

Australian telework places : a socio-behavioural exploration of home-based teleworkers

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Australian telework places: A socio-behavioural exploration of home-based teleworkers

Abbas Shieh

A thesis submitted in fulfillment of the requirements for the degree of
Doctor of Philosophy



Faculty of Built Environment
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Telework is a flexible way of working in time and space, using communication technologies for teamwork relationships. It has become prevalent during recent decades in many countries including Australia. Socio-behavioural studies of positive and negative effects of telework have focused mainly on non-place-related factors. The role of place-related factors such as physical, spatial, infrastructure and environmental characteristics has been overlooked in many studies. The central research proposition explored in this thesis is the significance of these latter factors in explaining teleworkers' level of work motivation.

The research addresses this gap by analysing the effectiveness of the home as the most common place of telework in Australia and explores the factors determining teleworkers' work motivation. A conceptual framework is developed to illustrate how place-related in addition to non-place-related factors affect the work motivation of teleworkers, guided by Self-Determination Theory exploring the psychology of motivation. A quantitative methodology is used to collect quantitative data defined identified in the conceptual framework from a survey of 277 employee and self-employed home-based teleworkers across Australia.

Descriptive and inferential analyses provide an understanding of the character and status of Australian telework. Predictive analyses identify factors significantly affecting Australian teleworkers' work motivation such as age, income, life stage, dwelling type, length of residence, workload, telework arrangements, workspace size, equipment, distraction, isolation, public transport access, private vehicle use and local area characteristics. The results also confirm the central research proposition that place-related factors have critical roles in explaining teleworkers' level of work motivation. The results support a review of the position of telework at local and metropolitan levels of Australian planning policy to increase teleworkers' level of work motivation. Policy suggestions for government support include encouraging formal telework agreements, modifying homes for telework for vulnerable social groups, developing telework on the outskirts of Australian cities and in small regional cities, encouraging compact urban form, and developing collective work hubs at the local level.

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This thesis is dedicated to my parents

Esmaeil Shieh

and

Tayebeh Ebrahimi Fakhari

for their love, endless support and encouragement.

“Change life! Change Society! These ideas lose completely their meaning without producing an appropriate space. A lesson to be learned from soviet constructivists from the 1920s and 30s, and of their failure, is that new social relations demand a new space, and vice-versa”.

-Henri Lefebvre, *The Production of Space*

Abstract

Telework is a flexible way of working in time and space, using communication technologies for teamwork relationships. It has become prevalent during recent decades in many countries including Australia. Socio-behavioural studies of positive and negative effects of telework have focused mainly on non-place-related factors. The role of place-related factors such as physical, spatial, infrastructure and environmental characteristics has been overlooked in many studies. The central research proposition explored in this thesis is the significance of these latter factors in explaining teleworkers' level of work motivation.

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Descriptive and inferential analyses provide an understanding of the character and status of Australian telework. Predictive analyses identify factors significantly affecting Australian teleworkers' work motivation such as age, income, life stage, dwelling type, length of residence, workload, telework arrangements, workspace size, equipment, distraction, isolation, public transport access, private vehicle use and local area characteristics. The results also confirm the central research proposition that place-related factors have critical roles in explaining teleworkers' level of work motivation. The results support a review of the position of telework at local and metropolitan levels of Australian planning policy to increase teleworkers' level of work motivation. Policy suggestions for government support include encouraging formal telework agreements, modifying homes for telework for vulnerable social groups, developing telework on the outskirts of Australian cities and in small regional cities, encouraging compact urban form, and developing collective work hubs at the local level.

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Table of Contents

Abstract	vii
Table of Contents	ix
List of Figures.....	xi
List of Tables	xii
Glossary	xiv
Acronyms	xv
Chapter 1: Introduction.....	1
1.1 Background: Technology, urban transformation and new work practices.....	1
1.2 Research problem statement	6
1.3 Research objectives and questions.....	10
1.3.1 Objective I	10
1.3.2 Objective II.....	11
1.3.3 Objective III	12
1.3.4 Objective IV	13
1.4 Research process	13
1.5 Research conceptual framework.....	14
1.6 Research empirical approach.....	15
1.7 Research significance	15
1.8 Thesis structure	16
Chapter 2: An Overview of Telework.....	19
2.1 Introduction	19
2.2 The concept of telework.....	19
2.3 The typology of telework	21
2.4 Telework in the Australian context	23
2.4.1 Telework rates and trends.....	23
2.4.2 Job-related and socio-demographic characteristics.....	27
2.4.3 Recent experiences and practices	30
2.5 Summary	32
Chapter 3: Telework, Work Motivation and the Role of Place-Related Factors	34
3.1 Introduction	34
3.2 Socio-behavioural understanding of telework impacts	35
3.2.1 Socio-behavioural consequences of telework.....	36
3.2.2 Telework places: socio-behavioural differences.....	40
3.3 The place-related factors of effective telework.....	43
3.3.1 Preferred telework place characteristics at home level	47
3.3.2 Preferred telework place characteristics at local and urban levels	50
3.4 Developing the research conceptual framework.....	57
3.4.1 Self-Determination Theory	62
3.4.2 Application of Self-Determination Theory in work motivation studies.....	65
3.4.3 SDT framework and motivation for telework places	67
3.5 Summary	70
Chapter 4: Research Design and Methodology.....	73
4.1 Introduction.....	73
4.2 Research methodology.....	73
4.3 Research analyses	75
4.4 Survey development	78
4.4.1 Defining the questions	78
4.4.2 Structure of the survey.....	79
4.4.3 Survey approach	84
4.4.4 Pilot survey.....	86
4.5 Sample recruitment and data collection	88
4.5.1 Sample definition.....	88
4.5.2 Ethics approval.....	90
4.5.3 Conducting data collection.....	90
4.6 Data analysis techniques.....	92
4.6.1 Data analysis software.....	95
4.7 Summary	95

Chapter 5: The character of Australian home-based telework.....	97
5.1 Introduction.....	97
5.2 Characteristics of Australian home-based teleworkers	98
5.2.1 Socio-demographic characteristics	98
5.2.2 Dwelling characteristics	102
5.2.3 Job-related characteristics.....	104
5.3 Effectiveness of Australian homes as a telework place	110
5.3.1 Teleworkers' place-related preferences at micro-level	110
5.3.2 Teleworkers' place-related preferences at macro-level	113
5.4 Summary	117
Chapter 6: Overall status of home-based telework in Australia	120
6.1 Introduction.....	120
6.2 Basic status of Australian home-based telework.....	121
6.3 Place-related status of Australian home-based telework.....	130
6.4 Summary	132
Chapter 7: Australian home-based telework: factors influencing work motivation.....	135
7.1 Introduction.....	135
7.2 Key differences between employee and self-employed home-based teleworkers.....	136
7.2.1 Significant categorical variables	136
7.2.2 Significant continuous variables.....	139
7.3 Factors affecting Australian teleworkers' work motivation.....	140
7.3.1 Basic characteristics model.....	143
7.3.2 Micro characteristics model	144
7.3.3 Macro characteristics model	145
7.3.4 Composite model	146
7.4 Summary	148
Chapter 8: Discussion of research findings.....	150
8.1 Introduction.....	150
8.2 Discussion of significant basic factors.....	150
8.3 Discussion of significant place-related factors.....	160
8.4 Discussion of important non-significant factors	169
8.5 Summary	170
Chapter 9: Conclusion	174
9.1 Introduction.....	174
9.2 Summary of research main developments and achievements.....	175
9.2.1 Objective I	175
9.2.2 Objective II.....	176
9.2.3 Objective III	177
9.2.4 Objective IV	177
9.3 Theoretical contributions.....	178
9.3.1 Research theoretical developments.....	178
9.3.2 Research findings and discussions	179
9.4 Policy implications.....	180
9.4.1 Policy suggestions for Australian federal and state governments.....	180
9.4.2 Policy suggestions for Australian urban and regional planning.....	182
9.5 Research limitations	187
9.6 Recommendations for further research	189
9.7 Concluding remarks	192
References	193
Appendix 1—Survey filtering Questions.....	215
Appendix 2—Survey questionnaire (employee teleworkers version)	216
Appendix 3—Survey questionnaire (self-employed teleworkers version)	223
Appendix 4— Overall degree of satisfaction with place-related characteristics.....	230
Appendix 5— Summary of results on work motivation variable.....	237

List of Figures

Figure 1.1 Research process.....	14
Figure 1.2 Structure of the thesis	16
Figure 2.1 Frequency of telework per week	25
Figure 2.2 Main reason worked at home during normal business hours	26
Figure 2.3 Reason preventing teleworking more	26
Figure 2.4 Number of home-based workers in Australia by occupation	28
Figure 3.1 Theoretical framework of office productivity	46
Figure 3.2 The continuum of Self-Determination Theory	63
Figure 3.3 SDT model of work motivation.....	67
Figure 3.4 Research conceptual framework.....	69
Figure 3.5 Development of the research conceptual framework	71
Figure 4.1 The research empirical model.....	75
Figure 4.2 Process of filtering appropriate respondents.....	82
Figure 4.3 The process of empirical research design and outcomes.....	96
Figure 5.1 Age of teleworkers by subgroup	99
Figure 5.2 Education of teleworkers by subgroup	100
Figure 5.3 Income of teleworkers in the research sample.....	101
Figure 5.4 Location of teleworkers by Australian state and territories.....	102
Figure 5.5 Location of teleworkers by major regions in the research sample	103
Figure 5.6 Occupation of teleworkers by subgroup	105
Figure 5.7 Time allocated to telework by teleworkers in the research sample.....	106
Figure 5.8 Employers' geographical location by major regions for employee teleworker subgroup in the research sample	108
Figure 5.9 Clients' geographical location by Australian region	109
Figure 5.10 Travel by type of transport to reach the geographical location of employers and clients	114

List of Tables

Table 1.1 Urban form in the Information Age	3
Table 2.1 Typology of telework based on various references	23
Table 2.2 Home-based workers in Australia by occupation	28
Table 3.1 Advantages and challenges of different telework places	41
Table 3.2 Theoretical framework of office productivity.....	46
Table 3.3 Teleworkers' spatial preferences at home level	49
Table 3.4 Teleworkers' ambience related preferences at home level	49
Table 3.5 Teleworkers' equipment related preferences at home level.....	49
Table 3.6 The main elements of telework adoption models	59
Table 3.7 The main elements of telework theoretical frameworks.....	60
Table 4.1 The relationships between research questions and empirical analyses.....	77
Table 4.2 Drawbacks of online surveys	85
Table 4.3 Data collection strategies and number of completed surveys.....	91
Table 4.4 The application of statistical tests and techniques in the research.....	95
Table 5.1 Summary of socio-demographic characteristics of teleworkers	101
Table 5.2 Summary of dwelling characteristics in the research sample	104
Table 5.3 Job-related characteristics of teleworkers in the research sample	107
Table 5.4 Employers' geographical location in the research sample.....	109
Table 5.5 Micro-level place-related characteristics in the research sample.....	111
Table 5.6 Satisfaction with micro-level place-related characteristics.....	113
Table 5.7 Central tendency scores of satisfaction with place-related characteristics at micro-level	113
Table 5.8 Travel by types of transport to reach the geographical location of employers and clients	115
Table 5.9 Easiness of using various modes of transport for reaching the geographical location of employers and clients.....	116
Table 5.10 Central tendency scores of easiness of using various modes of transport for reaching the geographical location of employers and clients	116
Table 5.11 Satisfaction with the local area	117
Table 5.12 Central tendency scores of satisfaction with the local area	117
Table 5.11 Summary of findings on socio-demographic character of Australian teleworkers	118
Table 5.12 Summary of findings on dwelling character of Australian teleworkers	118
Table 5.13 Summary of findings on job-related character of Australian teleworkers ..	118
Table 5.14 Summary of findings on telework place related character of Australian teleworkers	119
Table 6.1 Comparing the research sample of home-based teleworkers and Australian workforce population in terms of basic characteristics.....	125
Table 6.2 Comparing the research sample and the Australian workforce population in terms of geographical locations of residence and employer	127

Table 6.3 Comparing the research sample and the Australian population in terms of dwelling characteristics	128
Table 6.4 Comparing the research sample and the Trans-Tasman telework survey in terms of job-related characteristics	130
Table 6.5 Comparing the research sample and Trans-Tasman telework survey in terms of social isolation	131
Table 6.6 Comparing the research sample and the Australian workforce population in terms of the methods of transport to get to employer	132
Table 6.7 Main findings on Australian home-based telework at national level.....	134
Table 7.1 Categorical variables that significantly distinguish between the two home-based teleworker groups.....	138
Table 7.2 Continuous variables that significantly distinguish between the home-based teleworkers sub-groups	140
Table 7.3 Relationship between the categorical and dummy variables	142
Table 7.4 Basic characteristics model results	143
Table 7.5 Micro characteristics model results.....	144
Table 7.6 Macro characteristics model results.....	145
Table 7.7 Composite model results.....	147
Table 7.8 Significant variables in different research empirical analyses.....	148
Table 8.1 Comparing the length of residence and telework experience	159
Table 8.2 Summary of research discussions on the basic variables significantly affecting Australian teleworkers' work motivation.....	171
Table 8.3 Summary of research discussions on the place-related variables significantly affecting Australian teleworkers' work motivation	171
Table 8.4 Possible mediating associations with Australian home-based teleworkers' level of work motivation	172

Glossary

The research defines and uses the following terms to conceptualise and classify the characteristics of teleworkers.

Basic characteristics: The term basic characteristics refers to characteristics which are not related to the place of telework. They are mostly pre-determined, pre-existing and/or independent from people's decision to adopt telework. Basic characteristics include the socio-demographic, dwelling and job-related characteristics of teleworkers. Socio-demographic characteristics are a set of basic demographic and social factors such as teleworkers' age, gender, education and income. Job-related characteristics are the features related to teleworkers' overall experience of telework as well as the features of teleworkers' working conditions governing the telework job related to the employer such as the existence of a telework contract, telework workload and length of experience of teleworking.

Micro place-related characteristics: The micro place-related characteristics of telework and teleworkers include indoor environmental qualities, micro infrastructure facilities and physical components, and micro spatial characteristics of teleworkers' workplaces. Indoor environmental qualities are the features reflecting the environmental conditions inside the telework place such as the level of temperature, noise and light. Micro infrastructure facilities and physical components are the necessary working utilities for teleworkers such as internet accessibility, technology and office equipment. Micro spatial characteristics are the features indicating the spatial order, arrangement, layout and setting of the interior of the telework place such as the location of the workspace within the building, workspace size and workspace enclosure.

Macro place-related characteristics: Macro place-related characteristics of teleworkers are the spatial and infrastructure features associated with the working conditions of teleworkers on a scale beyond the building, and related to local and regional levels such as transport and accessibility to services.

Acronyms

ABS: Australian Bureau of Statistics

ACT: Australian Capital Territory

AE: Access Economics

AG: Australian Government

APSC: Australian Public Service Commission

ATAC: Australian Telework Advisory Committee

ATO: Australian Tax Office

CMHC: Canadian Mortgage and Housing Corporation

CBD: Central Business District

CCBR: Central Coast Business Review

CL: Core Logic

DB: Dynamic Business

DBCDE: Department of Broadband, Communications and the Digital Economy

DHS: Department of Human Services

DJSB: Department of Jobs and Small Business

DIRD: Department of Infrastructure, Regional Development

ETUC: European Trade Union Confederation

GCCC: Gold Coast City Council

GDP: Gross domestic product

GULC: Georgetown University Law Centre

GWA: Global Workplace Analytics

ICT: Information and Communication Technology

IEQs: Indoor Environmental Qualities

JCC: Joondalup City Council

MNF: My Net Fone

MOS: Metal Oxide Silicon

MYOB: Mind Your Own Business

NSWG: New South Wales Government

OS: Omny Studio

RAI: Regional Australia Institute

RCN: Raising Children Network

RDA: Regional Development Australia

RICS: Royal Institution of Chartered Surveyors

RMS: Roads and Maritime Services

RTA: Roads & Traffic Authority

SD: Standard Deviation

SDT: Self-Determination Theory

SPSS: Statistical Package for the Social Sciences

TCC: Telework Central Coast

USDC: United States Department of Commerce

WW: World at Work

Chapter 1: Introduction

1.1 Background: Technology, urban transformation and new work practices

Urban form has undergone tremendous changes throughout history (Morris & Morris, 1994), with these changes appearing in many guises in different historical ages and in different geographical contexts. The reasons for these changes have generated discussion and encouraged researchers to study the topic from different points of view (e.g. Benevolo & Culverwell, 1980; Lynch, 1981; Mumford, 1961; Ostrowski, 1970; M. Weber, 1966).

Some theorists mention technological advancement as one of the key reasons for urban transformation (Galantay, 1975; Lynch, 1981; Toffler, 1980). The history of technological evolution can be classified in different ages. Toffler (1980) identified three ages: the agricultural age, the industrial age, and the information age. Some recent theorists have identified the emergence of a more recent historical age: the virtual age which is “the ultimate progress of information technology and knowledge based environments into a three-dimensional virtual world” (Jalali & Mahmoodi, 2009, p. 1). Human civilisation is currently experiencing a “post-industrial age” introducing new concepts for cities such as the digital city (Mitchell, 1996, 2000, 2003), the network city (Castells, 1996, 2011), and the smart city (Townsend, 2013), the intelligent city (Batty, 1990a), the invisible city (Batty, 1990b), the informational city (Castells, 1989), telecity (Fathy, 1991), and uCity (Nedovic-Budic & Williams, 2013).

In the last two centuries since the industrial revolution, the impact of technology on urban transformation has been considered both positive and negative by many utopian movements and ideologists. In the 19th century, the application of technology was criticised by Culturalists (Choay, 1965), while others, including “Pre-urbanists” (Choay, 1965) and “Technicians” (Ostrowski, 1970) saw technology as a solution to many urban problems. Later, in the first half of the 20th century, “Futurists” and “Modernists” attempted to apply technology practically in cities (Choay, 1965; Ostrowski, 1970). In the middle of the 20th century the creative ideas of the American architect, Frank Lloyd Wright, through the concept of a “Broadacre City”, suggested an urban pattern

accompanying applications of new commuting and communication technologies such as the automobile, television and the telephone (Ostrowski, 1970). A wave of objections to the negative and destructive impacts of technology on aspects of the urban environment were raised from the 1960s. Subsequently, and in association with critiques of other political, economic and social trends, these objections led to the formation of pro-environmental movements throughout the world (Kingsley, 2012). In the 1970s, the information revolution resulted from organizational application of mainframe computers (Duque, Collins, Abbate, Azambuja, & Snaprud, 2007; Toffler, 1980), led to the advent of information age in the late 20th century. The fundamental dimensions of the theory of information revolution explaining and formulating the emergence of information age, has been pointed out and described by many theorists. Particularly, the information as a new factor of production that along with other factors (i.e. capital, labour, and land) can affect job and income distribution, automation and productivity has been discussed by many theorists (e.g. Veneris, 1984, 1990). In addition, the term “information revolution” has been metaphorically used to highlight the historical evolutions in communication media. For example, Fang (1997) categorises these evolutions as writing, printing, mass media, entertainment, the tool shed (or home), and the information highway (Fang, 1997). The information revolution was accelerated by the development of semiconductor technologies such as the MOS transistors and integrated circuit (Lukasiak & Jakubowski, 2010), leading to the appearance of small digital and computing devices in the homes, workplaces, and public places. In the middle of the 1980s, the invention of personal computers and new telecommunication technologies such as mobile phones and the emergence of local and global networks such as the internet provided a background for development of information and communication technologies services and applications. Indeed, the combination of the two areas of information processing and telecommunication technology has led to the creation of a new type of technology: information and communication technology (ICT).

Many theories have discussed the influence of ICT on urban transformation. Audirac (2002) classified these theories around two intellectual schools: the Deconcentration School and the Restructuring School. These schools differ in theorising mechanisms of the change and in the scale they see urban form. The Deconcentration School believes that the change in spatial structure of cities under ICT is a direct result of technological innovation in transport and communications. This school focuses on new challenges to

the geography of accessibility (Audirac, 2002). The Restructuring School, instead, emphasises the role of socio-technical change in transforming the organization of production, institutions, and everyday life (Audirac, 2002). Despite the different theoretical foundations, both schools are similar in focusing on urban decentralisation and centralisation (Table 1.1).

