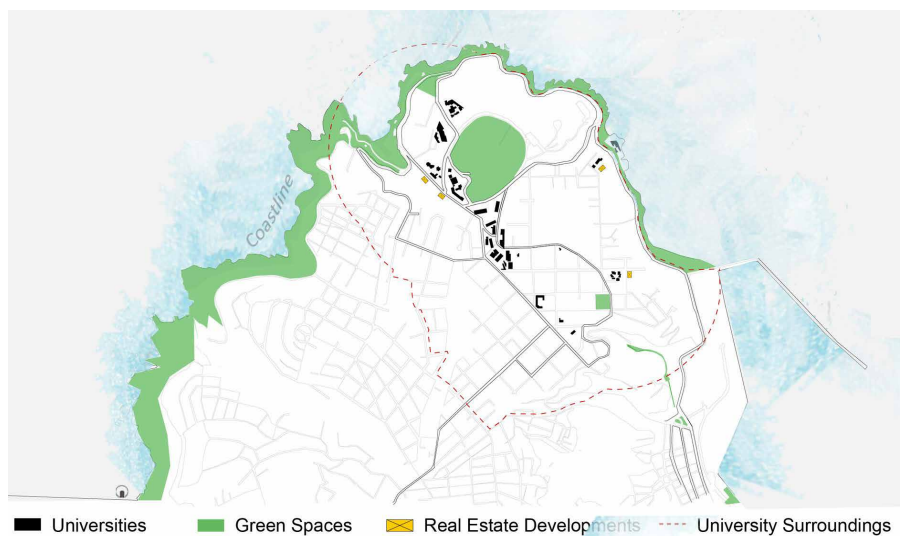


FIG. 5.27 Real estate development associated with university surroundings. UPLA, Playa Ancha, Valparaíso. Source: Author.

Reviewing the long-established and constantly evolving relationship between the tertiary education sector and the Valparaíso Metropolitan Area, it can be said that the traditional universities are (re)creators of urban centrality. Sited at the heart of the Valparaíso Metropolitan Area they attract and concentrate sufficient people to create a particular critical mass in specific areas. The strategic developmental decisions of these institutions give those territories a particular social dynamic associated with groups of people, youth, students and professionals, who typically have a common set of characteristics and behaviours. As Bellet suggests, this commonality often translates into a demand for a particular set of commercial, cultural and recreational services (Bellet, 2011). In this sense, the universities of the Valparaíso Metropolitan Area with their different origins and developmental strategies have responded to the urban spaces around them but have also acted to inspire change within the wider metropolitan environment.

5.6 Conclusions

The physical changes inspired by the traditional universities within the Valparaíso Metropolitan Area are underpinned by the wider political, economic and social changes that Chile and its tertiary education system have undergone in the last thirty years. The present and historical location patterns of these traditional institutions reveal how they influence and in turn are influenced by the longer-term changes in the city's spaces, the socioeconomic characteristics of inhabitants and its services.

In the first instance the spatial organisation of traditional universities within the Valparaíso Metropolitan Area was dependent on past responses to changes in the property market within Valparaíso and the expected agreements with private and local governments. The further development of infrastructure amongst the traditional universities at the beginning of the twentieth century was firmly connected to the notion of societal contribution. In the last few decades however, the traditional universities within the Valparaíso Metropolitan Area have recognised that they need to be competitive to survive. The clearest example of this new awareness of 'the market' is the behaviour of the UV as it attempted to deal with an expanding demand for education. Faced with weak support from central government, the UV has adopted a strategy of utilising heritage buildings within the urban centre through reciprocal agreements with local governments and private entities.

This dispersed development strategy offers the UV considerable flexibility in terms of scale and development times. Perhaps more importantly, it avoids dealing with two main problems: the shortage of land large enough to house a larger scale university complex and obtaining the funds to develop such an ambitious project. The UV can implement its developmental plans in the short- and medium-term, limiting costs and shifting the focus to the university's location with all the services that it cannot provide. The economic models applied by the UV are lease-purchase or the lease of significant buildings in square meters for higher education purposes. Some of them are of great historical value, such as the Hucke building which perhaps provides an important emotional connection with the previous focus on societal contribution.

Alternatively, the PUCV has increasingly focused idea that the metropolitan centre will become a viable option again – a view that highlights the universities' ability to recreate as well as create urban spaces. Initially, the PUCV responded to expanding demand for tertiary by following a dispersed developmental model as evidenced by its investments in its Curauma Campus. This strategy was modified in the aftermath of the 2010 earthquake as development prospects in the centre of Valparaíso

improve. Having paused developments in Curauma, PUCV has now completed two new buildings in the city centre and has a presence in seven buildings within one of the city centre's best-known areas, Brazil Avenue.

A growth in demand during the 1990s and early 2000s has led traditional universities to invest in new spaces right across the Valparaíso Metropolitan Area. The UPLA, for example, has strengthened its presence in the Playa Ancha sector to the point that it has become a recognised university district. It should be noted however that the university's developments in Playa Ancha is one part of a much longer process that began in the 1950s. It is therefore more accurate to say that the UPLA is one of several actors in the continuing development of Playa Ancha. For its part, the UPLA also now sees the potential for developing a new graduate facility in the centre of Viña del Mar which it now regards as holding a competitive advantage over other areas within the metropolitan area.

More broadly, the adoption of neoliberal free market models in the 1980s caused rapid changes in Chile's university provision. The Government's pursuit of neoliberal ideals underpinned the foundation of private universities. As the number of such institutions grew exponentially, the data shows that to meet the consequent growth in demand for tertiary education, these institutions benefited from their close ties to specific local communities. In essence, they proved to be adept at tailoring their educational provision to the needs of the students around them.

In contrast, and perhaps a product of their history, the traditional universities of the Valparaíso Metropolitan area found it less easy to follow a similar model of locally driven development to that adopted by their newer non-traditional counterparts. The subsequent efforts of the traditional universities to rationalize or control their infrastructural growth in disparate areas of Valparaíso Metropolitan Area, perhaps counterintuitively now means that the traditional universities have achieved a new degree of territorial concentration in the major centres of the Valparaíso Metropolitan Area.

Thus, the same processes that underpinned the development of an increasingly privatised, segmented, and diversified higher education system have had an equally profound effect on the area's traditional universities. Under a complex of pressures such as socio-political reform, strategic necessity, changing socioeconomic demand and the rise of market driven economics, the traditional universities of the Valparaíso Metropolitan Area have begun to contribute to the renewal of central urban spaces, attracting socially dynamic populations such as university students, teachers, and administrative personnel to previously deteriorated areas.

This return to the city centre by the traditional universities has therefore contributed significantly to the socio-economic and physical regeneration of these previously degraded environments. More broadly, economic agreements with private and local entities have acted to forge a new relationship between the state, the city, the urban fabric and its inhabitants. The foremost hope for traditional universities in this metropolitan region is therefore that the central government continues to reinforce policies that encourage city densification through imaginative agreements that serve to reverse the processes of urban deterioration. Looking ahead, the question that confronts the traditional universities in the central areas of the VMA is therefore whether the Municipality of Valparaíso or the regional government will continue to see the traditional universities as effective development partners if the collective focus were to switch to other perhaps more deteriorated areas of the metropolitan area.

6 Youth as Mobility Capital for Higher Education Students

6.1 Introduction

Previous chapters have spotlighted work from Kaufmann, Lévy and, from a Latin American perspective, Figueroa and Jirón. The work of these researchers connected Kaufmann's notion of 'Capital for Mobility' to three key conditions: *Competence*, *Appropriation*, and *Access*. *Competence* and *Appropriation* as conditions for mobility are related to the needs, plans, aspirations, motives, values, and habits of individuals and population groups. As such, it is necessary to focus on social practices and the socio-economic conditions affecting the lifestyle of the research subjects both at the level of the individual and as a group.

This chapter delves into this conceptual framing, connecting it to the realities that confront the research subjects considered in this thesis – higher education students. The focus will be on the two conditions for mobility that are most closely connected to identity; *Competence* and *Appropriation* conditions that together influence students' mobility choices and their 'Capital for Mobility'. *Access*, on the other hand, relates more to the structure of the networks that support movement through urban space, the urbanisation pattern in the metropolitan area, and the dispersal of urban functions or land uses. These will be considered in a subsequent chapter.

Conducted by the Chilean State Youth Institute since 1994, the National Youth Survey has the primary objective of making the youth segment of Chilean society and culture visible. The aim of the research is to enable reflection on the challenges that Chilean youth face within society and to contribute ideas to ensure that public policy making in Chile properly reflects the changing needs and priorities of this population group. This nationwide survey typically includes responses from around 7,570 young people. Although primarily intended as an instrument of governance, this longitudinal study affords interested researchers a unique opportunity to better understand the sociodemographic profile of this significant socio-economic group.

In this context, The National Youth Survey provides a means to understand the habits and motivations of higher education students who together make up a significant part of the Chilean youth population. Further it helps to reveal the structural determinants for their integration within Chilean society and as such, their participation in range of social spheres and social spaces. Further, the regional report of the Sixth National Youth Survey (2009) has a particular value when trying to understand the activities and daily movement patterns of the student population within the Valparaíso region.

Another important source of data is a series of in-depth interviews conducted in September 2016 and September 2017. The aim of this work was to better understand *Appropriation* as a condition for daily mobility. As such, *Appropriation* refers to how individuals or groups of people interpret and develop strategies for accessibility. These first-hand qualitative interviews with 61 students from the Technical University Federico Santa María explored the mobility strategies adopted by the students and the decisions that shaped their favoured strategies.

Based both on what the National Youth survey reveals can reveal about the mobility related needs and priorities of Higher Education students but also on the outcome of these in-depth interviews, this chapter will focus on *Competence* and *Appropriation* as condition for mobility within this population group. Rooted in their needs, aspirations, motives, values, and habits, the analysis aims to explore the ways in the student's mobility strategies are enacted daily around, across and within Valparaíso Metropolitan Area.

6.2 General Economic Conditions and Consumption Practices

Young people tend to be more dependent on parental support and occasional jobs than the broader population. Some researchers have labelled this pattern as ‘the poor economy of youth’ which often operates independently of their family’s socioeconomic condition (Cortes, 2002, p. 281). The consumption habits and network of services that ‘[this] poor economy of youth’ requires to function produces a range of daily mobility patterns that may be centred on the same residential location but might end in destinations different to that of the rest of the household. Another notable feature associated with ‘the poor economy of youth’ is that the prevalence of part time working mean that individuals might undertake more journeys than other sections of the population or that journeys might take place at different times of the day than might be expected.

Several standard measures or indicators exist to assist researchers when analysing complex data sets such as that developed from the Chilean National Youth Survey. The socioeconomic status (SES) or socioeconomic condition, is a measure that combines the economic and sociological part of a person’s job preparation and the individual or family’s economic and social position relative other people. This Indicator of Socio-Economic Status (ISES) considers the following set of variables: income, quality of life, access to primary and luxury services, household goods at home, and the primary household holder (PHH), and occupational rank of the PHH. This set of variables reflects both the home’s capital and comfort, such as the degree of vulnerability to social and economic changes in the country. With all these variables, an ideal order is established between individuals of the highest income ABC1, middle-income C2 and C3, D, low income and E, the poorest group of the population.

The Chilean youth population (as covered by the Chilean National Youth Survey) ranges from age fifteen to twenty-nine. This group makes up almost a quarter of the total population (INJUV, 2009). About one-third of the youth population within Chile declared a regular job as a source of income. Their average income of 193,359 Chilean pesos is less than the Chilean minimum wage of 257,500 pesos monthly (Ministry of Labour, 2016).

As shown in Table 6.1, the primary income source of students corresponds to parental financial support (59,3%), followed by regular employment (35,5%). When data is analysed concerning age, it becomes apparent that financial dependency diminishes over time (Table 6.2). According to socioeconomic level, among young people in high-income (ABC1) and middle-income (C2) groups, a higher proportion of young people (male and female) depend principally upon parental support. This phenomenon decreases proportionally among lower-income groups. It is important to note that there is a difference between socioeconomic groups who claim to work regularly (35,5%) and those who claim to work sporadically (12,8%). In this case, youth from high-income groups have a low percentage of regular and sporadic work, yet middle and lower-income groups have almost the same employment rates. Interestingly, the data shows that the highest percentage of educational grants are awarded to students from middle-income groups.

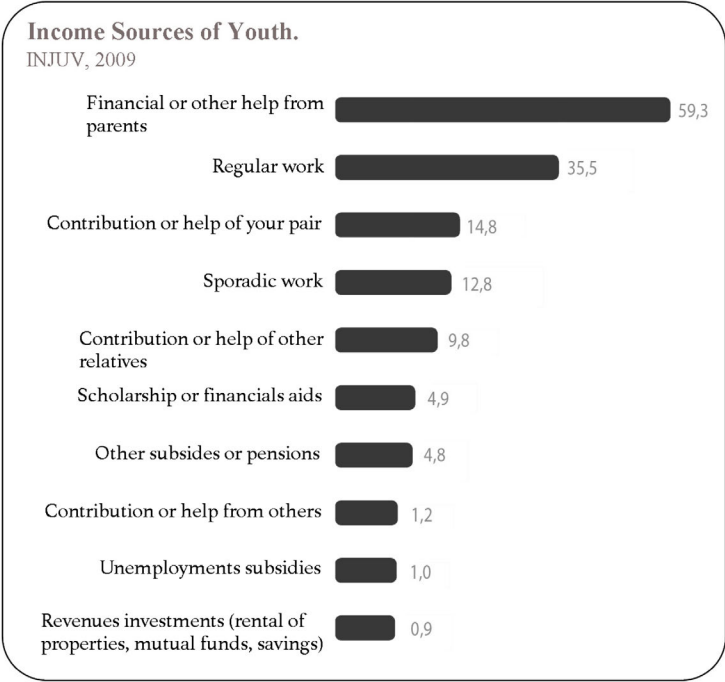


TABLE 6.1 Sources of income for Youth. Source: Sixth National Youth Survey. INJUV, 2009

Income Sources of Youth by age and socioeconomic condition. Source: Sixth National Youth Survey. INJUV, 2009									
	Total	Stage Age			Level economic partner				
		15-19	20-24	25-29	ABC-1	C2	C3	D	D
Financial or other help from parents	59,3	85,7	59,9	32,8	72,7	64,8	53,9	55,0	53,2
Regular work	35,5	12,9	35,6	57,7	31,1	35,8	38,7	34,2	35,5
Contribution or help of your pair	14,8	3,5	16,5	24,0	7,9	10,4	17,0	19,2	18,3
Sporadic work	12,8	8,0	14,8	15,4	9,7	14,0	12,9	12,1	12,5
Contribution or help of other relatives	9,8	10,5	11,8	7,1	9,3	10,0	10,5	9,3	10,0
Scholarship or financials aids	4,9	7,1	6,0	1,6	4,2	5,6	6,3	4,0	3,0
Other subsidies or pensions	4,8	2,6	5,5	6,1	0,5	2,1	4,1	7,5	11,2
Contribution or help from others	1,2	0,9	1,3	1,3	0,2	1,5	1,2	1,0	1,5
Unemployments subsidies	1,0	0,1	1,0	1,8	0,4	0,7	1,0	1,5	0,7
Revenues investments (rental of properties, mutual funds, savings)	0,9	0,5	0,8	1,4	1,5	0,7	1,8	0,5	0,7

TABLE 6.2 Income Sources of Youth according to age and socioeconomic condition. Source: Sixth National Youth Survey. INJUV, 2009

Aside from the sources of their income, other variables including income size (monthly budget) and spending are essential to understanding the spending habits of the youth population. Around half of this population live exclusively from income generated by other people, demonstrating a significant level of economic dependency within this proportion of the youth population (46,8%). The next largest proportion are those who have their own income supplemented by financial support provided by other people (19,6%). The final proportion live exclusively from their own income (18,9%) (See Table 6.3).

The data indicates differences between different socioeconomic groups, for example, populations that can provide financial support for younger people against those that are only provide partial support. Overall, it appears that incomes within the youth population are lower on a per month basis than those of a typical minimum wage earner in Chile.

Involvement of third parties in shaping youth budget.

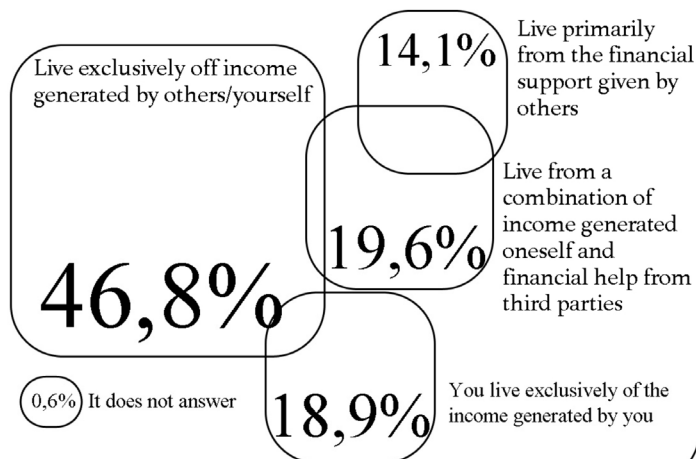


TABLE 6.3 Other entities involved in shaping young people's budgets. Source: Sixth National Youth Survey. INJUV, 2009

Monthly Average Income by age and socioeconomic condition.

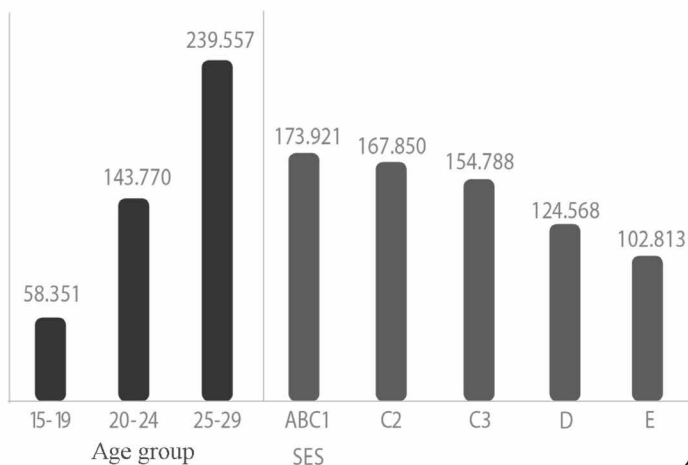


TABLE 6.4 Average monthly income according to age and socioeconomic level. Source: Sixth National Youth Survey. INJUV, 2009

Turning to typical outgoings within the youth population, the top five items included in young people's monthly budgets are those items mentioned by 50% or more of participants surveyed, in descending order of importance. They are: "Transport" (76,8%); "Food" (71,4%); "Perfumes, cosmetic and toiletry/personal care items" (63%); "Wardrobe" (61,1%); and "Parties" (53,1%) [Table 6.5]. Transport is one of the items that all young people, regardless of age or socioeconomic level need to include within their monthly budget. Thus, mobility strategies can be taken to mean the management of resources for consumption practices. A sub-dimension of the above refers to actual consumption practices (consumed or purchased) and another to aspirational consumption, the idea of spending not according to one's actual economic situation but rather the economic situation they aspire to have.

Item Participation in Monthly Budget									
	Total	Stage Age			Socioeconomic Status				
		15-19	20-24	25-29	ABC1	C2	C3	D	E
Transport and locomotion	76,8	75,3	78,0	77,3	79,2	81,3	79,5	71,8	69,1
Supply	71,4	58,5	73,6	84,1	65,0	68,7	73,2	74,4	72,5
Articles of perfumery, beauty and hygiene	63	55,3	63,2	72,0	60,5	61,1	62,3	65,1	67,0
Wardrobe	61,1	54,2	61,6	68,7	54,1	56,7	64,1	64,7	64,4
Holidays and / or parties	53,1	56,7	54,9	46,9	72,2	57,3	52,0	47,9	43,2
Entertainment, (sports and cultural activities like cinema, theatre, recitals, and so on)	41,2	43,8	39,5	40,1	59,4	44,2	40,3	36,7	33,9
Education (matriculation, credits and study material)	40,9	44,7	40,6	36,9	49,4	41,3	40,8	39,5	38,5
Accounts (light, water, gas, telephone, and so on)	40,2	28,9	37,8	56,2	26,2	36,9	44,3	43,7	41,9
To pay debts	35,4	27,5	33,3	46,8	21,6	34,2	38,8	36,6	37,9
Health (it excludes forecast of health)	29,8	27,9	29,4	32,6	25,8	29,3	31,1	30,8	29,2
Saving or investment (savings account, term deposit, mutual fund, money-bodes, an so on)	26,8	30,5	23,9	25,6	28,9	26,3	27,5	26,5	26,2
Housing (rental, mortgage)	25,4	25,1	22,9	28,4	17,8	23,8	27,9	26,4	27,2
Expenses or familiar transfers	22,8	26,5	20,2	21,4	16,0	19,3	24,0	25,5	29,1

TABLE 6.5 Item participation in monthly budget spending according to age and socioeconomic condition.
Source: Sixth National Youth Survey INJUV, 2009.

Monthly spending appears to grow over the years for higher education students and tends to rise in tandem with increasing socioeconomic conditions. The main expenditure for all the young people within the survey is housing (see Table 6.6). The data suggests that the cost of renting a place to live is one of their biggest items within their monthly budget. While it is recognised that spending rises in line with the socioeconomic condition, expenditures on housing for young people are almost 50% lower than the average spending on rent in Chile (CASEN²³, 2006). This seems to be related to the higher-than-average dependence on shared housing within this population group and other forms of expense reduction through informal arrangements between flatmates.

Average of monthly spending, according to gender, age, socioeconomic level									
	Total	Stage Age			Socioeconomic Status				
		15-19	20-24	25-29	ABC1	C2	C3	D	E
Housing (rental, mortgage)	61.530	46.380	55.482	66.296	06.530	73.403	52.199	48.333	35.245
To pay debts	57.631	25.458	44.551	69.328	95.732	68.208	54.795	44.125	44.688
Education (matriculation, credits and study material)	50.177	31.702	56.675	59.038	67.671	58.043	53.068	31.617	38.830
Expenses or familiar transfers	44.571	29.047	38.386	52.770	44.162	53.407	41.281	37.777	44.531
Supply	40.032	17.330	36.112	55.875	33.195	41.094	45.399	38.947	31.427
Saving or investment (savings account, term deposit, mutual fund, money-bonds, and so on)	35.526	21.711	36.013	41.715	42.957	38.764	33.524	29.967	22.588
Accounts (light, water, gas, telephone, and so on)	28.731	18.660	25.161	32.147	35.705	35.156	29.229	22.988	18.480
Wardrobe	23.003	17.617	22.250	26.899	22.451	22.697	23.649	23.554	20.919
Health (it excludes forecast of health)	19.253	12.508	15.121	23.902	24.188	22.018	17.644	15.640	16.108
Transport and locomotion	17.969	10.872	17.234	25.016	19.337	19.111	18.136	17.016	13.404
Holidays and / or parties	16.996	10.067	17.140	23.854	18.560	17.719	16.811	16.102	12.942
Entertainment, (sports and cultural activities like cinema, theatre, recitals, and so on)	14.171	8.188	14.277	18.561	13.684	15.395	14.655	12.622	9.651
Articles of perfumery, beauty and hygiene	12.688	9.534	11.880	15.260	15.135	13.764	12.266	11.691	10.817

TABLE 6.6 Average monthly spending, according to age, and socioeconomic condition. Source: Sixth National Youth Survey INJUV, 2009.

²³ Housing Survey of the Ministry of Housing and Urbanism in Chile

The third main budget expenditure for young people is education. In Chile, educational quality is related to private expenditure. The quality of the available educational opportunities tends to improve in relation to the ability of students and the student's families to pay for it. The amount spent on education grows as one ages and corresponds to one's socioeconomic level, with those who have more money choosing to pay for private elementary and secondary and university education. In a similar vein, compared with previous surveys, spending on entertainment related to sports and cultural activities has decreased overall, however it is evident that those from middle class backgrounds spend the most in this area.

The primary form of aspirational consumption by young people is housing 23,6% (see Table 6.7). However, this desire for better housing more clearly reflects the goals of those from disadvantaged backgrounds who tend to aspire to attain better housing as their socioeconomic condition increases. For higher income groups aspirational spending on housing tends to be lower. Overall, the most evident differences in spending are associated with socioeconomic condition. Lower-income groups tend to spend on housing, clothing, and their studies. In contrast, groups with more resources can rely on guaranteed help from their family, so they have more options regarding how they aspire to spend their money, choosing to spend it mostly on travel, clothing, or putting it into savings.

The primary area relating to consumption considered by young people in their monthly budget is transportation. Transport is however subsidised for at least some of the youth population, consequently the actual cost of transportation is not accurately reflected in the total. Half of all Chilean youth are registered as students and therefore only pay a third of the cost of public transportation through a subsidy given by the Chilean state (INJUV, 2009). For those travelling within the Valparaíso metropolitan region, there are four primary modes of public transport to consider. These four modes are metro-train, bus, trolley bus and shared taxi. Some of these public transport modes operate at the regional level such as the metro-train whilst other types are only found in central areas such as the trolley bus or bus. All four modes of transport have a special student rate.

The variations in the actual cost of transport that result from the selective application of state subsidies are seen again in differences between socioeconomic condition and residential location. Urry (2002) found that in developing countries some households develop extensive mobility patterns, while conversely, other households become more marginalised over time and have a reduced capacity to be mobile. Jirón and Rodríguez have argued that in the Latin American context, urban sprawl is typically associated with mobility model based on the use of automobiles, which they argue leads to unequal and fragmented access to good and public services (Jirón, 2012; Rodríguez, 2008, 2006a, 2006b).

For a substantial proportion of the population living in such areas having a private car means having access to public services within city areas. The aspirational spending from lower-income groups (D) stems from the desire to buy a car whether they can afford one or not. This data can be explained because group “D” has more potential to experience social mobility than group “E,” which is the lowest socioeconomic group in Chile (MINVU²⁴, 2010). On the other hand, the economic groups that spend the most on cars are those from the two highest socioeconomic groups (ABC1 and C3), but in those cases, the purchase of a private car has an element of personal satisfaction.