Cities under the influence of ICT change in many aspects. The main aspects which theorists have argued will affect urban spatial structure are the location of industry, services, housing, traffic and new working practices. There are some debates between thinkers about why the application of ICT in socio-economic and administrative procedures will change spatial distribution of businesses (Castells, 1996, 2011; Mitchell, 1996, 2000, 2003; Toffler, 1980). However, the most challenging discussions have tried to explain and formulate the transformative impacts of ICT on cities. These discussions mostly mention the significant role of ICT in changing the spatio-temporal nature of the working life.

Table 1.1 Urban form in the Information Age (source: Audirac, 2002)

	Deconcentration School	Restructuring School
City and region conceptualised	• Post-industrial city (Berry & Kim, 1993; Hall, 1997) • E-topia: smart city (Mitchell, 2000) • Aerotropolis (Kasarda, 2000)	• Post-Fordist City (Occelli, 2000) • Informational city (Castells, 1989) • Global city (Sassen, 2000) • Network city (Clark & Kuijpers-Linde, 1994)
Scale	• Metropolitan and intrametropolitan	• Metropolitan, regional, global
Urban/digital space	• Geography of accessibility and opportunity (Janelle & Hodge, 2013) • Hybrid space (combination of physical and virtual space) • Internet-backbone space (Moss & Townsend, 2000)	• Multimodal and digital connectivity (Hepworth & Ducatel, 1992) • Space of flows versus space of places (Castells, 1996) • Synergistic relations between urban place and electronic spaces (Graham & Marvin, 2000)
Research traditions	• Spatial interaction models (aggregate data, urban scale) • Probability choice models (individual behaviour)	• Case studies • Comparative studies of cities using aggregate data
Social equity issues	• Digital divide • Spatial mismatch • Spatial segregation	• Dual city: social polarisation • Casualisation of labour; flex-timers • Socioeconomic stratification • Uneven development • Physical and electronic ghettos
Political economy	• “Perverse” public subsidies	• Regime of regulation (Lauria, 1997; (Occelli, 2000) • Entrepreneurial city, growth machines
Planning challenges	Congested cities: fragmentation of activity in hybrid space and information technology (IT) synergies with automobile society result in travel demand that overwhelms transport infrastructure.	Interjurisdictional bidding wars for global capital. Congested cities: IT synergies with automobile society and just-in-time production result in travel demand that overwhelms transport infrastructure. Dominance of space of flows over space of places
Information-age landscapes	Sprawling polycentric: (1) High in mobility, low in accessibility, spatially mismatched; (2) connected/disconnected from internet backbone (network of a few metropolitan cities).	(1) Polycentric and intensely extra-networked by land, air, water, and digital means to global and regional urban systems; (2) deeply digitally and multi modally intra-networked, albeit all the more socioeconomically segregated, physically overextended, and stuck in traffic

Based on a work-orientated discourse, it can be concluded that some other new trends will also contribute to the evolution of the nature of working. Consequently, geography and spatial aspects of work will change rapidly. In his 2014 book, *The Future of Work*, Jacob Morgan describes and explains five trends as affecting future working life: new behaviours, technology, the millennial workforce, mobility and globalisation. Morgan explains that people's social behaviour in cyberspace has changed dramatically in recent years, so that people share more information relevant to their personal life and work virtually. Accordingly, people are increasingly willing to collaborate more. The trend is not limited to a particular generation, and covers all population groups located in different geographical areas around the world. New social behaviours are entering work organisations through employees, which give a priority to the use of social platforms. This fundamentally influences employees' expectations of work organisations more than at any time.

On the other hand, some innovative technological developments will have a profound impact on new work practices. The tendency to use cloud and collaboration platforms are important influences and, at a different level, developments such as the internet of things and big data, automation and artificial intelligence are also important. This will put the technology under the authority and control of employees and allow organisations to integrate people and information without dealing with specific time and place restrictions. Therefore, the decision-making process should be more effective (J. Morgan, 2014).

The millennial generation, defined as people born between 1981 and 1996, will be dominant in the workforce in the next decade. The generation brings new trends, behaviours, expectations and values, which are different from past conventional working habits. They are less dependent on a specific work location, and have more willingness to communicate and interact. They are always connected to a mobile device and use social and collaborative technologies extensively. From a business resilience perspective, it would be crucial for organisations to consider and understand the millennials' shift towards application of new telecommunication technologies. Indeed, the older workforce generations who are mostly dependent on traditional working facilities to work with data and information are retiring. This can subsequently result in losing information, knowledge and experience accumulated during the time in the organisations. Therefore

companies and organisations must be prepared for the millennial generation's attitudes to various aspects of work and life (J. Morgan, 2014).

Mobility is another important influence on working life. With the help of modern telecommunication technologies, employees are more accessible to working organisations, so they are able to carry out job tasks from different locations, in different times and via different devices. Today, many people in the world have mobile phones and a large percentage use smart phones, which has created very high communication capabilities among employees. Leading companies are using these capabilities and many small companies are able to create virtual teams based on technologies. As a result, employees can interact more and are able to carry out their job duties independent of their physical location and outside a traditional office-style workplace (J. Morgan, 2014).

Finally, globalisation is one of the most important factors leading to the evolution of the nature of working. It underlies the expansion of communications infrastructure. In the process of globalisation, different businesses can be formed around the world without facing cultural, transport and exchange restrictions. The ability of organisations to function in different locations is a major factor changing how individuals carry out a task. Work teams can be formed based on talent acquisition, regardless of location. Technology will play a key role in this process (J. Morgan, 2014).

To sum up, under the influence of the information revolution and the accelerated emergence of modern communication technologies, various aspects of urban life are being strongly influenced by new social trends. Working life is one of the most important aspects. Urban life is facing new possibilities in this area due to the impact of technology. After the industrial revolution, technology has always provided the possibility of socio-economic changes in cities concurrent with the extensive spatial evolution. This has created dilemmas for people's urban life. The separation between the locus of work and home is one of the most important spatial changes which occurred after the industrial revolution. The expansion of urban space gradually led to further imbalance between life and work, which has continued. Since the industrial revolution, employees have often been forced to spend part of their daily time away from home or commuting between work and home. The development of modern communication technologies and new working practices is expected to create a new balance between work and life, particularly

in cities. This argument lacks an evidence base and needs further investigation. The thesis research addresses this evidence gap.

1.2 Research problem statement

Recent technological developments have been conducive to flexible work conditions. As a new phenomenon, telework is one of the most influential flexible work arrangements. A wide range of definitions have been proposed for the telework phenomenon in the literature (e.g. ATAC, 2006; N. Dixon, 2003; ETUC, 2002; GULC, 2009; Meyers & Hearn, 2000; Scholefield & Peel, 2009), which may also be referred to as telecommuting, remote working, e-working and distant working. Telework can be defined as a type of work arrangement that enables the individual to use telecommunication technologies to work from a place other than a central place of work, such as a home or collective work hub, maintaining contact and work delivery with employers and clients at a distance. It has emerged and gradually become prevalent during recent decades in many countries including Australia.

According to the Australia Telework Advisory Committee (2006), about one third of Australian organisations allow their employees to adopt teleworking arrangements. In 2009, around 18% of all Australian employees undertook some work from home (DBCDE, 2011). In 2013, two thirds of small and medium-sized businesses in Australia had some employees that use telework solutions (MYOB, 2013). The latest Australian Bureau of Statistics data (ABS, 2018a) indicates that of the 11.6 million Australian workforce, about 3.5 million people do some sort of telework, with about 2.06 million people as employees and about 1.44 million people as managers or business owners. Based on this data, telework has grown steadily in Australia and has increased from about 8% of the workforce in 2001 to 30% in 2017 (MNF, 2018). Estimations show that, if 10% of Australian employees spend about 50% of their time doing telework, the annual profit may amount to \$1.4–1.9 billion (AE, 2010; DBCDE, 2011).

The many advantages of telework (see AE, 2010; Baruch, 2000; M. A. Tremblay, Blanchard, Taylor, Pelletier, & Villeneuve, 2009; Wheatley, 2012; White, Titheridge, & Moffat, 2011; Wilmot, Boyle, Rickwood, & Sharpe, 2014) may encourage employees to adopt it as their preferred method of employment and may entice private organisations

and governments to consider serious investments in its development. For employees, telework can involve advantages such as reduced commuting cost, improved work and life balance, increased job satisfaction, and improved health; while for employers, the advantages may include reduced absenteeism, increased productivity, and reduced office space and utilities costs. Telework also can deliver advantages for society, such as increased labour force participation, reduced congestion and avoided environmental impacts (Wilmot et al., 2014).

The Australian federal government plans to nearly double the number of telework arrangements by 2020, so that 12% of Australian employees will have telework contracts with their employers (see DBCDE, 2011). It is anticipated that, by 2020-2021, engaging in telework, facilitated through modern, fast and broadband infrastructure, will increase annual GDP by \$3.2 billion and create 25,000 new full-time job opportunities (DBCDE, 2013a; DIRD, 2014). By the mid-21st century, one out of every four Australian workers is expected to have a telework contract with their employer, which equates to 5 million Australian employees performing part of their jobs from home (Ruthven, 2012).

Telework is changing the temporal and spatial nature of work by expanding the traditional boundaries between home and work locations. According to the literature, this way of working could change the form of cities at different levels. At the metropolitan level, telework may be considered as a substitute for commuting trips and therefore can contribute to decreasing traffic congestion (Audirac, 2002). Teleworkers have more freedom in finding more desirable places to reside and may choose to live in outer suburban areas to have access to better quality of life (Mokhtarian, 1998; Niles, 1994; Salomon, 1986). Some studies also argue that telework may produce a multinucleated urban form and lead to a general decentralisation and even urban sprawl (Maeng & Nedović-Budić, 2008; Tayyaran & Khan, 2003). At the local level, the evolution of urban form under teleworking may lead to less need for main office spaces (Audirac, 2002) which are generally located in city and town centres.

The evolution of urban form under teleworking also has come with the emergence of different telework places located close to and within residential areas (ATAC, 2006; DBCDE, 2011; GULC, 2009; Kurland & Bailey, 2000). A range of telework places is possible including home-based, mobile spaces or collective workplaces such as satellite offices, telework centre, coworking spaces, smart work centres and others. These

different telework places differ in terms of the time, place and location of work, and the application of telecommunication technologies to perform work tasks.

Although various spatial forms of telework have been discussed in the literature, there is often little knowledge about the impact of place-related factors such as physical, spatial, infrastructure and environmental characteristics on teleworkers' life and work experience. Since the advent of telework, an extensive range of studies has been conducted on the optimisation of telework in different fields such as business, management, transport and family studies (see Bailey & Kurland, 2002; Baruch, 2001; McCloskey & Igbaria, 1998; Shin, El Sawy, Sheng, & Higa, 2000). Although many studies about telework have considered the socio-behavioural consequences of teleworking (see Gajendran & Harrison, 2007; Golden, Veiga, & Simsek, 2006; Van Dyne, Kossek, & Lobel, 2007) and a range of problems have been recognised and investigated by researchers, little effort has been made in the literature to research the place-related aspects of telework. Conversely, the few studies conducted to specifically address place-related factors have been less interested in the impacts of these factors on teleworkers' socio-behavioural outcomes. In general, the literature on telework during the last four decades has overlooked the need to theoretically and empirically address, discuss and explain the relationship between the place-related dimensions and the socio-behavioural consequences of telework.

The present research proposes that the socio-behavioural differences between teleworkers can indeed be explained by the place-related aspects of telework to a great extent. To test this proposition, the research formulates the relationship between place-related and socio-behavioural aspects of telework by focusing on work motivation as one of the most fundamental concepts in organisational psychology and work-related studies (see Kanfer, Chen, & Pritchard, 2012; Latham, 2012). The work motivation concept is defined in the literature as "a set of energetic forces that originate both within as well as beyond an individual's being, to initiate work-related behaviour, and to determine its form, direction, intensity, and duration" (Pinder, 2014, p. 11). An extensive part of the telework literature has explicitly mentioned the impacts of telework on motivational qualities of work and job satisfaction (Feldman & Gainey, 1997), autonomy (Gajendran & Harrison, 2007) and flexibility (Hill, Miller, Weiner, & Colihan, 1998). While some research supports the idea that telework can increase autonomy, flexibility and perceptions of work-life balance and job satisfaction for employees (Sparrow, 2000), other studies show that reductions in

face-to-face interaction of teleworkers with their in-office colleagues result in the feeling of social isolation and accordingly less motivation to work (Feldman & Gainey, 1997). In general, it seems there is a paradoxical situation as teleworkers indicate a high degree of work motivation through teleworking and simultaneously a lack of social interaction as in traditional workplaces (Chevron & Primeau, 1996; Cooper & Kurland, 2002; Gajendran & Harrison, 2007; Golden, Veiga, & Dino, 2008; Morganson, Major, Oborn, Verive, & Heelan, 2010; Siha & Monroe, 2006). A number of explanations for these mixed results have been suggested in the telework literature (Bailey & Kurland, 2002; Shin et al., 2000). An important explanation which has been less discussed is that the concept of telework is treated broadly but in practice it happens in diverse ways with respect to the place-related aspects of telework.

The purpose of the present study is to address the gap in the research by investigating the motivation of teleworkers working in different place-related conditions. The research investigates the impact of place-related factors on work motivation of Australian teleworkers. Through this investigation, the research aims to build a bridge between work motivation and the place-related preferences of Australian teleworkers. The research target population is employees and self-employed workers who have regular experience of home-based telework. In this study, home-based teleworkers are defined as people who use telecommunication technologies to work from their home maintaining contact and work delivery with employers or clients at a distance. The research focuses on home-based teleworkers because a large population of Australians regularly work from home (Toscano, 2016). The research proposes that place-related preferences of Australian home-based teleworkers are determined by the extent to which they are associated with more intrinsic motivation in the telework place. The place-related factors are assumed to incorporate a diverse set of characteristics. These characteristics may be divided into two categories: micro place-related characteristics of teleworkers pertain to “interior” physical, spatial, environmental and infrastructure features of the home, and macro place-related characteristics of teleworkers pertain to “exterior” infrastructure and spatial features associated with the local and metropolitan levels.

In order to assess the degree of work motivation of teleworkers, the research is guided by a general psychological theory of motivation, Self-Determination Theory (Deci & Ryan, 1985; Deci & Ryan, 2008; Ryan & Deci, 2000). Self-Determination Theory is “a macro-

theory of human motivation, emotion, and development that takes interest in factors that either facilitate or forestall the assimilative and growth-oriented processes in people” (Niemic & Ryan, 2009a, p. 134). Self-Determination Theory focuses on the degree of self-motivation or self-determination of human behaviour (Deci & Ryan, 2002). The application of Self-Determination Theory has been discussed by many studies as one of the most appropriate psychological motivation theories for organisational researchers in understanding different organisational and work related phenomena (Deci, Connell, & Ryan, 1989; Gagné & Deci, 2005; Sheldon, Turban, Brown, Barrick, & Judge, 2003; M. A. Tremblay et al., 2009). Furthermore, many studies have attempted to develop theoretical and conceptual frameworks to assess and explain the relationships between motivational qualities in work organisations (P. P. Baard, Deci, & Ryan, 2004; Deci et al., 2001; Gagné & Deci, 2005; Gagné et al., 2010; Gagné et al., 2015; M. A. Tremblay et al., 2009).

1.3 Research objectives and questions

This research aims to explore the implications of the emergence of telework places on the future shape of Australian cities. To do so, the research socio-behaviourally studies Australian home-based teleworkers to help provide a background for developing and deepening the discussions for a policy and planning framework in Australia. The first step for achieving this aim is defining practical objectives. Four research objectives are presented, followed by the main research questions.

1.3.1 Objective I: Develop a conceptual framework to adequately understand the relationship between the place-related aspects of telework and socio-behavioural outcomes

The research needs to develop a framework to conceptualise the central proposition of the research that place-related factors determine telework socio-behavioural outcomes. This is critical as the majority of socio-behavioural studies on telework have only focused on non-place related factors. The framework can organise the research presumptions, and the important hypotheses and findings in the literature to address the purpose of the research. It can illustrate the probable relationships between the research main concepts

including place-related factors, work motivation and possible socio-behavioural outcomes. The conceptual framework can help guide the study in the empirical phase through designing and shaping the research methodology. If the central proposition of the research is confirmed through research empirical analyses, the conceptual framework can be applied in future research on telework.

1.3.2 Objective II: Understand the nature and scale of the telework phenomena in Australia

Understanding the current situation of Australian telework is a first step towards further analysis and interpretation. This leads to defining the first research question as follows:

Research question 1: what is the status of Australian home-based telework?

Research question 1 allows an investigation of a range of basic and place-related factors that shape the character of Australian home-based telework. The research explores the socio-demographic, dwelling and job-related characteristics of Australian employee and self-employed home-based teleworkers and investigates to what extent these characteristics are similar to the characteristics of the Australian workforce population at the national level. The research also explores the place-related characteristics of Australian home-based teleworkers and the effectiveness of the Australian home for telework at the national level. The investigation is the base for defining the second research question:

Research question 2: what are the key differences between the main groups of Australian home-based teleworkers in terms of basic and place-related characteristics?

Teleworkers could be employees who are wage and salary earners (Alizadeh, 2012b) working for government organisations or private companies, or could be self-employed (Moos & Skaburskis, 2007; Rowe & Bentley, 1992) such as freelancers, business owners, independent contractors, consultants and entrepreneurs. Considering the different place-related dynamics of home-based telework for employees and self-employed people (e.g. Gurstein, 1996, 2002; Kawai & Shiozaki, 2004; Mahmood, 2007), research question 2 helps explore the current choices of the two main groups of Australian home-based teleworkers.

1.3.3 Objective III: Identify the primary factors affecting Australian teleworkers' work motivation

An effective and accurate Australian planning policy for telework depends on identifying the factors which can be improved to encourage telework and ensure work motivation. Pursuing this purpose, the research needs to respond to the third question:

Research question 3: what factors significantly determine Australian home-based teleworkers' level of work motivation?

Research question 3 helps explore the basic and place-related factors that determine Australian home-based teleworkers' level of work motivation. Through this exploration, some secondary empirical questions include:

- What basic characteristics including socio-demographic, dwelling and job-related characteristics of teleworkers significantly affect teleworkers' motivation?
- What micro place-related characteristics of teleworkers including the physical, spatial, infrastructure and environmental characteristics inside the home significantly affect teleworkers' motivation?
- What macro place-related characteristics of teleworkers including the spatial and infrastructure characteristics outside the home significantly affect teleworkers' motivation?

These secondary questions can help understand to what extent teleworkers' level of work motivation can be determined by any of the basic or place-related factors.

1.3.4 Objective IV: Contribute to planning policy implications of telework in Australia

A review of the position of telework in Australian planning policy highlights a considerable gap. Australian planning policy on telework is limited and narrow. Although the Australian federal government has supported telework and acknowledged its advantages (APSC, 2013), such as work-life balance, for the Australian workforce, there is little planning policy in response to the critical issues of telework. Current policies are limited to recommendations on organisational management, and have not much considered the place-related aspects of telework (see DBCDE, 2013b). There is a lack of policy to overcome the challenges that may come with telework, probably because little research has been conducted to support planning policy for telework, particularly on the place-related aspects of telework. The few Australian policy studies that have focused on place-related aspects of telework reveal gaps and inconsistencies in metropolitan planning and fail to address future Australian policy directions. There is little understanding of the place-related dynamism of Australian telework. Achieving the first three research objectives can lay the foundation for further understanding of the place-related dynamism of Australian telework which in turn supports further discussions and policy suggestions.

1.4 Research process

Figure 1.1 shows the research process of this study including the five main phases. Each phase includes several steps. The first phase reviews the current literature and identifies the gaps, calibrates the research questions and provides a conceptual framework for the empirical research. The second phase is a pre-survey phase which includes designing the empirical model and analyses, designing the survey, and implementing a pilot test and calibrating the survey. The third phase includes preparing a sampling plan, data collection and database preparation. The fourth phase includes data analyses and the synthesis of results and aims to respond to the research questions. The final step is a critical review of findings and conclusion.