Consumption aspirations by age and socioeconomic status.

	Total	Stage Age			Socioeconomic Status				
		15-19	20-24	25-29	ABC1	C2	C3	D	E
Housing	23,6	14,3	22,6	35,4	18,5	18,7	25,1	27,1	30,2
Wardrobe and Footwear	15,1	26,7	11,7	5,2	14,4	14,3	14,8	16,4	14,4
Savings	11,2	11,6	11,0	10,9	14,4	12,6	10,2	9,9	9,9
To study (photocopies and so on)	10,4	11,4	12,1	7,3	3,8	11,8	11,4	9,7	10,1
Car	6,5	6,4	6,6	6,6	9,2	7,5	5,7	6,4	3,2
Utilities	4,5	5,5	4,2	3,6	1,9	3,6	3,1	6,1	7,4
Debts	4,3	1,4	4,9	7,2	3,7	5,2	4,8	4,1	1,4
Trips or vacations	4,0	2,1	5,7	4,3	14,6	4,6	3,3	2,1	1,5
On children (school expenses, health, wardrobe and so on)	3,9	1,7	4,1	6,3	0,7	3,1	3,9	4,8	6,0
Technology (mobile phone, MP4, chambers, radio, etc)	3,2	5,6	2,2	1,3	3,6	3,6	3,8	2,5	2,3
Help relatives	3,1	3,6	3,3	2,5	1,3	3,5	2,8	3,2	3,7
Job relate expenses	2,8	1,1	3,6	3,7	1,9	2,8	3,9	2,3	2,3
Entertainment (sport and cultural activities like cinema, theatre, recitals and so on)	1,9	2,7	2,2	0,7	4,6	2,3	2,0	1,0	1,4
Miscellaneous	1,3	1,2	1,9	0,8	0,8	1,5	1,0	1,4	1,2

TABLE 6.7 Aspirational consumption according to age and socioeconomic condition. Source: Sixth National Youth Survey INJUV, 2009.

²⁴ Acronym in Spanish for the Ministry of Housing.

6.3 Conditions for Mobility Related to Identity

Flamm and Kaufmann (2006) argue that 'Capital for Mobility' defines a person's potential or capacity to be mobile. These conditions can be physical aptitude, the aspiration to be mobile, existing technologies of transport and its accessibility, space-time constraints related to urban infrastructure, the spatial structure of the city, or perhaps an individual's acquired knowledge of the city (Flamm and Kaufmann, 2006). It therefore seems to follow from Flamm and Kaufmann's thesis that some population groups such as higher education students will have a comparatively higher level of 'Capital for Mobility' than others.

As noted previously, earlier urban studies dealing with mobility have tended to focus on understanding traffic flows rather than considering the actors carried within such flows. The weakness of such a narrow compass stem from a desire to understand demand and consequently, they tend not consider consumption to any degree. In other terms, such origin-destination studies do not consider the social and cultural influences that can alter people's modal and spatial travel behaviour (Herce, 2009). Actors and their behaviours are however central to the mobility process. The interrelationship between the various conditions for mobility identified by Kaufmann therefore provide a means to explain not only how but also why higher education students move around the city (Kaufmann *et al.*, 2004).

The first condition for mobility identified by Kaufmann is *Competence* and this will be studied through the two main variables that have the most influence on the *Competence* of this population group: (1) stage of life (youth) and (2) training capacity. Kaufmann's second condition for mobility is *Appropriation*, which refers to existing mobility strategies which are shaped by needs, plans, aspirations, motives, values, and habits. The variables that influence *Appropriation* for higher education students include (1) stage of life (youth), (2) social networks and places of interaction, (3) use of free time, and (4) economic condition. For higher education students, the latter is in practice, heavily dependent on parental support and occasional jobs.

The potential to be mobile can be seen on an individual level, but it is not formed individually. Quite the contrary, 'Capital for Mobility' is eminently social (Kaufmann, 2002). In combination then, these variables bind these individuals into a distinctive coalition or group of urban inhabitants. The higher education students of the Valparaíso region therefore form one of many "mobile communities" that

move through and around this metropolitan area. This binding of individuals into ‘mobile communities’ makes it easier to explain the complex compromises made by individuals within these ‘mobile communities’ that are related to their modal practices and the strategies adopted in accessing the city. (Ascher, 2004).

Similarly inspired, Soja preferred the phrase “metropolitans” which Soja used to describe distinctive groups or populations of people dependent on public transportation and spending substantial time in the centres of large-scale metropolitan areas, such as San Francisco (Soja, 2004).

CONDITIONS FOR MOBILITY	
COMPETENCE	VARIABLES (influencing conditions for mobility)
The physical abilities, organisational and acquired skills, relating to rules and regulations of movement.	stage of life
	training
APPROPRIATION	stage of life
	social networks and places of interaction
	use of free time
	economic condition

TABLE 6.8 Kaufmann's Conditions for Mobility, Source Author

6.4 Condition for Mobility: Competence

Kaufmann's interpretation of *Competence* relates to three main aspects of individual mobility. First, the idea of *Competence* relate to physical ability, something that is strongly associated with age and life stage (i.e., walking, seeing). This is association has been considered by studies such as that by Fadda and Olivi, who focused on the relationship between age and urban mobility. They worked with some of Valparaíso's elderly population looking at the requisites needed to help them maintain a good quality of life (Fadda and Olivi, 2011). The second aspect of *Competence* as defined by Kaufmann (2002; 2006; 2012), is comprised of the organisational skills needed for mobility, these include the skills required to plan activities or to sort through the available information on bus schedules and routes which together contribute toward decisions made regarding travel. For Kaufmann, the final aspect of *Competence* is concerned with the acquired skills required for mobility. A driver's license, for example, must be obtained before driving, a knowledge of the English language is often needed for international travel, or the more simply, the local knowledge required to operate within the context of where the individual will move. The latter assumes that a local inhabitant has a greater understanding of local laws, public transport supply, and the knowledge of various routes for moving around their area.

A study of daily mobility patterns conducted in Rio de Janeiro's peri-urban neighbourhoods shows the importance of acquired skills in shaping 'mobility', but also highlights the importance of both geographical context and social condition. This study analysed a group of children's routes to school in an area of intense social vulnerability and varied topography. The results showed that although some children live less than five minutes from their schools, they took almost half an hour to reach them due to their mothers' network of alternative routes to avoid streets plagued by drugs and gangs (Institut pour la Ville en Mouvement, 2014).

Applying the same approach, it becomes apparent that the mobility strategies of higher education students in Valparaíso's are rooted in the needs, aspirations, motives, values, and habits related to their youth. The physical capacities of the students can be seen as an advantage in gaining access to the city and can be used as 'Capital for Mobility' by young people in hilly city areas. This is reflected in the 6th Annual Youth Survey which recorded that within the Valparaíso Metropolitan Area walking grew from 18.3% in 1998 to 26.1% in 2016 (SECTRA, 2014). Youth is therefore an essential consideration when exploring the conditions that influence the intense daily mobility of the students and the specific factors that influence those conditions (Kaufmann 2002; *et al.*, 2004; Canzler *et al.*, 2008; Flamm and Kaufmann, 2006).

Life stage is particularly significant in a territory of high topographic complexity as the provision of road infrastructure for connectivity, such as highways and bridges, can become extremely difficult both from a cost and engineering perspective. The result is often a discontinuous road network of poorly laid out narrow and winding streets. This change in the data is therefore most likely due to the hilly condition of the expanding metropolis, where steep slopes and hilly terrain exacerbate spatial discontinuity (Peters and Skop, 2007). Walking paths are often more rapid and direct than public transport (Figure 6.1). Therefore, young people's capacity to walk substantial distances can be seen as an advantage and therefore becomes a condition of their 'Capital for Mobility'.



FIG. 6.1 Walking paths state projects. Source: Quiero Mi Barrio (Ministry of Housing).

Besides physical abilities, the two other aspects of *Competence* as a condition for mobility are related to organisational and acquired skills. Higher education students form only 3.8% of the total Chilean national population which has increased by almost 2.3% in ten years (National Educational Council, 2016). Although only a small proportion of the total population, higher education students can draw on disproportionately high levels of organisational and acquired skills through their relatively advanced educational level (Bourdieu, 1979; Dubet, 2005).

That 90% of their travels are made by public transport highlights their ability to research information and acquire knowledge related to such means of transport (SECTRA, 2014).

Information and Communications Technology (ICT) which is strongly associated with both organisation and the acquisition of skill is particularly significant in the lives of higher education students. The authors of the World Youth Report have suggested that young people have a greater facility with ICT tools than the general population because they were born during the technological era (World Youth Report, 2003). Related to acquired skills, young people tend to depend on ICT in many aspects of their lives, such as for pursuing their studies or more simply for playing games. The growing centrality of ICT within their lives extends into personal sphere, where virtual relationships are becoming more frequent and more often people interact through chat and have video conversations using webcams.

Despite the use of virtualisation technologies, it is possible to say that almost 83% of students in Chile spend time predominantly with friends at their homes (INJUV, 2009). Such a focus on neighbourhood against a growth in the use of virtualisation might suggest a counter-intuitive slowing in the demand for physical movement whilst the importance of mobility to individual is maintained. Urry (2002) argues that virtual travel can easily be substituted for corporeal travel for in the words of García Palomares “induction relations” (2008, p.11).

The latter author has analysed mobility in terms of the ability of information and communication technologies to reduce the need to travel (substitution) but also its potential to generate new trips (inductions). Based on this analysis, Urry concludes that information and communication technologies can generate new needs for personal contacts and many times, fostered from contacts through the network, which later induce displacement (Urry, 2002).

Face-to-face conversation therefore appears crucial for developing trustful relationships even, or perhaps especially, within cyberspace (Urry, 2002, p. 68). This is confirmed by Putman (in Urry, 2002) who similarly concludes that frequent contact between people via the internet complements frequent face-to-face contact but is not a substitute for it. Urry further suggests that many of the community ties evident within population groups are formed from a complex of interrelationships facilitated by face-to-face encounters scheduled togetherness, telephone calls, emails, and broader online discussions, among those who share common interests (Urry, 2002).

One such example might be the organisation of neighbours through a WhatsApp group that can, as a result, bring about a physical interaction between neighbours. A message sent by WhatsApp allows a community to mobilise and plan meetings, which constantly integrates neighbours. Thus, mobile phones with messaging style applications enable a change of travel plans in real-time. Urry states “There are [now] countless new means of communication emerging that are small, mobile and embedded within, or part of, the very means of mobility” (Urry, 2002, p. 269).

6.5 Condition for Mobility: Appropriation

Appropriation as a condition for mobility refers to the way in which people interpret the other conditions of mobility, *Access* and *Competence*, because *Appropriation* mainly consists of strategies for movement shaped by an individual’s needs, plans, motives, and aspirations. Looking at higher education students in the UK, Christie has argued that a student’s decision concerning residential mobility are not only related to the rational economic decisions of students from non-traditional backgrounds but are mainly steeped in young people’s “...emotional attachments to locally based networks of family and friends” (Christie, 2007).

As such, Christie argues a student may be labelled “...person who gets homesick easily..” when confronted with unfamiliarity or choose to stay in a familiar place because they do not want to leave local contacts related to the labour market (Christie, 2007, p. 2455). Christie’s work highlights the way in which residential mobility is rooted in factors such as habits, motives, and aspirations, related to the condition of *Appropriation*. The choices made about where to live are in part dependent on the travel strategies associated with daily mobility and are in turn shaped by an individual’s personal needs, plans, and motives.

Studying non-traditional students in the UK, Christie recognised that one of the main difficulties that individuals experienced with their daily travel arrangements was the need to co-ordinate home, work, study, and leisure activities arose because most of the group studied were commuters based outside the city centre (Christie, 2007). For those that choose to live at home, there is an advantage in that they can maintain the friendships made close to their parents’ homes. New friendships made at the university, close to campus or within the city centre will however increase the need for leisure time as it becomes necessary to allow for more travel time whilst the required extra journeys complicate daily mobility patterns.

Within the present study, Kaufmann's notion of *Appropriation* is considered against empirical data gathered from in-depth interviews conducted (first-hand data) between September 2016 to September 2017. The 61 interviewed students from Universidad Técnica Federico Santa María (UTFSM) were given the interview guide with questions which can be found in the appendix. The research was conducted with the aim of connecting *Appropriation* to the daily mobility patterns practised by higher education students.

The resultant data set covers:

- 1 Travel routines include trips during Tuesday or Thursday, travel time, transport modes, origin and destination locations, and permanence.
- 2 Mobility strategies related to five questions, who moves, how they move, where, why, and for what, – as such, the dataset indicates possible motivations for traveling and factors that may discourage travel.

The following stories emerged from the interviews. Names have been changed to ensure participant anonymity. Franco, a student who lives in Nogales, an interior rural city of almost twenty-two thousand inhabitants in the Valparaíso Region, travels to a university located in the city of Valparaíso every day. His daily commute depends mostly on reaching the nearby town of Calera, where there is a better public transport supply. From there he can choose his means of transport dependent on two factors- cost and time of travel. Franco takes almost two hours to get to the university each day, taking two buses using his 'College Card.' He chooses to ride a shared taxi, and although it is about thirty minutes faster than the bus, it has no discounted fare for students. Although he recognises that staying at his parent's home was mainly influenced by economic reasons, local attachments to family and friend networks are also important. He sees himself as a 'day student' who lives at home and maintains a spatial and temporal separation between his home and university life. He commutes to the university daily (Figure 6.2).

"I like my rural life at home, and even though I have to travel almost two hours to get to the university every day, I need to come back almost every day to Nogales."

Vicente, who migrated from another region to study, lived a fifteen-minute walk away from the university. The importance of proximity for Vicente is fundamental because of economic and social factors, and the selection of his housing location reflects them. His daily mobility occurs in almost one square kilometre, where he has all the essential urban services and social networks. He can walk home for lunch and spend more time there. He is also a thirty-minute walk or seven minutes by bus to two of the most significant urban centres of the VMA.

Another interesting example comes from a group of local students living in the Valparaíso Metropolitan Area. Almost all the members of the group live on the city's outskirts but still within the region.

Danica is a student that lives on one of the hills that surround Viña del Mar, one of the cities that borders the coast (Figures 6.4 and 6.5). Her home is far from the city centre and access is difficult both because of the local topography and a consequent lack of suitable transport infrastructure that connects her neighbourhood with the rest of the city. The area has just one type of public transportation, and sometimes, during rush hour, she waits for up to an hour for her bus. In the VMA, the only means of transport with a reliable schedule is the metro, rendering it impossible to plan how long bus trips will take. Another possibility is taking a shared taxi, which is more efficient but does not offer a student discount. Shared taxis also have informal charging policies and have a history of arbitrarily changing prices. Danica uses four types of transport daily, two buses and two shared taxis; this can change depending on travel time and safety conditions.

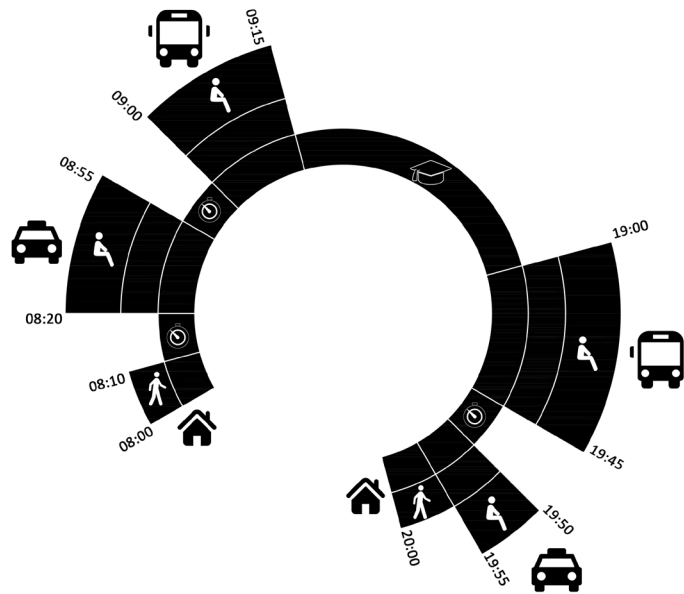


FIG. 6.4 Danica's Daily Mobility Pattern on Thursday in Placeres Hill, Valparaíso. Source: Author



FIG. 6.5 Google Earth image of Danica's commute from home to the university. Source: GoogleEarth

“.... When I was a first-year architecture student, I had more time and preferred to save money, now that I am a third-year student, my travel habits have changed as my time is more limited because my studies have become more demanding.”

Daily mobility strategies may depend on each semester's academic load as well as the desire to travel safely at night. Danica uses shared taxis almost every night despite their informal charging policies.

“Because public transport is scarce, I cannot stay at the university later than 9:00 pm because public transportation stops running at 10:00 pm. This schedule means that I am forced to return home during rush hour; there is no choice. I also cannot return home too late because my neighbourhood is isolated and is not safe.”

Another example is provided by Francisca, who lives with her parents in one of the hills near the flat area of Valparaíso city centre (Figure 6.6). On Thursday morning, her day began in a friend's apartment who lives a few minutes away from the University on Placeres hill. She travelled to her home by bus, stopped at the supermarket, and walked to take the urban elevator to get home. She explains...

“I prefer to take the elevator because it is cheaper than the shared taxi and takes less time to start the trip”.

Francisca's mobility strategies are based on her proximity to the city centre and the university, so she can make mobility decisions that link her student life with her family life. Francisca's daily mobility is diverse; she goes to the university and the supermarket with her mother and has a coffee in the city centre. Her life is not centred around the university but open to her different needs in the city. Her daily trip is characterised by different transport modes and does not last longer than 15 minutes.

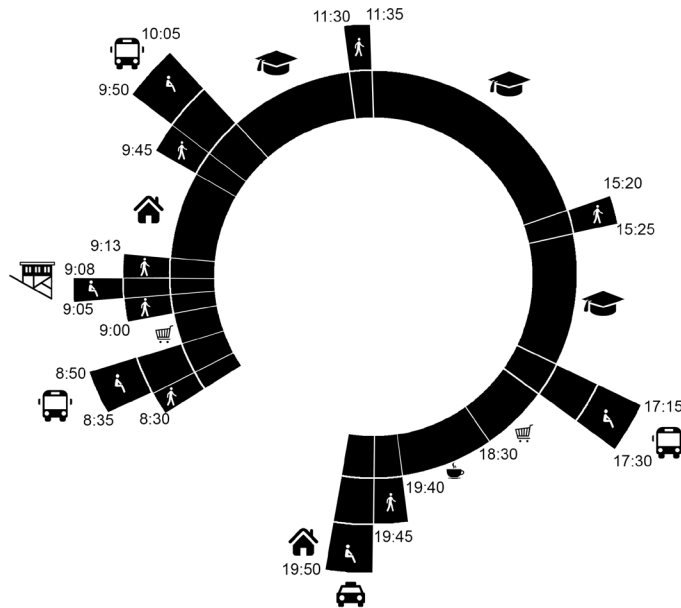


FIG. 6.6 Francisca's Daily Mobility Pattern on Thursday, Valparaíso. Source: Author

Although such stories perhaps serve to demonstrate the complexity of decisions and strategies around daily mobility made by individuals, they also serve to illustrate the point made earlier that the choices that an individual makes about residential location are strongly associated with wider social networks and family decisions. Although these are examples of daily mobility on an individual level, it should perhaps be noted that the individuals themselves are not the sole constructors of their daily mobility pattern. Often their decisions are related to family decisions for travel, friends, or in some cases, even neighbours. Daily mobility patterns are therefore constructed on two levels; (1) individual mobility, which depends on the daily mobility of family, neighbours, or friends, but also (2) amongst groups of people who do not live close to their university or workplace. This seems to prove Urry's contention that the mobility of individuals is eminently social (Urry 2002).

6.5.1 Social Networks, and Places of Interaction as Motivators for Youth Mobility

Urry (2002) argues that social life requires physical proximity and co-presence that together make physical travel necessary. He argues that certain types of co-presence are possible through virtual means, but many other types cannot be easily virtualised, these include legal, economic, and familial obligations between specific or generic types of people. In this way, Urry's thesis suggests that co-presence and the spatial conditions that best suit different types of co-presence are the some of the first distinctive determinants of the need for mobility. For this reason and for most people, Urry argues, an individual's social life is still shaped by encounters that require physical trips (Urry, 2002, p. 268).

Urry's perspective echoes Weber's earlier observation that the "persistent power of propinquity" relates to cities and people. Weber argued that metropolises are massive communication switchboards and exist because interdependent people and groups must be accessible to each other (Weber, 1976). Aside from business and formal exchange, Weber argues that informal situations are likely to encourage the exchange of more content than virtual communication or formal meetings (Weber, 1976). Urry supports this view, concluding that different forms of movement are essential for developing social lives that may involve greater distances or more intermittent co-presence. Communication and trips required for co-presence, Urry suggests, can be rich, varied, and transform the nature of the social exchanges that follow (Urry, 2003).

For young people, social life is more fundamental than for any other population group (Bonvallet and Dureau, 2002). They suggest that "...the dual practise of recognising oneself in others while differentiating oneself is part of the identity construction process" (Bonvallet and Dureau, 2002, p.45). For this reason, young people attach great importance to the establishment of social networks. However, these social networks operate in different places and are made through differing activities. There are strong connections between young people's social networks and the locations that their interactions take place and therefore such places are frequented by young people.

For Bonvallet and Dureau (2002), the places where friendships are made are crucial because they imply a specific social and spatial environment related to life cycles. Different social networks can be linked to different locations and social environments. They argued a student's choice of where they will live is therefore not only related to rational economic decisions or their enacted friendship networks but is mainly steeped in their longer-term attachment to a local network of family and friends (Bonvallet and Dureau, 2002).

With the foregoing in mind, information contained in the regional report of the Sixth National Survey (2009) can be used to confirm the main places where students meet their friends and how far they travel to do so, together with other details relating to other travel instances connected to leisure. The Sixth National Survey is an instrument with almost 7,570 cases, with a margin sampling error of 1,15% nationally and up to 5% in regions with fewer cases, and a 95% confidence interval assuming maximum variance (INJUV, 2009). It consists of a multiple-choice questionnaire that offers an objective assessment in which respondents were asked to select one answer from the choices. Once the responses were totalled, each category was given a percentage (0% to 100%) based on the respondents' number.

The resultant dataset shows that slightly more than 50% of young adults met their current friends "in high school" or "in the neighbourhood" (see Table 6.9). These two alternatives were the most frequently mentioned, respectively, with 59,9% and 58,4%. Other less often mentioned places were "work" (23,2%), university or technical institutes (22%), and "parties" (14,1%). Information on places where friendships are made (see Table 6.9) reveals essential distinctions related to educational level. Those with university studies most often list three main places and social networks where friends are made: university (70,6 %), secondary school (60,7%), and their neighbourhood.

If this information is analysed through the lens of socioeconomic condition, the middle class, the leading consumer of higher education, differs from the general trend because the two highest percentages (63,6% and 59,2%) aligned with friends from secondary school friends from the neighbourhood. The socioeconomic condition of individuals increase the percentage of friendships made at high school and university (related to education). On the other hand, as socioeconomic conditions decrease, friendships made in the neighbourhood increase, like those made at work. Young people in a low-income bracket frequently claim to have made their friends in the neighbourhood. Daily mobility studies related to social exclusion and urban conditions often emphasise inequalities in the distribution of such opportunities. A lack of to urban facilities makes access to education, services, and employment difficult leading to the high rates of immobility evident within low-income groups.

The Sixth National Youth Survey from 2009 isolate socioeconomic condition and educational level as key variables that together account for the most significant difference in places where friends met (see Table 6.10). High-income youth (ABC1) who have university studies predominantly spend time with friends at home or in paid recreational places like bars or nightclubs. While middle-income youth (C2, C3) prefer to spend time with friends in public spaces, in their neighbourhood, on the streets or in squares.

Most university students prefer to spend their leisure time at home (82,9%), secondly in paid recreational spaces (46%) and third place areas of study (44%). Households acquire the role of being a place of leisure through ICT.

Places where friendships are made												
	Total	Stage Age			Socioeconomic Status					Educational level		
		15-19	20-24	25-29	ABC1	C2	C3	D	E	Secondary and low	Technician	University Students
At university, lyceum, school	59,9	82,1	54,8	39,8	69,0	63,6	59,2	55,1	58,0	61,4	50,5	60,7
At the neighborhood	58,4	63,3	55,4	56,0	40,8	53,2	60,7	64,5	65,4	66,6	52,2	38,8
At work	23,2	5,8	25,4	40,9	18,4	24,3	23,4	23,2	21,6	22,3	33,5	20,3
At university, CFT, IP	22,0	6,8	34,7	25,2	49,7	33,3	18,8	10,3	5,6	0,0	46,4	70,6
At parties or	14,1	16,2	15,2	10,4	21,9	14,1	14,1	13,3	10,8	14,2	13,7	14,0

TABLE 6.9 Places where friendships are made. Source: Sixth National Youth Survey. INJUV, 2009

Places where Young People Meet Friends on a Daily Basis												
	Total	Age			Economic Status					Educational Level		
		15-19	20-24	25-29	ABC1	C2	C3	D	E	Secondary and low	Top technician	Top university
Houses (home)	75,1	69,0	76,1	81,1	85,9	81,0	74,4	70,9	61,0	71,2	81,0	82,9
Public places : streets, passage, corner, squares, parks	41,7	56,7	37,6	28,6	36,4	37,0	45,0	44,2	46,9	48,1	33,7	27,6
Places of study : colleges, elementary or secondary school, CFT, IP	28,1	44,8	25,7	11,6	39,9	32,2	26,6	23,6	23,1	23,1	24,4	44,0
Paid recreational spaces	27,0	15,5	33,8	32,8	41,5	36,1	25,3	18,2	15,4	17,5	41,6	46,0
Malls or shopping centers	0,4	11,2	7,5	6,3	9,4	9,9	8,2	8,3	2,9	9,1	6,8	7,4
Headquarters or space of some organization or group	7,4	7,5	5,8	9,0	4,8	6,8	7,1	8,2	9,4	7,5	7,0	7,3

TABLE 6.10 Places where young people meet friends daily. Source: Sixth National Youth Survey. INJUV, 2009

Another notable feature of the dataset is that almost half of all youth belong to some social organisation on regional and national levels. Most college student organisations have been neighbourhood councils, cultural, athletic, or social groups during the past two years. The most frequent rates of participation in organisations during the last year, according to Sixth National Youth Survey, INJUV (2009), are in sports clubs (25,5%), followed by recreational organisations and artistic or cultural organisations (12,5% and 11,7%, respectively); with lesser frequency are volunteer groups (9,9%), student government (7%), neighbourhood organisations (4,2%) or political parties (1,4%). Participation increases notably with membership in private organisations that reflect personal interests, like sporting clubs (25,5%) and virtual communities (12,5%). Taking part in these organisations can affect mobility choices and be an essential factor in where students – particularly those who migrate to the area – choose to live.