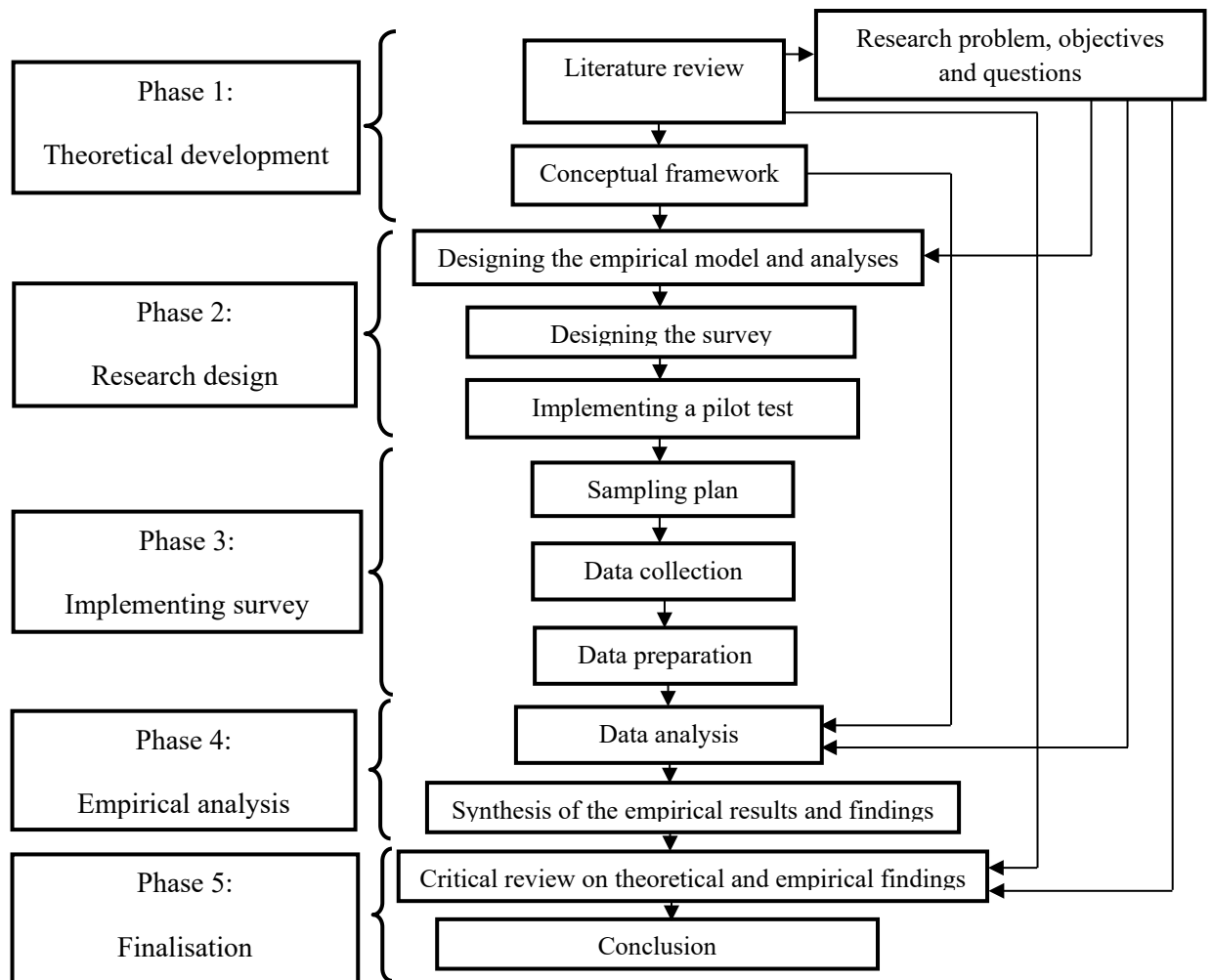


Figure 1.1 Research process

1.5 Research conceptual framework

A research conceptual framework was developed for the research by analysing and comparing the typology of developed frameworks and models of telework. Place-related factors were considered and expanded along with other features, introduced by previous models as basic factors, in the research conceptual framework. The conceptual framework used work motivation as a pivot in the explanatory and predictive structure due to the importance of this variable in studies on organisational psychology and work psychology. The conceptual framework was guided by Self-Determination Theory. A quantitative research methodology was selected for the research, mainly because of the importance of this methodology in Self-Determination Theory studies.

1.6 Research empirical approach

A research empirical model was developed which formulates the relationships between basic and place-related factors of telework and work motivation as the central construct of the research. Based on the research empirical model, seven empirical analyses of research were designed to answer the main research questions. An online survey with seven parts including 37 questions was developed and used as the research empirical instrument. Using different social and organisational networking strategies, a sample of 277 surveys was collected for empirical research. A range of statistical techniques including frequency analysis, one-sample t-test, chi-square test for goodness of fit, independent samples t-test, chi-square test for independence, multiple regression analysis and bootstrapping were used for empirical analyses. All the empirical analyses were performed using IBM SPSS software (version 25) and Microsoft Office Excel 365 ProPlus.

1.7 Research significance

Both theoretical and practical contributions are made. The study contributes to the theory of telework by exploring the role of place-related factors at different scales on the work experience of teleworkers. Place-related factors have been overlooked in most telework socio-behavioural studies, and it is of great importance to understand to what extent these factors determine the socio-behavioural outcomes of telework. The new understanding can help future socio-behavioural studies on telework to empirically incorporate the role of place-related factors. The study presents a conceptual framework for empirically investigating the place-related factors of telework by focusing on teleworkers' motivation. If the role of place-related factors is confirmed through research empirical analyses, the conceptual framework can be applied in future research on telework. As there are only a few studies on work motivation of teleworkers, the research empirical results and findings could be important for current knowledge on telework specially as there is little Self-Determination Theory research on telework. From a practical perspective, the synthesis of the research theoretical and empirical findings leads to an understanding of the place-related dynamism of Australian telework. This can help the research to contribute to Australian planning policy. The research theoretical and practical

achievements can also provide background for deepening planning discussions on telework at the international level.

1.8 Thesis structure

The thesis includes nine chapters in three main parts as illustrated in Figure 1.2.

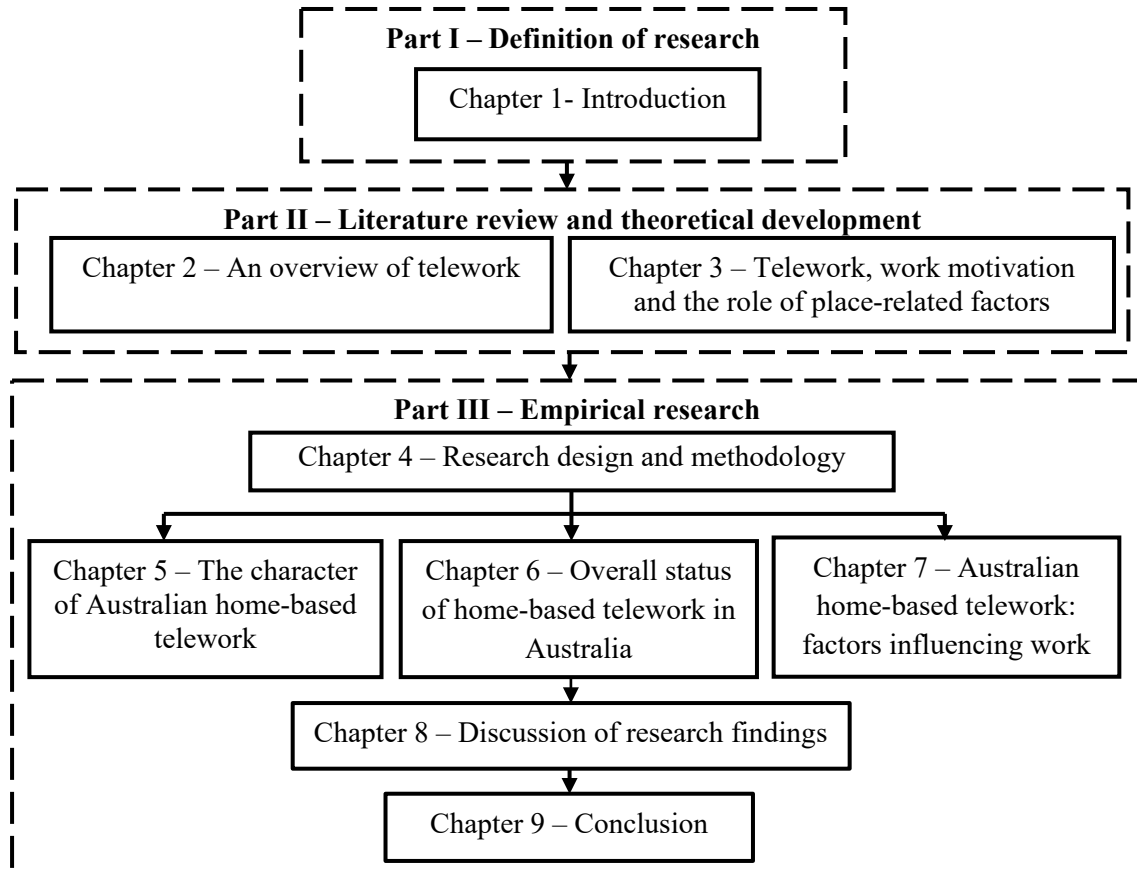


Figure 1.2 Structure of the thesis

Part I, including Chapter 1, explains the definition and the key aspects of the research. It provides a historical background on the relationship between technology and urban form with a focus on Information and Communication Technology (ICT). The chapter includes a problem statement and highlights the central research proposition, main aim and scope. It defines the four research objectives and three related questions, and presents the research approach. The research significance is discussed and the structure of the thesis is explained.

Part II, including Chapters 2 and 3, focuses on the theoretical background of the study and shapes a conceptual framework for application in empirical research.

Chapter 2 sets the foundation for research into telework and analyses the current status of telework, focusing on Australian developments. It reviews the concept of telework, including the many definitions of telework. It then reviews the typology of place for telework and classifies different telework strategies. The chapter reviews Australian developments in telework including Australian telework rates and trends, job-related socio-demographic characteristics of Australian teleworkers and telework practices in Australian cities.

Chapter 3 reviews theoretical foundations to better link the place-related characteristics of telework with the positive psychological experiences of teleworkers. The chapter reviews understanding of telework as a socio-behavioural phenomenon. It highlights the findings of studies on the main socio-behavioural outcomes of telework and fundamental socio-behavioural differences of telework place typologies. The chapter then reviews place-related factors of telework and how they contribute to teleworkers' perception. The chapter develops the research conceptual framework to illustrate how place-related factors affect the work experience of teleworkers based on theoretical frameworks and models proposed in the telework literature and a previous validated model of work motivation.

Part III, including Chapters 4 to 9, explains and discusses the empirical research and responds to the research questions.

Chapter 4 describes the methodology for the research. The chapter presents the advantages of the quantitative research methodology selected, and explains the main empirical analyses to answer the research questions. The chapter presents the development of a survey as an instrument to collect the data for analysis including the definition of questions, the general structure and parts of the survey, the approach to implementation of the survey, and final adjustments. It then discusses identification and formation of the statistical sample, and the review of strategies used to find potential respondents, and data collection procedures. The chapter reviews and explains the statistical techniques and software used for analysis.

Chapter 5 provides information on the characteristics of home-based telework in Australia based on descriptive analysis of the research sample. In addition to the aggregated results for the entire sample, the chapter also provides results separately for

two subgroups: employee and self-employed teleworkers. The chapter firstly reports the results of descriptive analyses of socio-demographic, dwelling and job-related characteristics of teleworkers. It then evaluates the efficiency of the residence as a telework place in Australia in terms of place readiness and preparedness from a variety of aspects at different urban levels.

Chapter 6 compares the results in Chapter 5 to demographic and geographical statistics for the Australian workforce population at the national level, and to similar results in recent home-based telework research in order to ensure the generalisability of findings to the entire Australian home-based telework experience. This comparison is made for most of the characteristics previously evaluated, depending on availability and comparability of data. Results from chi-square tests for goodness of fit are reported and discussed. The chapter explains the findings of this comparison for each of the basic characteristics of telework practice, and then compares place-related characteristics. The chapter draws conclusions on the living, working and place-related status of Australian teleworkers.

Chapter 7 reports the results of investigations of the determining factors that are necessary and of great importance for understanding the dynamism of Australian home-based telework. The chapter firstly reports the basic and place-related characteristics that are significantly different between the main groups of home-based teleworkers (employee and self-employed). It then reports the basic and place-related characteristics that significantly increase (or decrease) teleworkers' degree of work motivation.

Chapter 8 discusses the findings of Chapter 7 to improve understanding of Australian home-based telework place dynamics including all the significant place-related variables as well as the significant basic variables, in the context of current literature, and findings and results from other chapters. The chapter presents propositions on place-related factors.

Chapter 9 reviews the achievements of the research and presents recommendations based on the research findings. It summarises the main developments and findings of the research, followed by the theoretical contribution and the policy implications of the research. The research limitations and recommendations for further research are then presented. The chapter ends with concluding remarks.

Chapter 2: An Overview of Telework

2.1 Introduction

The chapter sets the foundation for research into telework and analyses the current situation of telework, focusing on Australian developments. Section 2.2 reviews the concept of telework, including the many definitions of telework. It is important to give a specific definition to provide a firm foundation for the theoretical and empirical research and avoid possible misconceptions about telework. Section 2.3 reviews the typology of place for telework and classifies different telework strategies. Since its inception, telework has been practised in different ways. Telecommunication technologies have enabled teleworkers of different jobs to adopt various types of work arrangements for time and place of work. As the research focuses on the individual experience of telework in Australia, Section 2.4 reviews Australian developments in telework including Australian telework rates and trends, job-related socio-demographic characteristics of Australian teleworkers and telework practices in Australian cities.

2.2 The concept of telework

The concept of telework first emerged in the 1950s, suggesting the combination of telecommunication technology and computing technology could lead to change in the locus of work (Jones, 1957). During the 1970s scholars started to explore the idea of telework as a significant new way of working and commuting to and from work and the workplace (Nilles, 1976). Telework emerged as a solution in response to the oil crises of the 1970s. The cost of fuel, and the cost of the daily commute, increased rapidly in the beginning of the 1970s which raised concerns about the future supply and cost of oil for fuel (Baruch & Yuen, 2000; DBCDE, 2011; Scholefield & Peel, 2009). Although there was a conservative approach at first by many people and organisations to accept telework as a new way of work, a number of other factors, such as major emergencies and the advent of new technologies, also made the idea of teleworking popular (DBCDE, 2011).

There is no accepted definition of telework and there is ambiguity in the literature on the definition of the concept. Various terms have been created and used by scholars for the

concept such as telework, telecommute, work from home, smart work, e-work, digital work, remote work, distant work, flexible work, technology-mediated work, distributed work, virtual work and offsite work. The variety in terminology indicates the tendency of theorists to emphasise different dimensions of the concept. According to the Australian Government Department of Broadband, Communications and the Digital Economy most definitions generally refer to the role of telecommunication technologies to undertake remote work (DBCDE, 2011). However, different perceptions and ideas about characteristics like regularity of work, location of work, time allocated to work and formality in work influence various definitions of telework. Achieving a common definition for telework is difficult for researchers as the diversity in teleworking arrangements influences the way different teleworking research is framed (Mokhtarian, Salomon, & Choo, 2005). The complexity in the structure of teleworking populations inevitably forces project-specific definitions for telework research (Alizadeh, 2013; Haddon & Brynin, 2005; Sullivan, 2003). Definitions may vary because different teleworking strategies are different workplaces that unconsciously have identified independently and distinctly with their own specific work climate.

Alizadeh (2013) considers two different trends in the literature in terms of defining the telework concept. The traditional trend sees telework in the form of different flexible work strategies such as traditional home-working, outworking or remote work (e.g. Dam, Scott, Paez, & Wilton, 2010; Daniels, 1989; Rowbotham & Rowbotham, 1993; Weijers, Meijer, & Spoelman, 1992), while a new emerging trend sees telework as a remote and ICT-based working practice for knowledge workers in the chain of knowledge production (e.g. Haddon & Brynin, 2005; Hotopp, 2002; Pratt, 2002). Wilmot et al. (2014) similarly identify that jobs with technological constraints and requiring elements of cooperation are suitable for telework, and that knowledge, information and marketing departments are the most suited to telework (Wilmot et al., 2014).

In Australia, different definitions for telework have been considered in research, documents and standards based on the need and the new goals assumed for telework developments. For example, Australian Telework Advisory Committee (ATAC) defines telework as “a form of flexible working, which is enabled by ICT, and undertaken outside of a traditional office environment”, while emphasising the role of information and communication technology (ATAC, 2006, p. 13). The Australian Government

Department of Broadband, Communications and the Digital Economy (DBCDE, 2011, p. i) also defines telework as “an arrangement where an employee works from home on a regular basis. The employee utilises telecommunications technology in order to work from home in the same manner as they would in the traditional workplace”. The Institute for Sustainable Futures at the University of Technology Sydney conducted a study on the potential of the Western Sydney region in terms of demand for the development of smart work hubs as a new and innovative form of telework. Acknowledging that there may be different definitions for telework, Institute for Sustainable Futures (2014) recognised four main common aspects in most definitions: location, time distribution, type of work, and employment arrangements. The study ultimately cited the following definition (Wilmot et al., 2014, p. 19) : “An arrangement between employer and employee that allows work to be performed outside of a usual place of work on a regular basis that reduces commuting time, by harnessing ICT which reproduce significant aspects of the centralised work environment”.

Recognising a range of different definitions have been adopted across the literature, telework is defined for the present research as working from home or working at a work hub, using internet, telephone, etc. to maintain contact and work delivery with employers and clients at a distance.

2.3 The typology of telework

The typology of telework includes several elements. Place is the most important element. Telework places are the physical environments in which teleworking takes place and mostly frame the working strategy a teleworker can adopt. The literature on telework includes innovative ideas about spatially implementing telework. Studies have developed a typology for telework places. Some typologies are more comprehensive as they put more emphasis on the concept of work flexibility and not necessarily the environment telework takes place in, although every form of telework should be defined in the context of a specific environment.

Since the 1970s, two forms or places of telework have been suggested: working from home, and working from a regional office close to home in a regional telework centre (Mokhtarian, 1992; Nilles, 1988, 1991; Nilles & Alexander, 1974). Although home-based

telework has been a common form of telework during the past three decades, telework also includes other new forms of non-traditional work environments. Fritz et al. (1995) reviewed and categorised different studies on the typology and the methodology of telework and provided a taxonomy of telework according to three different structures: telework spatial structure, telework coordination structure, and telework temporal structure. On spatial structure, they made a distinction between two groups of locations: traditional and non-traditional telework locations. Traditional locations include traditional satellite office, distributed work groups, mobile work and inter-organisational systems, while non-traditional locations include non-traditional satellite offices, neighbourhood work centres, telecottages and telecommuting. In addressing the temporal perspective, three other types of telework are resort offices, flexitime, and supplemental work at home (Fritz, Higa, & Narasimhan, 1995).

Although Fritz et al. (1995) is a comprehensive study, including all types of telework and telework places, recent literature prefers more general classifications. For example, the Australian Telework Advisory Committee (2006), which considers the concept of teleworkers rather than telework, only recognises four groups of teleworkers where the definitions focus on the nature of work (ATAC, 2006): home-based employed teleworkers, home-based self-employed teleworkers, mobile teleworkers, and day extenders. However, some references stress the environment of telework instead. Georgetown Law (2010) introduces four approaches to telework (DBCDE, 2011): hot desking, where the employee works from a remote location part or most of the time, and from the main office the rest of the time; hoteling, which is similar to “hot desking” but employees must reserve a space ahead of time; telework centres, which are facilities that provide workstations and other office facilities employees from several organisations can use; and collaborative offices, which are virtual work environments where employees can work cooperatively from different locations using a computer network.

Identified telework places can also vary in characteristics such as architectural form and functional roles. Exemplifying the matter of architectural form, Alizadeh (2012), in a study on American and Australian live-work communities, recognised three different types of home-based offices (integrated with home, semi-separated from home, and completely separated from home) and two different types of community-based offices (co-workplace and office buildings).

Table 2.1 summarises the typology of telework based on various references.

Table 2.1 Typology of telework based on various references

Reference(s)	Focus	Example(s)
Fritz et al. (1995)	Spatial structure of telework	Traditional locations: satellite office, distributed work groups, mobile work and inter-organisational systems
		Non-traditional locations: non-traditional satellite offices, neighbourhood work centres, telecottages, telecommuting
	Coordination structure of telework	Hierarchical coordination
		Market coordination
	Temporal structure of telework	Resort offices, flexitime, and supplemental work at home
ATAC (2006)	Individuals teleworking	Home-based employed teleworkers, home-based self-employed teleworkers, mobile teleworkers, day extenders.
Georgetown Law (2010)	Environment of telework	Hot desking, hoteling, telework centres, collaborative offices
Alizadeh (2012)	Architectural form of telework place	Home-based offices: integrated with home, semi-separated from home, completely separated from home
		Community-based offices: co-workplace, office buildings

2.4 Telework in the Australian context

This section reviews telework rates and trends, telework socio-demographics, and recent experiences and practices in Australia.