6.5.2 Habits of Youth- Use of Time and Their Most Frequent Activities

When studying the daily mobility patterns of this population, it is important to explore how and why students organise their daily routine within urban spaces. To understand what social networks and places of interaction mean for the young population is to understand at least some of the motives that drive youth mobility and perhaps its intensity. Bonvallet and Dureau (2002) explain that daily life is structured around four spheres governed by different actions: the sphere of work, social commitments, domestic and free time (Bonvallet and Dureau, 2002). If two or more aspects of daily life occur in different places then some of the intensity evident in youth daily mobility patterns becomes apparent, not least due to the relatively novel nature of the social spheres where friendships and other forms of social relations are formed.

One characteristic behavioural pattern associated with youth and their social identity are the series of processes and experiences that force them to assume more significant degrees of personal autonomy and social responsibility, both inside and outside the domestic sphere. This characteristic change in behaviour patterns marks the transition to adulthood (Salas and De Oliveira, 2009). Youth's first experiences with increasing personal autonomy and daily mobility often corresponds with the following groups of activities: 1) studies (class attendance and studying); 2) home and family responsibilities (cleaning, childcare, looking after family members and older relatives, taking care of the sick); 3) paid work; 4) unpaid family work (family business), and 5) free time.

The categories of young people's regular activities as they begin the transition to adulthood are generally established and are initially mostly related to their free time. The Chilean population between the ages of nineteen and twenty-nine dedicate the most significant proportion of their time (more than one-third) to activities associated with "free time" (35,8%). On the other hand, the following activities decrease in proportionality, namely "study" time (24,6%), domestic work and unpaid care (20,9%), paid work (16,7%), and at low-income conditions, unpaid family work (National Youth survey, 2009).

After the age of twenty, the time they dedicate to study decreases substantially. Accordingly, youths between the ages of fifteen and nineteen are the ones who spend the most significant proportion of their time on these activities (42,5%). A similar pattern occurs concerning free time, but much less markedly. Young people between the ages of fifteen and nineteen devote 38,9% of their time to activities associated with free time; by comparison, people between the ages of twenty-five and twenty-nine dedicate 30,7% of their weekly time to leisure activities.

The activities most frequently undertaken by Chile's youth population take place principally within private spaces, in the company of close acquaintances (National Youth survey, 2012). Most of these activities have an insignificant economic cost. The most mentioned activity is "being with the family" or at family places. Looking at different socioeconomic groups and the frequency that activities are taken, there are a few notable differences in the first four responses: activities associated with family, watching television, listening to music, and being with friends.

The principal differences appear in the use of Internet or computer use, reading, and party attendance. The relative percentage of time devoted to such activities decrease as income decreases. For example, these activities represent 50,6% of the time within the high-income group and only 33,3% within the low-income group (National Youth survey, 2009). Regarding Internet or computer use, the percentages of youth from high socioeconomic backgrounds that partake in this type of activity are more than twice the youth from low socioeconomic groups (86,1% and 35,5%, respectively). It is also evident that the proportion of high-income youth who extensively participate in these activities exceeds the national average.

Turning to difference in educational attainment, the activities undertaken with the most significant frequency show essential differences are: "Internet or computer use," "reading newspapers, books, or magazines," and "going to parties." There is a greater tendency to participate in such activities among higher educational levels. More than half of the young people with a secondary level of educational attainment engage in "Internet or computer use" (50,6%), while this figure among youths with

a university level of educational attainment increases to 83,1%. Two-fifths of young people with a university-level education frequently cite “going to parties” (39%), whereas less than one-third of young people with only secondary levels of education frequently participate in this activity (26,8%) (National Youth survey, 2009).

6.6 Conclusion

Kaufmann argued that the mobility paradigm does not dissociate time, space and identity related to lifestyle (Tarrius in Kaufmann, 2002). This conceptual framework provides a foundation for two of the three Kaufmann’s Conditions for Mobility, *Competence, and Appropriation*. When analysing a given population’s mobility patterns, the first questions are: Who are they? Where do they live? Subsequently, it becomes important to ask how and why does a given population move? The study of daily mobility therefore requires an awareness of sociological dimension of daily movement or alternatively, the study of daily mobility demands that the researcher understands daily mobility as a social practice.

This has been taken as part of an operational framework with which to explore daily mobility as these two conditions are mainly related to identity characteristics. Therefore, to understand the daily mobility of university students in metropolitan areas, who they are, what characteristics define them, what motivates them, and their aspirations, habits, and values, among others, the two conditions are critical. In this case, *Competence* and *Appropriation* were assessed through the lens provided by the Sixth National Youth Survey, and through one-to-one interviews conducted with 61 higher education students in Valparaíso.

Turning to the first of Kaufmann’s Condition for Mobility, *Competence*, which relates to not only the physical ability required for mobility but also the organisational and acquired skills that underpin adherence to the rules and regulations of travel. In this sense university students can be easily identified as a population group made up of younger inhabitants. The physical capacities of this population group can be seen as an advantage in gaining access to the city and can be used as ‘Capital for Mobility’. This is significant in a territory where walking grew to 26% of the trips in Valparaíso Metropolitan Area (SECTRA, 2014). The high topographic complexity of the VMA with little provision of road infrastructure for connectivity, such as highways and bridges, can become extremely difficult to access.

Another important characteristic related to *Competence* are acquired skills such as the ability to organise. As a relatively privileged section of the broader population, their advanced educational level serves to further improve their 'Capital for Mobility' (Bourdieu, 1979; Dubet, 2005). This assertion is based on the belief that young people have a greater facility with and access to ICT tools than the general population. Born during the technological era, young people tend to make greater use of ICT as part of their work, to organise their personal lives or more practically, to access information sources such as transport schedules (World Youth Report, 2003). Added to which the formation and maintenance of virtual relationships of all types are becoming more frequent within this population as they increasingly interact with each other through chat programmes or hold video conversations using webcams. Despite the growing use of such virtualisation technologies, almost 83% of students in Chile say that they predominantly spend time with friends at their homes rather than in virtual spaces (INJUV, 2009).

The second condition for mobility is *Appropriation*, a condition describing the strategies for movement that are shaped by individual needs, plans, motives, and aspirations. Despite the close connection between mobility and individual identity, as the examples of daily mobility patterns cited earlier show, individuals themselves are not sole constructors of their daily mobility patterns. An individual's mobility pattern can be related to family decisions and strategies for travel, friends, or even neighbours. In such cases, daily mobility patterns should be recognised as being prominently social in character (Urry 2002).

The strategies for mobility related with Urry's statement is reflected on two levels; (1) an individual's mobility, which depends on the daily mobility of family, neighbours, or friends, and (2) groups of people who do not live close to their university or workplace. In the latter case, as illustrated previously, frequently the student's choice of housing location relates mainly to social networks and family decisions (Tarrius in Kaufmann, 2002).

Migrant university students are for example, mostly young adults parting from their families for the first time. Simultaneously, these types of students are adopting new lifestyles subjected to several conditions, such as finding new places to live (student housing) in a new city, dealing with the nature and scope of available resources, and dealing with the types of sociability resulting from their ideological and political choices, among others. This means that an individual student's lifestyle is in part determined by their study choices and in part, their relative youth compared with the general population. It also means that there is a greater diversification in the lifestyles of students than evident in the broader population. Youth is therefore a fundamental factor influencing *Appropriation*, the last of Kaufmann's Conditions for Mobility.

This condition is apparent in many ways, but aside from the ‘work’ of being a student in the higher education sector, *Appropriation* is particularly connected with three further sociological concerns:

- 1 the student’s social networks and the places in which social interactions take place,
- 2 how students choose to use of their free time,
- 3 the student’s general economic condition.

The student’s social networks are characterised by their informality and by peer affinity. They are “by affinity” in the sense that they occur between friends and classmates based on shared interests and opportunities. Compared with other ‘youth’ populations, the social networks of higher education students are often more “informal” because they tend to revolve around cultural or sporting activities. Such activities are important because typically ‘student life’ often provides a means to build bridges between pre-university life and the new relationships made at university (Agence d’Urbanisme de la Communauté Urbaine de Brest et de son Environnement [AUCUBE], 1993).

In terms of ‘place’ higher education students list three main places where they have met their friends, indicating three different urban and social environments: friends made in the university (70,6%), friends from secondary school (60,7%), and friends from the neighbourhood. The places for meeting friends in order of preference: home, paid recreational places like bars or nightclubs, and public places. Their free time is also spent close to home or in places of study because they tend to consider access to information and communications technology essential. If the lifestyles inscribed within these findings are more diverse than the broader population and respond to a hierarchy, it seems clear the social element of ‘student life’ is fundamental to the development of these young people.

While sociality is a significant influence on *Appropriation*, a student’s economic condition is also significant. Economic condition is transversal to a youth population, who predominantly remain dependent on parental contributions (59%), or monies earned from occasional or part-time jobs. The choices made about residential location by migrant students, for example, is crucial because it provides an indication of what they can pay for housing and demonstrates a student’s preferences for particular social and cultural networks.

Economic condition is also significant in that economic condition has an important influence on consumption and habit. Of particular interest in this respect are the consumption habits of students and the networks of services that students need or aspire to have because these are often central to a student's strategies for residential or daily mobility. Within wider Chilean society, for example, the economic and social influence of the middle-classes has been growing steadily over time and as result, are now the best represented income group amongst higher education students. The influence of their aspirational consumption patterns now mean that many young people regard the ownership of a car as one of their main goals, something that is especially apparent among the low middle-class student population.

7 The Daily Mobility of High Education Students

Field Work

7.1 Introduction

The focus for this chapter will Kaufmann's third condition for mobility, *Access*. This condition refers to the range of possible mobility modes according to place, time, and urban constraints. This condition thus integrates the other conditions proposed by Kaufmann including *Competence* and *Appropriation* (Kaufmann, *et al.*, 2004). Kaufmann and later Jirón saw daily mobility patterns as some of the most complex and relevant phenomena associated with contemporary spatial configuration and organisation (Kaufmann, 2002; Jirón *et al.*, 2010). Despite their complexity and apparent significance to the configuration of urban space however there is little specific data on daily mobility patterns within in Chile, and more broadly, in other Latin American countries – an absence that the present study seeks to address.

Several questions from Kaufmann's understanding of *Access* arise in relation to the present study. What, for example, are the variables that influence the daily mobility patterns of higher education students? How do variations in the student's daily mobility patterns play out and what impact do students mobility patterns have on the metropolis?

To begin to answer such questions, an internet-based survey was designed and conducted with the intention of recording the daily mobility routines associated with a range of students enrolled at traditional universities within the Valparaíso

Metropolitan Area. It was expected that given the nature of the sample such a survey would provide a complete dataset of statistically significant samples at a metropolitan scale. As such, the selected method falls between an ethnographic mobility study and a travel survey like the origin-destination surveys most often used by the Secretariats of Transport Planning.

In analysing the resultant dataset, three variables relating to *Access* as a condition for mobility were explored. The first variable is 'residential', which refers to the place of origin (family home) but also the locations where the students live during their university studies. Three residential conditions will be recognised related to those of local students, regional migrant students, and national migrant students. In this context, migrant will be defined as changes in residential location that occurs in short temporalities during periods of academic study, rather than the long-term or lifelong changes of residence with which the term 'migrant' is more commonly associated. This temporally short interpretation of the term 'migration' is significant in the study of mobility due to the influence of the different forms of migration, for work or studies, travel for the purposes of tourism, changes in residency for short-term social or economic purposes, and daily mobility (Kauffman, 2012).

The second variable that influences *Access* as a condition for mobility relates to travel routines throughout the metropolitan area. An individual's daily travel routine and its place in the organisation of daily life is constructed from components associated with mobility but also with the notion of permanence. Three different elements are central to this variable: travel (time-distance), modal partition and origin-destination of travel. The third variable influencing *Access* as a condition for mobility is socioeconomic condition, which form the basis for the capital of mobility in many studies (Alvarez *et al.*, 2009; Greene and Mora, 2005; Jirón and Mansilla, 2014; Landon, 2013).

Such studies have confirmed that there is a direct relationship between socioeconomic condition and mobility in that mobility tends to increase as income increases. This relationship between mobility and income makes socioeconomic condition fundamental to the study of mobility, yet socioeconomic condition is perhaps the most difficult variable to measure in an internet-based survey as a few people are willing to share their private information with researchers by such indirect means. To overcome this problem, information on socioeconomic condition was gathered using less direct indicators.

The survey instrument, for example, included questions about whether the students were recipients of any state scholarships and if so, the number and type/s of scholarship they received. These answers were then linked to the respondent's residential location and data derived from the surrounding urban spatial structure and the availability of different modes of public transport in those areas. Such geographical and socio-structural data provides valid evidence in this specific context given the long-recognised strong association between an individual's socioeconomic condition and the spatial distribution of specific populations within Latin American cities.

In analysing the survey results, two methods were adopted. First, the location of the students' residences, transport supply, and campus areas were mapped using Geographic Information System (GIS). The use of GIS allows the measurement of individual travel routines between residential locations and the location of university campuses and other university facilities in terms of the distance covered and time taken. The second methodology involved the use of SPSS to carry out a statistical analysis of the collected data. Together, these methods provided a means to correlate and compile the large amount of information collected in relation to the students' daily mobility routines. By combining the information from derived from GIS and data obtained through statistical analysis, it was hoped that a narrative could be constructed about the student population's specific mobility practices and patterns.

7.2 Instrument Design as it Relates to Access as a Condition for Daily Mobility

The design of the survey instrument was based on a method developed by Hernández, Fernández, and Baptista (2003). The instrument uses three variables; residential condition, socioeconomic condition, and travel routines to reveal the characteristics of the university students' daily mobility patterns. The design of the survey instrument was founded on the structure suggested by Hernández *et al.*, (2003), but was also dependent on organising concepts developed by Flamm and Kaufmann for their 2006 qualitative study of mobility (Flamm and Kaufmann, 2006).

The survey instrument provides a means to generate the field data needed to spatialise daily mobility within urban space. It clearly defines a vertical structure that can recognise variables or concepts broken down into dimensions (ex. Trip routines), indicators, and questions (as shown in Table 7.1). The vertical structure defines the information necessary to understand what variables influence *Access* as a condition for students' mobility. In addition to furthering the analysis of *Appropriation* and *Competence* as conditions for mobility, the vertical structure helps create and validates reflections on the data gathered involving travel routines.

CONDITION FOR MOBILITY (DAILY)				
		1	2	3
ACCESS	VARIABLE	RESIDENTIAL CONDITION	SOCIOECONOMIC CONDITION	TRAVEL ROUTINE
Access, which refers to the range of possible mobilities according to place, time and urban constraints. It depends on the spatial distribution of the population, infrastructure and services within the city.	DIMENSION	RESIDENCE ADRESS	AIDS AND CHARACTERISTICS	TRIPS
	INDICATOR	NUMBER OF RESIDENTIAL LOCATIONS AND TIME (LIVED THERE)	NUMBER OF AIDS	NUMBER OF TRIPS BY DAY
	ITEM 1 (QUESTION)	Indicate the last three places you lived during this past academic year and the amount of time lived at each place including your current residence?	Do you currently have any of following aids?	Indicate the number of trips to school or work made this past month?

TABLE 7.1 Survey of Vertical Structure proposed by Hernández, et al., (2003). Source: Author

This study postulates a paradigm of mobility that does not disassociate time, space, and identity related to lifestyle. Following this model, it is assumed that each student's socioeconomic condition can be considered as a characteristic of their identity. In exploring the identities and daily mobility patterns of the students, a qualitative analysis was conducted using a range of personal data including (1) residential condition (migration, housing location), (2) daily travel routines, and (3) socioeconomic condition.

In this sense, the design of the survey follows Kaufmanns' (2002, 2006, 2012) argument that an integrated approach is needed when analysing mobility in its primary forms: migration, tourism, residency, and daily mobility. The virtue of adopting such a systematic approach to the study of mobility is that it considers a spatial movement to be a phenomenon that can take alternative forms. Daily mobility patterns were central to the design of this survey instrument as they provide the most information for understanding changes in the spatial structure at a metropolitan scale, but migration related to residential location and tourism were also considered as they too relate to daily travel routines. Given the nature of the survey the number of measured variables within the survey instrument was kept to a minimum because the average attention span of a youthful respondent is typically 10 minutes when taking internet surveys.²⁵

The variables were broken down broadly into three groups (see Table 7.1). The first set of variables relate to the residential condition of respondents. For the students within the Valparaíso Metropolitan Area, their time at university is often associated with changes in their residential locations as they commonly migrate from other regions of Chile and other urban contexts. For many students, this can change more than once during their studies (a specific period) although a percentage of them continue to live in their family homes. Residential history reflects individual choices and is often associated with life stages. Some dimensions of this variable are the place of origin (family home), housing study locations, and stability (average length of time at each residence).

²⁵ An internet survey for youth should be precise because even though youth are quite open to answering a survey that is of interest, they only have an attention span of about 10 minutes (Universities Admission Directorate).

The second group of variables relates to *socioeconomic condition*. This was an individual characteristic that proved quite elusive as it was difficult to get accurate information about this via an internet-based survey instrument. Broadly, it can be stated that students in traditional universities come from a range of socioeconomic backgrounds but are mainly drawn from the middle class as higher education in Chile is not fully subsidised by the state. The study therefore measured socioeconomic condition indirectly by recording the number of students who had received scholarships. Provided either by the state and or the university, these awards are intended to improve access to tertiary education amongst those lower-income students who receive good marks in high school.

The third and final group of variables within the survey are related to individual travel routines. These are defined as the set of movements that occur in everyday life (Miralles-Guasch and Cebollada 2003). These variables therefore primarily relate to daily trips through urban space and time. It is based on the understanding that daily mobility is constructed from two components: mobility and permanence. Three different dimensions relate to this set of variables: travel (distance-time), modal partition, and origin-destination (permanent locations).

7.3 Residential Condition and its Influence on Access as a Condition of Mobility

Bonvalet and Dureau argue that the process of selecting a particular housing location is a means by which an individual expresses their way of life within a specific urban and social context at a particular time (Bonvalet and Dureau, 2002). The selection of a place of residence will subsequently shape how individuals move every day throughout the city. As such, the choices made by individuals about where they live fundamentally influences their ability to make use of infrastructure networks and how they view a city structure's spatial functionality. The significance of this influence on shaping and defining an individual's life within the metropolis means that access becomes a vital condition for their daily mobility (see Table 7.1). Indeed, both Kaufmann and Contreras have suggested that the selection of residential location is an essential consideration in defining an individual's capital for mobility, in other words, an individual's potential or capacity to be mobile in particular urban settings (Kaufmann, 2002; Contreras, 2011).

The suggestion that an individual's choice of the housing location is both a means of expressing a social identity and essential in defining their capital for mobility highlights the importance of choice when selecting a place to live, however narrow the range of available choices might be. The key determinant behind the choices that are available to an individual, group of individuals or family are the economic resources available to them. The comparatively restricted economic freedom that most students have therefore also means that their choice of residential location is comparatively restricted compared with other population groups. Other factors are however important in shaping the choices made by students. The first factor influencing the choices made by students studying in the Valparaíso Metropolitan Area about the location of their residence is whether they should migrate to study.

Each academic year, a substantial number of students migrate into the Valparaíso Metropolitan Area (March to December). The number of local and migrant students studying in the Valparaíso Metropolitan Area is around 82,000 (Ministry of Education, 2018). This means that nationally, the Region of Valparaíso has the second-highest concentration of higher education enrolment. The concentration of students within the Valparaíso Metropolitan Area during term time is high in part due to the landscape conditions of the metropolis (on the coast and the bay) but is mainly due to concentration of historically well-regarded universities in what is a central area of the country. For students studying within the traditional universities

of the Valparaíso Metropolitan Area, the choice of residential location is therefore determined by their socioeconomic condition but also factors such as proximity to familial networks.

Further analysis of the survey data shows that the entire student sample can be split into six different residential categories (see Table 7.2). The biggest group (42,1%) live locally in the Valparaíso Metropolitan Area (the first group). They are students raised within the Valparaíso Metropolitan Area and are living with their families in one of the five communes of the metropolis. In these cases, their daily mobility patterns are bound to their family's economic condition. The second group are national migrants, comprising 36.2% of the sample. This group comes from other regions of the country but have chosen to live and study in the Valparaíso Metropolitan Area. Some of them come from distant places²⁶ and only travel back home during university vacation periods. The third group are regional migrants who make up almost 12% of the sample. Students in this group have chosen to live and study in the Valparaíso Metropolitan Area as did the national migrant group, but regional migrants perhaps know more about the region and tend to live relatively close to their family home.²⁷ The fourth group are residents of the wider Valparaíso region who chose to study within the Valparaíso Metropolitan Area. They make up 8.4% of the sample.

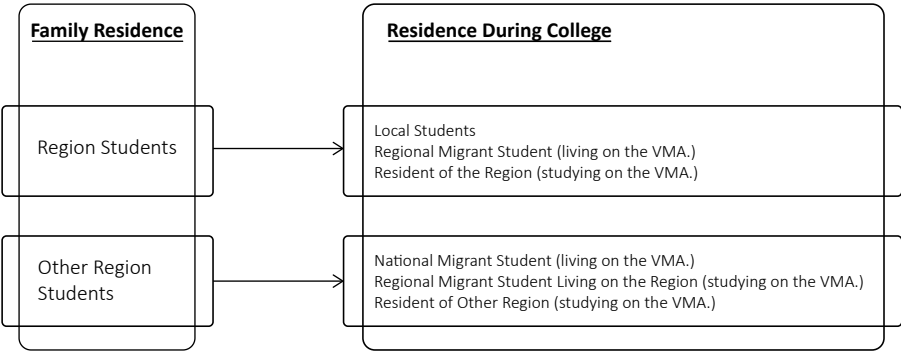


TABLE 7.2 Family residence related to student's housing location during university. The table is based on the survey design for the study. Source: Author

²⁶ Punta Arenas is one of the most distant cities where students come from and is located 3128 km from Valparaíso city.

²⁷ Los Andes is one of the most distant cities where students come from and is located at 130,8 km from Valparaíso city.

Although the influence of familial networks and socioeconomic condition are important in determining residential location, the most important influences are however those that relate directly to the urban structure. These influences are mainly related to accessibility to activities, people, and places within the city. Accessibility is particularly significant in a metropolis characterised by connectivity problems caused in part by the complex terrain on which it is built. Students' resident in the wider Valparaíso region, for example, travel daily into the Valparaíso Metropolitan Area to attend their universities. Their daily journeys in and out of the Valparaíso Metropolitan Area are dependent on reductions in travel times that were achieved through state investment in the regional and interurban road infrastructure over the past ten years and upgrades to railways (higher speed) connecting the interior cities with the port town (Álvarez *et al.*, 2009).

The results of such investments are seen most clearly when the housing locations of the surveyed students are plotted on a map of the region. The line of student housing runs across the Aconcagua Valley (from the coastal area to the mountains), reflecting the privileged connectivity resulting from investment in transport infrastructure in the early 1990s (Figure 7.1).

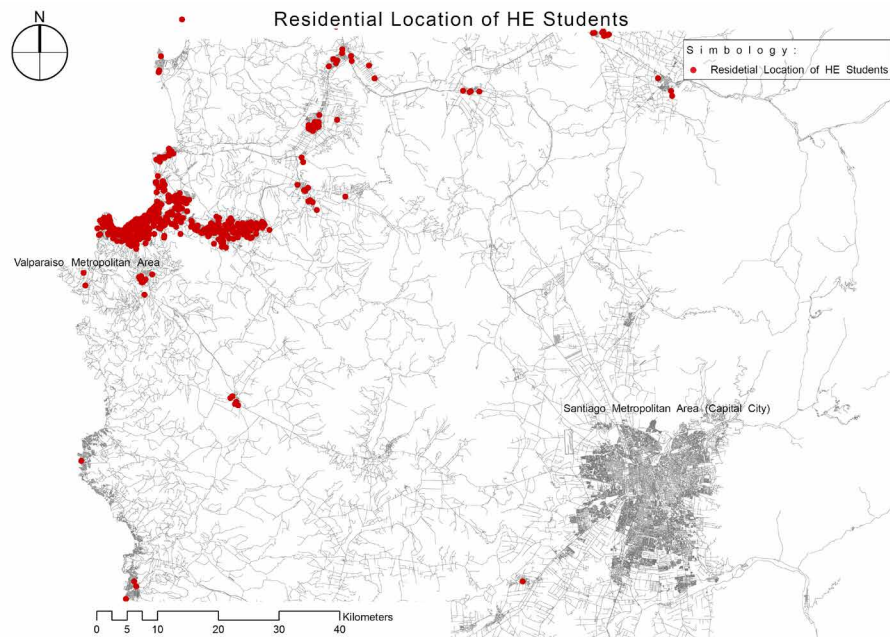


FIG. 7.1 The housing locations of all surveyed students. Source: Author All housing locations of the students surveyed were geo-referenced using GIS and appear in this map.