2.4.1 Telework rates and trends

The telework statistics are diverse and extensive. Many references have attempted to define telework and measure it from different perspectives. The variation in definitions of telework has influenced measuring telework and led to producing various statistics. This made difficult reaching a holistic picture of the telework situation.

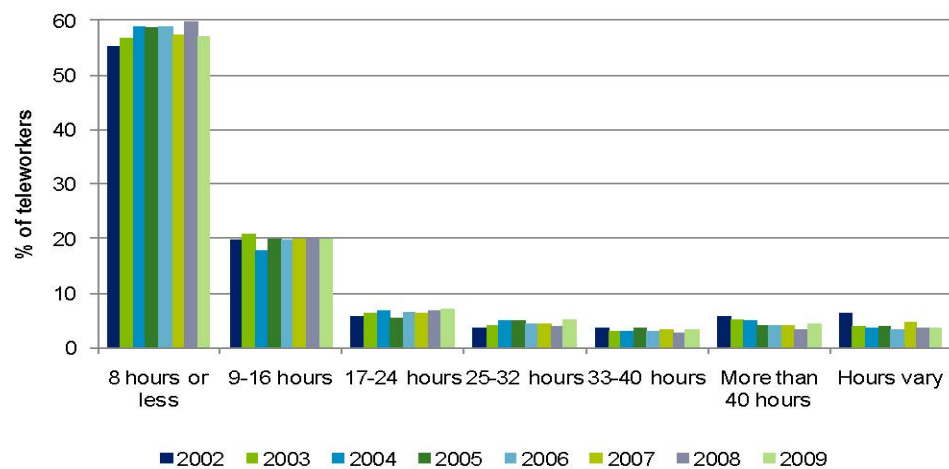
Globally, the general rate of telework adoption has been increasing over recent decades (DBCDE, 2011), although the general trend has varied in different countries. In regions

such as the United States, Canada and Europe; more than 10% of the workforce frequently undertakes telework (Fortier, 2010; Haddon & Brynin, 2005; USDC, 2002). In the United States, based on 2008 International Telework Association and Council survey, it is estimated that 33.7 million people telework at least one day per month at home during normal business hours which is an increase compared to the previous estimate of 24.1 million people in the 2004 survey (WW, 2009). According to 2017 State of Telecommuting in the US Employee Workforce (GWA, 2017), 4 million employees in the United States (3% of workforce) worked from home at least half of the time in 2015 which indicates a 115% increase since 2005. While the non-telecommuter population grew by less than 12% between 2005 and 2015 (GWA, 2017).

Australia's telework adoption rate is considered low-to-middle among developed economies (Wilmot et al., 2014). In spite of the variation in the rate of telework in Australia, national surveys conducted show there is potential interest in Australian society for the adoption of telework as a legitimate alternative work arrangement (Alizadeh, 2013). A national survey for the Australian Telework Advisory Committee (ATAC, 2006) conducted by Sensis among Australian small to medium-sized businesses suggested that 34% of these companies have been involved in teleworking (Alizadeh, 2013). A later survey in 2009 indicated that 24% of the organisations had employees that had adopted different teleworking arrangements (Sensis, 2009). The Australian Bureau of Statistics (ABS, 2008) survey which covers 3,900 households shows that just 6% of the total Australian workforce were involved in telework in 2006 (DBCDE, 2011). Although the Australian Bureau of Statistics survey only considered home-based telework, it included all types of work arrangements including from full-time telework through to occasional arrangements.

The Household, Income and Labour Dynamics in Australia (HILDA) survey provides current data on telework in Australia. According to the HILDA data which covers 7,000 households for every year of the survey, 18% of all surveyed Australian employees undertook some work from home in 2009, regardless of having a formal arrangement (DBCDE, 2011). According to the Department of Broadband, Communications and the Digital Economy (DBCDE, 2011), this rate shows an interest in adoption of telework on an informal basis at home during non-standard working hours or on an ad-hoc style. On frequency of telework, the HILDA data indicates that around 60% of all Australian

teleworkers undertook work from home for eight or fewer hours per week whereas less than 10% worked from home 33 or more hours per week (Figure 2.1).



Source: DBCDE (2011), with data calculated from HILDA data 2002–2009

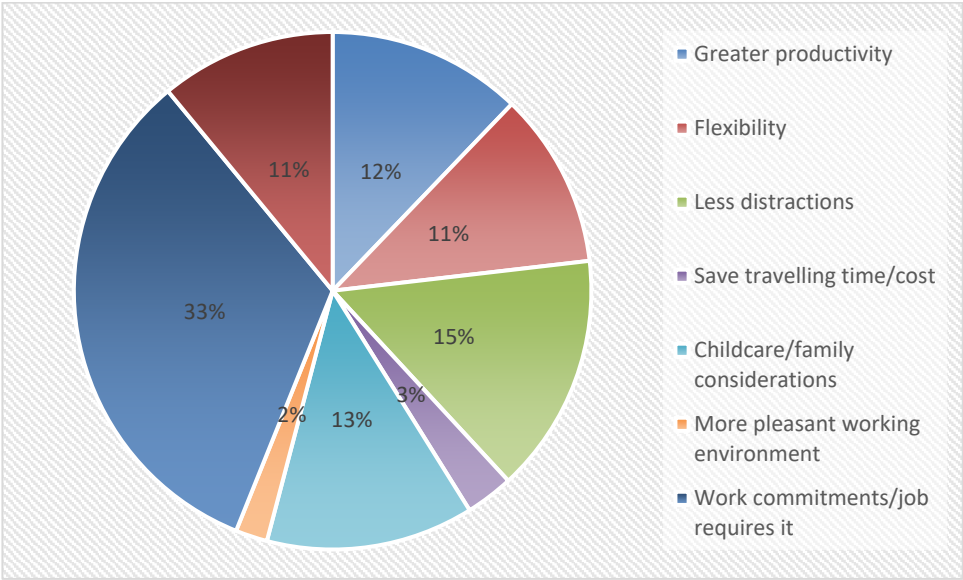
Figure 2.1 Frequency of telework per week (2002–2009)

The HILDA data also indicates that in 2010 23% of respondents spent part of their working hours at home doing their job, but there is no significant change in the number of hours devoted to teleworking compared to previous years. According to this data, 71% of people spent less than 10 hours a week on telework. Only 5% of people reported that they devote the majority of their time to work at home (APSC, 2013). According to APSC (2013), 10% of the public service employees in Australia are engaged in telework, a decrease compared to 15% in 2012.

The latest Australian Bureau of Statistics data (ABS, 2018a) indicates that of the 11.6 million Australian workforce, about 3.5 million people do some sort of telework, with about 2.06 million people as employees, and about 1.44 million people as managers or business owners. Based on this data, telework has grown steadily in Australia and has increased from 8% in 2001 to 30% in 2017 (MNF, 2018).

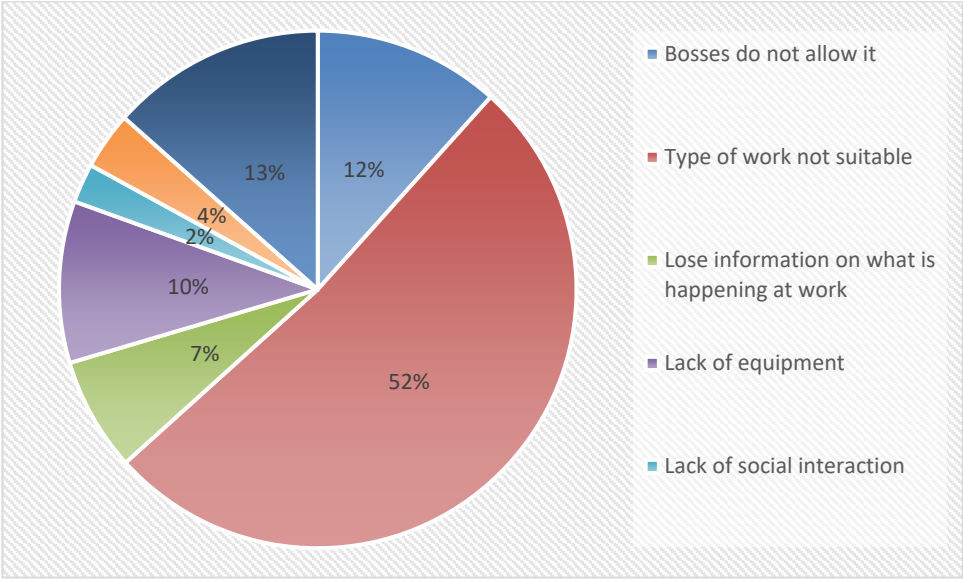
The Australian Bureau of Statistics Teleworking Survey (2002) reviewed the most important reasons for Australian teleworkers choosing home-based telework. As Figure 2.2 shows, the most important reason for choosing to telework by teleworkers in Australia was job commitment (33%), followed by less distraction (15%), family considerations (13%), more productivity (12%) and more work flexibility (11%). Place-related factors

such as saving time and cost of travel, as well as the more pleasant working environment, were not reported as having a significant impact on the choice of telework. According to the Teleworking Survey (Australian Bureau of Statistics, 2002), the unsuitability of type of work, failure to get employer permission, and insufficient equipment were considered the most important barriers to telework (Figure 2.3).



Source: Data adapted from Teleworking Survey by Australian Bureau of Statistics (2002)

Figure 2.2 Main reason worked at home during normal business hours



Source: Data adapted from Teleworking Survey by Australian Bureau of Statistics (2002)

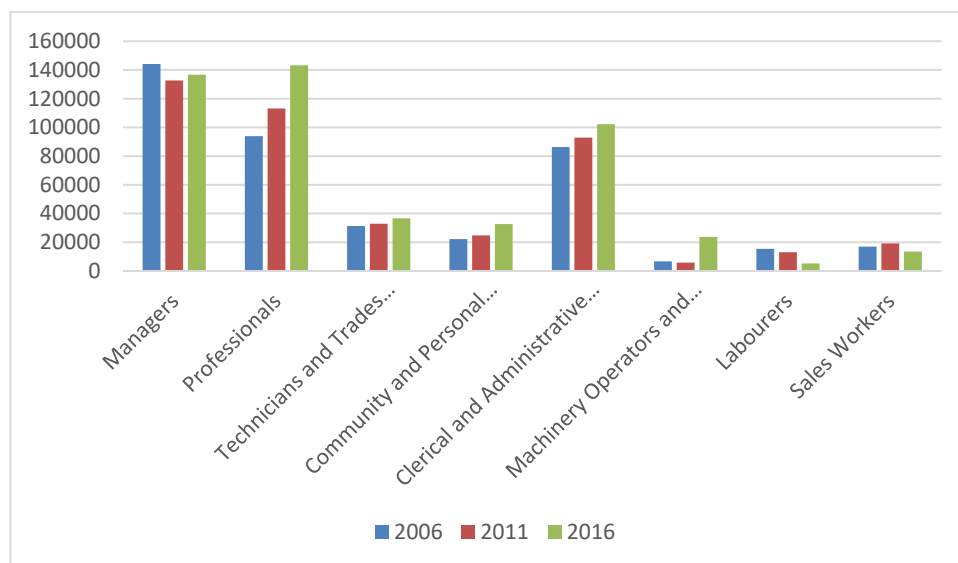
Figure 2.3 Reason preventing teleworking more

According to Australian Public Sector Commission (2013), the most important barrier for public service employees in the choice of telework in 2013 was that telework had not been offered as a work arrangement in their organisation. In 2013, respondents reported that the need for physical presence, and to a certain extent, failure to obtain permission from the employer were the two main reasons for not doing telework (APSC, 2013).

In the latest Australian Bureau of Statistics study, people mentioned two main reasons for doing telework)ABS, 2018a(: 42% of people do regular telework to do their job properly, and 20% reported the need for enough work space and not being obliged to pay related rental and overhead costs (MNF, 2018).

2.4.2 Job-related and socio-demographic characteristics

With the shift in the global economy to knowledge-based economies, teleworkers engaged in knowledge-based businesses account for the largest number of teleworkers. The job groups related to information workers include managers, professional workers, and those engaged in secretarial and administrative jobs. According to Australian Bureau of Statistics, in the 2006, 2011 and 2016 censuses, teleworkers, defined as home-based workers, included three groups: managers, professionals, and clerical and administrative workers. Of the three groups, professionals home-based working increased by 52.6% between 2006 and 2016 and clerical and administrative workers by 18.5%. However, managers, although still the largest group of home-based workers, had a negative growth rate of 5.2%. Sales workers groups which traditionally has been identified as occupational groups suitable for telework had a decline in home-based work. Among the groups not traditionally considered to be major teleworkers, the occupational groups of community and personal service workers, and machinery operators and drivers experienced a significant increase in the number of home-based workers (Figure 2.4 and Table 2.2). These major changes may be consistent with the removal of structural and cultural barriers to the choice of telework within the framework of these occupational groups, which requires further research.



Source: Data adapted from Australian Bureau of Statistics censuses (2006, 2011, 2016)

Figure 2.4 Number of home-based workers in Australia by occupation, 2006, 2011 and 2016

Table 2.2 Home-based workers in Australia by occupation, 2006, 2011 and 2016

Occupation	Census			Growth 2006- 2011 (%)	Growth 2011- 2016 (%)	Growth 2006- 2016 (%)
	2006	2011	2016			
Managers	144165	132659	136653	-8.0	3.0	-5.2
Professionals	93872	113139	143218	20.5	26.6	52.6
Technicians and Trades Workers	31324	32894	36649	5.0	11.4	17.0
Community and Personal Service Workers	22235	24804	32737	11.6	32.0	47.2
Clerical and Administrative Workers	86251	92892	102242	7.7	10.1	18.5
Machinery Operators and Drivers	6673	5775	23774	-13.5	311.7	256.3
Labourers	15379	13110	5292	-14.8	-59.6	-65.6
Sales Workers	16936	19210	13518	13.4	-29.6	-20.2
Inadequately described	7601	7523	7606	-1.0	1.1	0.1
Not stated	2088	1935	1899	-7.3	-1.9	-9.1
Total	426524	443941	503588	4.1	13.4	18.1

Source: Data adapted from Australian Bureau of Statistics censuses (2006, 2011, 2016)

According to various studies and surveys, teleworkers were more likely to be male. For example, in a household travel survey by the NSW Bureau of Transport Statistics, 59% of teleworkers in Sydney were male (Corpuz, 2011). In the Trans-Tasman Teleworking Survey, 54% of teleworkers were also male (Bentley, McLeod, & Bosua, 2013). According to the Bureau of Transport Statistics survey, most teleworkers were in the age group of 31–50 years (Corpuz, 2011) which is consistent, to a large extent, with the results of the study of the Australian Bureau of Statistics Teleworking Survey (2002). According to Australian Bureau of Statistics (2002), people in the age group of 35–44 years had a greater probability of teleworking.

In the Trans-Tasman Teleworking Survey which studied 1,827 employees from 50 Australian and New Zealand organisations, 89% of respondents reported that they spend one hour a week or more on telework. The average telework time for these people was 13 hours a week. They were generally full-time and permanent employees (90%). Over a third (35%) of respondents were teleworkers with a low telework intensity rate of less than one day or 8 hours per week and 38% of respondents were teleworkers with a moderate telework intensity rate of one to three days a week. Only 16% of respondents were doing telework more than three days a week. In this survey, teleworkers had an average of 5.8 years of work experience in their current job. Most of the respondents (85%) were doing telework at home, and most of those with telework experience (77%) had a fixed working space in the main office of their employer (Bentley et al., 2013).

It is estimated the majority of Australians who telework have no formal work contract about telework. According to the results of the Trans-Tasman Teleworking Survey about 74% of respondents reported that their employers were aware of their teleworking, but they do not have an official contract for doing telework; or they only have an oral agreement with the employer about telework (Bentley et al., 2013).

Wilmot et al.'s (2014) review identified the population of Australian teleworkers has a recognisable distribution pattern around two features of gender and type of job. Specifically, male teleworkers from the group of professionals and female teleworkers in clerical jobs are the two largest groups. In Lafferty and Whitehouse (2000), Australian female teleworkers were mostly employed in the administrative and communication departments of public and government organisations.

In the Trans-Tasman Teleworking Survey, most teleworkers (79%) were married or lived with their partner (Bentley et al., 2013). In the Bureau of Transport Statistics survey, 67% of teleworkers were in the highest income group (equal to or more than \$60,000 a year) (Corpuz, 2011).

2.4.3 Recent experiences and practices

Although telework has mostly been done in home-based environments in Australia, a number of collective forms of telework places have also emerged. These collective telework places differ in purpose, size, geographical location, sphere of influence and type of ownership (public or private sector). These places can be small or medium size businesses or be under the ownership of large organisations.

The Australian Telework Advisory Committee (2005) reviewed and reported many case studies of collective teleworking practices in Australia including the Satellite Centre of the NSW Government, Roads and Traffic Authority, the Lateral Sands time-shifting approach, the Modular Interactive Telecommunications Environment project with a rural satellite centre, and the Collaborative Training and Education Centre involving virtual working. However, more recent information on collective telework places in Australia is needed.

The NSW Central Coast has long been a major out-commuting region and has had a telework centre since the late 1990s. The Roads and Traffic Authority created the West Gosford telework centre in 1998 as a six month trial to assess the financial benefits of telework (RMS, 2010). West Gosford was selected as the best place for servicing Roads and Traffic Authority's staff who lived in the Central Coast and commuted to Sydney or Newcastle to work. The successful experience of the West Gosford office proved that a teleworking centre can be a cost-effective alternative to home-based work (RMS, 2010). Based on this experience, a Penrith telework centre was established for the large number of Roads and Traffic Authority staff who lived in greater western Sydney. Central Coast residents who commute to Sydney can also take advantage of another telework centre at Wyong. In addition, the Henry Kendall Group announced that it will create the Nexus Hub centre in North Wyong to support collaboration and innovation for small business operators, entrepreneurs and teleworkers. The hub will use the existing infrastructure of

the Group's Infraserve data centre, and provide internet connectivity at the rate proposed by the National Broadband Network to make possible high-quality multimedia communication via internet (CCBR, 2013). A number of other new 'smart hubs' are also intended to be introduced in the Central Coast (TCC, 2013).

Many state governments and city councils in Australia have started to consider innovative strategies for developing different types of collective telework places. For example, an ACT Assembly Committee is looking at ways the ACT government and neighbouring councils can work more closely together (Jean, 2013), based on residents' potential interest in working from smart work centres in commuter towns under a proposal raised by regional councils (Jean, 2013). In Western Australia, a digital strategy was launched by the City of Joondalup in northern Perth to establish a telework centre (smart work centre) as a part of a digital city hub (JCC, 2013).

A similar interest in creating new 'digital work hubs' is emerging in South East Queensland. Five Regional Development Australia committees (Sunshine Coast, Logan and Redlands, Gold Coast, Moreton Bay and Brisbane) are researching the possibility of creating collaborative workspaces across the five regions because "with almost 191,000 workers commuting to Brisbane daily from the Sunshine Coast, Moreton Bay, Ipswich, Logan, Redland and Gold Coast regions, it's crucial to develop flexible work practices and opportunities to minimise the impact on workers' health, wellbeing and productivity" (RDA, 2013).

Co-working spaces have also had significant growth in Australia in recent years. A co-working environment is a space where independent professionals such as designers, developers and marketers, can work independently or collaboratively in a shared office space (Sparovic, 2012). It is facilitated by high quality internet access, conference rooms, breakout areas and other office necessities (Sparovic, 2012). International companies such as Regus that are active worldwide in the field of remote work services have expanded various branches of co-working spaces in Sydney, Melbourne, Brisbane, Adelaide and Perth (OS, 2017). Australian companies such as Hub Australia have also developed co-working spaces in different cities (DB, 2017). The development of co-working spaces has not been limited to large companies, and small and medium-sized businesses have also been active. New teleworking hubs can be co-located with different

innovative work practices such as co-working, office space for start-ups and small business services, and social enterprise innovations.

Home-based teleworking plays an important role in the ecosystem of flexible working. Live-work communities, defined as “technology-based environments that provide collaborative telework opportunities for their teleworking residents and merge housing, business, education, and leisure to offer their desired life/work style” (Alizadeh, 2012b), are good examples of co-location. Alizadeh (2012b) discussed an example of this type of development in South East Queensland established by private developers which includes different types of telework places: home-office (integrated, semi-separated, and completely separated) and community-based offices. Community-based offices have two forms: the co-workplace (shared office space and shared office facilities) for independent workers, and office buildings (including satellite corporate office and independent office space) used by major companies such as IBM Australia, MaxSoft Group, On the Net, go talk, and Conics (Alizadeh, 2012b).

2.5 Summary

This chapter provided a general understanding of the phenomenon of telework. Two reasons for the difference between various definitions of telework were identified: the complexity of the population structure of teleworkers, and the fundamental difference between telework places leading to different work experiences despite the use of similar work strategies. In addition, new work processes lead to newer definitions of telework which rely on the role of new information technology and the cycle of knowledge production. Different authorities provide specific definitions about telework in their policy documents and reports according to their goals. These definitions usually vary in positioning relative to location, time distribution, type of job and work contract. Considering the various definitions, telework is defined for this research as “working from home or working at a work hub, using internet, telephone, etc. to maintain contact and work delivery with employers and clients at a distance”.

Types of telework differ in spatial, managerial, and temporal structures. Telework can, spatially and temporally, be in home-based and collective forms (on a local, urban and

regional level). Telework can also be considered a way of working for both independent workers and employees.

Since its emergence in Australia, telework has been increasing in use, although, the pace of growth sometimes fluctuates. The most important reason for adopting telework is having work commitments and the reason for not adopting telework is job mismatches. Most teleworkers have a low intensity rate of telework.

Data from three Australian Bureau of Statistics censuses in 2006, 2011 and 2016 indicated an increase in the number of home-based workers working in the information and knowledge sector. Professionals experienced the highest rate of growth of teleworkers. Teleworkers were more likely to be between the ages of 31 and 55 years. Australian teleworkers do telework without a formal contract. Male teleworkers were more likely to be professionals and female teleworkers were in administrative and clerical jobs. Teleworkers were more likely to be high income.

Recent developments in Australia leading to the emergence of new forms of telework included collective telework, realised by the public and private sectors in various ways and for different purposes. Public sector smart work centres and digital work hubs often aimed to help the socioeconomic development of more disadvantaged areas by increasing employment opportunities and creating more local attraction for private sector investment, contributing to greater environmental sustainability by reducing congestion, and urban and regional traffic and consequently reducing the use of fossil fuels, and saving time and money by reducing road traffic. In the private sector, large, medium and small enterprises expanded co-working spaces and expanded social networking opportunities. Life and work communities were developed, creating an environment consistent with the various needs of teleworkers. The communities are highly diverse in types of telework places, and reflect different innovative and entrepreneurial companies.

The following chapter highlights the findings of studies on the main socio-behavioural outcomes of telework and fundamental socio-behavioural differences of telework place typologies.

Chapter 3: Telework, Work Motivation and the Role of Place-Related Factors

3.1 Introduction

The chapter reviews theoretical foundations to better link the place-related characteristics of telework with the positive psychological experiences of teleworkers. As stated in Chapter 1, the present research aims to evaluate place-based characteristics of telework which make telework a better psychological experience for individuals. Many studies of positive and negative effects of telework have focused mainly on non-place related factors. The role of place-related factors has been overlooked. In this research, individuals' work motivation during telework practice is considered a key factor in achieving other psychologically positive qualities. Therefore, this chapter focuses on theoretical developments to support the assumption that improving the place-based characteristics of telework can increase work motivation among teleworkers and facilitate other positive results.

Section 3.2 reviews understanding of telework as a socio-behavioural phenomenon. Evidence is reviewed to illustrate that telework is not a general phenomenon which consists of different working strategies. Different telework strategies are working places with different socio-behavioural considerations. Thus, it is important to investigate the role of place and relevant characteristics in socio-behavioural implications of telework to show that the socio-behavioural effects of teleworking are manageable through reorganisation of the telework place. The literature review highlights the findings of studies on the main socio-behavioural outcomes of telework and fundamental socio-behavioural differences of telework place typologies.

Section 3.3 reviews place-related factors impacting on effective telework. The theoretical literature on telework has a relatively clear perception that the transformation of a telework place can bring about different and sometimes contradictory socio-behavioural outcomes. However, there is little knowledge of how the place-related factors of telework affect socio-behavioural outcomes. The section reviews existing knowledge on how place-related factors contribute to teleworkers' perception. It includes a literature review

on the effects of place-related factors on the socio-behavioural attitudes of conventional office-based employees which provides background on previous developments in workplace studies including an overview of theoretical frameworks and models. Then previous studies on the preferences of teleworkers for characteristics of an ideal telework place are reviewed. Since the focus of this research is on the home-based type of telework, this study only addresses the preferences of individuals working from home.

Section 3.4 develops the research conceptual framework to illustrate how place-related factors affect the work experience of teleworkers. The concept of work motivation has had considerable significance in the organisational psychology literature, with relatively strong correlations between work motivation and other socio-behavioural qualities such as job satisfaction, job performance, productivity and health. Thus, the work motivation concept and the role of the place-related factors in affecting work motivation is at the centre of the conceptual framework. The structure of the theoretical frameworks and models proposed in the telework literature is discussed first. Then the research conceptual framework is developed with reference to a previous validated model of work motivation.

3.2 Socio-behavioural understanding of telework impacts

Telework can contribute to spatial decentralisation in work organisation and flexibility in life and work scheduling. The telework literature has discussed the possible consequences of telework from different perspectives (e.g. Baruch, 2000, 2001; DBCDE, 2011; Hamilton, 2002; Harpaz, 2002; Kurland & Bailey, 2000; Mello, 2007; Sikes, Mason, & VonLehmden, 2011). Some studies presented specific classifications by methodology, distinguishing between the advantages and disadvantages of telework from different points of view. Given the job-related nature of telework, some studies have separated individual and organisational advantages and disadvantages (e.g. Boell, Campbell, Čećez-Kecmanović, & Cheng, 2013; Madsen, 2003; Mahler, 2012; R. E. Morgan, 2004). A few studies also present more general classifications considering the consequences of teleworking for society in addition to those of the workplace (e.g. Baruch, 2000; Campbell & McDonald, 2007; Crandall & Gao, 2005; DBCDE, 2011; Harpaz, 2002; Kurland & Bailey, 2000; Leung, 2004; Mello, 2007). Section 3.2 reviews the telework literature to understand telework as a teleworker's inner experience, with the possible consequences of telework reviewed from an individual worker's point of view.

3.2.1 Socio-behavioural consequences of telework

Telework has benefits for workers. Telework can facilitate finding a job, especially for individuals who are geographically far from central locations of work, parents who need to take care of their children, or people with disabilities (Baruch, 2000). Considering the emergence of telework with high fuel prices in the 1970s, the transport related advantages of telework also have an obvious motivational role (Apgar IV, 2002; Bailey & Kurland, 2002; Jack M Nilles, Frederic R Carlson, Paul Gray, & Gerhard Hanneman, 1976) including the reduced time to commute, the reduced distance of the commute (Eom, Choi, & Sung, 2016; Spillman & Markham, 1997), the reduced cost of transport (Paul & Grantham, 1995; Spillman & Markham, 1997), and the reduced stress caused by transport and traffic (Bailey & Kurland, 2002). These advantages may change individuals' travel patterns (Hamer, Kroes, & Van Ooststroom, 1991; Mokhtarian, 1991; Pendyala, Goulias, & Kitamura, 1991). However, the transport related advantages like travel reduction have not been classified as the main factors affecting employees' motivation to telework according to some studies (Bailey & Kurland, 2002). Teleworking may even increase the length of commute and transport costs (Bailey & Kurland, 2002; Baruch & Nicholson, 1997; Mokhtarian, 1997; Olszewski & Mokhtarian, 1994; Pinsonneault & Boisvert, 2001; Riswadkar & Riswadkar, 2009; Seaman, 1997).

Various studies have been conducted on the more uncertain consequences of telework. To explain the uncertainty, the majority of these studies emphasise the role of telework in reshaping the boundaries between life and work. These outcomes, which are mostly considered as socio-behavioural, have usually been categorised in three areas (see Grant, Wallace, & Spurgeon, 2013): employees' work-related outcomes, employees' work-life balance, and employees' wellbeing outcomes.

3.2.1.1 Employees' work-related outcomes

Two major outcomes from teleworking are increased autonomy and increased productivity.

Job autonomy

Telework can increase work autonomy, depending on factors such as teleworkers' job role, their level of control over the workload, and the level of trust provided by their line manager (Grant et al., 2013; Karasek & Theorell, 1990). Campbell and Heales (2016) reviewed the literature on the feeling of autonomy in teleworkers and identified effective factors including the managerial mechanisms controlling the teleworkers' work (e.g. Feldman & Gainey, 1997; Guimaraes & Dallow, 1999; Metzger & Von Glinow, 1988; Watad & Will, 2003; Wright & Oldford, 1993), the feasibility of undertaking more complicated tasks as a result of less interruption and more flexibility (e.g. Apgar IV, 2002; Baruch & Nicholson, 1997; Bélanger, 1999; Chevron & Primeau, 1996; DuBrin, 1991; Duxbury, Higgins, & Neufeld, 1998; Pinsonneault & Boisvert, 2001), and considerations for task and technology fit (e.g. Bell & Kozlowski, 2002; Campbell, 1998, 2006). In general, teleworkers with higher levels of autonomy need less managerial and supervision considerations (Grant et al., 2013).

Productivity, job performance and job satisfaction

In the telework literature, there are frequent discussions on the relationship between telework, and the relatively intercorrelated work qualities of productivity, work performance and job satisfaction (e.g. Apgar IV, 2002; Bailey & Kurland, 2002; Gajendran & Harrison, 2007; Golden, 2001, 2002; Kanellopoulos, 2011; Konradt, Hertel, & Schmook, 2003; Pyöriä, 2011; Sherry & Salvador, 2002; van der Meulen, Baalen, & Heck, 2012). In general, teleworking improves outcomes such as job satisfaction, productivity, and job commitment (Baruch, 2000; R. E. Morgan, 2004). Several factors might contribute, including the reduced levels of distraction (van der Meulen et al., 2012) and the availability and accessibility of information and communication technologies (Belanger, Collins, & Cheney, 2001).

3.2.1.2 Employees' work-life balance

Telework can improve the work-life balance (T. L. Dixon & Webster, 1998; Mokhtarian, Bagley, & Salomon, 1998b; Shamir & Salomon, 1985). Life responsibilities can be

managed better when less time is spent commuting between home and work because of telework. Workers who are not able to attend main places of work due to caring responsibilities, sickness or physical disabilities can establish balance between important life responsibilities and necessary job activities through telework.

Work-family conflict

However, the role of teleworking in improving work-life balance is still debatable. Telework can reduce the time allocated to other activities such as leisure specially for teleworkers who are parents with children (Hilbrecht, Shaw, Johnson, & Andrey, 2008). Telework diminishes the boundaries between work and home; and increases the probability of work and life task interference (Greenhaus & Beutell, 1985), as work tasks overlap with family related duties in the same place simultaneously (Gajendran & Harrison, 2007). Telework extends the work time significantly for some employees, which increases work activities and life duties conflicts (Duxbury, Higgins, & Mills, 1992). Work-life conflict can also increase psychological stress among teleworkers (Ahuja, Chudoba, Kacmar, McKnight, & George, 2007; Ayyagari, Grover, & Purvis, 2011; N. Baard & Thomas, 2010).

Despite the possible negative outcomes, other studies indicate the positive effects of telework on reducing work load and stress (Baruch, 2001; Kanellopoulos, 2011). The contradictory effects on work-life balance may result from the demographic characteristics of teleworkers. For instance, work-life balance can vary by gender. Women consider work-life balance as dealing with family related issues and caretaking of children, while men regard work-life balance as a way of spending more quality time with the family (Grant et al., 2013; Sullivan & Lewis, 2001).

3.2.1.3 Employees' wellbeing outcomes

Telework can have positive or negative effects on employees' health and wellbeing (Hartig, Kylin, & Johansson, 2007; S. Mann & Holdsworth, 2003), with psychological health referring to social isolation and work stress.

Social and professional isolation

Telework can increase loneliness and lead to irritability and worry (Grant et al., 2013; S. Mann & Holdsworth, 2003) increase depression, and deprive individuals of opportunities for affiliation and detachment through social interactions (Baruch, 2000). Social isolation and professional isolation may increase (Apgar IV, 2002; Baruch & Nicholson, 1997; Chevron & Primeau, 1996), and employees may lose the ability to share problems with their colleagues and sympathise with them (Apgar IV, 2002; Baruch & Nicholson, 1997; Chevron & Primeau, 1996). Social isolation can also reduce psychological wellbeing (Simpson, Daws, Pini, & Wood, 2001). However, some studies found that telework could reduce the chances of depression among women because it could increase their working autonomy (Grant et al., 2013; Kossek, Lautsch, & Eaton, 2006).

Telework can also increase work exhaustion due to the increased workload (Weinert, Maier, Laumer, & Weitzel, 2014). On the other hand, the interpersonal relationships of teleworkers can be affected in different ways such as increasing the workload of non-teleworkers working in the main office due to the teleworker's absence (Apgar IV, 2002; Baruch, 2001; Campbell & Heales, 2016; Duxbury & Neufeld, 1999; Kompast & Wagner, 1998).

Job stress

There are several theories on the effects of telecommunication technologies on stress among users (Weinert et al., 2014). For instance, the person-environment fit theory indicates that the stresses created by telecommunication technologies can intensify different psychological and behavioural strains eventually (Caplan, 1987; Weinert et al., 2014). The telework literature is ambiguous on the relationship between telework and employee stress. Some organisational psychology studies indicated that the telework experience could reduce employee stress compared with that of other employees working in the central office (S. Mann & Holdsworth, 2003). Central office workers may have to bear the stress caused by office politics in addition to the commute stress (Hobbs & Armstrong, 1998). Although the telework experience can reduce work stress in certain cases, it can reduce the restorative effects of home at the same time (Baruch, 2000) due to the increased probability that home-related activities overlap with work-related tasks

(Hartig et al., 2007) or due to the prolonged working time or increased workload (Grant et al., 2013).

3.2.2 Telework places: socio-behavioural differences

Telework can have diverse socio-behavioural outcomes for employees. Boell et al. (2013) noted some studies have claimed that teleworkers experience fewer work interruptions increasing job satisfaction (e.g. Gajendran & Harrison, 2007; Konradt et al., 2003). However, other studies indicated that employees could experience higher levels of social isolation and more interruptions while teleworking (S. Mann & Holdsworth, 2003; Pyöriä, 2011). Work interruptions can be caused by family-related duties interfering with work-related activities (Boell et al., 2013).

Studies have attempted to explain the contradictory findings (Bailey & Kurland, 2002; Baruch, 2001; Crandall & Gao, 2005; McCloskey & Igbaria, 1998; Shin et al., 2000). The impact of different telework places is one reason for contradictory findings (McCloskey & Igbaria, 1998; Shin et al., 2000). Kurland and Bailey (2000) classified hypothetical advantages and challenges of teleworking in different telework places at three levels: organisational, individual and societal. They assumed differences between four different teleworking strategies (environments): home-based telecommuting, satellite office, neighbourhood work centres, and mobile work. Research on the socio-behavioural impacts of teleworking needs to consider fundamental differences between different telework places, as summarised in Table 3.1.

Table 3.1 Advantages and challenges of different telework places

***	Advantages			Challenges	
Home-Based Telecommuting	Organisational	• Greater productivity • Lower absenteeism • Better morale • Greater openness • Fewer interruptions at office • Reduced overhead	• Wider talent pool • Lower turnover • Regulation compliance	• Performance monitoring • Performance measurement • Managerial control • Mentoring • Jealous colleagues • Synergy • Informal interaction • Organisation culture • Virtual culture	• Organisation loyalty • Interpersonal skills • Availability • Schedule maintenance • Work coordination • Internal customers • Communication • Guidelines (e.g. expenses) • Technology
	Individual	• Less time commuting • Cost savings • Less stress • More need for relocation • More autonomy • Schedule flexibility • Comfortable work environment	• Fewer distractions • Absence of office politics • Work-family balance • Workplace fairness • More job satisfaction	• Social isolation • Professional isolation • Organisation culture • Reduced office influence • Work-family balance • Informal interaction	• Conducive home environment • Focusing on work • Longer hours • Access to resources • Technical savvy
	Societal	• Less traffic congestion • Less pollution • Less neighbourhood crime	• Greater community involvement	• Telework culture	• Loss of ability to interact with others
Satellite Office	Organisational	• Greater productivity • Better morale • Wider talent pool • Lower turnover	• Customer proximity • Regulation compliance • Corporate culture intact	• Performance monitoring • Performance measurement • Managerial control	• Jealous colleagues • Virtual culture • Internal customers
	Individual	• Less time commuting • Cost savings • Less stress	• No need for relocation • Work-family balance • More job satisfaction	• Professional isolation • Reduced office influence	• Access to resources
	Societal	• Less traffic congestion • Less pollution • Greater community involvement			
Neighbourhood Work Centre	Organisational	• Greater productivity • Better morale • Wider talent pool • Lower turnover	• Customer proximity • Regulation compliance	• Performance monitoring • Performance measurement • Managerial control • Mentoring • Jealous colleagues • Synergy	• Informal interaction • Organisation culture • Virtual culture • Organisation loyalty • Schedule maintenance • Work coordination • Internal customers
	Individual	• Less time commuting • Cost savings • Less stress • No need for relocation	• More autonomy • Absence of office politics • Work-family balance • More job satisfaction	• Social isolation • Professional isolation • Organisation culture	• Reduced office influence • Access to resources
	Societal	• Less traffic congestion • Less pollution	• Greater community involvement		
Mobile Work	Organisational	• Greater productivity • Lower absenteeism	• Customer proximity	• Performance monitoring • Performance measurement • Managerial control • Synergy • Informal interaction • Organisation culture • Virtual culture	• Organisation loyalty • Availability • Schedule maintenance • Work coordination • Communication • Guidelines (e.g. expenses) • Technology
	Individual	• More autonomy • Schedule flexibility	• Absence of office politics	• Social isolation • Professional isolation • Organisation culture • Reduced office influence	• Longer hours • Access to resources • Technical savvy
	Societal			• Telework culture	

Source: Kurland and Bailey (2000)

Morganson et al. (2010) analysed fundamental socio-behavioural differences between different telework places under three socio-behavioural concerns: work-life balance, job satisfaction and workplace inclusion. The impacts of teleworking on work-life balance may vary for different telework places. Working at home is often seen as a facilitating working strategy which helps to balance the relationship between work and life (Morganson et al., 2010; Shockley & Allen, 2007; Sparrow, 2000). However, working in other telework places such as satellite offices and telework centres may not similarly support work and life balance as there is not enough integration of work and life compared with home-based telework.

On job satisfaction, Morganson et al. (2010) argued that job satisfaction for home-based teleworkers can be affected by the isolating impact of teleworking. Lack of face-to-face relationships between teleworkers and their colleagues in the main office can increase social isolation and likely contributes to depression (Campione, 2008). However, there may be other impacts on job satisfaction in other telework places. Compared with home-based teleworking, teleworkers in collective telework places such as teleworking centres or satellite offices have better opportunities to manage and control interference between working and living. However, they may feel less job satisfaction compared with main office workers. Because they are less connected to the main office and their organisational situations, they may be overlooked by the organisation which may lead to less job satisfaction.

The third issue identified by Morganson et al. (2010) is workplace inclusion, understood as a sense of attachment to the organisation, and defined as “the degree to which an employee is accepted and treated as an insider by others in a work system” (Hope Pelled, Ledford Jr, & Albers Mohrman, 1999, p. 1014) and “the extent to which diverse individuals are allowed to participate and are enabled to contribute fully” (Miller, 1998, p. 151). Since telework changes the place, location and time of working, it can decrease communication between employees, their managers and their colleagues (Dambrin, 2004; Hinds & Bailey, 2003). Telework can mean being not recognised as a real organisational member, ‘being out of the loop’ and fearing losing formal and informal opportunities, because teleworkers cannot realise their working situation in the organisational context, and be sure about getting their membership rights (Bartel, Wrzesniewski, & Wiesenfeld, 2007; Gajendran & Harrison, 2007; Lombard & Ditton, 1997). Professional isolation,

which can be considered as an adjunct to work exclusion, may also come with negative outcomes such as increasing social isolation (Montreuil & Lippel, 2003), and reducing job performance (Golden et al., 2008). Morganson et al. (2010) argued that it is understandable that these negative outcomes increase when face-to-face interactions decrease. Since every telework place varies in its own social interactions, each therefore varies in providing job satisfaction and productivity for teleworkers.