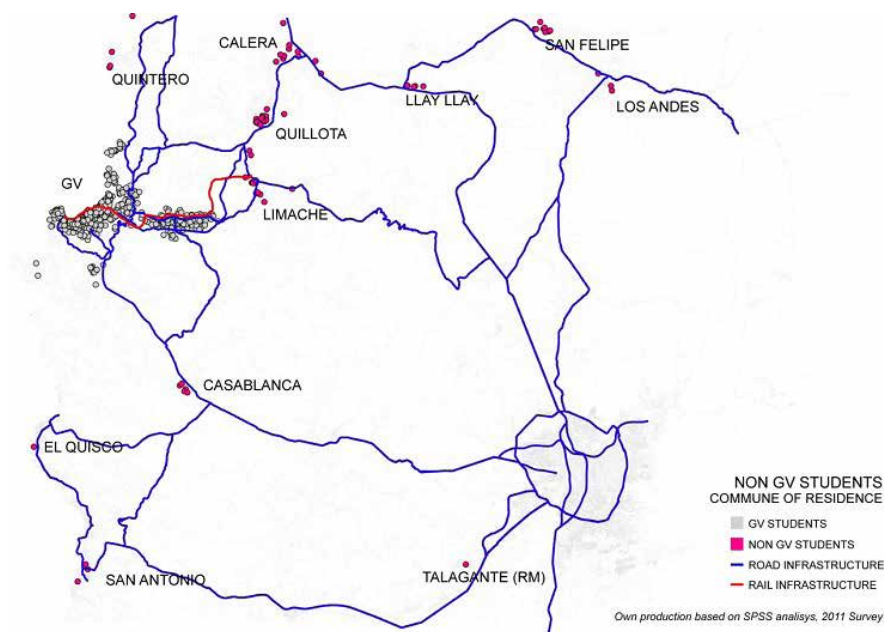


FIG. 7.2 The housing location of surveyed students. Source: Author

The last two groups of students are *migrants from within the region* who come to study in the Valparaíso Metropolitan Area making up 1,6% of the sample and finally, *residents from other areas* that together make up 0.1% of the sample. In terms of residential location, the commonest option is to stay with relatives which suggests that perhaps for economic reasons, they have decided to stay with their extended families and travel to study. The data demonstrates that almost 90% of surveyed students chose to reside in Valparaíso Metropolitan Area itself (Table 7.3 and Table 7.4). Students in this group tend to reside Valparaíso or Viña del Mar. Nearly 75% of those residing in these two areas, indicated that their residence was in one of the three areas in Valparaíso city. This is perhaps to be expected as given that of the two areas, central Valparaíso has the largest concentration of university facilities.

This data is consistent with other observations and connects to the tendency amongst traditional universities to locate their facilities within the central urban spaces of the Valparaíso Metropolitan Area. When asked where their campus was located within these central areas, most answered indicated locations where traditional universities have invested heavily: Playa Ancha, Brasil Avenue, and Placeres. Another 5.7% however answered Curauma, one of the Catholic university campuses based in the city's peri-urban area. In contrast, a similar number of students (5.58%) said their campus was in Sausalito, Viña del Mar, where there is a mix of traditional and private universities.

RESIDENCIAL CONDITION	UNIVERSITIES		PER UNIVERSITY				
	FREQUENCY	PERCENTAGE	PUCV	UV	UPLA	UTFSM	PRIV. U
Local students	347	42,1%	123	105	50	44	25
Regional Migrant living in the VMA	95	11,5%	38	18	18	13	8
National Migrant living in the VMA	298	36,2%	98	74	44	69	13
Resident of Region (studying in the VMA)	69	8,4%	22	16	17	7	7
Migrant living in the Region (studying in the VMA)	13	1,6%	1	5	5	2	
Resident of the other Region (studying in the VMA)	1	0,1%		1			
No information	1	0,1%					
TOTAL STUDENT PER UNIVERSITY	824	100,0%					53

TABLE 7.3 Residential Condition of the surveyed students. Source: Author

RESIDENCE COMMUNE	FREQUENCY	PERCENTAGE
Valparaíso (VMA)	320	38,83
Viña del Mar (VMA)	284	34,47
Quilpue (VMA)	80	9,71
Villa Alemana (VMA)	42	5,10
Concón (VMA)	15	1,82
Region	82	9,95
Other Region	1	0,12
Total	824	100,00

TABLE 7.4 Communes where students reside. Source: Author

7.3.1 Factors that Influence a Student's Choice of Housing Location

For most of the twentieth century, living close to one's workplace or school was a way of life for many. Today however housing location and proximity to one's workplace or school are however not necessarily the determinants they once were. In the case of local students, the factors that influence their residential choices are primarily associated with their family's socioeconomic condition as most of them live with their parents. On the other hand, individuals amongst regionally migrant and nationally migrant students are more able to choose locations associated with specific socioeconomic conditions or places of residence that fit well with other aspects of their metropolitan lifestyle.

The residential location of each respondent was registered in ArcGIS to determine the concentration of student residences within each commune within the Valparaíso Metropolitan Area. The maps in Figure 7.3 were generated using an interpolation technique that calculates a magnitude per unit area (km²) from map that incorporates residential location data from the 824 students that reside within

the Valparaíso Metropolitan Area. A “core function” was used to fit a smoothly tapered surface around each point. The mean adjustable intervals then reflect the concentration of residential locations throughout the territory. Other factors were also considered including accessibility, a factor which Bonvalet and Dureau argue frequently influences an individual’s decisions when choosing where to live (Bonvalet and Dureau, 2002).

There are several ways to define accessibility, but Ben-Akiva and Lerman have suggested that commonly it is taken to be a function of the attractiveness of a place as measured by its potential for new opportunities and the resources necessary to realise them (Ben-Akiva and Lerman cited in Kaufmann, 2006). For the most part, whether they are local, or migrate on a regional or national basis, higher education students often find themselves financially dependent on their families. As such, they are often economically vulnerable for the duration of their studies. During this period of their lives, their economic condition is strongly associated with their choice of where to live which in turn affects their ability to access a range of student services.

For this reason, the cost of transport is one of the most critical items in their monthly budgets. This is reflected in their reliance on an array of adaptive strategies including using various modes of public transport and walking. The following variable are the three key factors that aside from their economic vulnerability seem to have the most influence where students choose to live and therefore their Access as a condition for daily mobility:

1 Proximity to urban services (centralities)

For the Valparaíso Metropolitan Area, a key characteristic is the topographic complexity of the area. The two foremost centralities of the metropolis are the historical centre of Valparaíso city and that of Viña del Mar. The former is associated with local and state administration such as the Ministry of Culture, and all the areas’ port facilities. The latter provides a variety of tertiary services, including housing, and tourism. As seen in Figure 7.3, Viña del Mar has the highest density of commercial licenses, largely due to the concentration of investment that has flowed from its accessibility to other areas of the Valparaíso Metropolitan Area, rising land values and the easy availability of city services.

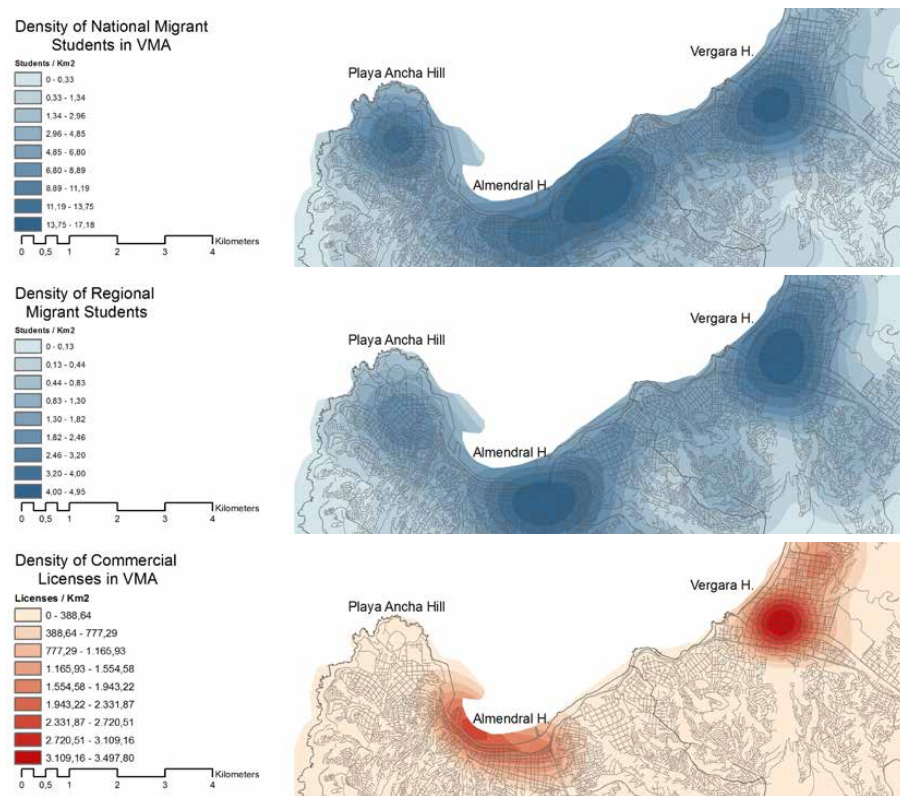


FIG. 7.3 The density of commercial licenses compared with the housing location of regional and national migrant students. Image generated using ArcGIS. Source: Author

Leaving aside local students who tend to reside within their own neighbourhoods, the ArcGIS mapping confirms that student housing for those living away from their familial networks is most often located close to or within the central areas of the metropolis (Figure 7.3). The data reveals that regional migrant students are concentrated mostly in the coastal plain areas of Valparaíso where there are between 388 to 1 554 commercial licenses per square kilometre. Viña del Mar similarly houses the most national and regional migrant students who are primarily located in areas with the highest density of commercial licenses that range between 2 331 to 3 109 licenses per square kilometre. Other areas with a high concentration of licenses are in the surrounding hilly areas that range between 0 to 388 licenses per square kilometre.

2 Proximity to places of study

As noted previously, historically the Valparaíso Metropolitan Area has been associated with several substantial spatial reorganisations, including, for example, the movement of businesses from the historic centre of the area towards the emerging city of Viña del Mar. For the newer higher education institutions within the Valparaíso metropolis, the twin pressures of increased competition and growing demand led to the construction of new university campuses in Valparaíso's peripheral areas. Conversely, amongst Valparaíso's traditional universities, the last few decades have seen a renewed focus on the urban centres as university administrations have taken advantage of falling land prices and the opportunities provided by deteriorated buildings and spaces. Such opportunism has helped these institutions avoid land shortages or and the significant expenses associated with the development of larger-scale university campuses.

Together these outward and inward flows have created a distinctive dispersion pattern in which the locations associated with traditional universities differs substantially from those of the newer private universities. This is apparent in Figure 7.4, which demonstrates that the facilities associated with the metropolitan area's traditional universities are now primarily concentrated in Playa Ancha Hill, Valparaíso's central area near the coast, and Placeres Hill. This is confirmed by the survey data. When asked where they attended university, nearly 75% of students surveyed indicated that they studied at one of the three university campus in areas of the metropolis where most of the area's traditional institutions are concentrated.

In comparing places of study with the areas where students choose live, it was notable that national migrant students primarily live near the university campus areas located in Placeres and Playa Ancha Hill or in other cases, close to urban centres. This seems to confirm Jara and Carrasco's (2010) work on accessibility which looked at the relationship between university environments and external services. Jara and Carrasco took an individual's housing location or university building as starting point and proposed that people preferred that their start point be to within a radius of 500 meters walkable distance from other urban services (Figure 7.5).

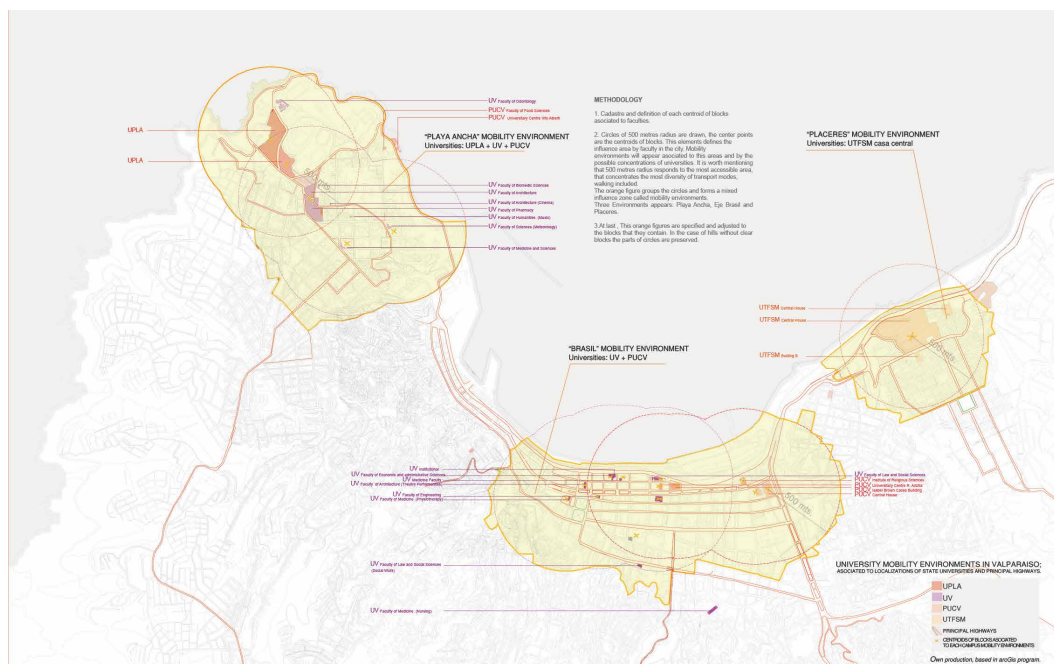


FIG. 7.4 Universities and their surroundings areas. Source: Author

3 Public transport supply as a factor influencing a student's housing choices

The student survey reveals that like other sections of the population, students tend to prefer to use microbuses. This preference is strongly associated with the extensive reach of the diverse microbus routes that run throughout the Valparaíso Metropolitan Area. A further factor behind the student's preference for both this mode of transport or the metro train network is that the use of these networks are state travel subsidises administered via the student 'College Card' system. To further understand how public transport availability affects a student's choice of housing location, Inverse Distance Weighting (IDW) within ArcGIS was used to map public transport availability in the areas indicated by the survey data.

Based on Origin-Destination survey data (2014), Fig7.5 shows the intensity values of microbus lines (transport supply) in central districts of the Valparaíso Metropolitan Area. The resulting map shows that the areas with the highest intensity of public transport supply are around the metropolis' coastal flat area. The largest concentration of microbus lines starts on the west side of Valparaíso on Playa Ancha Hill, where all the interurban

buses end their routes and travels all over the flat coastal area of Valparaíso up to Viña del Mar. In the latter, there is particularly heavy use of public transport, as buses from Viña del Mar travel eastward, crossing the metropolis towards its interior cities.

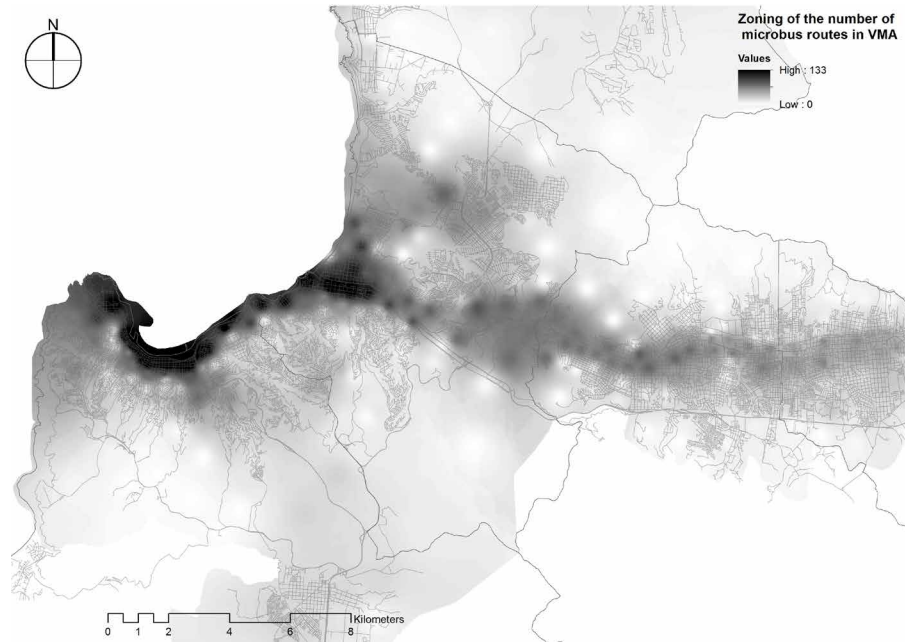


FIG. 7.5 The intensity of microbus lines. Image generated using ArcGIS. Source: Author

Using the same technique, IDW was used to measure the concentration of trips using public transport (Figure 7.6). The resultant map highlights a significant number of trips made using public transportation within the two border cities and shows that the concentration of trips on public transport occurs mainly in the hills of the Valparaíso Metropolitan Area, something that is clearly connected to the topographical complexity of the area. As might be expected, the highest concentrations in public transport use are primarily found in regions with the highest density of public transit services such as in central Viña del Mar. Elsewhere intensity in public transport use is associated with areas where urban services are concentrated, like retail outlets (shopping malls), healthcare facilities, schools, and banks. In contrast, the concentration in the use of public transport in the hilly areas of the VMA corresponds mainly with zones of metropolitan connectivity like Playa Ancha Hill at the west of the metropolis or areas which are close to social housing developments (Figure 7.6).

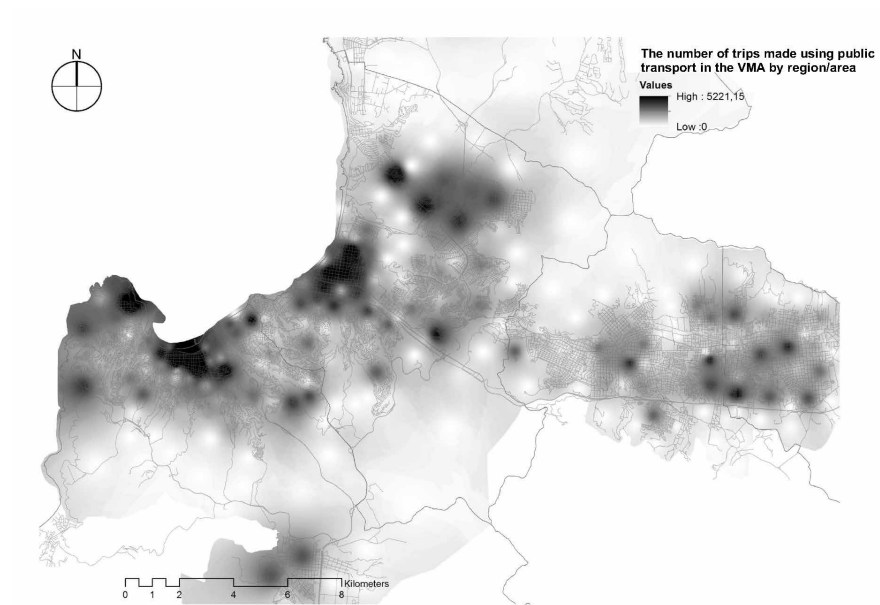


FIG. 7.6 Trips made by using public transport. Image generated using ArcGIS. Source: Author

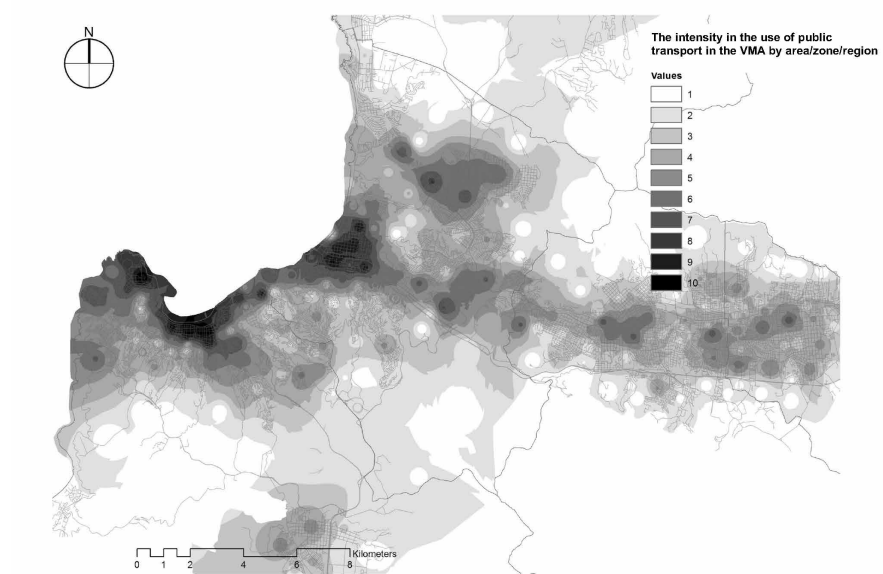


FIG. 7.7 The varying levels of public transport use. Image generated using ArcGIS. Source: Author

Weighted Overlap (A tool in ArcGIS) was used to evaluate the areas that better meet conditions for detecting the intensity in the use of “public transport services” with the previously generated zoning maps (Figure7.3). These maps were reclassified according to the number of intervals they previously had (in this case, each map has ten intervals) by assigning each interval value from 1 to 10. The result calculates the intensity of public transport service usage as being equal to the number of trips using public transport + number of microbus routes in each O-D zone. Comparing the maps showing the intensity of public transport use with the concentration of student housing (Figure 7.8), most local and national migrant students live in areas with the highest intensity levels of public transport use, from values 10 to 5.

The most considerable differences are between national migrant students who live near to where they study and a few other students located in the hills where the intensity of public transport ranges from values 5 or 6, entirely below the averages of other areas.

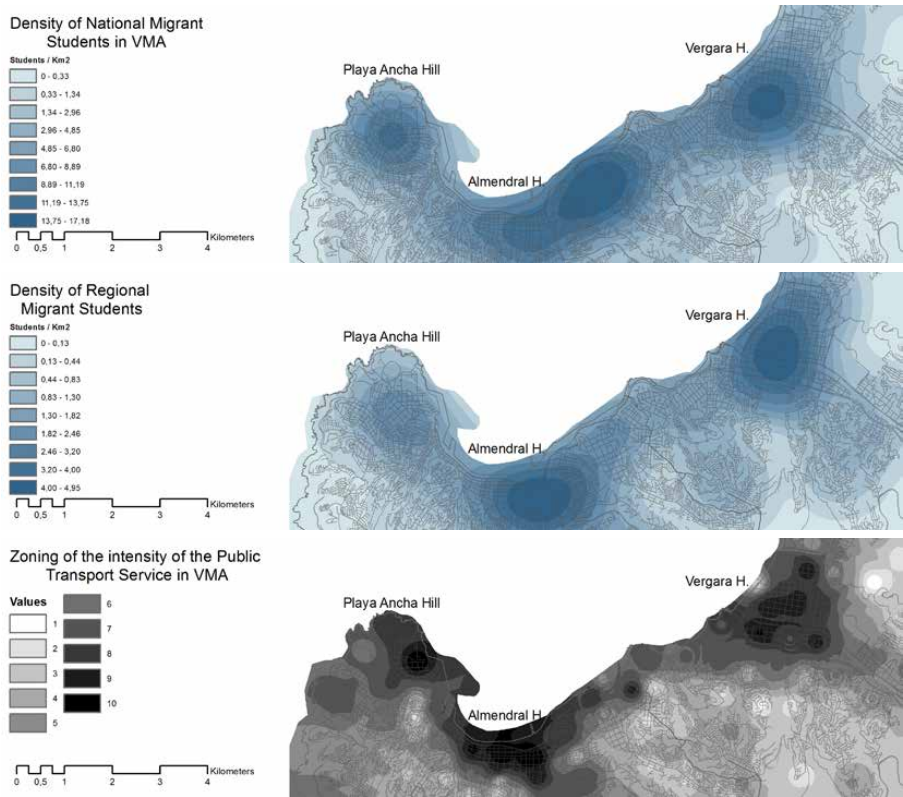


FIG. 7.8 Comparing the intensity in the use of microbus lines with a map of the housing location of students.
Source: Author

7.4 Daily Mobility Characteristics of Local, National and Regional Migrant Students

Among the total population in the Valparaíso region, the student population complete the second-highest percentage of daily trips during non-peak hours. Students therefore are one of the most mobile population groups within the Valparaíso Metropolitan Area. The student survey highlights the five most important aspects that influence an individual students' daily movements. These include the location of their universities, the mode of transport, the times of the day they travel, the number of daily trips made and other factors such as whether they have a part-time job.

As noted previously, the location of universities within the Valparaíso Metropolitan Area is strongly influenced by functional factors such as the administrative origin of such institutions, their historic locations and their development policies and governance. The dispersed urban location model favoured by the area's traditional universities means that these institutions have tended to spread their facilities throughout the city rather than creating compact complex campuses. This means that to study at these institutions, students must move between a set of isolated buildings that do not have physical links between each other (Bellet, 2011; Campos, 2000).

For this reason, of the students surveyed, 20% of the population studied at an average of three different university buildings in different areas throughout the metropolis, travelling between multiple study places during the week. While the number of locations at which the students' study daily is clearly significant in defining their daily movement routines, as noted previously, this must be considered against where they choose to reside. If the choice of housing location is fundamental to understanding an individual's daily mobility routines, the selection of specific subgroups addresses two primary mobility forms: daily mobility and migration (residential condition). This follows Kaufmann's argument (2002, 2006, 2012) that an integrated approach is needed when analysing mobility and its four principal forms: daily mobility, residential mobility, migration, and travel.

Within this group, the survey data reveals some general differences between the daily mobility patterns of local, national, and regional migrant students. In contrast, the largest group of the surveyed population are national migrant students who study at only one campus and live in the same area where they attend university

are surveyed (Table 7.4). The second largest group are national migrant students studying at two different campus locations and who live in the same commune as one of them (Table 7.5). On the other hand, local students (defined as those who live throughout the Valparaíso Metropolitan Area) are the largest group that lives in a different commune from the commune where they study. Regional migrant students fall in the middle as they prioritise living in central areas close to public transit over living nearby where they study.

The average commute time analysis from home to university shows that regional migrants fall between local and national migrant students, who travel between 16 to 30 minutes (see Table 7.6). The commute time for local students takes between 31 to 45 minutes, and national migrant students take between 1 and 15 minutes, a distance short enough to walk, something discussed in Chapter 3. Almost 20% of them walk to school (Table 7.7) making national migrant students the largest group to do so. Nearly all students prefer to take microbuses, which are the most extensive public transport network in the metropolitan area, from 73,3% of local students to 61,3% of regional migrant students.