3.3 The place-related factors of effective telework

Although the telework literature seems to be largely concerned with the importance of place in creating these different socio-behavioural consequences, few detailed and systematic studies have been conducted on how place and its determinants influence socio-behavioural consequences. But, relatively extensive research has been conducted in organisational and work psychology on the positive and negative effects of conventional workplaces on employees' work and health including physical, spatial, environmental and infrastructure characteristics of the workplace as well as the availability of work equipment and communication technologies. Much of the literature focuses on the effects of environmental factors such as light, temperature, air quality and noise, as well as the effects of the physical setting and spatial layout of the workplace on work outcomes such as job satisfaction (e.g. Carlopio & Gardner, 1992; Farrenkopf & Roth, 1980; Lunden, 1972), job performance and health (e.g. De Croon, Sluiter, Kuijer, & Frings-Dresen, 2005; Y. S. Lee, 2007; Rashid & Zimring, 2008; Wells, 2000), job commitment (e.g. McGuire & McLaren, 2009), work creativity (e.g. McCoy & Evans, 2002; Oksanen & Ståhle, 2013; Vithayathawornwong, Danko, & Tolbert, 2003), and productivity (e.g. Clements-Croome, 2000; Haynes, 2007; Leaman, 2000; Oseland, 1999).

There are different views in the literature on the general effect of place features on the important work outcomes. Studies have assessed, in different ways, the role of factors shaping the workplace, together with different socio-behavioural factors. Empirical research on the effect of physical and environmental factors on job performance has led to different results. Some studies have not shown a significant and direct relationship between the physical and environmental determinants of workplace and important work outcomes such as job satisfaction (e.g. S. Y. Lee & Brand, 2005). However, other studies

have shown a significant and obvious relationship between these factors and employees' job satisfaction (e.g. Brill & Weidemann, 2001; Carlopio, 1996; Sundstrom, Town, Rice, Osborn, & Brill, 1994; Zalesny, Farace, & Kurchner-Hawkins, 1985). Brill and Weidemann (2001) pointed out place-related factors can explain a quarter of the variation in job satisfaction. However, the studies indicating no significant relationship may have ignored and neglected some mediating factors in the development of their statistical models (e.g. Carlopio, 1996).

Studies on the effect of different place shaping factors on socio-behavioural experiences of employees and related psychological consequences used different frameworks and models. However, there is a lack of a comprehensive and universally accepted theoretical framework at the international level that can properly and structurally explain the factors affecting the workplace (Haynes, 2007). The presented models are sometimes limited to the requirements of traditional work environments and do not take into account the requirements of more modern forms of workplaces.

De Croon et al. (2005) presented a conceptual model that applies to both conventional and modern workplaces (for example, telework places) based on an extensive overview of theoretical literature, and by examining various studies. This model was designed to investigate the effect of workplace defining variables and work conditions on short-term and, ultimately, long-term reactions of employees. Short-term reactions include psychological consequences such as job satisfaction and stress, which can lead to long-term reactions such as health and job performance because of the long-term accumulation. In this model, the factor of office concepts involves workplace definition features, including office location (conventional offices or telework office), office layout (workplace openness and distance between workplaces), and office use (fixed workplace or desk-sharing). Working conditions includes job demands (cognitive workload and working hours) and job resources (communication, work autonomy, privacy). An outstanding point in this model is that the factor of office concepts directly and indirectly affects the other factors. In addition, the model can study new workplace considerations. However, this model ignores indoor environmental qualities in defining the factor of office concepts.

Haynes (2007) provided a relatively developed, integrated and comprehensive theoretical framework based on various theoretical and empirical studies to explain the relationships

between the most important factors of a workplace for productivity. Haynes (2007) has drawn on other studies (e.g. Laing, 1991) and pointed out that the changing spatiotemporal nature of work has led to tensions in office design, because conventional office design prevents organisations from being sufficiently creative. There is a need for a “post-Fordism” flexibility-oriented approach in office design to create a range of different work areas. According to Haynes (2007), many studies (e.g. Cairns, 2003; Duffy, 2000; Grimshaw, 1999; Nutt, 1999; Price, 2001) have emphasised the role of the facilities management discipline in considering spatial change, and in optimising the costs for appropriate use of space and adoption of new working practices (e.g. RICS, 2002). Haynes (2007) reiterated that the role of facilities management should not be limited to reducing costs, as it is also important for the performance of the organisation. The existing literature is mostly shaped under the cost reduction and operational approach, and has neglected the relationship of office environment and employee productivity that considers the importance of people’s cultural interaction beside physical space, and also knowledge creation (Haynes, 2007; Haynes et al., 2000). Haynes (2007) reviewed the background of research into the relationship of office environment and employee productivity and found it is focused on the two main disciplines of facilities management and environmental psychology, although the boundaries between these two disciplines are merging. Haynes (2007) also identified that the literature rarely addresses the role of behavioural factors in workplace productivity, and has mostly prioritised the role of physical factors with a focus on layout and comfort.

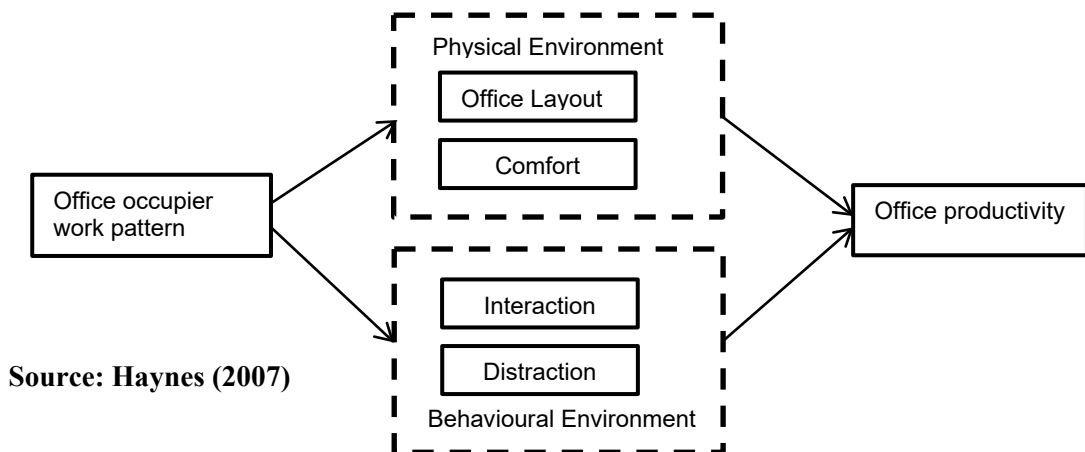
Haynes (2007) developed a theoretical framework to include both physical and behavioural environment dimensions in measurement of office productivity and conducted an empirical investigation on two datasets from a local authority and a private company. The investigation tested the reliability between 27 variables using factor analysis techniques. The 27 variables were categorised into seven underlying dimensions: distraction, environmental services, office layout, interaction, designated areas, comfort, and informal interaction point. Further factor analysis with stricter and more reliable criterion on both datasets combined merged the seven dimensions into four dimensions: comfort, office layout, interaction, and distraction components (Table 3.2).

Table 3.2 Theoretical framework of office productivity

Dimensions	Name	Variables
1	Comfort	Ventilation, heating, natural lighting, artificial lighting, decor, cleanliness, overall comfort, physical security
2	Office layout	Informal meeting areas, formal meeting areas, quiet areas, privacy, personal storage, general storage, work area–desk circulation space
3	Interaction	Social interaction, work interaction, creative physical environment, overall atmosphere, position relative to equipment, overall office layout and refreshments
4	Distraction	Interruptions, crowding, noise

Source: Haynes (2007)

Following this investigation, Haynes (2007) claimed the office productivity model successfully encompassed both physical and behavioural elements of a workplace (Figure 3.1). Further analyses by Haynes (2007) indicated that the behavioural components of office productivity, interaction and distraction, which are considered as the dynamic elements of the model, could have greater effects on office productivity. Based on this finding Haynes (2007) claimed that achieving the optimum balance between increasing positive work interactions while at the same time minimising distractions in offices is the main challenge for designers of work environments. Haynes (2007) concluded that the model is applicable in any further investigation of office productivity.



Source: Haynes (2007)

Figure 3.1 Theoretical framework of office productivity

3.3.1 Preferred telework place characteristics at home level

Telework is often seen as a way of creating work-life balance. But shifting employees from the main and conventional work environments to telework places can have some risks. Telework can increase disruption, distraction and stress, as well as social isolation and professional stress. To mitigate some of these consequences, some studies have suggested separating work responsibilities and family obligations by employees as a management strategy (Lautsch, Kossek, & Eaton, 2009). In general, if work-life boundaries are properly managed and there is control over the place and time of work, telework can improve the health of employees (Chevron & Primeau, 1996; Kossek et al., 2006). However, work-life boundary management follows different methods depending on the personal style of individuals (Chevron & Primeau, 1996; Kossek et al., 2006).

Research on optimising work-life boundary management during telework practice demonstrates the adoption of different strategies by individuals (e.g. Fonner & Stache, 2012; Mustafa & Gold, 2013). Using a dedicated room for telework can partly improve the spatial overlapping of work-related and non-work activities, but this strategy does not necessarily improve mental and temporal overlapping (Hartig et al., 2007).

In qualitative research on 20 home-based teleworkers, Mustafa and Gold (2013) identified different integration-segmentation strategies in both physical and temporal dimensions. Mustafa and Gold (2013) argued that the success in creating a work-life balance depends, to a large extent, on the ability of teleworkers to manage the responsibilities and the roles they play simultaneously in life and work which is possible through adopting integration-segmentation strategies. Mustafa and Gold (2013) discussed strategies for the management of physical boundaries around three types of boundaries, where the management of physical boundaries is not solely about the location of the workplace at home, but the physical strategies include the management of the boundaries of equipment, activity and ambience. Mustafa and Gold (2013) concluded that even temporal boundary management is largely dependent on the physical management of the boundaries, because the management of work interruptions and connections and the realisation of temporal strategies such as “switch off” largely depend on the ability of teleworkers to identify the work and life domains.

To facilitate work-life boundary management to maximise the benefits of telework, while minimising its disadvantages, new design ideas have been developed to achieve ideal and efficient architectural forms. Some developers in countries such as the United States and Australia have introduced different types of home-based offices (integrated, semi-separated and completely separated) and community-based offices (co-workplace and office buildings) by establishing live/work communities (Alizadeh, 2012). Developers have attempted to consider a variety of design options in response to the possible and potential needs of different teleworker populations.

Some designers have also focused on the challenge of life-work planning and design. For example, Dolan (2012) defined different types of live-work and provided various examples of live-work projects in different locations to show how the issue of live-work has been addressed within building codes and city plans by councils and municipalities (Dolan, 2012). Although the efficiency of the home office has been considered by developers and designers, the majority of home-based telework practices still occur in buildings not necessarily designed for working.

On the influence of place-related factors on the psychological experience of teleworkers, there is little research in the telework literature. Most studies have focused only on teleworkers' preferences in relation to place-related factors, and the role of these factors in creating socio-behavioural outcomes has been less investigated. Fan Ng (2010) extensively reviewed ideas and findings in the literature on the conventional office setting and developed a conceptual framework adapted from De Croon et al. (2005)'s conceptual framework to discuss how place-related factors of the home as a place of living may influence work behaviours of home-based workers and teleworkers. The findings of Fan Ng (2010) are summarised and categorised in Tables 3.3, Table 3.4 and Table 3.5.

Table 3.3 Teleworkers' spatial preferences at home level

Category	Factors	Findings
Space	Home space requirement	• Having more space at home (a larger home) is a key factor in telework adoption • Teleworkers tend to increase the size of the home during the telework time, if the home is not big enough • Teleworkers are less interested in changing the home, but more interested in renovating their current home (e.g. adding a new room or allocating a separate space)
	Size of workspace	• Majority of teleworkers require a workspace of at least 18.5 square metres • Average size of the workspace requested by teleworkers can be possibly equal to the average size of usual workspaces in conventional offices
	Location of workspace	• The criterion of "the availability of a free space" is considered the most important factor in choosing a workspace at home by teleworkers • Although it is not the most desirable, teleworkers usually mentioned the basement as the most commonly used space for the home office • Teleworkers mentioned a spare room, ground floor, and library as the next priorities for the office • Teleworkers preferred closeness to the bathroom to the closeness to the kitchen and living room • The closeness of the workspace to bedrooms was considered a negative point by most teleworkers
	Layout and use	• Teleworkers normally prefer a private home office than a workplace within the home • Teleworkers with family priorities are less interested in a completely separated physical workspace from home, but they prefer a separate working room within the home • Women have more difficulty finding a separate workspace at home • Mothers are more interested than fathers in having their workspace close to their children.

Source: Adapted from Fan Ng (2010)

Table 3.4 Teleworkers' ambience related preferences at home level

Category	Factors	Findings
Ambience	Noise	• Teleworkers experience different types of noise at home compared to the noise in conventional offices • Teleworkers prefer their workspace at home to be away from places like the kitchen and television room that are normally noisy
	Lighting	• Teleworkers found it desirable to have natural light as well as the glow of artificial light to the workspace (and not directly on the computer) • Many teleworkers mentioned the poor lighting of the workspace as a major problem
	View of outdoors	• The lack of access to a window is considered a major problem by teleworkers • Majority of teleworkers consider it desirable to have a window in the workspace • Some teleworkers want access to at least a long-range view from their workspace

Source: Adapted from Fan Ng (2010)

Table 3.5 Teleworkers' equipment related preferences at home level

Category	Factors	Findings
Equipment	Adequacy of resources	• Teleworkers know a workspace is ideal if it has enough storage space, enough power outlets, adjustable ergonomic furniture and equipment, as well as a fixed telephone line • Having enough equipment is a very important factor for teleworkers • The supply of basic equipment by employers has been associated with increased satisfaction • The lack of storage space, and to a lesser extent the lack of a telephone line, have been considered as the big problem
	Ergonomics	• Many teleworkers experience discomforts such as tired eyes, sore back, neck pain, and sore wrists while during telework

Source: Adapted from Fan Ng (2010)

Fan Ng (2010) discussed the impact of each factor associated with a traditional workplace based on the related literature, and then summarised the preferences of teleworkers for each of these factors. Fan Ng (2010) also classified and discussed the effects of place-related factors on the work behaviour of teleworkers including cognitive workload, working hours, communication, professional isolation, work autonomy and control, privacy, access to information, territory, status and image. The main findings associated with telework places are (Fan Ng, 2010):

- There is less distraction due to being away from workplace noises.
- There are fewer interruptions due to being away from colleagues and politics of the main office.
- There are reduced family-work interferences and conflicts in case of assigning a separate workspace.
- There is negative mediating role by household size in explaining the impact of telework on family-work interference.
- There are reduced distractions and interruptions due to the absence of usual distractors in the main workplaces, such as noises and existing work politics.

3.3.2 Preferred telework place characteristics at local and urban levels

Apart from knowledge and literature on the impact of place-related factors of the indoor environment on the telework experience, studies conducted on the relationship between place-related factors at local and urban levels and telework have focused more on the assessment of spatial changes in relation to the displacement of activities and individuals. Changes include increased opportunities for access to work at a regional level and beyond urban centres (Pyöriä, 2011), more freedom for people to choose their place of residence in cheaper places that are normally found in outer urban areas (Alizadeh, 2013), and consequently, the strengthening of local development due to the local economic growth as a result of the concentration of population throughout the day (Wilmot et al., 2014).

The findings of Kawai and Shiozaki (2004) also suggest some possibilities for the home location of teleworkers. According to Kawai and Shiozaki (2004) some of teleworkers

compared to the national average in the United States, typically reside in the vicinity of the city centres, probably because of their work-related needs. While some others tend to live in suburban areas and outskirts, after starting telework, so their dependence on the neighbourhood can increase in terms of shopping and other services but their dependence on the urban city centres may decrease (Kawai & Shiozaki, 2004).

The results of various studies, which are mostly based on objective and time series data, are sometimes contradictory. For example, contrary to the initial and prevailing perceptions and speculations on the fundamental, positive and transformative effects of telework on urban spatial organisation at various urban levels, some new research suggests that the relationship between urban spatial organisation and travel patterns is weakly affected by telework (e.g. Elldér, 2017). According to Ellder (2017) teleworkers' different travel strategies together lead to heterogeneous behaviour for daily travel, mostly influenced by personal characteristics, rather than the geographical location of place of residence. Also, the impact of geographical location of the main workplace on telework adoption is more than the impact of telework on the choice of place of residence and work; and therefore, the secondary effects of telework that have been discussed may not occur (Kim, 2016). Although telework may initially lead to decreased travel, it can increase the total household travel demand (Kim, 2016).

On the other hand, it should be noted that telework-related spatial changes may not necessarily lead to positive outcomes. The desire to live in the outskirts, and population concentration in suburban areas can increase the risk of urban sprawl. The need to visit clients or transport goods, especially for those teleworkers who work independently, can also lead to more car dependency (Gurstein, 1996).

Little research has been conducted on teleworkers' preferences for place-related factors at the local level. In one of the few studies in this field and based on people who work at home, Ahrentzen (1989) studied preferences for having various facilities and services in the neighbourhood, as well as decreased or increased importance of each of these facilities after starting work at home. The importance of proximity to instrumental services such as copy centres, post offices, and office supply stores increased dramatically. On the other hand, given that teleworkers often need access to professional and legal services, as well as meeting clients and participating in business events, the desire to live close to the city centre became important. This also facilitated clients' access to home offices. In addition,

the need for access to a library became a priority. Some homeworkers believed that a local library has some potentials to be used as a place of work. The importance of environmental qualities of the neighbourhood such as privacy from neighbours, peace and quiet, pleasant outdoor view and a place for a quiet walk also increased. For many teleworkers, the demands for the environmental qualities of the neighbourhood do not contradict the desire to be close to the centre of the city. Finally, having a neighbourhood with a professional image, worthy of a client's presence, is of great importance (Ahrentzen, 1989). Ahrentzen's study dates from before many new telecommunication technologies such as mobile phones, file sharing via laptops, etc. It is quite likely that the relative importance of some of the factors listed above may have changed for teleworkers as a consequence. For example, for self-employed teleworkers, client access might be less important now, as it can be facilitated by new software innovations (e.g. Skype meetings, etc).

The place-related preferences of individuals at the local and urban levels can be different depending on socio-demographic and job-related characteristics that influence different spatiotemporal patterns related to the lifestyle of individuals. In research on women who work at home, Mahmood (2007) defined a system of settings as "a chain of settings linked through time and space to a corresponding chain of activities". Mahmood (2007) argued that considering the nature of the work, as well as the level of communication and contact with clients, such systems for teleworkers may range from home to surroundings, neighbourhood, and other urban areas. Mahmood (2007) suggested that the systems of the group of extensive outside-contact participants that have family and child-related concerns can be different from the systems of the group of moderate and limited outside-contact participants. Although the extensive outside-contact participants tend to use settings near their home because of childcare issues, the scope of the activities and presence of the moderate and limited outside-contact participants may extend to the work spaces of clients further away and elsewhere in the city. Accordingly, Mahmood (2007) concluded that, from a planning and policy-making point of view, different local facilities should be designed and developed for these two groups according to their needs. While the first group may need facilities such as parks, community libraries, safe playgrounds, neighbourhood grocery stores, and childcare, the second group may need public transport access (Mahmood, 2007).

Based on three studies of teleworkers and home-based entrepreneurs in San Francisco and Sacramento, California, in 1990, Canada-wide in 1995, and in Vancouver in 2000, Gurstein (2002) conducted a relatively comprehensive study on the place-related preferences of homeworkers at the local level including the community sphere, use of the community, relocation to a neighbourhood telework centre or satellite office, and travel patterns.

According to Gurstein (2002), in North America, work at home has not in practice resulted in better and broader social communication at the neighbourhood level (i.e. with the neighbours); and there was a significant difference between the home-based workers and office workers who worked in the main places of work in terms of social interaction at the local level. In the California study, most home-based workers were aware of the isolating nature of their neighbourhood. For some, the existing social isolation was associated with having no easy access to the necessary services. A significant number of home-based workers in the California study recognised a residential role for the streets around their place of residence, and a small number of them considered a mixed-use role for these streets. Most home-based workers have 10-minute walk access to stores and services, but they spend more time accessing services such as copy offices, and recreation, sports, leisure, and childcare centres. A small number of respondents stated that they knew many immediate neighbours. Some felt loneliness and isolation during the day in their neighbourhood, even those living in more densely populated neighbourhoods.

There was no significant difference between home-based workers and non-home based workers in the use of services; because both groups did not have social contacts at the neighbourhood level, and they also did not have much activity in their neighbourhood. Failure to use services could be attributed to the lack of services or the use of services provided in places other than the neighbourhood. There were differences between home-based workers in terms of gender and type of engagement: women made more use of services than men; and part-time male and female homeworkers used services more than full-time male homeworkers. In the three studies, most neighbourhoods had reported shortcomings in terms of appropriate socialising places, such as cafes and restaurants. Home-based workers, like office workers, prefer to choose their recreational places based on their preferences, and not necessarily those recreational places that are locally available. After starting work at home, most people reported that they had not in practice used the neighbourhood services more than before.

Throughout the day, some homeworkers felt a strong sense of community in the specific circumstances of the immediate environment, related to the presence of a considerable number of home-based workers in the neighbourhood, as well as the design of a building block, including the specific arrangement and placement of buildings and the specific architecture of the units. However, Gurstein (2002) pointed out that most home-based workers did not have such an environment. In the California study, home-based workers did not spend much of their leisure time in the neighbourhood compared to when they did not work at home. They tended to be away from local people when they spent their leisure time. Gurstein (2002) noted the results of the California study are consistent with the results of Ahrentzen (1989) on this aspect, indicating that most people, after adoption of work at home, did not know more neighbours compared to when they did not work at home; and in general, they did not feel strong attachment to their neighbourhood.

In some cases, typically in the California study, homeworkers recognised their neighbourhood as having only low social opportunities. They were often incapable of proposing solutions and suggestions for improving this situation since most of these individuals were not able to distinguish between loneliness and isolation from working at home and the elimination of this isolation by improving the environmental conditions of the neighbourhood. People did not feel high control over changing and improving the neighbourhood. Changes in the neighbourhood structure are often not arbitrary and are negatively considered as the causes of density, congestion, and traffic. Gurstein (2002) noted that while many people were not satisfied with the current situation, they still did not want to change the neighbourhood. However, in the Canada-wide survey, neighbourhood changes in terms of better transport, improved shops and services, and telephone services were proposed by the respondents.

On use of the community, in the Canadian study, there were not many changes in the rate of service use after people started to work at home. Post offices, copy offices and banks were used more than other services. Other services, such as those provided by cafes, restaurants, recreational centres, and gyms, were used less than expected, and there were no changes compared to when not working at home. Gurstein (2002) argued this could be due to lack of time and other priorities for social and leisure activities. Although the Canadian study suggested that most respondents tended to spend their leisure time near their home, Gurstein (2002) argued that the time allocated to total leisure activities decreased compared to when workers did not work at home. In the Canadian study, most home-based workers did not feel any changes in the level of communication with other

neighbours. Gurstein (2002) stated that most home-based workers have a casual interaction style with their neighbours and believed that this level of social communication is common in the high-mobility North American residential settings. Therefore, homeworkers may need time to learn and interact with other neighbours.

In the Canadian study, most homeworkers believed that their work at home had no effect on the neighbourhood. However, some pointed out that their presence in the neighbourhood was fruitful for other neighbours because it added more security and social interactions to the neighbourhood. Homeworkers believed that focusing on their work was the reason for the lack of influence of their work activities on their neighbourhood.

Relocation to a neighbourhood telework centre or satellite office was examined. In the Canadian study, a significant number of respondents worked from a neighbourhood telework centre where space was shared between different businesses, or a satellite office affiliated to a specific company. The home-based employees and independent contractors reported or showed the most interest in this area, while self-employed consultants and home-based business operators showed less interest. In the California study, a high percentage of respondents, with more women than men, also tended to work at a nearby satellite office. In the Canadian study, self-employed workers worked in such centres under certain circumstances including suitable location and availability of these centres; presence of necessary equipment such as a fax machine, photocopier, and computer; less flexibility and less decentralisation; joint educational activities such as holding workshops; more social contacts and sharing clerical services such as answering phone calls. People who were reluctant to work at these centres mentioned better productivity at home, lack of opinion about cost savings in these centres, and lack of flexibility for managing family issues.

Travel patterns were examined. In the Canadian study, the number of trips by home-based workers declined. However, these results did not mean that the general travel pattern of home-based workers changed significantly. Travelling by car, the preferred mode of transport of home-based workers, did not change much. However, there was a difference between self-employed and employee groups of home-based workers: the use of cars by employee home-based workers decreased, while the use of cars for business trips to meet clients and suppliers by self-employed home-based workers increased. A significant

number of people used public transport, however, most only used it occasionally. For some respondents, there was a relative increase in the use of other modes of transport including walking and cycling. Most home-based workers walked regularly. After starting to work at home, walking increased. Cycling was still used for recreation and increased for some home-based workers. The use of taxi, as well as courier, increased for some home-based workers.

The Canadian study found a difference between the travel pattern of employee home-based workers and self-employed home-based workers. Employee home-based workers used cars less often and travelled short distances for all their daily activities. In the Canadian study, median distance travelled related to work, family and leisure time activities greatly and significantly decreased for employee home-based workers. Trips by self-employed home-based workers had fewer changes. Gurstein (2002) concluded that the reduction in the use of cars influenced by working at home, as previously assumed, would not be fully achieved, because the travel of self-employed workers increased. Since self-employed workers work both at home and out of home, it is unclear how much their total travel changes and it requires further research.

Studies have considered how to achieve the positive consequences of telework in designing new forms of neighbourhoods and changing the strategic approach to zoning systems and local planning regulations, to accept and integrate the issue of work. This change in approach will potentially lead to the regeneration of existing neighbourhoods by encouraging low intensity occupation at home and neighbourhood telework centres and supporting the necessary services in single-use residential areas (Gurstein, 1996). Development of collective work spaces at local levels that have advantages such as shorter trips to get to the workplace, and a professional image at the same time, can be effective strategies (Gurstein, 1996; Mokhtarian, 1991). Childcare services, copy shops, communication services, post and courier services, and restaurants and cafes can be located alongside these collective work centres or in suburban shopping centres that can lease work spaces. In the new neighbourhoods, the system of zoning and regulations should be less restrictive, while at the same time, having flexibility to meet the needs of different businesses. Based on this, an urban planning and management system at the local level should distinguish between minor home occupation, that involves only the members of one household, has no visual work-related public performance, does not create high occupancy rates, and does not need any parking, and major home occupation

that involves the members of more than one household, and has work-related public performance and requirements beyond the usual residential parking.

Alizadeh and Sipe (2013), Alizadeh (2012a), Alizadeh (2012b) and Alizadeh (2009) studied different life/work communities developed in the United States and Australia in to meet the residential needs of teleworkers, and examined comparatively different qualities of urban design, planning policies and regulations, and zoning systems in these communities. In response to better integration of work and life, Alizadeh identified place-related strategies, such as the existence of a mixed-use system, and the design of diverse collective workspaces and housing architectural patterns (Alizadeh, 2009, 2012a, 2012b, 2013).

3.4 Developing the research conceptual framework

There are two types of theoretical frameworks and models in the telework literature: frameworks and models that focus on explaining how telework is adopted, and frameworks and models that explain the effects of telework in different dimensions.

Many studies have been conducted on the factors affecting the adoption of, and motivation to telework, and various models have been presented (e.g. Bernardino, Ben-Akiva, & Salomon, 1993; Campbell & Heales, 2008; Campbell & McDonald, 2007; Hunton & Harmon, 2004; Shin, Higa, & Sheng, 1997; Siha & Monroe, 2006). The purpose of these types of models is to make a clear connection between the related basic factors and selection of telework by individuals. They have often considered several specific intermediary factors to justify this relationship. These types of models have often been developed for applications in a given field in accordance with the theories and knowledge of that field. Different dimensions of these models are summarised in Table 3.6.

On the other hand, some research has developed theoretical frameworks to understand and explain how various factors influence the telework experience and its subsequent outcomes (e.g. Baruch, 2001; Collins, 1998; Gajendran & Harrison, 2007; Lim & Teo, 2000). Table 3.7 summarises the factors contributing to these theoretical frameworks. The table shows most studies highlighted similar basic factors. Socio-demographic, job-related, and technological characteristics as well as the features related to the way an

individual works with the organisation are the basic factors in almost all these theoretical frameworks. In most cases, these studies have also had a socio-behavioural approach, where mediating factors and social-behavioural structures are used to explain the relationship between the basic factors and the final results. In addition, these studies have often addressed at least the individual socio-behavioural consequences as the final result of developing their theoretical framework.

Place-related factors have had a minimal role in the development of these theoretical frameworks. In some cases, the difference between telework places is recognised in terms of different work arrangements (e.g. Feldman & Gainey, 1997); or the importance of managing the geographical distance created between the organisation and the employees has been addressed (e.g. Baruch, 2001), but overall the telework place is poorly recognised in the theoretical frameworks.

Table 3.6 The main elements of telework adoption models

Reference	Practical focus	Theoretical context	Basic factors	Intermediary factors		Central factor	Outcomes
				Preliminary	Secondary		
Bernardino et al. (1992)	Organisational management	- Telework sociological characteristics - Travel behaviour and the transport system	- Environment: - Technology - Government policies - Employing organisation	- Individual: - Situational characteristics, Perception attitudes	----	Decision process	- Adoption of telecommuting - Level of telecommuting
Shin et al. (1997)	Organisational management	- Innovation acceptance and implementation - Organisational effectiveness	- Organisation effectiveness - Problems and opportunities - Potential benefits	- Motivation factors - Degree of management support	- Technical validity - Organisational validity - Management features - Constraints	Features of telework program	Telework performance
Hunton and Harmon (2004)	Organisational psychology	- Procedural justice - Self-determination	Telework policy	Motivation	- Cognition - Affects	Telework behaviour	- Individual outcomes - Organisation outcome
Siha and Monroe (2006)	Organisational management	- Competition - Government regulation	- Organisational - Telecommuting program	- Management Support and adaptation - Employee selection - Employee support and motivation - Self-discipline	- IT Support: Managing through technology - IT Support: Appropriate technologies	Successful telecommuting program	- Regulatory compliance - Favourable environmental impact - Productivity increases and cost reductions - Worker satisfaction; flexibility; Work-life balance
Campbell and McDonald (2007, 2008)	Organisational management	- System theory - Fundamental structural elements of telework practice within organisations	Telework drivers (Motivation)	- Organisational factors - Industry work practices - Employee preferences	- Management support - ICT for the management of telework - Governance mechanisms - ICT for the support of telework - Employee support	Telework processes	- Organisational impact - Societal impact - Employee impact

Table 3.7 The main elements of telework theoretical frameworks

Reference(s)	Basic factors	Intermediary factors	Outcomes
Feldman and Gainey (1997)	Individual differences: - Demographic status - Personality Dimensions	Job attributes: - Job autonomy - Social interaction with others - Task independence - Groupware/Conferencing usage Telecommuting arrangements: - Hours - Schedule - Location - Program initiative	Individual: - Performance - Absenteeism - Turnover - Commitment - Satisfaction
Collins (1998)	- Organisational characteristics - Individual characteristics - Work characteristics - Technology characteristics	- Fit between variables	- Individual - Organisational - Societal
Lim and Teo (2000)	Demographic characteristics: - Gender - Marital status Work-related attitudes: - Job insecurity - Organisational commitment Support factors: - Supervisory support - Work colleague support Perceived advantages and disadvantages: - Individuals - Organisation	-----	- Attitudes toward teleworking
Baruch (2001)	Individual: - Traits and characteristics Job: - Job profile, technology Organisation: - Policy, support, mechanism Nation: - Culture, infrastructure	Teleworking processes: - Work/family balance - IT intensity - Distance management - Legislation	Positive outcomes: - High efficiency. Quality of life, Less stress - Better performance, Cost savings, Image - Environment and community improvements Negative outcomes: - Isolation, poor career - Poor performance - Poor control - Autistic society
Gajendran and Harrison (2007)	- Telecommuting (flexible work location)	Psychological mediators: - Perceived autonomy - Work-family conflicts - Relationship quality Structural moderator: - Telecommuting intensity	- Job satisfaction - Performance - Turnover intention - Role stress - Perceived career prospects

The remainder of this section develops the conceptual framework of this research in the second category to explain the effects of telework in different dimensions. The conceptual framework of this research seeks to recognise the predictive structure of the impact of basic determinants of teleworking practice on telework socio-behavioural attitudes. Since this research emphasises the fundamental difference between the places of telework in terms of socio-behavioural outcomes, the place-related characteristics have a special role in the conceptual framework. In addition to other important factors mentioned in the telework literature for defining the basic conditions of teleworking, the role of place-related factors at different levels is expanded, with characteristics divided into micro and macro characteristics. Micro characteristics refer to interior features of the telework place including indoor environmental qualities, infrastructure specifications, and physical and spatial features. Macro characteristics refer to exterior characteristics, including infrastructure and spatial matters associated with the suburban and metropolitan levels such as quality of local and community facilities, and transport to city centres.

In addition to emphasising the role of place related factors in defining the basic conditions, the conceptual framework focuses on the key role of the work motivation factor in establishing the relationship between the basic factors of teleworking practice and socio-behavioural outcomes. Work motivation is defined as a set of energetic forces that originate both within as well as beyond an individual's being, to initiate work-related behaviour, and to determine its form, direction, intensity and duration (Pinder, 2014). The emphasis on the concept of work motivation in the conceptual framework is due to the importance of this psychological concept in the research related to organisational psychology as well as work psychology (Gagné, 2014; Kanfer et al., 2012; Langton, Robbins, & Judge, 2013) and also due to the relationship of work motivation, in certain circumstances, with other positive outcomes related to the work and life of employees such as job performance, job satisfaction, job commitment, and health (Gagné & Deci, 2005).

To assess the degree of motivation, the research conceptual framework is guided by a general psychological theory of motivation, Self-Determination Theory (Deci & Ryan, 1985; Ryan & Deci, 2000), which is one of the most appropriate psychological motivation theories for organisational researchers in understanding different organisational and work related phenomena (Deci et al., 1989; Gagné & Deci, 2005; Sheldon et al., 2003; M. A.

Tremblay et al., 2009). Furthermore, many studies have developed theoretical and conceptual frameworks to assess and explain the relationships between motivational qualities in work organisations (P. P. Baard et al., 2004; Deci et al., 2001; Gagné & Deci, 2005; Gagné et al., 2010; Gagné et al., 2015; M. A. Tremblay et al., 2009).

3.4.1 Self-Determination Theory

Self-Determination Theory (SDT) is “a macro-theory of human motivation, emotion, and development that takes interest in factors that either facilitate or forestall the assimilative and growth-oriented processes in people” (Niemic & Ryan, 2009a, p. 134). Self-Determination Theory focuses on the degree of self-motivation or self-determination of humans’ behaviour (Deci & Ryan, 2002). The theory identifies three universal and inborn (not learned) psychological needs as the main essentials of people’s survival, growth and integrity (Deci et al., 2001; Ryan, Sheldon, Kasser, & Deci, 1996):

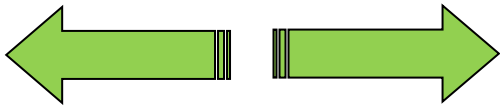
1. Autonomy refers to “volition-the organismic desire to self-organize experience and behaviour and to have activity be concordant with one’s integrated sense of self” (Deci & Ryan, 2000, p. 231). It is defined as “the need for volition and choice, for regulation of behaviour to be internal, determined by the self” (Cooke & Fielding, 2010, p. 159) and requires “experiencing choice and feeling like the initiator of one’s own actions” (Deci et al., 2001, p. 931).
2. Relatedness refers to “the desire to feel connected to others—to love and care, and to be loved and cared for” (Deci & Ryan, 2000, p. 231) and requires “a sense of mutual respect, love, caring and reliance with others” (Deci et al., 2001, p. 931).
3. Competence refers to “the experience of behaviour as effectively enacted” (Niemic & Ryan, 2009b, p. 135). It is defined as “the need to be effective within an environment, and obtain valued outcomes from it” (Cooke & Fielding, 2010, p. 159) and requires “succeeding at optimally challenging tasks and attaining desired outcomes” (Deci et al., 2001, p. 931).

SDT claims that people achieve motivation and wellbeing in organisations to the extent that they achieve satisfaction of mentioned psychological needs within those

organisations (Deci et al., 2001). The work environments that satisfy these needs psychologically support working life satisfaction and productivity. According to Deci et al. (2001), “contextual variables that support need satisfaction, as well as self-reports of need satisfaction on the job, should both predict people’s work involvement and mental health”.

Many studies have supported the proposition that satisfaction of the three psychological needs is associated with more “intrinsic motivation” (P. P. Baard et al., 2004; Ilardi, Leone, Kasser, & Ryan, 1993; Kasser, Davey, & Ryan, 1992). SDT has established a continuum that identifies different types of motivation along a spectrum and considers “intrinsic motivation” as the highest degree of motivation (Ryan & Deci, 2000) (Figure 3.2).

Figure 3.2 The continuum of Self-Determination Theory

Behaviour	Non-Self determined  Self-determined					
	Amotivation	Extrinsic				Intrinsic
Degree (or type) of motivation	None	Controlled		Autonomous		
Perceived causality	None	Controlled		Autonomous		
Locus of motivation	None	None internalised	Process of internalisation			Internalised
Type of regulation	None-regulation	External	Introjected	Identified	Integrated	Intrinsic

Source: Based on Deci and Ryan (2000)

The lowest degree of motivation is “amotivation” (lack of motivation and regulation) which is non-internalised and means not having intentionality to act. Under this condition, no perceived contingency is realised between action and the subsequent outcomes of action (Deci & Ryan, 1985).

Along the spectrum, motivation moves from amotivation to extrinsic motivation, which are types of motivation where people need to perceive a contingency between action and a desired outcome such as implicit approval or tangible rewards. SDT has recognised four types of regulation within extrinsic motivation (Ryan & Deci, 2000): External, Introjected, Identified, and Integrated regulations. When people experience externally regulated motivation (a classical type of extrinsic motivation), they behave only in order

to achieve a desired outcome such as getting a reward or avoiding a punishment (Gagné & Deci, 2005). Therefore, they are just engaging in behaviours which lead to those outcomes such as only working when the boss is watching. In this situation, behaviour is not important in itself.

Moving along the spectrum, the external motivation types become more internalised. The SDT framework sees extrinsic motivation in a range from extremely autonomous to extremely controlled. Extremely autonomous (i.e. intrinsic motivation) means activities are interesting for people and they do activities extremely volitionally, for enjoyment and fun, while extremely controlled means people feel an obligation to participate in activities, even though they are not interested in them. This range principally shows the degree of internalisation of behaviours. Accordingly, external regulation which is located at the beginning of the continuum is considered non-internalised, meaning that motivation is completely under the influence of external factors, and considered the most controlled.

On the other hand, intrinsically motivated behaviours are naturally autonomous behaviours. Extrinsically motivated behaviours need to experience the process of internalisation to be considered as autonomous behaviours. Accordingly, as behaviours become more internalised, they no longer need the presence of external contingencies (Gagné & Deci, 2005). The internalisation of motivation means that the desire to do an action comes from inside a person. Three other types of regulation (Introjected, Identified, and Integrated) within extrinsic motivation represent different levels of internalisation (Gagné & Deci, 2005). Introjected regulation is when the behaviours are under the control of the contingent consequences which are administered by the individuals to themselves. This is unlike external regulation in which the contingent consequences are administered by others (Ryan & Deci, 2000). Examples of this regulation are when people do something because of pride or shame such as working because it makes them feel like a worthy person. Here the locus of motivation is partially internal and in a controlled way because, although the regulation is inside the person, it is still relatively external to the self. Identified regulation is when people internally identify with the value of a behaviour such as identifying the importance of exercising for health leads to exercising more volitionally (Ryan & Deci, 2000). In this situation, people accept the value and importance of the behaviour and the behaviour becomes part of their identity. Here people feel more freedom as the behaviour is in line with their personal identity (Gagné & Deci,

2005). The fullest type of internalisation within extrinsic motivation is integration regulation and means integrating identifications with other aspects of oneself (Ryan & Deci, 2000). This is the most autonomous, self-regulated and self-determined form of extrinsic motivation. Although in some aspects it is considered similar to intrinsic motivation, it is principally extrinsic because people are interested in the behaviours to instrumentally achieve their personal goals (Gagné & Deci, 2005). In this type of regulation people fully accept behaviour and internalise it with their sense of self and with their other interests and values such as a nurse who, in addition to identifying with the value of the activities for maintaining patients' health, sees nursing as core to their identity and is interested in caring for people generally (Gagné & Deci, 2005).