Origin	Number of HE student's who live in the same commune where they study
Local Students	89
Regional Migrants Students	40
National Migrants Students	148
Total	277

TABLE 7.5 The number of students who study at only one university campus and who also live in the same commune where they study. Source: Author

Origin	Number of HE student's who live in one the two commune where they study
Local Students	16
Regional Migrants Students	10
National Migrants Students	27
Total	53

TABLE 7.6 The number of students who study at two university campuses and who also live in the same commune as one of the two campuses where they study. Source: Author

ORIGIN	Frequency			Percent		
	Local	Migrant National	Regional Migrant	Local	Migrant National	Regional Migrant
1 1/2 to 2 hours	31	8	61	3,3	1,3	16,1
1 to 1 1/2 hours	119	14	49	12,5	2,2	12,9
1 to 15 min	107	220	75	11,3	34,4	19,8
16 to 30 min	232	199	92	24,4	31,1	24,3
31 to 45 min	261	127	57	27,5	19,9	15,0
46 min to 1 hour	198	70	33	20,8	11,0	8,7
more than 2 hours	2	1	12	,2	,2	3,2
Total	950	639	379	100,0	100,0	100,0

TABLE 7.7 Student's Travel Time. Source: Author

Means of Transport	Local Student's		National Migrant Student's		Regional Migrant Student's	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Passenger	7	1,1	1	0,2		
Driver	20	3,2	11	2,2	4	1,6
Bicycle			3	0,6	2	0,8
Bus	59	9,6	32	6,3	34	14
Walking	41	6,6	99	19,5	23	9,5
Metro	28	4,5	10	2	19	7
Microbus	452	73,3	331	65,3	149	61,3
Others			8	1,6		
Taxi	9	1,5	6	1,2	11	4,5
Institutional Transport	1	0,2	6	1,2	1	0,4
Total	617	100	507	100	243	100

TABLE 7.8 Means of Transport use by Local Regional and National Migrants students in one day. Source: Author

7.5 Socioeconomic Condition as a Factor Influencing Access

Whilst residential condition and travel routines are essential when considering Access as a condition for daily mobility, income is another factor that substantially affects a given population's daily mobility (García Palomares, 2008; Jirón 2007; Figueroa, 2005). The amount of capital that families, economic agents, or people have, tends to shape how people travel through the city. The economic dependence of many students on parental support, perhaps helps to explain why 22.74% of the students work in part-time jobs. This means that almost 184 students work and therefore have more complex daily movement patterns than their classmates as they move between home, work and university during the day.

The data also shows that regional migrant students regularly use buses (interurban transport) when traveling through interurban routes, possibly because, on weekends, many of them travel to see their families who live nearby - less than or equal to 140km from the metropolis. The interviews revealed that some of the students travel home (regional context) during weekends for work. Although a somewhat counter-intuitive activity, typically such weekend movements tend to occur because the students had gained the employment through local contacts (family home).

Perhaps unsurprisingly, this movement arising from familial networks and part time work highlights the extent to which parental income has a significant influence on the student's mobility. Research has indicated that despite the varying geographical and functional characteristics found within a particular urban context, mobility tends to increase as income rises (García Palomares, 2008). For the surveyed students, this point is best illustrated by looking in more detail at the 22.74% of students who indicated that to a lesser or greater extent they were dependent on parental support.

In assessing the socioeconomic status of individual students, initially an effort was made to also consider whether a student was employed. Using this variable however altered the results of the analysis and produced an inclusive result. The data that had been obtained on the employment status of the students was however subsequently used to analyse the daily mobility patterns of individual students. Instead, in assessing the socioeconomic status of a respondent the type and number of scholarships/loans they received as used as an indicator – one has a constant relevance for all the surveyed students given the costs associated with higher education.

Group	Scholarship	Transport means
High-income	scholarship <= 1	Car as Driver > 0
Upper-middle-income	scholarship <= 2	Car as Driver = 0 & Car as companion > 0
Middle-income	scholarship <= 2	Car as Driver = 0 & Car as companion = 0
Lower-middle-income	scholarship <= 3	Car as Driver = 0 & Car as companion = 0
Low-income	scholarship > 3	

TABLE 7.9 Methodology for the socioeconomic classification of the students surveyed. Source: Author

Using SPSS, the type and number of scholarships/loans they received was compared with the modes of transport they choose to use (see Table 7.8). In the first instance, the seven forms of scholarship/loans selected for the analysis include two that are based on academic merit and cover annual school fees (BEA, BPSU). Two other scholarships awarded to students from lower-income families that also pay for matriculation fees (BJGM, BBIC), two supplementary grants for meals and living expenses (BAES, BMES), and finally, individual student loans provided through the state loan system (FSCU).

Having considered the form of scholarship/loans, the analysis considered the means of transport used by the surveyed students. Unlike most European cities, in Latin America investments made in public transport provision does not guarantee an adequate service in terms of geographic reach, travel times, or frequency. In practice, such inequalities have tended to mean firstly, that not all citizens have good access to public transport and secondly, a general reliance on cars and the road network. These inequalities and their consequences are central to the previously noted association between income levels and the ability to move through urban space.

Taken together, together these related socioeconomic indicators made it possible to identify five discrete socioeconomic groups: high-income, upper-middle-income, middle-income, lower-middle-income, and low-income (see Table 7.8). Though not necessarily identical, these groups were comparable to the socioeconomic groups defined by Chilean census data (ABC1, C2, C3, and D), considering that those from group E, the most vulnerable sector, do not normally any form of receive tertiary education. Thus, high and upper-middle-income groups would fall into the ABC1 and C2 groups, while the middle-income group (70% of the students surveyed) is associated with group C3. The lower-middle and low-income groups fall under categories C3 and D.

The decision to apply this grouping was further confirmed by several external rules and regulations. Those students from high-income groups, for example, only qualify for one scholarship which is based on a combination of academic merit and PSU scores (National University Entrance Examination). To be included in the high-income group, students must also either be the owner of or have frequent access to a vehicle for their personal use. Having access to a car however was not assumed to preclude the use of other means of transport.

For the upper-middle-income group, individuals were included based on their eligibility to receive only one scholarship, for academic excellence, and whether there was a possibility of obtaining a student loan from the government, such as from the FSCU (Solidary University Credit Fund). Students falling into this category were considered if they frequently used a private car, but solely through their association with the driver/owner of the vehicle or as a passenger. Being passengers alludes to the fact that, while the vehicle might not be their own, the student belonged to an environment where car ownership was the norm; this speaks to both students' social relationships and the urban environment. Carpooling with someone implies, to some degree, a shared route for both people and proximity to those from more privileged socioeconomic levels. Once again, the use of a car was not assumed to exclude the possibility that they might also use other forms of transport.

Those from the middle-income group also were eligible for a maximum of one scholarship and a state loan. For these students it was often necessary to apply to more than one of funding since most sources of funding have rules about what is or is not covered under the terms of the loan/scholarship. Unlike upper-middle-income students, however, those in the middle-income group did not have access to private vehicles, but otherwise, had good access to other means of transport. It should be emphasised that this group made up nearly 70% of the surveyed students. Interestingly, this local figure is consistent with the percentage of middle-class students found in traditional universities at the national level.

The lower-middle-income group was made up of students who had two scholarships and a state loan (for both school fees and books and living expenses) and who do not have access to a car. they could use any other means of transport. The only difference between the low-income group and those from the lower-middle-income group was the number of scholarships, the latter group typically received at least four scholarships. More than one scholarship was necessary given that the coverage of single scholarship is often only sufficient to pay for necessary tuition expenses, further grants are then needed to pay for meals and living expenses (BAES and BMES).

Whilst not an exact match, the students in this group roughly correspond to national socioeconomic group D and as such, they are unable to pursue their studies without external financial support.

Although the applied criteria worked as expected for almost all categories, the high-income and low-income groups were exceptional. Most high-income students did not need to use any scholarships. In contrast to early expectations however, those who received financial help did not receive academic excellence scholarships. The majority (60%) applied for and were the beneficiaries of student loans from the FSCU. Conversely, low-income students tended to need several scholarships/grants to finance their enrolment fees. Of the total number of students belonging to this group (61), around 90% had at least one scholarship for enrolment fees, another student loan from the FSCU, together with additional grants to cover basic living costs. Moreover, 20% stated that they had other grants, primarily in the form of individual scholarships provided by the universities or private organisations rather than being provided by the State.

By dividing the surveyed students into five socioeconomic groups, it becomes possible to build a detailed narrative around each socioeconomic group's daily mobility practices. For each socioeconomic cluster, and using the three residential categories, local, regional, and national migrant students, a map was created that highlighted where the students lived within the Valparaíso Metropolitan Area. This locational data for each group was supplemented by more detailed information on the student's daily movement activities, presented in the form of three tables covering the percentage of local, regional, and national migrant students, their residential condition, distance, and the travel time to their places of study, work, or leisure activities and their preferred mode of transport, the distance covered, and the overall travel time.

7.5.1 Mobility Patterns of Low-Income Students

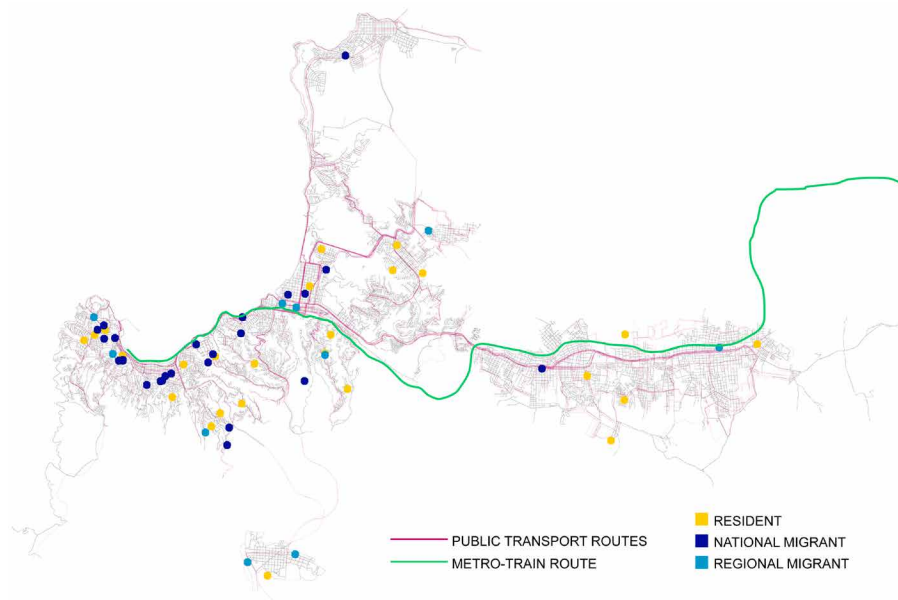


FIG. 7.9 Distribution according to socioeconomic condition: low-income students. Source: Author

a) LOCAL AND MIGRANT'S STUDENTS PERCENTAGE		
Local	Regional Migrants	National Migrants
41	18	41

b) MIGRATION, DISTANCE AND TRAVEL- TIME CORRELATION		
Rotated Component Matrix	COMPONENT	
	1	2
Travel Time to Campus		0,787
Travel time to Leisure Activities	-0,778	
Travel time Places of Study	0,794	
Travel Time work	0,493	
Travel Time Leisure Activities		0,763

c) DISTANCE, TRAVEL- TIME AND MEANS CORRELATION			
Rotated Component Matrix	COMPONENT		
	1	2	3
Campus- Residence Distance			0,768
Study travel time	0,645		
Work Travel Time	0,586		
Leisure Travel Time		0,633	
Microbus	0,909		
Bus	-0,408	0,774	
Metro			0,658
Collective Taxi			
Walk		0,67	

TABLE 7.10 SPSS analysis results of low-income student mobility patterns. Source: Author

Correlation: distance from residence to campus/ travel time/ residential condition

Travel times to campus and work were more extended for local students than for migrant students. The extended durations experienced by local student compared with migrant students is consistent with the fact that most local students live with their families who tend to reside on the outskirts of the Valparaíso Metropolitan Area. This forces these students to undertake perhaps more complex journeys to reach their various destinations (see Table 7.10). Travel times to and from leisure activities were also extended perhaps also due to the comparatively complex journeys between residence and campus. Although the data from the survey in this respect is not entirely conclusive on its own, together with the previously compiled data on housing location found in point 7.3 notably this seems to particularly hold true for local students from the lower-income groups whose homes are often distant from urban centralities.

Correlation: distance from residence to campus/ travel time/ means of transport

Although local students tend to experience significantly longer travel times, there appears to be no statistically significant correlation when looking at the straight-line distance between the university campuses and the student's place of residence. This seems to hold true for both local and migrant students (Table 7.10). This somewhat counter-intuitive observation may depend on the relatively smaller number of low-income students (migrant and local students) who lived far away from their university campuses. Turning to the choices that these students make about the types of transport they use, the metro was more often used in cases where there was a greater distance between an individual's place of residence and their university's campus. For those with longer commutes (students living along the 28km of metro lines), the metro train proves not to be the most rapid transport mode but also the most direct, clean, efficient, and most regularly scheduled option (Figure 7.9).

On the other hand, the bus network (interurban transport) covers the Valparaíso Metropolitan Area more comprehensively than the other available public transport options. The buses however follow no scheduled time and are not well integrated with other transportation modes. The data from the students reflects such drawbacks, revealing that students using the bus network experience longer travel times to and from places of study despite the relatively greater spread of such services. If local students from lower socioeconomic backgrounds have less choice in deciding where they live, by extension, they also have less freedom to choose a specific mode of transport. This is because lower-income families tend to reside in

peripheral areas where most often the only available transport is the bus, it follows that for those with a lower socioeconomic background, travel times are much more significant in shaping their daily movement patterns (Figure 7.10).

Having established that the distance to be travelled itself is not statistically significant for either local or migrant students, adding the mode of transport into the analysis yields further insights into the association between the distance travelled and the time taken to complete a given journey. For example, the distance from Valparaíso's centre to Quilpué, one of the cities where some of the surveyed students live, is 22 km away from the centre of the metropolis and by train takes approximately 30 minutes (MERVAL website). Conversely, from the same point towards the northern edge of Viña del Mar's centre (flat area) the distance is 10 km, but by bus takes almost 45 minutes during rush hour.

The daily movement patterns of those students living in Quilpué or Viña del Mar are clearly shaped by this tricky relationship between the distance to be travelled and the time taken for those journeys. For those who live and study within the urban centre, this disparity between distance to be travelled and time taken to travel that distance is far less relevant. This particularly applies to migrant lower-income students who tend to reside closer to the universities in the urban centres, whereas lower-income *local* students were more likely to reside in more peripheral locations.

7.5.2 Mobility Patterns of Lower-Middle-Income Students

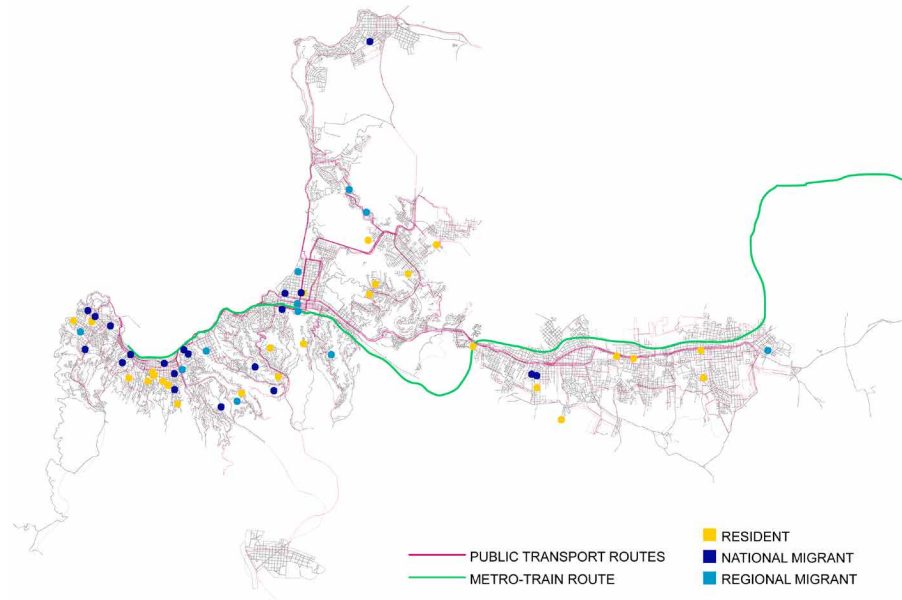


FIG. 7.10 Distribution according to socioeconomic condition for lower-middle-income students.
Source: Author

a) LOCAL AND MIGRANT'S STUDENTS PERCENTAGE			
Local	Regional Migrants	National Migrants	
45,8	20,3	33,9	

b) MIGRATION, DISTANCE AND TRAVEL- TIME CORRELATION			
Rotated Component Matrix	COMPONENT		
	1	2	3
Travel Time to Campus	0,723		
Travel time to Leisure Activities	-0,32	0,543	-0,615
Travel time Places of Study	0,81		
Travel Time work			0,859
Travel Time Leisure Activities		0,875	

c) DISTANCE, TRAVEL- TIME AND MEANS CORRELATION			
Rotated Component Matrix	COMPONENT		
	1	2	3
Campus- Residence Distance			-0,561
Study travel time		0,8	
Work Travel Time	0,536		
Leisure Travel Time	0,599	0,301	0,467
Microbus		0,832	
Bus		-0,496	
Metro	0,617		-0,567
Shared Taxi	0,82		
Walk			0,748

TABLE 7.11 SPSS analysis results for mobility patterns of lower-middle-income students. Source: Author

Correlation: distance from residence to campus/ travel time/ residential condition

Unlike the low-income students from peripheral areas of which there were so few that there was no statically significant correlation between the distance to be travelled and the location of the universities, there were numbers of lower-middle-income students living in peripheral areas. The relatively larger sample size for this latter group meant that a statistically significant correlation between distance and the length of travel time from residence to places of study becomes apparent (Table 7.11).

For local students in the lower-middle-income socioeconomic group who are living in outlying areas where housing prices are lower and social housing more readily available, the greater distance between residence and campus is reflected in longer travel times. Naturally, the increased distance means that for this group the time taken to travel to work is also extended. In contrast, distances and trip times are much shorter for migrant students in this socioeconomic group. This seems to be related to the tendency of such students to prefer living in more central areas closer to their universities. The analysis indicated however that the travel time to and from leisure activities is more significant for this group of migrant students. The explanation for this seems to relate to their choice of housing location in the Valparaiso Metropolitan Area compared to where local students live.

Local students tend to live with their families and as such, remain largely within reach of their existing social networks. Local students may have most of their friends in different places than regional or migrant students. They have leisure activities closer to their homes, family networks, or near secondary or neighbourhood friends. The middle class, which is the primary consumer of higher education, has the two highest percentages (63,6% and 59,2%) of friends from secondary school and friends from the neighbourhood. Conversely, migrant students tend to prioritise being to be closer to their place of study rather than being closer to locations where their leisure activities take place. This seems to be related to the construction of their social networks which are more often based at their universities and the degree of their involvement in student life.

Correlation: distance from residence to campus/ travel time/ means of transport

Some interesting insights emerge when considering the means of transport chosen by the students. Broadly speaking, students avoid using shared taxis (capacity for four passengers) because they do not have a special student fare. Such vehicles do however have an advantage over larger vehicles in that they run more frequently over the road network and spend less time loading and offloading passengers than

other forms of public transport. As Glaister has highlighted these collective taxis act as an informal but efficient public transport system, that despite operating in a complex geographical setting, manages to adapt to the constant urban development processes on the fringes of the metropolis (Glaister, 1986).

Despite the significant drawback of not having dedicated student pricing, those students that have part time work tend to make greater use of these vehicles than the broader student population. This seems to be a consequence of the tighter daily schedules and reduced travel times that shape the daily movement patterns of these working students. The metro train offers a practical alternative to the comparatively expensive collective taxi, the metro train follows a fixed path and has a reliable schedule where students can predict with greater certainty the exact amount of time it takes to travel to work. More broadly, buses are the commonly used mode transport used by the surveyed students within the Valparaíso Metropolitan Area. This result is in-line with a study published by Valparaíso’s Observatory for Higher Education which found that the preferred method of transport were microbuses (Table 7.12).

In the current study, those students who mainly use the bus network reported taking longer to get to their campus. This complaint however was not necessarily associated with longer commuting distances, not even for migrant students. Perhaps counter intuitively, this complaint was also made by those students who live within walking distance of their university’s buildings, since they often had to travel longer distances to the areas where daily leisure activities commonly occur. Thus, it appears that the use of buses is transversal for the entire group of students who use any means of transport.

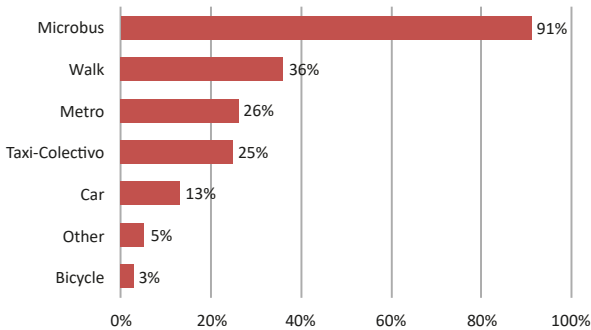


TABLE 7.12 Means of transport used by students. Source: Valparaíso’s Observatory for Higher Education, 2011

7.5.3 Mobility Patterns of Middle-Income Students

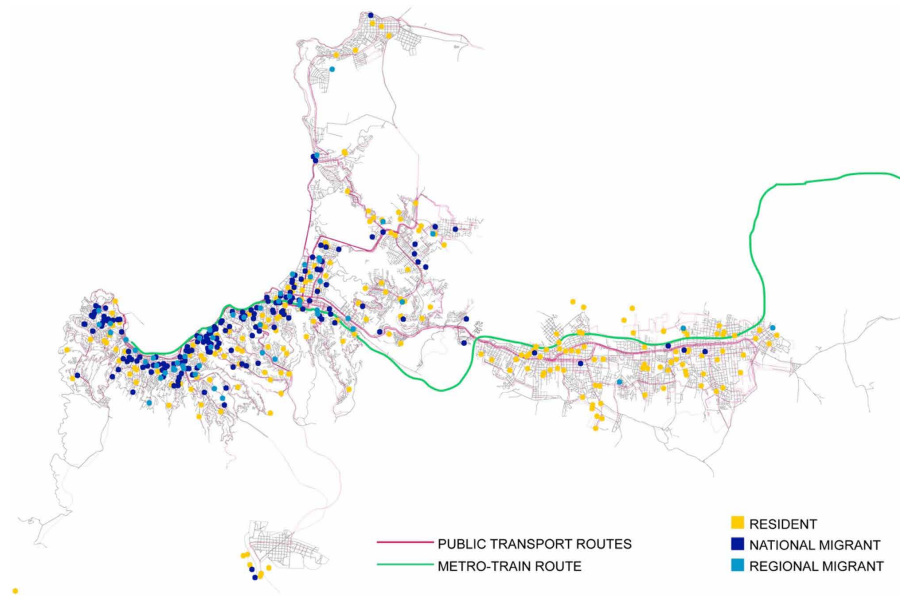


FIG. 7.11 Distribution according to socioeconomic condition for middle-income students. Source: Author

a) LOCAL AND MIGRANT'S STUDENTS PERCENTAGE		
Local	Regional Migrants	National Migrants
43,7	12	44,3

b) MIGRATION, DISTANCE AND TRAVEL- TIME CORRELATION		
Rotated Component Matrix	COMPONENT	
	1	2
Travel Time to Campus	0,722	
Travel time to Leisure Activities	-0,695	
Travel time Places of Study	0,788	
Travel Time work		0,758
Travel Time Leisure Activities		0,674

c) DISTANCE, TRAVEL- TIME AND MEANS CORRELATION				
Rotated Component Matrix	COMPONENT			
	1	2	3	4
Campus- Residence Distance	0,754			
Study travel time	0,798			
Work Travel Time				0,646
Leisure Travel Time		0,774		
Microbus			-0,75	0,436
Bus			0,849	
Metro	0,554			
Shared Taxi		0,65		
Walk		0,491		

TABLE 7.13 SPSS analysis results for the mobility patterns of middle-income students. Source: Author

Correlation: distance from residence to campus/ travel time/ residential condition

Turning to middle-income students once again, there is a correlation between commuting distance, travel times to and from campus, and migrant category (Table 7.13). Longer distances and extended trip times are directly related to local students, while for middle income migrant students, the inverse ratio applies, i.e., relatively shorter commuting distances and travel times. The broader trend amongst migrant students who tend to choose to live in central areas is also confirmed (Figure 7.11). A difference is also observed between regional and national migrants in that the latter tend to choose housing locations near the university campus. There appears to be no substantial relationship between travel times to work and leisure activities and commuting distance or migrant type in contrast to other groups. This data could be due to the middle class's heterogeneity, who made up 70% of the total number of surveyed middle-income students.

Correlation: distance from residence to campus/ travel time/ means of transport

More middle-income students live in the Concón Commune (mainly local students) than any other socioeconomic group while a significantly higher number of middle-income students live in the dormitory cities²⁸ of Quilpué, El Belloto, and Villa Alemana. Those living in these dormitory cities demonstrated a direct relationship between commuting distance, travel time to campus, and the metro train. It should be noted that the use of bicycles and institutional transport services has been left out of the analysis since the numbers of the surveyed student using such means of transport are negligible and serve only to generate distortion in the results.

Travel times to leisure activities are mainly associated with trips made via shared taxis and, to a lesser degree, journeys made on foot. Since commuting distances do not appear to be significant, it can be assumed that walking is strongly associated with middle income students who reside in urban centralities and are therefore near places where leisure activities occur. It is however impossible to make this assumption regarding shared taxi use since they used both by students who live far away and those who live relatively close to leisure venues. The use of shared taxis by middle income students seems to be always related to special trips, such as those made for leisure activities. Having no system of student pricing, such journeys are undertaken using a comparatively expensive form of transport.

²⁸ Also referred to as commuter towns, bedroom communities, or a dormitory suburb.

7.5.4 Mobility Patterns of Upper-Middle-Income Students

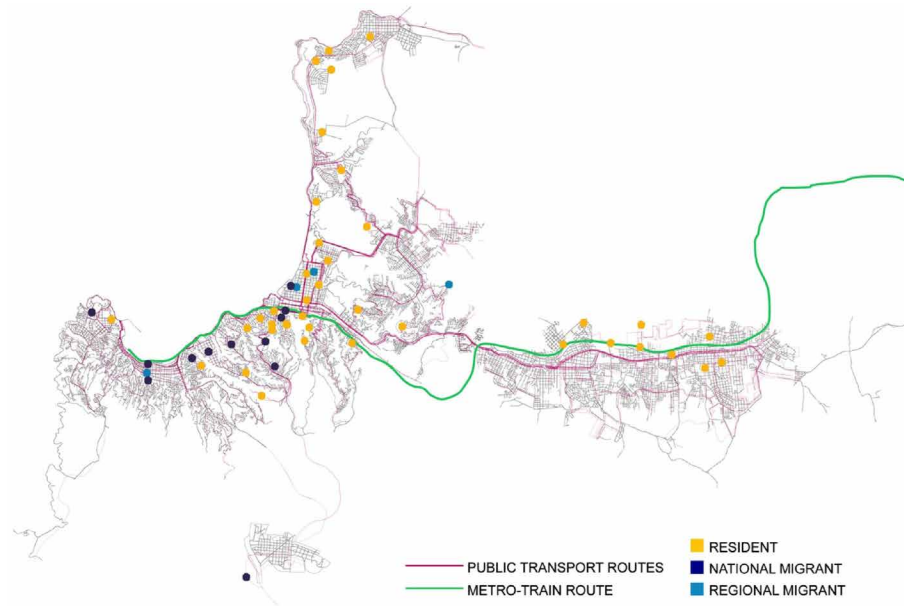


FIG. 7.12 Distribution according to socioeconomic condition for upper-middle-income students. Source: Author

a) LOCAL AND MIGRANT'S STUDENTS PERCENTAGE			
Local	Regional Migrants	National Migrants	
70,9	7,3	21,8	

b) MIGRATION, DISTANCE AND TRAVEL- TIME CORRELATION				
Rotated Component Matrix	COMPONENT			
	1	2	3	
Travel Time to Campus	0,681			
Travel time to Leisure Activities	-0,479	0,601		-0,378
Travel time Places of Study	0,845			
Travel Time work				0,946
Travel Time Leisure Activities		0,935		

c) DISTANCE, TRAVEL- TIME AND MEANS CORRELATION				
Rotated Component Matrix	COMPONENT			
	1	2	3	4
Campus- Residence (commuting distance)			0,736	
Study travel time	0,532	-0,307	0,616	
Work- related Travel Time	0,467		0,435	
Amusement- related Travel Time				0,892
Cars as Companion		0,482	0,417	0,381
Microbus		0,824		
Bus		0,707		0,318
Metro	0,645			
Shared Taxi	0,761			
Walk	0,711			

TABLE 7.14 SPSS analysis results for the mobility patterns of upper-middle-income students. Source: Author

Correlation: distance from residence to campus/ travel time/ residential condition

For those students in the upper-middle-income group, there is an important difference between local and migrant students. Whereas almost all local students in the middle, lower-middle, and lower socioeconomic groups made up 45% of the surveyed population, in the upper-middle-income group, they comprise 71% (Table 7.14). This higher percentage demonstrates that those from the high-income group prefer to stay home, rather than migrating to other regions to study. This is entirely different to upper-middle-income students in England where migration to study is common amongst higher income students (Christie, 2007).

For those higher middle-income students studying within the Valparaíso Metropolitan Area, and despite their general preference for studying within their home area, the correlation between commuting distances, travel times to campus, and migrant type is maintained. This correlation, in which local students travel greater distances and spend more time traveling than migrant students become apparent when the residential locations of this group are mapped (Figure 7.12). Local higher middle-income students noticeably tend to reside in the sectors of Concón and dormitory cities (Quilpué, El Belloto, Villa Alemana, in between others) whereas higher middle-income migrant students primarily prefer the urban centralities of the Valparaíso Metropolitan Area.

Interestingly for this group, migrant students report longer travel times when travelling to their leisure activities than those reported by local students. This is a quite different from the patterns reported by the other income groups and seems to be related to the tendency of this socioeconomic group to live in upper-middle-income areas of the Valparaíso metropolis (Recreo, Población Vergara, Paso Hondo, in between others). Extended journey times in these cases seems to be related to the way in which such areas are less central than those preferred by other socioeconomic groups.

Correlation: distance from residence to campus/ travel time/ means of transport

Upper-middle-income students tend to have multimodal mobility patterns. The use of the metro train, shared taxis, and walking is associated with longer travel times to places of study and work and is directly associated with the tendency to live in less central dormitory cities. The use of the bus network is again associated with migrant students and shorter travel times to campus. The use of a car merely as a passenger (or for carpooling?) is mostly commonly associated with local students. Their use of cars as a passenger(?) implies that while the vehicle might not be their own, the students come from an environment in which car ownership was the norm. The use of a car therefore, references both the student's social relationships but also their relationship with the urban environment, since sharing a private car with someone implies a shared route for both and ready access to a more privileged socioeconomic background. Once again however, the access a car does not indicate that this is the only form of transport used by such individuals.

7.5.5 Mobility Patterns of High-Income Students

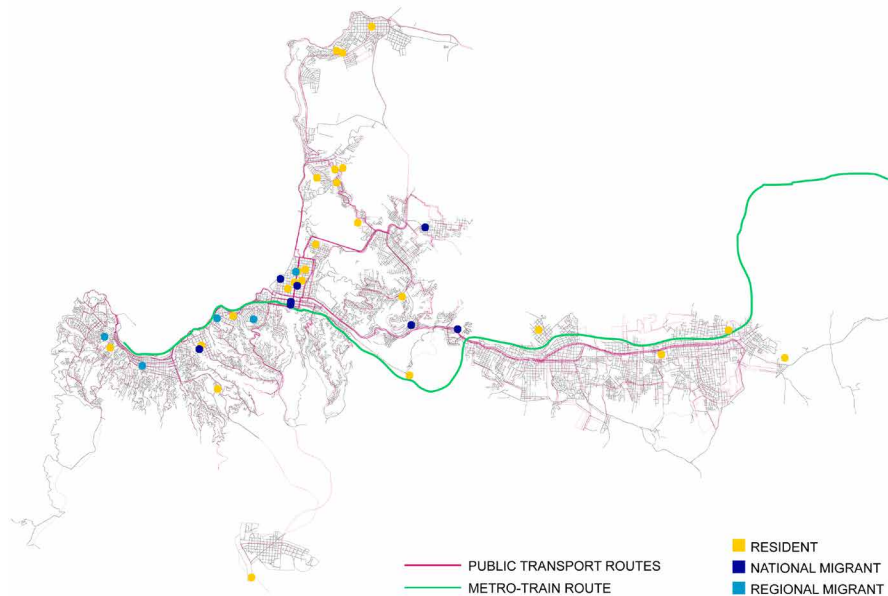


FIG. 7.13 Distribution according to socioeconomic condition for high-income students. Source: Author

a) LOCAL AND MIGRANT'S STUDENTS PERCENTAGE		
Local	Regional Migrants	National Migrants
66,7	12,8	20,5

b) MIGRATION, DISTANCE AND TRAVEL- TIME CORRELATION		
	COMPONENT	
Rotated Component Matrix	1	2
Travel Time to Campus	0,831	
Travel time to Leisure Activities	-0,514	0,357
Travel time Places of Study	0,886	
Travel Time work		-0,495
Travel Time Leisure Activities		0,798

c) DISTANCE, TRAVEL- TIME AND MEANS CORRELATION				
	COMPONENT			
Rotated Component Matrix	1	2	3	4
Campus- Residence (commuting distance)		0,896		
Study travel time		0,866		
Work Travel Time			0,676	
Leisure Travel Time	0,671			
Cars as Drive			0,522	-0,717
Cars as Companion	0,741			
Microbus				0,898
Bus			-0,635	
Metro	0,464	0,836		
Shared Taxi	0,742			
Walk				

TABLE 7.15 SPSS analysis results for the mobility patterns for high-income students. Source: Author

Correlation: distance from residence to campus/ travel time/ residential condition

Like upper-middle-income students, this group also have a higher percentage of local students in comparison with migrant students (Table 7.15). They share the same characteristics vis-à-vis the distance between residence and campus, migrant condition, and travel times to campus. Notwithstanding such similarities however, there is an important difference in that the high-income migrants tend to live farther away from urban centralities and are mostly located in the upper-middle-class residential sectors of the Valparaíso Metropolitan Area (Figure 7.13). Despite this tendency to be located less centrally than locally resident students, this migrant group still chooses to be located close to university campuses as well as to leisure activity locations. Perhaps for this reason, no migrant students live in Con Cón or the other more distant dormitory cities. Another consistency when comparing this migrant higher income group with the other migrant student groups is that they also report longer travel times to leisure activities. Since the use of a car as a driver is a determinant for this group, it may be assumed that traveling greater distances is not the limiting factor that it is for the other groups. Thus, the trend amongst this group suggests that they live further away despite the longer travel times. However, in work-related trips, an inverse correlation applies, i.e., migrant students experience shorter travel times and show an increased use of cars.

Correlation: Distance from residence to campus/ travel time/ means of transport

Turning to the means of transport and higher income group students, there is an association between local students and the use of the metro train, whose commuting travel times are the longest, although this only affects four students within this socioeconomic group. The most extended travel times for leisure purposes within this socioeconomic group are connected to shared taxis and riding in cars as a companion. The data confirms that the increased use of cars amongst this group means that there is a corresponding drop in bus use. Such observations are consistent with living farther away from urban centralities and higher socioeconomic condition which enables such mobility choices.

7.6 Patterns of Daily Mobility

Dividing the surveyed students into three subgroups depending on their status as local, national migrants or regional migrant provides an alternative way of creating a narrative of mobility that acknowledges Kaufmann's view of the conditions for mobility but also respects the differences in the daily mobility patterns associated with each group. This alternative narrative helps to explain how the surveyed students move within the city but also perhaps reveals some of the population/urban dynamics that serve to shape the metropolis around them.

Local Students

Local students (42%) were the largest group within the entire sample. Of those surveyed, most of the local students live with their families in one of the five communes of the Valparaíso Metropolitan Area. It seems axiomatic therefore that for these students, their daily mobility routines are bound those of their family's mobility strategies. The residential location of the student's families therefore reveals the student's socioeconomic condition, where their social networks are, and the places where their friendships are made. This relationship between family, location and social network is important since their travel times for leisure activities are shorter in time and distance compared with migrant students who tend to live closer to the urban centres.

All local students, independent of their socioeconomic condition, live further away and experience longer travel times to campus. This mainly due to external familial influences that together mean their homes are often located on the fringes of the metropolis. Low-income students within this group however experience other specific disadvantages as they tend to live in peripheral areas with deficient transport supplies and little connectivity to downtown areas of the metropolis.

Local students also form the most significant student group that live in a different commune from their places of study. Their travel times to campus are on average between 31 minutes to 1 hour, and 75% of them preferred to travel by microbus. Danica, for example, is a student who lives less than 20 km from the university and during peak hour, it typically takes her more than one hour to get there. Only 4.3% of local student drive vehicles or ride as passengers, although most of these belong to upper-income brackets, just 10% of the population surveyed. Despite their access to vehicles, upper-middle and high-income local students report that they have multimodal mobility patterns. In such cases, the use of the metro train is often linked with walking or shared taxis when associated with longer travel times to places of study.

National Migrant students

National migrant students (36.2%) make up the second-largest student group living within the Valparaíso Metropolitan Area. These students come from other regions of the country, choosing to live in the Valparaíso Metropolitan Area during the academic year. Some come from such distant places that they can only travel back home only during vacation periods. National migrant students tend to live near the university campus areas located in Placeres and Playa Ancha Hills. They report that they have less knowledge of the city, which may be another contributing factor in their decision to live near to the urban centres.

The overall weaker economic condition of students (dependent mainly on parental financial support) affects their choices of where to live during their study period and consequently, their overall access to the micro-market of student services located around university buildings. All the students consider transport costs in their monthly budget and often shape their daily mobility strategies around the need to reduce costs as much as possible. Proximity to student services and places to study is therefore a crucial factor for them. This is confirmed by other data that shows that national migrant students are the largest group that study at only one campus and live in the same commune where they study and most of them walk to the university.

Comparing the intensity of public transport provision with the places where migrant students prefer to reside, migrant students seem to prefer to live with the highest intensity of public transport provision. This is confirmed by correlation tables which show that travel distances and times are shorter for migrant students. The average travel times to their places of study are between 1 and 15 minutes, with walking reported as a primary mode of transport which again reflects the shorter commuting distances required of these students. These shorter commuting distances are perhaps balanced by the longer travel times to leisure activities experienced by these students. This makes sense in that as many of these leisure activities occur far from university campus areas where the national migrant students prefer to live.

Regional Migrant students

The third group of students living in the Valparaíso Metropolitan Area are regional migrant students (11.5%). These students are from the local region and consequently, tend to have a much greater knowledge about the area than the national migrants. In general, regionally migrant students prefer to live near urban centralities or downtown areas. Their residential choices are to an extent determined by the topographic characteristics and the resulting urban structure. In this case, public transport tends to be concentrated in the central areas of the metropolis's flat coastal area.

For this reason, the areas with the highest intensity of public transport supply are on the coastal border regions, where the most centrally located areas of the Valparaíso Metropolitan Area are found. Therefore, it seems regional migrant students preferred to live in areas well connected to public transport at a metropolitan and regional scale. Indeed, this group has the highest percentage in the use of buses with interurban connections. This seems to be because unlike the national migrant students, regional migrant students have the option of traveling home every weekend. Their average travel times to campus inside the VMA are between 16 to 30 minutes as most university buildings in the region are close to centrally located areas.

7.7 Conclusions

The study of daily mobility tends to focus on the analysis of the three conditions for mobility proposed by Kaufmann *et al.*, (2004) these are: *Access* (1) to available urban choices; *Competence* (2), which relates to the acquired skills needed to make use of this access; and *Appropriation* (3) or in other words, the evaluation of the available means of access. As such, the amount of economic capital that families, economic agents, or people have access to determines the way in which they move throughout the city to a considerable extent.

For the student population in the Valparaíso Metropolitan Area, socioeconomic condition is not the only determinant variable is shaping movement through urban space. Socioeconomic condition does however serve to highlight essential differences between daily mobility practices amongst different socioeconomic groups. This is revealed through the foregoing analysis since the same correlation has been observed between commuting distance, travel times to campus, and migrant conditions in all the socioeconomic groups studied.

Longer distances covered and extended trip times are directly related to local students regardless of socioeconomic condition, while for migrant students, the inverse ratio applied, i.e., shorter commuting distances and travel times to campus across different socioeconomic groups. That means that local students – regardless of their socioeconomic condition- have longer travel times and distances at all socioeconomic levels because they live mainly in the peripheral areas.

In contrast, migrant students, tend to live near their study places and experience shorter daily mobilities both in time and distance. Regardless of their socioeconomic condition, migrant students still prefer to live in centrally located areas. This gives them proximity to their places of study and well-served areas of public transport. A choice which run contrary to the broader tendency of populations to abandon deteriorated central areas, as is the case of Valparaíso.

Accessibility and the immediacy to places that are attractive to students are therefore seen as essential when these students make decisions about where to live. They tend to choose those areas that offer closeness to those neighbourhoods that offer both opportunities and the resources required to obtain those potential benefits. The proximity to studying places and other areas notably shorten their travel times from between 1 to 30 minutes compared to that of local students whose travel times range on average between 31 to 45 minutes. Migrant students take between 1 and 15 minutes, a time so short it indicates that they most likely walk to campus or other areas.

Looking further into the students' daily mobility patterns, it becomes clear that the spatial distribution of higher education institutions are also important. The dispersed urban location developmental model followed by the traditional universities within the Valparaíso Metropolitan Area have specific repercussions on their student's daily mobility patterns. This then alters the relationship between the students and the city that hosts them. The dispersed urban location model means that local, nationally and regionally migrant students all must travel to different campuses located in different areas of the metropolis. Of the 824 surveyed students, 59 students, on average studied in three different buildings with different locations throughout the Valparaíso Metropolitan Area. This last group of students with more than one study place comprised of almost 20% of the population surveyed, which reflects both investments made by the traditional universities in the dispersed urban model, but also the complexity of the student's daily mobility patterns.

Despite losing its primacy in terms of the concentration of public and private investment, population size, and tertiary sector developments compared with Viña del Mar, the daily mobility patterns of the surveyed students reveals that much of their lives still take place in the city of Valparaíso. Data from 75% of the survey students indicates that their campuses were in one of the three areas within the city of Valparaíso, Playa Ancha, Brasil Avenue, and Placeres. Valparaíso also has the highest percentage of housing locations in the Valparaíso Metropolitan Area, with almost 39% of the students surveyed reporting that they live there. This means that most of the students' daily mobility occurs in the more deteriorated area of the metropolis and as such, should perhaps be seen as a significant engine for change within the city of Valparaíso.

8 Conclusions And Reflections

8.1 Introduction

This study was undertaken to examine the interrelationship between daily mobility and the spatial structure of an emerging metropolitan urban system. The work depends on the assumption that daily mobility can be understood as the sum of individual movements in the city that make it possible to understand specific urban spatial dynamics and the ways in which they relate to the structure and form of the metropolitan system. The research first considered the effects of an accelerated urbanisation process and the way in which in developing countries such processes tend to reproduce or maintain increasingly fragmented and segregated socioeconomic conditions. As such, these accelerated urbanisation processes produce and reproduce different systems of inequality which was later confirmed by studying by a specific group of inhabitants (higher education students) as they experience urban living within the metropolis.

From this perspective, daily mobility becomes a socially enabled practice that provides access to people, activities, and places through urban space and time, an understanding of movement that respects the relatively recent 'mobility turn' in social sciences (Miralles-Guash, 2002). Focused on 'movement' as an actor of change, this paradigmatic shift in thinking enables an exploration of how change within urban structures impact the inhabitants of such spaces and seeks to understand how such changes are experienced by those living with them.

Despite the explanations that have been unlocked by this paradigmatic shift, the application of such thinking has been largely dominated by European and North American examples. As such, these ideas about mobility have seldom been applied in studies of Latin American cities and metropolitan areas. In responding to this

absence, a range of research methods have been used examine the daily mobility patterns of a specific population group (higher education students) living within the Chilean Valparaíso Metropolitan Area.

The collection and analysis of data, including empirical surveys and interviews, was informed by Kaufmann's three conditions for mobility, *Competence*, which relates to the physical abilities and acquired skills needed for mobility, *Appropriation*, relating to the available options and opportunities for the development of successful mobility strategies, and finally *Access*, which refers to the all of the possible options for movement according to place, time and urban constraints (Kaufmann, 2002, 2006, 2012). All three conditions, Kaufmann argues, determine the capital that a population has in terms of their mobility and defines how a specific individual or group of individuals takes advantage of existing mobility options and uses them to create a lifestyle (Kaufmann, 2002, 2006, 2012).

How a given population, such as the higher education students considered here, lives, works, studies, and spend its leisure time proves to be dependent on a complex of structural factors. These include, for example, the locations where these activities are performed, the socioeconomic background of those performing such activities and the distribution of university facilities within a metropolis that is shaped by the complex topography of the area. In addition, the daily activities of a population such as higher education students turns out to be influenced by more dynamic and perhaps more subtle factors such as the changing functions of the urban space, increasing socioeconomic fragmentation or perhaps the inequitable provision of public transport across topographically complex areas such as the Valparaíso Metropolitan Area.

8.2 Findings: Metropolitan Spatial Changes and Urban Mobility

To fully appreciate the outcomes of the empirical survey work, it important to acknowledge the origins and further development of the urban and institutional spaces in which the surveyed population now live, work and relax. Explored in chapter four, the Valparaíso Metropolitan Area has gone through several significant developmental iterations from its original inception as a seaport. Of these, the most relevant iteration in the present context is the latest period of urban change

between 1980 and 2012. Three fundamental changes were identified during this period that perhaps more than any other, have contributed to the metropolisation of the Valparaíso area.

These are: (1) productive transformation together with the redistribution of centralities which becomes evident when the issuing of business licenses within the area is considered, (2) population growth and socioeconomic (re-)distribution which can be traced by, for example, comparing census data with the location of new housing developments, or by considering (3) the patterns evident in road infrastructure investments since 1992. The latter proves to be not only crucial in understanding how urban mobility patterns have changed since 1992 but explains critical changes in other transport infrastructures.

Although in many ways typical of other Latin American metropolitan areas, the diffused peripheral expansion induced by investments in regional transport infrastructure during the 1990s within the Valparaíso Metropolitan Area did not result in the 'oil stain' type of growth that might be expected. Often cited in the literature, 'oil stain' growth refers to the slow continuous expansion of an urban area. This understanding of urban growth is dependent on patterns of development that are currently apparently essential for understanding the term 'metropolisation'. For Latin America such developmental patterns are often used to explain the functional annexation of suburban areas driven by the needs of a growing population resulting in ever increasing land consumption.

This research has however revealed a much more fragmented and complex process of 'metropolisation'. For the Valparaíso Metropolitan Area, the subsumption of peripheral areas into the metropolis depends on more dynamic factors, including economic and political change and the local complex topography. Such foundational influences serve to shape and determine all other variables. These influences have led to the development of two distinctive forms of urban development in the area: (a) an interior metropolis on the bay, consisting of various hills that surround an extended urban centre in the low-lying areas, with stagnant formal growth in its (interior) periphery due to the lack of public infrastructure investment in the hills, and (b) a peripheral (exterior) metropolis beyond the bay, boosted by an extensive supply of single-family housing (suburban areas) and well served by interurban highways.

In looking at daily mobility patterns that arise from such a complex urban structure, it is important to understand the spatial changes that have been induced by the transformation in production and particularly those arising from the severe politically inspired economic adjustment of the 1980s. During the period of dictatorship (a

period of unprecedented privatisation and unregulated expansion), industrial centres shifted away from the downtowns and mostly out of the region. A new tertiary sector began to emerge, driven both by the geographical setting and tourism-led real estate development along the coastline.

Although commonly studies of Latin American metropolises have tended to emphasise the polycentric structure of such urban spaces, the Valparaíso Metropolitan Area proves to be an example of an extended monocentric metropolis, a urban form that has been heavily influenced by the topography of the area. The spatial discontinuities of the area are exacerbated by the steep slopes and hilly terrain that contain and constrain the narrow, low-lying areas within which are the two main urban centres.

The selection of information, processing, and mapping of the locations where municipal business licenses have been granted highlights the changing distribution of economic activity within this complex space. The highest concentration of business licenses in relative terms is in Viña del Mar, where 47% of business activity occurs, while the Valparaíso area accounts for 26% of the business licenses issued. Conversely, the lowest number of business licenses have been issued in Concón. A newly developed city, Concón is characterised by its high-rise housing developments (mainly for second homes) and only 3% of the business licenses issued.

This distribution pattern highlights the way in which the flat areas of the centre act as a 'service centre' that now supports and sustains the peripheral and suburban metropolitan areas/neighbourhoods. Topographic complexity and changing economic patterns in the Valparaíso Metropolitan Area have therefore combined to produce daily movement patterns that are pendular in nature as residents move from the periphery to the centre and back. This tidal movement pattern is characteristic of monocentric city structure, unlike the more complex polycentric patterns found in other Latin American Metropolises.

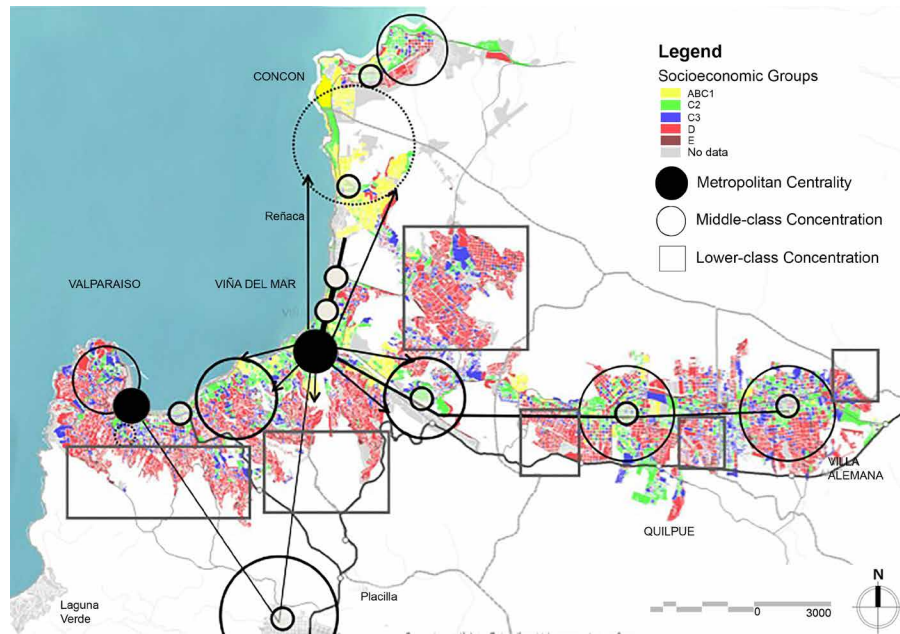


FIG. 8.1 Metropolitan centralities and socioeconomic structure of the VMA. Source: Atisba S.A.

Whilst topography and economics are one influence on daily movement patterns, a second pressure has been population growth and the changing distribution of wealth amongst those living within the Valparaíso Metropolitan Area. This study has highlighted that populations within the Valparaíso Metropolitan Area have tended to move in a way that is inversely proportional to the historical centre. Looking at census data from the last four decades, it becomes apparent that the city of Valparaíso began losing population in the 1980s, a change that especially affected high-income groups. Between the 1992 and 2002 the census data shows that Valparaíso had a negative annual growth rate of -0.24%. In the last decade, population growth in the dormitory communities around the city of Valparaíso has remained steady but the overall, the population distribution pattern within Valparaíso and Viña del Mar has changed. In the former, there has been renewed population growth on the outskirts, accommodated by both high-rises and single-family housing, while in the latter, growth has tended to occur downtown where a significant number of high-rise dwellings have been constructed.

Although a similarly segregated urban spatial structure has been observed by Latin American researchers concerned with other metropolises, the structure of the Valparaíso Metropolitan Area seems somewhat unusual. It is segregated by commune, with low-income groups concentrated in Valparaíso and high-income groups in Viña del Mar and Concón. There is also segregation resulting from the area's topography, with the lowest-income groups concentrated in the highest areas of the communes (+110 and +200 m.a.s.l.) in urbanised informal settlements with low connectivity to the rest of the metropolis. The latter areas are notably more vulnerable to socio-natural disasters such as urban fires.

The low connectivity available to the lowest income groups within the Valparaíso Metropolitan Area contrasts with the transport options now on offer to other population groups. The Valparaíso Metropolitan Area has received the highest concentration of private concession investment in Chile from 1997 to 2007. This investment greatly accelerated the development of transport infrastructure which has now become a significant driving force of metropolitan transformation and broader changes in urban mobility. One such example, the development of an intraregional ring road along the peripheral border of the metropolis connecting all the communes and highways to the Country's capital city, Santiago, has generated significant changes in modal distribution flows for both drivers and bus passengers.

The development of this intraregional ring road has however tended to reinforce car dependence in the now connected areas. Private car use in these areas of the Valparaíso Metropolitan Area has increased from 15,85% of daily trips in 1998 to 29,4% in 2014. As well as increasing car dependency, a robust peri-urbanisation process (real estate development) has resulted from the strengthening of interregional transport networks. Improvements to road infrastructure has tended to accelerate the development of urban sprawl, in part due to weak territorial planning and poor housing policies (1980).

Such investments in road infrastructure have underpinned unprecedented regional changes, creating additional accessibility for some, increased land values and inspired substantial changes to urban zoning. More practically, the consequences of this urban restructuring have been the development of dry ports in new peri-urban areas, an expansion in peri-urban services, and new large, private urban settlements, all of them dependent on the new centrality of Valparaíso and Viña del Mar. Together such changes have tended to accentuate the monocentric structure of the developing metropolis.

Origin-destination surveys conducted in 1998 and 2014 provide alternative way of understanding the impact of such changes on urban mobility. By looking at those urban units that attract and generate trips it becomes possible to determine how mobility patterns have changed through this transition. In both the 1998 and 2014 surveys, the most significant trip concentrations are found in main urban centres of the Valparaíso Metropolitan Area. The latter survey reveals an increasing number of trips on the outskirts of central cities of the metropolis.

Places of intermodal connections within the historical centre of Valparaíso, the Central Omnibus Station, and Central Metro Station, still attract significant mobility during rush hour which confirms that a good portion of the area's working population now arrives from different peri-urban areas of the metropolis and region. In contrast, Viña del Mar tends to attract more mobility outside of the rush hour where a concentration of tertiary services (malls, shopping centres, workplaces, healthcare facilities, among others) has emerged in the last 19 years.

The two areas that generate trips during the morning rush hour are the peripheral areas which are characterised by high-density social housing developments but also the new developments of middle-class high-rise housing on the eastern outskirts of Valparaíso. The areas that generate the highest number of trips however are the suburbs where developments associated with single-family housing are located. This seems to reflect a continuing expansion of urban sprawl in the outer areas of the metropolis. The only area that bucks this trend is the more central downtown areas of Viña del Mar where a high-rise housing boom in the last seven years has tended to generate new and alternative patterns of mobility.

To summarise, the research has confirmed that within the Valparaíso Metropolitan Area urban mobility is first shaped by the area's rugged and complex topography which has tended to shape and restrict urban growth. The potential for growth in the centre has in part been restricted by the nature of the road network infrastructure in the interior metropolis. The result has been inequitable access to land and inequalities in quality of life among those residents who have fewer resources. By contrast, within the more peripheral areas of the metropolis which are now better served by new interurban highways there has been an exponential growth of new downtown areas made up of better-quality low-density housing. This however has led to a much greater dependency on automobile-based mobility. This mobility is both environmentally unsustainable and due to its cost, serves to generate inequitable access to jobs and services.

8.3 Findings: The Changing Spatial Organisation of Urban Universities

Chapter five considered the influences that have influenced the development of higher education over four decades in Chile as whole but particularly within the Valparaíso Metropolitan Area. The research has highlighted the way in which the political and economic restructuring under the dictatorship government (1973-1990) generated unprecedented privatisation and the unregulated expansion of universities. During this period, the total number of institutions grew from 8 to 60 in a single decade, a rate of change that is unique in Latin America. The outcome of a more general political and economic restructuring, the period saw the foundation of 40 new private universities. As such, broader changes in the economic, social, and political condition of the country produced a new and rapid expansion of private higher education provision

The new private institutions consist of two groups. The first group were for-profit businesses that charge large sums of money in exchange for educational services of varying degrees of quality. The second group of universities were reliant upon large endowments and donations from businesses or private donors in exchange for significant tax cuts. A further driver for the accelerated growth of these new institutions was the separation of the state's two public universities into regional universities, increasing from 2 in 1980 to 14 in 1990. Public universities including the original six created at the beginning of the twentieth century therefore form a third cluster of institutions that can be labelled the 'traditional universities'.

Following the restructuring of the sector in the 1980s, between the mid-1990s and the mid-early-2000s there was a second wave of expansion in the country's higher education sector. Inspired by substantial growth in university enrolments, this era is also notable for an diversification of the student population. Influenced by neoliberal ideals, during the 1990s the economic cycle served to expand the middle classes, not only in Chile, but the rest of Latin America. This meant that an increasingly diverse population group came to the fore, who were more willing to demand better access to higher education.

This rising demand, led universities that had one single urban campus during the 1990s, to mutate into macro-universities with multiple campuses and differentiated management structures. This resulted in a very segmented higher education system that served a notably diverse student population. Through the late 2010s, the precipitous expansion of the Chilean higher education sector stabilised, with some private universities and programmes closing because of newly enacted education laws.

Despite such closures, the research shows that for the universities of the Valparaíso Metropolitan Area as a whole, there is a schism between location patterns of older and newer buildings centred on three determining conditions as identified by Caravaca and Ferial (1995). These are: (1) the historical location patterns associated with the older institutions, (2) the administrative origins of the institution, and (3) the dynamics of university policies, strategies, and governance. The historical location, administrative origin and strategies of governance can be mapped on to the three types of urban locations for higher education institutions housed within the VMA: (1) *peripheral locations* in which facilities are concentrated and separated from consolidated urban areas, (2) *concentrated locations* within the city with facilities in a specific area and (3) *dispersed locations* with facilities scattered throughout the city or metropolis.

In practice, particularly amongst the new private sector institutions there was an increasing demand created a need for new infrastructure which tended to be developed close to the more peripheral communities that the new institutions were serving. Similarly, for the traditional institutions of the Valparaíso Metropolitan Area changes in demand inspired further investments in infrastructure. The location pattern of the traditional universities within the Valparaíso metropolis however runs counter a more general trend that emerged in the 1908s for populations and tertiary services to move away from the historical centre.

Instead, the area's traditional universities have since taken advantage of the growing abandonment of central areas. Two universities founded during the period of urban industrial development have continued to develop infrastructure around their foundational buildings, one founded in the city's central district and the second, established in one of the hills on the east side of Valparaíso Bay. The other two institutions have had the same location patterns since the mid-20th century. This study examined the locations of buildings associated with the four highlighted institutions and found that the four institutions used 50 buildings throughout the metropolis of which 80% of which are in Valparaíso. In these cases, the increasing decay of central areas, including an increase in vacant sites and the abandonment or underuse of historic buildings has been used as an asset as they strive to rationalise or control their infrastructural growth leading to a degree of urban concentration.

There are now some 12 higher education institutions within the Valparaíso Metropolitan Area, of which four are examined in this study. The clusters of traditional universities consist of two public institutions: Valparaíso, and Playa Ancha University and two private institutions that are governed in the public interest: Pontifical Catholic Valparaíso and Federico Santa María Technical University. The clustering of the four traditional institutions highlighted within the study has arisen partly through the increased socioeconomic diversity of the students they serve but also through the character of the urban area that houses them.

It becomes apparent from the research that wider political, social, and economic change has interacted with the history, administrative origins, and governance of individual universities of the Valparaíso Metropolitan Area to shape the present-day location patterns of the area's traditional universities. Although their early development at the beginning of the twentieth century was strongly focused on the central areas of the city, the higher education institutions of the Valparaíso Metropolitan Area are now linked with newer forms of urban organisation. Broader societal changes along with internal and external pressures can be said to have resulted in the creation of buildings or new campus areas that forged a series of new relationships between these institutions and the metropolitan space.

Driven by expansive pressures of deregulation, free market economics and substantial increases in demand from the mid-1980s onwards, one of the traditional universities has chosen to expand its infrastructure by choosing locations on the periphery, space previously characterized by mono-functional construction such as low-density suburban housing. Large transport interurban corridors connect this peripheral location to the central city, which is the sole repository of urban values of interaction, functional complexity, and centrality.

Some traditional universities in contrast have in contrast responded to the same set of challenges in a very different way. They have tended to remain concentrated in Valparaíso's city centres and present in central areas of Viña del Mar. One motive for this focus was accessibility to public transport which was important in meeting the needs of their more socioeconomically diverse student population. More significantly, the traditional universities have taken advantage of the growing abandonment of central areas, an approach that has meant that the historical location patterns of the four universities studied in this this have persisted.

The most prevalent pattern of university location within the Valparaíso Metropolitan Area is now based on a *dispersed location model*. Some of the facilities belonging to three of the four studied universities have adopted this model of development over the last thirty years. There is no compact campus in this typology, but instead

university and faculty functions are housed in somewhat scattered buildings all around the city and generally have no direct links between one building and another. Within this arrangement, certain centralised services may be less effective; for example, due to the partition of university resources (libraries, dining rooms, offices).

Despite the everyday problems such divisions create for staff and students, this development model has contributed to urban restructuring and regeneration of deteriorated urban centres. Such dispersed development models can serve as catalysts for revitalising the city because they invigorate local social networks, becoming economic engines at different scales. This urban typology enables three essential situations that must be compatible: infrastructural development, engagement with the city, and city services integration.

Despite the problems associated with investing in new buildings within central urban areas, one of the universities in this research study created an innovative infrastructure location policy involving agreements with local governments to use historic government-owned buildings. It also negotiated with private entities, applying lease purchases as an economic model for buying historic buildings. Its further infrastructure investments came to depend on the opportunities associated with building on vacant sites or using or buying decayed buildings or by leasing larger spaces from a small pool of such buildings that available in central areas.

This university had therefore developed a new infrastructure development model in which it acted as a parasitic organism. This metaphor fits its doubly profitable policy of using abandoned buildings while reaching advantageous agreements with public and private entities. For public entities, the reciprocal benefits of these agreements are related to campus spaces and the ability of university branches to improve the quality of their surrounding environments. Such agreements, therefore, have perhaps tended to act as urban regeneration instruments. On the other hand, the private sector investing in more peripheral locations has also benefited. While the traditional universities focus on more central locations, the private universities have faced less competition in the areas they deem as significant. This is important since under their development model centrality is not profitable for large private entities.

Despite the apparent dominance of the dispersed model, a concentrated location typology was also identified through the research, with universities maintaining their facilities within the city but concentrated in one specific area. One example amongst the private universities was built as a campus in the early twentieth century, surrounded by walls and cliffs at the top of Placeres Hill. The second, after a significant financial crisis in 2007, decided to concentrate its facilities on Playa Ancha Hill around a building from the 1970s.

8.4 Findings: Conditions of Daily Mobility of Higher Education Students, Conditions, and Patterns

Having considered the environment that now shapes the lives of higher education students within the Valparaíso Metropolitan Area, chapter seven focused more closely on Kaufmann's three conditions for mobility (Kaufmann, 2002, 2006, 2012). Even though two of Kaufmann's conditions of mobility *Competence*, the physical ability or the acquired skills, and *Appropriation*, which refers to strategies for movement shaped by needs, plans, aspirations, motives, values, and habits, are significant, both of these conditions are crucial to Kaufmann's third condition, *Access*. The latter being broadly measured according to place, time, and urban constraints, a condition whose influencing variables are residential conditions (local or migrant), socioeconomic conditions, and travel routines (Kaufmann, 2002, 2006, 2012).

Together, these three conditions shape mobility potential and form the 'Capital for Mobility' with which the population uses to organise its daily life in the city. For the higher education student population of the Valparaíso Metropolitan Area, Kaufmann's three conditions for mobility were considered under three headings – socioeconomic condition, residential condition, and travel routines. Together these headings provide a means to connect an individual student's daily mobility pattern, their lifestyle and finally their experience of urban space.

The students of the Valparaíso Metropolitan Area (around 82,000 students) are perhaps second largest group of students in the country. A review of the available data suggests that collectively, they account for the highest percentage of all daily journeys in the Valparaíso Metropolitan Area, far surpassing those of public workers in the last two decades. This perhaps counter-intuitive finding is however in line with the results of O-D based research in other Latin American cities. Meanwhile, the analysis of student daily mobility patterns undertaken as part of this research aligns well with other social science literature which since the 'mobility turn' has tended to emphasise the importance of mobility in understanding and defining lifestyle.

8.4.1 Competence

The first condition of mobility, *Competence*, is strongly related to age and acquired skills. Amid the geomorphological conditions that have created abrupt and irregular variations in the local topography, walking paths within the Valparaíso Metropolitan Area are faster, more direct, and more abundant than public transport infrastructure networks. The physical capacities of young people can therefore be seen as an advantage in gaining access to the city. Indeed, 12 % of them walk to and from the university, which rises to 19,5% among migrant students, who often live near their campus and thus have shorter commutes. This population group, which accounts for 6,4% of the national population, ranges in age between seventeen and twenty-seven. Higher education students are also a privileged group when compared with the wider population in that it has both facilities and advanced education needed to access all the available information and communication technologies relating to mobility practices and strategies. In other words, students have a greater acquired ability to use and benefit from ICT tools that help them develop more appropriate and effective mobility strategies.

8.4.2 Appropriation

The second condition for mobility is *Appropriation*, a condition that highlights the way in which mobility strategies are shaped by needs, motives, aspirations, and habits. In this study its indicators are youth, social networks and places of interaction and use of free time. Among the main motivations behind the student's desire to travel are opportunities that it offers to further the development of social networks, in different places or spheres where friendships are formed and developed. To an extent these life enhancing activities depend on regular or occasional co-presence and, therefore, travel.

As local students have developed their lives in the metropolis, they have found or adopted different places where their friendships are formed (schools, neighbourhoods or sports clubs amongst others). As such, they recorded significantly more travel time for their daily activities than the regional and national migrant students. In addition, local students from all socioeconomic groups tend to record more extended trips to and from their university than migrant students, who choose to live downtown or near campus.

Meanwhile, travel time to and from leisure activities is more significant for migrant students. Like local students, migrant students also tend to engage in leisure activities in the places where friendships were formed – neighbourhoods, high school, and university – which in their case means more travel since these leisure activities often seem to take place closer to their family or neighbourhood. This relationship between location and leisure activity only changes for migrant students from high-income families who prefer to live in wealthy residential areas.

8.4.3 Access

The third condition for mobility is *Access*, which refers to the range of possible mobilities according to place, time, and urban constraints. In this study, the key indicators of *Access* are taken to be the student's residential condition (local or migrant), their socioeconomic condition, and their travel routines. The first of these, residential condition is complex in that students often change residential location numerous times during their studies as they migrate from other regions of Chile and other urban contexts. Broadly translated, the research indicates that familiarity with the city to which a student migrates to study allows a detailed selection of the place to be chosen as a housing location.

Migrant students from the Valparaíso Region (who are typically more familiar with the metropolis of Valparaíso) choose to live mainly in downtown areas, where there is a better supply of regional-scale public transport and an adequate supply of all types of services. By contrast, migrant students from other regions, some of them from places as far as 2.240 km away, tend to look for housing close to universities. For these students, proximity to their primary destination, the university, is fundamental. The third group, local students, echo the general population's housing location patterns, tending to live on the outskirts of the metropolitan area where there is greater demand for housing. Overall, it appears that the choices that student make concerning residential location are rational economic decisions but are also steeped in young people's emotional attachments to family and friends' local networks.

The second indicator that influences *Access* as a condition for mobility is socioeconomic condition. Overall, half of all young people in Chile live exclusively on another's income, demonstrating significant economic dependence among this wider population group. The practices of the students often do not however always conform with the socioeconomic condition of their families. The survey shows for example, that 90% of the students use public transport, an activity more often associated with the lower-income groups who are typically dependent on public transport provision despite its bad quality, low frequency and uncertain availability.

Most higher education students in Chile come from the middle class, to which 70% of the surveyed students belong. Indeed, it was necessary to separate this large group into three smaller ones: lower-middle, middle and upper-middle-income to facilitate meaningful comparisons with the other two significant socioeconomic groups - lower income (7,4%) and higher-income (22,6%). Thus divided, the analysis suggests that for the student population mobility practices do not differ significantly across the different socioeconomic categories which is a change from other daily mobility study results. The data demonstrates the same correlation among commuting distance, travel times to campus, and migrant conditions in all socioeconomic groups.

Local students, regardless of socioeconomic condition, experience longer distances and travel times, while for migrant students, the inverse is true (i.e., across different socioeconomic groups, they have shorter commuting distances and travel times to campus). In addition to this difference, half of the migrant student population chooses to live in Valparaíso, which goes against the broader trend for the metropolitan population to shift towards the outskirts of the city, looking for new and diverse real estate offers that allow larger lots despite being far from public services. Migrant students instead take advantage of living near the universities and central areas of Valparaíso, which generally offers a better public transport supply and are close to general urban services. These home locations can be demonstrated by travel times, which are lower for migrant students between 1 and 15 minutes compared to 31 to 45 minutes for local students.

The main differences in daily student mobility among socioeconomic groups relate to transport mode and how students travel to their part-time jobs. Only high- and upper-middle-income students use cars or ride in them as passengers. Besides, middle-income students travel to part-time jobs or leisure activities in shared taxis that do not have special prices for students. This finding indicates demanding schedules that include home, work, study, and leisure activities. On the other hand, it was found that low-income students do not use shared taxis because of their high fares and because these students have demanding study schedules to maintain their scholarships, so they do not have part-time jobs. Some of these students need at least four scholarships to study which demands a high level of academic excellence and leaves no time for work. This later observation is vital to fully understand the lifestyle of this group.

For lower-income groups, distances between residence and campus were unrelated to travel time to campus, which was inferred from the non-correlation between longer distances and longer travel times. This seems to be associated with to the segregated spatial structure of the metropolis, in which lower-income groups living in the high areas of the interior metropolis have comparatively with low connectivity to central areas due to insufficient public transport.

The third indicator that influences *Access* as a condition for mobility is *travel routine*. This variable depends mainly on residential condition (migrant or local), allowing three main groups to be distinguished: local students, migrants from other regions, and migrants from the Valparaíso Region. Local Students (42%) formed the largest group of the entire student sample, with most of them living in one of the Valparaíso Metropolitan Area's five communes with their families. As might be expected, their choice of housing location is consistent with the general tendency amongst inhabitants of the Valparaíso Metropolitan Area to live on the area's outskirts.

Low-income students however face specific disadvantages as such residing in peripheral areas often have sparse transport options and low connectivity to downtown areas of the metropolis. Local students also comprise the most significant student group living and studying in different communes. Their travel times to campus are, on average, between 31 minutes to 1 hour, and 75% of them preferred to travel by microbus. Only 4,3% of local students are drivers or ride in cars as passengers, although most of them belong to the upper-income bracket, which accounts for just 10% of the surveyed population. Such upper-middle and high-income local students often have multimodal mobility patterns; those with long travel times to study may walk or use shared taxis to connect with the metro train.

Migrant students from other regions (36,2%) living in the Valparaíso Metropolitan Area were the second-largest student group within the survey. Most choose to live near campus during the academic year and return to their home region during university vacations. These migrant students turn out to be the largest group studying at only one campus and they tend to live and study in the same commune. Proximity to their place of study means that they tend to have lower travel costs and the use of all kinds of services around the campus, including fast-food restaurants, shops, internet centres, ATMs, and bank offices. The average travel time to their place of study from their place of residence are between 1 and 15 minutes and due to the shorter distances, that they need to cover, walking tends to be their primary transport mode.

Migrant students from the Valparaíso region (11.5%) that live in the Valparaíso Metropolitan Area. These students migrate from elsewhere in the Valparaíso region to the Valparaíso Metropolitan Area and consequently know more about the area than migrant students from other regions. This familiarity with the area perhaps encourages them to live near to more complex urban centres such as the downtown areas of Valparaíso and Viña del Mar. Migrant students from the region generally preferred to live in areas well connected to regional and metropolitan public transport, although for some the desire for strong intraregional connections means they may not end up living too near their places of study.

Perhaps unsurprisingly, students in this group have the highest percentage of use of buses with interurban connections because they have the option of traveling home every weekend. This group commonly walks to leisure activities, as their central living locations offer various urban services, including banks, hospitals, shops, fast food, and bars. Their housing-to-campus travel times are between 16 and 30 minutes, and their main transport modes are minibuses and by foot.

In summary, understanding *Access* as a condition of mobility highlights serves to highlight differences inscribed in the daily mobility patterns of higher education students. Three primary daily mobility patterns emerged from the survey: those related to local, regional, and national migrant students. They can be explained first by residential condition, whether students are locals or migrants, and from which region they are coming. This latter condition for example, influences the choice of housing location by migrant students.

It was discovered that regional migrants tend to live around central areas of the metropolis whereas national migrants prefer to nearer the university. By contrast, local students cannot choose, and they live all around the metropolitan area. The trips of local students are longer, but fewer, compared to those of migrants. National migrants travel more during the day, but their trips are shorter in distance and time and carried out mainly on foot. Finally, regional migrants have recorded more journeys than national migrants but make fewer trips than local students.

8.5 Conclusions

Among the problems common to cities of different sizes and geographic locations within Latin America are large historical central districts that are deteriorated or underused. They often contain many decaying areas, buildings in varying degrees of abandonment or underuse, and empty sites. These central areas are however usually well equipped with notable public spaces and served by an effective and proven transport infrastructure. This combination with contrasts with districts and economies located in peripheral areas of the metropolis where the improvements to connections with the rest of the metropolitan area and the creation of spaces devoted to public good often run second to the demands of growth and urban expansion.

Despite this apparent limitation to movement and personal expression, changes in the preferences of higher-income population groups have tended to further promote peripheral growth and with it the growing abandonment and decline of the historic centre. This characterisation of the problems that now face many Latin American cities is also evident within Valparaíso Metropolitan Area. The historical spatial structure of Valparaíso has been entirely reconfigured as inner-city populations have moved to take advantage of the apparently more favourable conditions of Viña del Mar (its neighbouring city).

The daily mobility patterns of local students tend to reflect this general development pattern, with individual students now undertaking long trips from distant communes to campuses that are mostly in the city of Valparaíso. This daily mobility pattern is particularly clear among the high-income student population, who mainly live in remote communes such as Concón and areas on the North coast of the bay where there are many new housing developments. The flight of higher-income groups to areas such as more remote areas such as Concón helps explain why some central communes such as Valparaíso now have a comparatively large population of low-income residents. Running counter to this socially polarised outward flow is an urban development process that now perhaps suggests the beginning of a return to the historic centre, a trend that is evident in the infrastructure planning of the area's traditional higher education institutions. The improvement and recovery of previously deteriorated historical central areas that has occurred through the traditional universities' investment strategies present an excellent development opportunity for both for the metropolis and its containing region.

The underlying logic of this research has been to procedurally understand the territorial determinants that have influenced the choice of university infrastructure location and thus understand the daily destinations of students (both migrants and locals), most of which are concentrated around university environments. To this extent, the spatial organisation of traditional universities within the Valparaíso Metropolitan Area provides a laboratory that has revealed the true impact of the changes which the country and its higher education sector have faced since the 1980s. One response to those challenges has been a changed relationship between university governors and local authorities, one that created new uses for the deteriorated or underused central areas of the metropolis.

The agreements between universities and local governments related to the use of abandoned buildings that have created new scope for development within the central areas have reciprocal benefits. This potential could however shift to other areas of the metropolis if the Municipality of Valparaíso or the regional governments do not continue to see the universities as partners in the city's recovery. Conversely, if the universities do not continue to understand the central areas of the metropolis as an asset, they can quickly move to areas with better competitive advantages like Viña del Mar or other areas on the metropolitan shoreline. Such movement is already beginning to happen in the form of graduate buildings now being opened in the central districts of the neighbouring city.

The possibilities and opportunities offered by these structural dynamics are reflected in the survey of 824 students undertaken as part of this research study. This survey has provided essential data on diverse travel patterns from different parts of the metropolis. Those surveyed include migrant students living in proximity to their places of study or in central areas, and local students spread across the metropolitan area. Of those surveyed, 39% of them live in Valparaíso. Almost all their trips during the day are on foot through the area around the university. These university students are enacting a particular form of metropolitan lifestyle which is most clearly expressed in their daily mobility routines. These mobility routines encompass trips to their places of study and their trips for leisure activities, which are essential for this young population group.

One of the main aspects of the students' 'Capital for Mobility' is their preference for being near their study places. National migrant students chose to live around the campus area and regional migrant students chose to live around centralities well connected to campus by foot or public transport, while local students live their daily lives mostly around the university. Even though local students (70%) tend to live on the city's outskirts, the rest of their activities or trips take place near their universities in central areas or secondary university centralities in the hills. By

contrast, more than 70% of trips taken by local and migrant students for leisure consist of travel to different parts of the metropolis. Even migrants who live in centralities take longer trips to the sites of leisure activities.

The research showed that local students have shorter travel times for leisure because they formed friendships in three different social environments: their neighbourhoods, high schools, and universities. The results imply that local students remain near home for leisure, explaining their shorter travel times. This location pattern is not the case for low-income local students who live far away from all services and must take longer trips to engage in leisure activities. This research highlights the demand among young people for diverse, strong social networks, and how important it is for students to have the proper mobility to foster them. Thus, the need for metropolitan connectivity is a priority. The central areas in which their daily lives unfold and through which they move are well served by public transport at all scales and are the best environment for living a metropolitan life.

A further factor in the lives of the student population that stimulates so much metropolitan mobility is the urban location typologies of higher education institutions. Three of the four studied universities operate under the dispersed urban model, in which facilities are scattered throughout the urban network rather than housed in a complex, compact campus. There are generally no links between one building and another. In this arrangement, students' study in more than one campus or building in the metropolitan area.

Even though most live and study in the same areas, many students travel among three campuses located around the metropolis, a situation particular to this fragmented metropolitan area. It is clear from the survey that local economic development in the city through food sales, copy shops, leisure activities, and informal residential housing revolves around the university. More importantly, all the students, both migrants, and local students appear as essential agents in the recovery of central areas since they provide the motivation behind the agreements reached between the universities and the local authorities that have provided for a reimagined purpose for the centre of the metropolis.

8.5.1 **Fragmented Spatial Dimensions of Daily Student Mobility**

Earlier some characteristics of the emerging metropolitan urban spatial structure were highlighted: the physical fragmentation related to the complex topography of the territory, and an emerging social polarisation with the most impoverished residential areas located in the highest hills. These aspects of the metropolis have a direct impact on the capital for student mobility - mainly relating to conditional strategies for daily movement in time and space. Even though it is recognised that travel times are longer for all local students independent of their socioeconomic condition, the data regarding low-income groups present some qualifications to these observations.

The low-income groups of local students who live in areas with limited connectivity and depend on the insufficient supply of public transport have more extended trips to their study places. It is demonstrated that the capital for mobility for this specific group implies social differentiation. They can live near the university in terms of distance, but due to poor connectivity resulting from a fragmented geography, they rely on complicated routes and strategies to reach their places of study. Daily, they may take three different transport modes to get to the university. Their daily mobility strategies depend on their academic load, which may involve long hours of work at the university and travel safety conditions (as most of them live in high-crime areas) which means that they cannot get home very late. In contrast, the lowest income groups that migrate can choose, so they live near the universities or in central areas with good connectivity to different parts of the metropolis.

The fragmented spatial condition of the metropolis is something that local students must navigate using mobility strategies that in turn, tend to create social divisions. All local students have extended trips, but those in the lower-income group must develop complicated strategies to get to their places of study due to the absence of investment in road infrastructure in the internal periphery of the metropolis. Besides, due to the insufficient supply of public transport in the periphery and low connectivity resulting from an absence of road infrastructure development, combined with other social factors, students who live there face unsafe conditions.

As León has pointed out the decades-long lack of investment in transport infrastructure can make it extremely difficult to reactivate the cycle of development in the city (León, 2013). Such periods of low investment in infrastructure act to increase the technological complexity of making substantive improvements to the existing infrastructure making it more expensive and increasingly unreachable for the state. Finally, investment dynamics that ceased at the beginning of the twentieth century still restrict the population's accessibility to central areas, disproportionately

affecting underprivileged groups and their mobility patterns. The consequence is reflected in elaborate routines and strategies of students.

8.6 Generalisations and Implications

In the last decade, the notion of mobility in the field of social science has drastically changed how urban mobility is understood. Such ideas form the basis for this research, associating urban spatial dynamics with the daily mobility patterns of one specific population group as they navigate urban space. To this end, the data obtained was analysed in the light of the three conditions of mobility proposed by Kaufmann (2012). These were taken to be: *Competence*, the physical abilities, and acquired skills as they relate to the rules and regulations of movement; *Appropriation*, which refers to the options for mobility strategies that are shaped by the needs, plans, aspirations, motives, values, and habits of the population and *Access*, which refers to the range of possible mobilities according to place, time, and urban constraints Kaufmann (2012).

Together, all three conditions form an individuals' 'Capital for Mobility' which is related to their ability to move or choose the means and length (time-space) of that movement to preserve a lifestyle or develop one. The conditions for 'Capital for Mobility' provide a means to understand and perhaps explain both identity characteristics and lifestyle choices. In this undertaking, this study adopted a mixed method approach to measure and evaluate daily mobility. This research design has several advantages over the more traditional origin-destination studies, including improvements in the quantity of the data obtained and the speed with which responses could be collected and analysed.

The primary condition for assessing the student's 'Capital for Mobility' was *Access*, which was measured by three variables: socioeconomic condition, residential condition, and travel routines. By examining these three variables it becomes possible to complete a richer and more complex analysis of the student travel routines from different parts of metropolitan Valparaíso. The mixed methods approach adopted in this study has helped in the development of a metropolitan-scale dataset. As such, this research designed falls between an ethnographic mobility study²⁹ and a large travel survey such as the origin-destination surveys used by the Secretariats of Transport Planning.

²⁹ In the case of daily mobility, ethnographic methods are related to the selected inhabitants surveyed regarding their daily mobility routines throughout the city. These cases were analysed one at a time.

8.7 Policy Implications

The research has revealed that a lack of a comprehensive infrastructure network in the interior of metropolis means that the significant group of the population living above 100 meters above sea level (m.a.s.l) or more must develop particularly complex daily mobility strategies. The current lack of inter-area connectivity and the consequent relative isolation of specific areas and populations was demonstrated a fire in early 2014, which resulted in the loss of 3,000 informal and formal homes. The local and central government has previously implemented policies fostering the development road infrastructure at a regional scale, but these did not include provision for new roads that would connect hilly areas on intra-and inter-commune (metropolitan) scales. The problems facing this section of the population could therefore perhaps be best addressed by the construction of an accessibility system between hills, perhaps in the form of a ring road which serve to connect areas of the city at the height of 100 m.a.s.l.

The paradox lies between the growth rate and the infrastructure deficit. The urbanised area is currently 10,200 ha within the Valparaíso Metropolitan Area, and the area regulated by the Metropolitan Master Plan for Valparaíso is 51,845 ha. The use of statutory planning tools have increased the developable area of the metropolis by 41,000 hectares, but due to the lack of infrastructure of all kinds, especially accessibility infrastructure, overall, the amount of occupied territory within the metropolis is stagnant. Regulatory plans are inflexible instruments, some of which have taken more than 30 years to update. As such, they have failed to keep pace with urban changes triggered by private interests or informal urban settlements. From an urban planning perspective, the analysis of a mainly regulated city instead of being planned is of particular interest for policy implications.

Another critical issue is the deterioration and underuse of central historical areas. This study has outlined how and why higher education institutions might play an essential role in reversing these trends. The experience of the traditional universities within the Valparaíso Metropolitan Area has demonstrated that the higher education sector can be an engine capable of creating environments that attracts families and companies to resettle deteriorated central areas. The question is perhaps whether the investments by the higher education institutions can trigger a self-sustaining process that will recover real estate assets and develop vacant land.

The research shows that although the universities have already played a crucial role in the recovery of some areas, such improvements are always precarious due to the lack of decisive public action. The public sector is the social actor responsible for ensuring the common good, but it is the only sector with the capacity to develop a long-term vision and that has the necessary instruments to address the coordination problem that private actors face in these areas. The public sector's biggest challenge will be to solve this coordination problem and ensure that the private actors in urban development enter a virtuous circle that puts all available urbanised land to its best and most productive use.

To this end, various urban governments have resorted to integrated programs to revitalise deteriorated areas with broad participation among the community and real estate investors such as the higher education sector. In successful cases, the central beneficiary areas have gone from deterioration or abandonment to active growth and development consistent with their respective cities' vital areas. In contrast, the private sector, makes regular real estate investments in areas in which there is an adequate provision of public services, public infrastructure, and public spaces. They do so in response to the demand of a variety of actors, such as families of different income levels, education institutions, and different kinds of business of different kinds all of which enrich the recreated spaces.

In addition to more responsive urban planning models for university cities, a public transit system financed by taxes generated by real estate development that gives students and the general population the same access to all services and opportunities within the city is needed. The integration of the population through the creation of such a system will support the creation of educated talent for the knowledge economy that will permeate all areas of development including the port city of Valparaíso - the administrative and cultural capital of the region. The Valparaíso Metropolitan Area does have the advantage that it is now inhabited by a comparatively educated population, several innovative economic areas that have high levels of entrepreneurial activity and a sizable arts and culture sector, together with large non-profit concerns that together could help build and sustain a vibrant civil society for the next 20 years and more.

8.8 Recommendation for Future Research

To further analyse the daily mobility patterns of higher education students in the Valparaíso Metropolitan Area, a deeper understanding of local housing market is needed. This might cover the effects of market supply and demand, the types of houses that make up the market and the nature of the demand among different socio-economic groups of students. Such an enhanced understanding would help answer questions such as whether the development of high-rise buildings near campuses will alter the situation of low-income students who live near their universities.

It is possible, for example, that such developments might force students to look for housing removed from their places of study – a change that would substantially affect the urban fabric around the universities. If the primary goal of planning is equity and opportunity for all students to access urban services, it must be considered that low-income national migrant students will no longer choose to live near the campus area if new high-rise constructions were allowed to alter the character of the nearby housing market. The low-income national migrant student's capital for mobility consists mainly of living in proximity to their study places, such an upheaval in the local market might, for example, induce change in their lifestyles for the worse.

Applying the same mixed method approach adopted here to the study of student's daily mobility patterns may open other lines of research if it was applied to other population groups such as school children or the experience of older people within the metropolis. This more modern socioeconomically informed methodological approach to daily mobility patterns could perhaps help to create a greater understanding of the diversity of metropolitan lifestyles and the implications of urban change for specific population groups. More positively, such studies might suggest how urban planning instruments could improve the daily lives of such groups but also reveal more about how their interrelation with the urban spatial structures continues to shape the future of the metropolis.

Appendices

Interviews with higher education Students (Chapter 3)

- 1 Digital diagram of your daily mobility.
 - Time: diagram all your trips on Tuesday and Thursday since you get out of your home. It would help if you were precise in travel time, transport mode and time of permanence in every place you been during the day.
 - Trips Daily destinations: All destinations (leisure, work, study, sports, shopping, etc.) must be precise, considering the reason for your trip.
 - The key questions to answer in the analysis:
 - Who travels (who are you)?
 - How did you travel (transport mode)?
 - Where are you travelling?
 - Why and for what are you travelling?
- 2 Write a short text to analyse the mobility strategies and travel experience, applying all the information delivered to you related to daily mobility.

Internet Survey

Description: This survey is part of a PhD Research of a professor of the Universidad Técnica Federico Santa María. It will enable improvement in planning transportation and services related to Campus life. The information provided here shall be treated as strictly confidential according to legislation in force.

- 1 ID Number
- 2 In the list below, indicate your current university and career (major):

UNIVERSITY OPTIONS	
BELONGS TO CRUCH	Pontificia Universidad Católica de Valparaíso
	Universidad de Valparaíso
	Universidad de Playa Ancha
	Universidad Técnica Federico Santa María
	Universidad de Los Lagos (Institute)
PRIVATE	Universidad Santo Tomás
	Universidad de las Américas
	Universidad Nacional Andrés Bello
	Universidad de Viña del Mar
	Universidad Adolfo Ibáñez
	Universidad del Mar
	Universidad de Aconcagua
	Universidad Tecnológica de Chile INACAP

CAREER OPTIONS	
CAREERS	
Performing Arts (Acting)	Mechanical Engineering
Public Administration Management	Fishery Engineering
International Business Management	Musical Performing Arts Main Instrument Specialization
Hotel And Gastronomy Management	Kinesiology
Public Administration	Bachelor Of Fine Arts
Public Administration (Evening)	Bachelor In Science Specialization In Biology Or Chemistry
Multi-Language Tourism Administration	Bachelor In Sciences Specialization In Physics
Agronomy	Bachelor In Sciences Specialization In Mathematics
Chemical Analysis	Bachelor In Sciences Specialization In Chemistry
Architecture	Bachelor In Physics Specialization In Astronomy
Art	Mathematics
Management And Business Assistance	Medicine
Judicial Assistance	Meteorology
Audit	Music
Audit (Evening)	Nutrition And Dietetics
Bachelor Of Arts	Midwifery
Bachelor Of Sciences	Oceanography
Librarian	Dentistry
Marine Biology	Optics
Biology	Family Orientation, Human Relations Specialization
Bio-Chemistry	General Education Pedagogy Program
Cinema	Special Civil Engineering Program For Technical Engineers
Civil Construction	Special Program Bachelor In Education
Accounting And Auditing	Fine Arts Pedagogy
Accounting And Auditing	Pedagogy In Biology And Sciences
General Accountant	Pedagogy In Biology And Natural Sciences
Law	Pedagogy In Spanish
Project Drafting	Pedagogy In Spanish And/Or Bachelor In Language And Hispanic Literature
Graphic Design	General Education Pedagogy
Industrial Design	General Education Pedagogy Specializing In Rural Education And Development
Design	Differential Education Pedagogy
Design (Evening)	Physical Education Pedagogy
General Education	Physical Education Pedagogy- Ladies
Special Education Specialized In Specific Learning Disabilities	Physical Education Pedagogy-Men
Preschool Education	Music Education Pedagogy

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CAREER OPTIONS	
CAREERS	
Nursing	Technological Education Pedagogy
Statistics	Pedagogy In Philosophy
Speech Therapy	Pedagogy In Philosophy And/Or Bachelor In Philosophy
Geography	Pedagogy And Physics And Computer Sciences
Tourism And Culture Management	Pedagogy In Physics And Bachelor In Physics
Environmental Engineering	Pedagogy In History And Social Sciences
Civil Engineering	Pedagogy In History And Geography
Civil Engineering - Environmental	Pedagogy In History, Geography And Social Sciences And/Or Bachelor In History Specializing In Social Sciences
Civil Engineering - Biomedical	Pedagogy In English
Civil Engineering - Biochemistry	Pedagogy In English And/Or Bachelor In Language And English Literature
Civil Engineering - Electrical	Pedagogy In Mathematics And Computer Sciences
Civil Engineering - Electronics	Pedagogy In Mathematics And/Or Bachelor In Mathematics
Civil Engineering - Computer Sciences	Pedagogy In Music And/Or Bachelor In Musical Arts And Science
Civil Engineering - Industrial	Pedagogy In Chemistry And Sciences
Civil Engineering - Mathematics	Pedagogy In Chemistry And Natural Sciences
Civil Engineering - Mechanical	Pedagogy In Religion And Moral And/Or Bachelor In Religious Sciences
Civil Engineering - Metallurgy	Journalism
Civil Engineering - Extractive Metallurgy	Common Plan In Civil Engineering
Civil Engineering - Oceanic	Pedagogical Training For Technical Education Professionals
Civil Engineering - Chemistry	Social Planning
Civil Engineering - Telematics	General Education Professor, Bachelor In Education
Business Engineering	Applied Computer Sciences Programming
Business Engineering 1 Sem Evenings	Psychology
Business Engineering 2 Sem Evenings	Industrial Chemistry
Food Sciences Engineering	Chemistry and Pharmacy
Technical Electronical Engineering	Chemistry
Technical Bio-Processes Engineering	Social Services
Technical Computer Engineering	Social Economy
Technical Metallurgical Engineering	Sociology
Technical Chemical Engineering Specialized in Control	Theater
Transport Engineering	Business Administration Technician
Technical Business Engineering	Construction Technician

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CAREER OPTIONS	
CAREERS	
Technical Business Engineering for Technicians	Preschool Education Technician
Technical Engineering in Administration, Specialization in Public Admin.	Geological Mining Technician
Technical Engineering in International Trade	Mining Environmental Technical Management
Technical Engineering for Computer Technicians	Computer Technician
Technical Engineering - Risk Prevention	Mining Technician
Technical Engineering – Industrial	Risk Prevention Technician
Electrical Engineering	Mining Security Technician
Electronic Engineering	Judicial Technician
Aquaculture Engineering	Sports and Recreation Technician
Construction Engineering	Medical Technician
Product Design Engineering	Occupational Therapy
Statistical Engineering	Social Work
Computer Engineering	Spanish-German Translation and University Technician in Tourism or University Technician In International Trade
Applied Computer Engineering	English-Spanish Translation and Interpretation
Industrial Mechanical Engineering	French-Spanish Translation and University Technician in Tourism Or University Technician In International Trade
English Spanish Interpretation and Translation	

3 In which of the following campuses do you have classes. You may select more than one.

CAMPUSES OPTIONS	
BELONGS TO CRUCH	
PontificiaUniversidadCatólica deValparaíso	Main Campus
	Monseñor Gimperit Building and Ruben Castro Building
	Institute of Religious Sciences
	Isabel Brown Caces Building
	Rafael Ariztía university center
	Malaquias Morales Muñoz university center
	Music Institute
	School of Architecture and Design
	Vito Alberti university center
	School of Food Science
	Art Institute
	History Institute
	María Teresa Brown de Ariztía university center
	Republica de Suiza university center
	School of Mechanical Engineering
	School of Agronomy
	Curauma Campus
	Open City of Ritoque
	Universidad de Valparaíso
Faculty of Architecture	
Faculty of Architecture (Performing Arts)	
Faculty of Architecture (Cinema)	
Faculty of Sciences	
Faculty of Sciences (Environmental Engineering)	
Faculty of Sciences (Biomedical Engineering)	
Faculty of Sciences (Meteorology)	
Faculty of Economics and Administrative Sciences (Administration International Business)	
Faculty of Economics and Administrative Sciences (Las Heras)	
Faculty of Economics and Administrative Sciences (Administration -Hotel and Gastronomy)	
Faculty of Economics and Administrative Sciences (Administration -Business Engineering)	
Faculty of Ocean Sciences and Natural Resources	
Faculty of Law and Social Sciences	

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CAMPUSES OPTIONS	
BELONGS TO CRUCH	
Universidad de Valparaíso	Faculty of Law and Social Sciences (Social Work)
	Faculty of Pharmaceutical Sciences
	Faculty of Humanities (Music)
	Faculty of Engineering
	Faculty of Medicine (Blanco)
	Faculty of Medicine (Preschool education)
	Faculty of Medicine (Nursing)
	Faculty of Medicine (Kinesiology)
	Faculty of Medicine (Psychology)
	Faculty of Dentistry
	San Felipe Campus
	Sports center
Universidad de Playa Ancha	Campus 1
	Campus 2
	Campus 3
	San Felipe Campus
Universidad Técnica Federico Santa María	Main Campus
Universidad de Los Lagos	Valparaíso
	Quillota

CAMPUSES OPTIONS	
PRIVATE	
Universidad Santo Tomás	Branch 1
	Branch 2
Universidad de las Américas	Viña del Mar
Universidad Nacional Andrés Bello	Campus Los Castaños
	Campus Miraflores
	Campus Reñaca
Universidad de Viña del Mar	Campus UVM
	Campus Centro
	San Felipe Branch
Universidad Adolfo Ibañez	Viña del Mar Campus
Universidad del Mar	Campus Reñaca
	Campus Recreo
	Campus Quillota
	Campus ECUM

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CAMPUSES OPTIONS	
PRIVATE	
Universidad de Aconcagua	Viña del Mar Branch
	Quilpue Branch
	La Calera Branch
	Los Andes Branch
	San Felipe Branch
	La Ligua Branch
Universidad Tecnológica de Chile INACAP	Valparaiso Branch

- 4 Indicate the trips (commute) for studying and work you have made during the last month in the following days of the week. You may suppose your routine or usual activities in the city.

Day	N° of Trips per day	Origin	Trip duration	Means of Transportation	Beginning time of trip
Tuesday					
Thursday					
Saturday					

OPTIONS			
Origin - Destination	Means of Transportation	Schedule Options	Trip duration options
Add all the campuses indicated by the respondent in question 4	Car Driver	07:00 a 08:59	5 to 15 min
	Car Passenger	09:00 to 12:59	16 to 30 min
	Bus	13:00 to 14:59	31 to 45 min
Work	Bus	15:00 to 17:59	46 min to 1 hour
Home	Metro	18:00 to 19:50	1 to 1 1/2 hours
	Shared Taxi	20:00 to 22:59	1 1/2 to 2 hours
	Walk	23:00 to 06:59	over 2 hours
	Bicycle		
	Others		
	Institutional transportation		
	School Bus		

5 Do you currently have any of the following scholarships?

OPTIONS
Scholarships
PSU Score Scholarship
Academic Excellence Scholarship
Bicentennial Scholarship
Juan Gómez Millas Scholarship
Food Scholarship For Higher Education
Maintenance Scholarship For Higher Education
University Credit Solidarity Fund
Other

6 Indicate the trips (commute) on average over the last 2 weeks in the city of Valparaíso (Viña del Mar, Con con, Reñaca, Quilpué, Villa Alemana).

Nº of Trips	Origin	Destination	Trip duration	Means of Transportation	Time

OPTIONS			
Origin - Destination	Means of Transportation	Schedule options	Trip duration options
Valparaíso: Plaza Anibal Pinto sector	Car Driver	07:00 to 08:59	0 to 15 min
Valparaíso: A. Errazuriz sector	Car Passenger	09:00 to 12:59	16 to 30 min
Valparaíso: Barrio Puerto sector	(micro) Bus	13:00 to 14:59	31 to 45 min
Valparaíso: Subida Ecuador sector	Bus	15:00 to 17:59	46 min to 1 hour
Valparaíso: Subida Cumming sector	Metro	18:00 to 19:50	1 to 1 1/2 hours
Viña del Mar: Agua Santa-Von Schroeders sector	Shared Taxi	20:00 to 22:59	1 1/2 to 2 hours
Viña del Mar: A. San Martín sector	Walk	23:00 to 06:59	over 2 hours
Reñaca	Bicycle		
Quilpué	Others		
Villa Alemana	Institutional transportation		
Con Con	School Bus		
Home			
Work			
University			
Friends' house			

- 7 Indicate your last 3 addresses of residence in the academic period of your current career and the time you lived there, including your current place of residence.

Residence	Commune	Street	Number	Duration of permanence at residence
Current				
Last				
Before last				

OPTIONS

Permanence options

Under 3 months

6 months

Between 6 months and one year

Between one and two years

Over two years

- 8 Indicate the type of your current residence, with whom you share it and the rent conditions.

Type of residence	Shared with:	Rent conditions	Approximate expenses	Financing conditions

OPTIONS

Type of residence	Shared with:	Rent Conditions	Approximate Expenses	Financing Conditions
Apartment	Alone	Rented from a third party	0 - 20,000	Contribution of Parents or Guardian
Home	Parents	Owner (Parents)	20,000 - 40,000	Work
Boarding House	Extended family	Extended family	40,000 - 60,000	Boarding house scholarship
Room	Friends	University scholarship	60,000 - 80,000	Boarding house scholarship in money
	University classmates	Does not pay	80,000 - 100,000	Does not spend
	Owner of the property		100,000 - 120,000	
			120,000 - 140,000	
			140,000 - 160,000	
			160,000 - 180,000	
			180,000 - 200,000	
			over 200,000	

- 9 Do you currently have a formal job? If your answer is yes, indicate the address.
- 10 Indicate your parents' current address.

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Curriculum Vitae

Marcela Soto Caro is a Professor at the School of Architecture, Communications and Design at Universidad de Viña del Mar. She also teaches at the Department of Architecture at Universidad Técnica Federico Santa María (UTFSM). A board Director of Valparaíso Railways, Chile, she was Head of Urban Planning in the Department of Architecture at UTFSM between 2005 and 2023. As such, she was the University's designated representative within number of planning bodies both at the city hall and regional government. In particular, she worked in the Senate Committee for rebuilding the City of Valparaíso related to the Urban Fire in 2014 and within the 2016 Presidential Commission of Pro-Mobility led by Germán Correa, former Minister of Transport and Telecommunications of Chile. She was an invited expert in the Urban Planning Project Cuauhtémoc, Mexico (2016-2018), at an International Summer School Stuttgart University (2018), and at the 2nd International and Transdisciplinary Urban Design Studio, City of Buenos Aires (2018). She has entered several public planning competitions including Baron Park (2018), Temuco Urban Park (2014), Osorno Urban Park (2017) and Border Project Collaborator of the Valparaíso Metropolitan Area (2017) where she was awarded first prize. The research topics focus on studying mobility through specific groups of inhabitants with similar daily mobility characteristics. As Director of Research related to daily mobility, Marcela has published articles related on childhood mobility including "City and Children's Mobility", "The New Functions of Public Space in The Construction and Education of Civility, Associated with Anthropogenic and Natural Disasters, Focusing on Children", and "The City of Care, A New Inside at the Public Space Induced by COVID-19 Focusing on Children" among others. Marcela has attended over 30 International Urban Planning Congresses and directed over 50 theses and projects using both quantitative and qualitative community-based research methods within the areas of urban planning and urban mobility.

Daily Mobility in Metropolitan Areas

The case of higher education students and urban spatial development in the Valparaíso Metropolitan Area

Marcela Soto Caro

This study seeks to understand the interrelationship between daily mobility and the spatial structure of an emerging metropolitan urban system. It is concerned with the daily mobility of a specific group of inhabitants, higher education students, living in a contemporary metropolis and experiencing urban living. The study's main aim is to better understand aspects of this complex urban spatial structure through the students' lives and through their daily mobility to explore specific urban spatial dynamics and trends. This study therefore considers the effects of an accelerated urbanisation process and the development of an increasingly fragmented and segregated socioeconomic environment. In doing so, it highlights the ways in which rapid urban expansion in developing countries has tended to reproduce or maintain a range of inequalities. In this study, how the student population lives, works, studies, and spends its leisure time within the Valparaíso Metropolitan Area (VMA) proves to be dependent on a complex of structural factors. Such day-to-day activities are further shaped by more dynamic and perhaps more subtle influences such as the changing functions of the urban space, increasing socioeconomic fragmentation and segmentation and the inequitable provision of public transport across what is a topographically complex area. This research within this study however demonstrates that a better understanding of an individuals' daily mobility can make visible urban trends that have previously been left undisturbed by the existing traditional origin and destination surveys. The research therefore serves to highlight the social and economic flows that continue to shape the metropolitan spatial structure.

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