The present research applies SDT to understand motivational differences that might emerge between different telework places as new working environments by drawing on the concepts of autonomy, relatedness and competence to analyse the socio-behavioural attitudes of teleworkers to different types of telework places. According to SDT, more intrinsic motivation that stems from need satisfaction should be related to the perceived productivity of teleworkers. The more workers' needs for autonomy, competence and relatedness are met by their environment, the more intrinsic motivation they will experience. Applying this theoretical reasoning to telework places, the more a telework place meets the needs for autonomy, competence and relatedness in relation to people's work, the more intrinsic work motivation they should feel and the more productive they should be.

3.4.2 Application of Self-Determination Theory in work motivation studies

There are various theories other than SDT about work motivations including goal-setting theory, action regulation theory, Kanfer's task-specific motivation, job characteristics theory, needs and motives (Alderfer, 1972; Herzberg, 1966; Maslow, 1954), Kelman's theory of internalisation and the concept of identification. One important characteristic of SDT compared to other theories of motivations is its focus on differentiating between types of motivation. While other theories of motivations focus on the total amount of

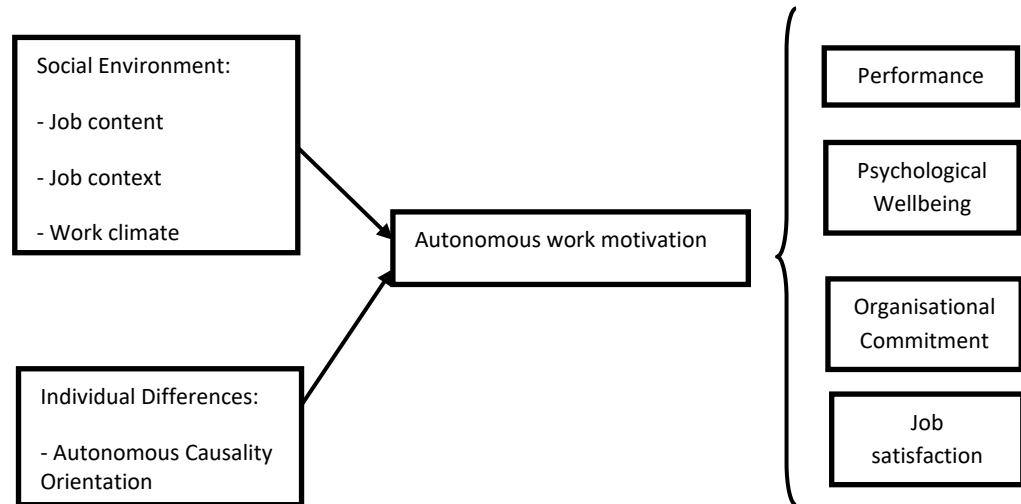
motivation, SDT focuses on relative strength of motivation (autonomous versus controlled) (Gagné & Deci, 2005).

Accordingly, many studies have applied SDT in organisational research. These studies confirm that autonomy supportive work environments provide greater basic need satisfaction and better internalisation of extrinsic motivation. This has secondary positive outcomes such as greater job satisfaction and job performance, and psychological wellbeing. Gagné and Deci (2005) have categorised these studies according to seven findings as follows:

1. There are negative relationships between “perception of extrinsic rewards” and the amount of “autonomy”, “intrinsic motivation” and “wellbeing” (e.g. Deckop & Cirka, 2000; Eden, 1975; Shirom, Westman, & Melamed, 1999).
2. Some relations have been observed between “managerial autonomy support” and “positive work outcomes” (e.g. Deci et al., 1989).
3. Regardless of socio-cultural context (individualistic or collectivist), “managers’ autonomy support” can more appropriately satisfy the SDT’s basic needs (autonomy, competence, relatedness) causing better achievement of “job satisfaction” and facilitating other positive organisational goals such as better performance evaluations, greater persistence, better acceptance of organisational change, and better psychological adjustment (e.g. P. P. Baard et al., 2004; Chirkov, Ryan, Kim, & Kaplan, 2003; Deci et al., 2001; Gagné, Koestner, & Zuckerman, 2000; Ilardi et al., 1993; Kasser et al., 1992).
4. “Managerial autonomy support” has a positive relationship with “subordinates’ autonomous and internalised motivation”, and the quality of the subordinates’ performance (e.g. Blais & Brière, 2002; Lynch Jr, Plant, & Ryan, 2005).
5. Feeling autonomy in the work environment improves involvement, performance and goal attainment in work activities (e.g. Breugh, 1985; Sheldon & Elliot, 1998).
6. Autonomous motivation can predict organisational commitment, although organisational commitment does not necessarily lead to autonomous motivation (e.g. Gagné, Boies, Koestner, & Martens, 2004; Gagné & Koestner, 2002).

7. Transformational leadership in organisations results in followers’ autonomy and better satisfaction of basic psychological needs which in turn lead to achievement of job satisfaction and organisational commitment (e.g. Bono & Judge, 2003).

Figure 3.3 shows the SDT model of work motivation in organisational studies, summarising the main input and output elements.



Source: Based on Gagné and Deci (2005)

Figure 3.3 SDT model of work motivation

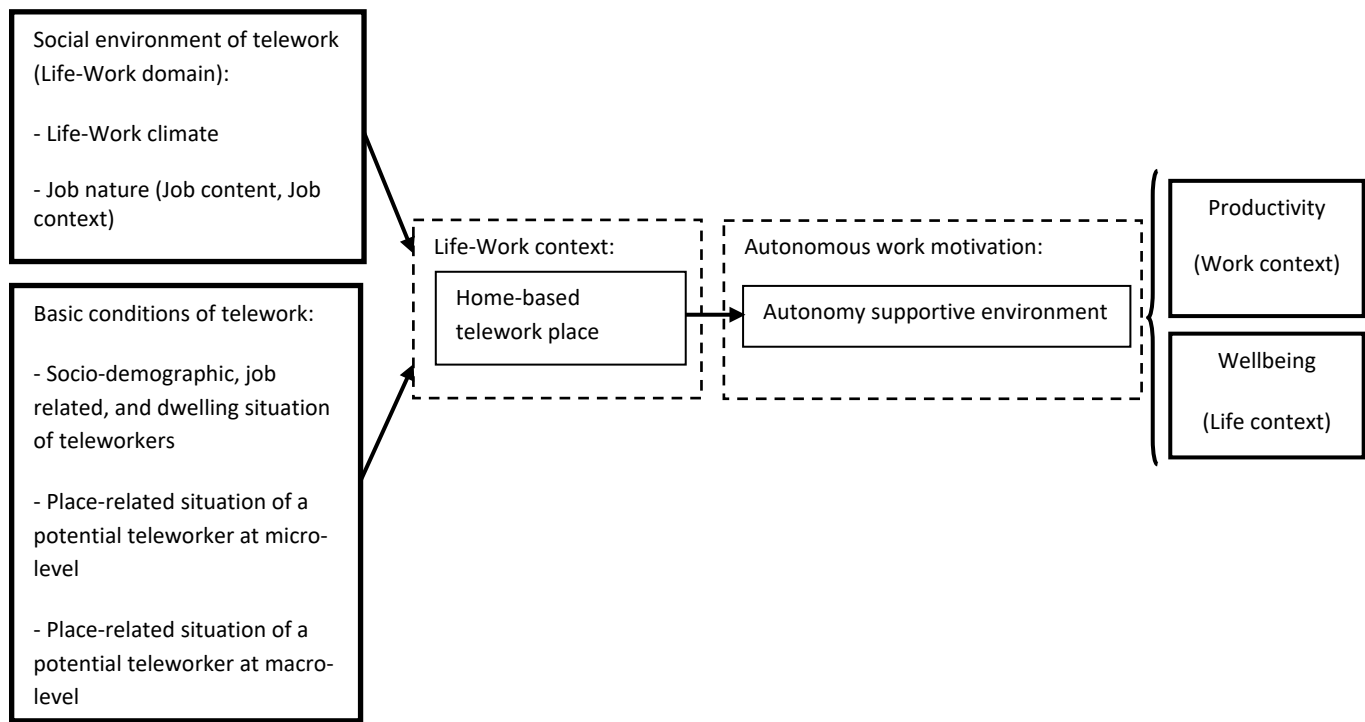
3.4.3 SDT framework and motivation for telework places

This research applies the SDT framework to understand the degree of teleworkers’ motivation in different telework places. SDT has been used to develop a work motivation model to assess the degree of people’s work motivation (Figure 3.3). The SDT model of work motivation has focused on characteristics of traditional work environments and has defined input elements as social environment (job content, job context and work atmosphere) and individual characteristics (autonomous causality orientation). Central to the model is the existence of an “autonomous work motivation”. By considering an autonomous work motivation the model expects to have employees’ performance, psychological wellbeing, organisational commitment and job satisfaction as output elements.

Telework places, similar to traditional workplaces, can be considered from the point of work context. However, they can also be seen through the lenses of life context as they are part of the life domain as well. Accordingly, the literature has mostly considered telework through a mixed domain of work and life. Although the literature has frequently mentioned different potential positive outcomes of telework adoption for workers including having better work-life balance and greater job performance, the current findings are mixed and more research is needed to understand the circumstances under which telework can have positive outcomes or not for workers.

For example, on work-life balance, Hunton (2005) argued about two opposing motivational forces for teleworkers as research confirms that people are extrinsically motivated to work outside home where they can have valued external rewards for their work (e.g. Bandura, 1997; Locke & Latham, 1990; Sullivan, 2012). On the other hand, other research shows that people are intrinsically motivated to do home activities since they have valued internal rewards (e.g. P. P. Baard et al., 2004; Deci, 1975; Vallerand, 1997). Therefore, employees are always facing a paradoxical conflict as they are under the influence of two opposing motivational forces: extrinsic motivation for work activities outside the home and intrinsic motivation to perform home-life activities. From the perspective of SDT, Ryan and Deci (2000) noted the role of autonomy supportive work environments in achieving a balance between opposing motivations and overcoming the problem, recognising that organisations with autonomy supportive work atmospheres such as flexible work arrangements can potentially provide wellbeing and productivity for their employees by improvement of “self-regulation” which means choice, volition and freedom to engage in certain valued behaviours (Hunton, 2005; Ryan & Deci, 2000).

Based on the model of SDT work motivation by Gagné and Deci (2005) (Figure 3.3), a model of telework place motivation has been developed to guide the present research (Figure 3.4). As the current research focus is on the work-life domain, the work motivation model has been adapted to reflect this expanded focus and provides a basis for empirical analysis.



Source: author

Figure 3.4 Telework places motivation model (research conceptual framework)

In the model, the social environment of telework is related to the job-related conditions of teleworkers. It includes teleworkers' work-related concerns and considerations previously discussed in the literature such as teleworkers' organisational support, work-life balance and professional isolation. The basic conditions of telework represent the individual profile of teleworkers apart from (or regardless of) their telework experience including the socio-demographic (e.g. age, gender, etc.), job-related (e.g. occupational categories, geographical location of employer), and residential (e.g. geographical location of residence, dwelling type) characteristics of teleworkers.

As suggested by the present research, the basic conditions of telework need to be extended to incorporate the telework place-related context of teleworkers. Based on the current literature, the model differentiates between the place-related situation of teleworkers at the micro and macro levels. The place-related situation of teleworkers at the micro level can be related to the key dimensions of a productive traditional workplace as theorised by Haynes (2007) such as layout, comfort, interaction and distraction, or the other

possible place-related requirements of teleworkers inside the home such as a separate workspace. The place-related situation of teleworkers at the macro level can also be related to the place-related needs of teleworkers at the local area and metropolitan levels including access to transport and local area services. As the model proposes, improving both the social environment and the basic conditions of telework which together shape the life-work context of a home-based telework place can increase autonomous teleworkers' work motivation and achieve an autonomy supportive environment at home, and as a result generate other positive socio-behavioural outcomes such as increased productivity and well-being. The model sets a foundation for designing the research empirical model in the next chapter.

3.5 Summary

This chapter reviewed the theoretical foundations to better link the place-related characteristics of telework with the positive psychological experiences of teleworkers and develop a conceptual framework. Figure 3.5 illustrates the different stages of the development of this conceptual framework in Chapter 3.

The chapter initially reviewed the findings of studies on the socio-behavioural experience of telework. Findings were categorised as employees' work-related outcomes, employees' work-life balance, and employees' wellbeing outcomes. Differences in various types of telework places were discussed in terms of different socio-behavioural outcomes. This discussion highlighted that more research is required to explore the place-related factors that affect socio-behavioural experience of teleworkers.

The research literature was then reviewed to determine the effects of place-related factors on the socio-behavioural characteristics of individuals working in conventional workplaces, and important models were introduced. The models were comprehensive enough to explain the relationships between place-related factors and socio-behavioural outcomes. In particular, Haynes' (2007) model emphasised the importance of office layout, comfort, interaction and distraction in the formation of a productive workplace. presented as two general forms of the built environment and the behavioural environment.

Socio-behavioural understanding of telework phenomena

Telework socio-behavioural consequences

Importance of telework place

The place-related factors of effective telework

Productive workplace

Preferred telework place characteristics

Developing the research conceptual framework

Telework frameworks and models

Self-Determination Theory of motivation

SDT work motivation model

Telework place-based work motivation model

Figure 3.5 Development of the research conceptual framework

The research conceptual framework was finally developed by analysing and comparing the typology of developed frameworks and models of telework. Frameworks and models include telework adoption models and explanatory models predicting the socio-behavioural outcomes of telework. All explanatory models are characterised by common basic factors related to socio-demographic, job and technology related characteristics. Most models benefitted from key socio-behavioural factors mediating the effects of basic factors in results. Most of the developed models have ignored the roles of place-related characteristics as effective basic factors, or the factors have been poorly represented. Place-related factors were considered and expanded along with other features, introduced by previous models as basic factors, in the research conceptual framework. The conceptual framework used work motivation as a pivot in the explanatory and predictive structure due to the importance of this variable in studies on organisational psychology and work psychology. The conceptual framework is guided by Self-Determination Theory which is “a macro-theory of human motivation, emotion, and development that takes interest in factors that either facilitate or forestall the assimilative and growth-oriented processes in people” (Niemic & Ryan, 2009a, p. 134).

Chapter 4: Research Design and Methodology

4.1 Introduction

This chapter describes the methodology for the research. The research uses a quantitative methodology to collect data on the variables defined in the research conceptual framework through design and implementation of a survey of teleworkers, and addresses the research questions through statistical analyses.

Section 4.2 presents the type of research methodology selected and its advantages. Section 4.3 explains the main empirical analyses used to answer the research questions. Section 4.4 presents the development of a survey as an instrument to collect the data for analysis including explaining the definition of questions, the general structure and parts of the survey, the approach to implementation of the survey, and final adjustments. Section 4.5 discusses identification and formation of the statistical sample, and the review of strategies used to find potential respondents, and procedures for collection of data. Section 4.6 reviews and explains the statistical techniques and software used for analysis.

4.2 Research methodology

Survey-based quantitative methodology is very commonly used in socio-behavioural studies (Ajzen, 1988; Triandis, 1977), due to its many advantages (Babbie, 2015; Blair, Czaja, & Blair, 2013; Bryman, 2012; Creswell, 2013; R. B. Johnson & Onwuegbuzie, 2004). A survey-based quantitative methodology was considered the most appropriate method to answer the research questions for the following reasons:

- It provides rapid collection of data for predictive ability.
- It has ability to analyse relatively large sample sizes.
- It allows rapid data analysis via appropriate software.
- It allows more accurate identification of cause and effect relationships between study variables.

- It supports the possibility of further tests and development of existing theoretical frameworks.
- It supports further development and generalisation of results in later stages and development of new theoretical frameworks.

Additionally, the majority of Self Determination Theory research has applied a quantitative research method (Ryan & Niemiec, 2009).

Given the above advantages, the present study selected a quantitative methodology, despite knowledge of the weaknesses, biases and usual errors in measurement of concepts (see Babbie, 2015; Hudson, Seah, Hite, & Haab, 2004) that may occur in defining standard questions or in the process of sampling. However, various techniques have been followed to minimise such errors, including using filtering questions at the beginning of the survey to identify eligible respondents, and using multiple scales to increase reliability and validity in measurement of features and concepts (Churchill Jr, 1979; Hoyle, Harris, & Judd, 2002).

In general, the application of quantitative methodology has limitations. The literature on research methodology (e.g. Baxter & Jack, 2008; G. Morgan & Smircich, 1980) has mentioned various disadvantages of quantitative methodology as follows:

- The secondary data is not always available or accessible in quantitative research.
- Quantitative research data might be not sufficiently robust to explain complexities.
- Quantitative research method may bring about a wrong impression of homogeneity in a sample for the researchers.
- Data collection is usually expensive and time-consuming in quantitative research.
- In quantitative research, the researchers are less able to control the environment and the time the participants respond to the questions in the survey.

To overcome the limitations of quantitative methodology, the present research has relied on several strategies including but not limited to designing a comprehensive survey with many complementary exploratory questions (see Section 4.4).

The present study acknowledges the value of future qualitative studies for theoretical development of the subject and scrutiny of results, and considers qualitative approaches probable, but does not consider a qualitative study is necessary at this stage. Previous studies conducted on various aspects of telework have introduced different hypotheses, which have enabled the present study to initially identify factors involved in work motivation (see Chapters 2 and 3 for the literature review and conceptual framework) and largely reduced the need for explorative and qualitative methods.

4.3 Research analyses

Based on the Telework Places Motivation Model introduced in Chapter 3, the research empirical model has been developed to design practical research analyses (Figure 4.1).

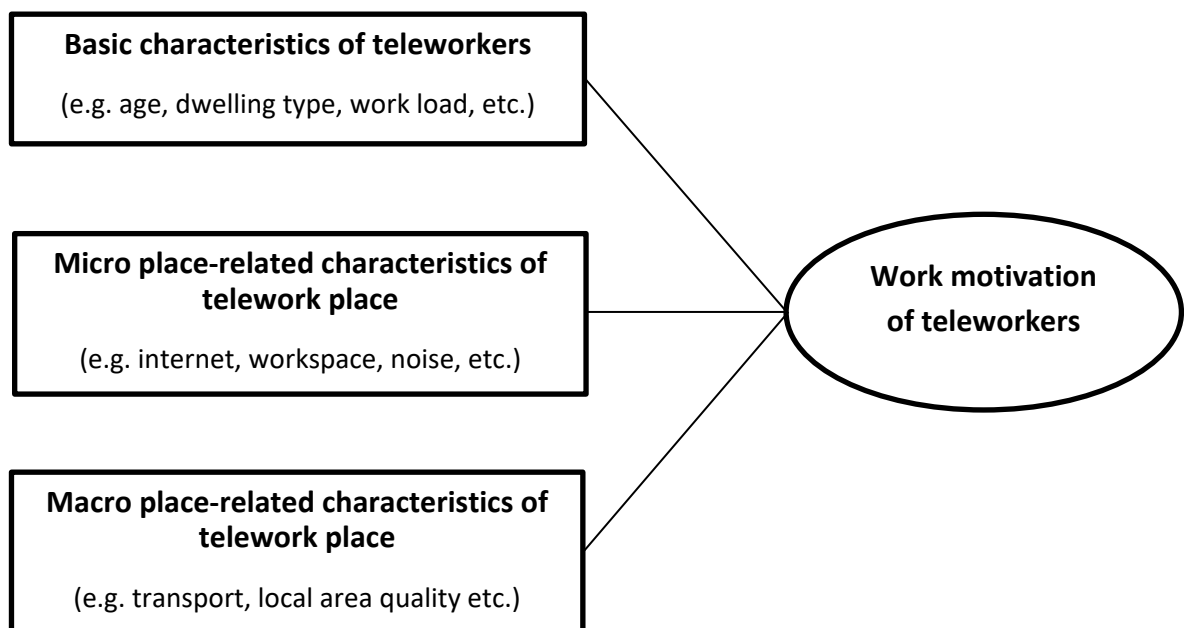


Figure 4.1 The research empirical model

According to the developed empirical model, and in order to respond to the research questions, seven sets of analyses are implemented as follows:

1. Analysing the status of basic variables (including socio-demographic, dwelling and job-related variables), micro place-related variables, and macro place-related variables
2. Comparing the status of basic variables (including socio-demographic, dwelling and job-related variables), micro place-related variables, and macro place-related variables of the research to relevant statistics at the national level
3. Comparing the status of basic variables (including socio-demographic, dwelling, and job-related variables), micro place-related variables, and macro place-related variables based on teleworkers' employment status
4. Testing the relationship between basic variables (including socio-demographic, dwelling and job-related variables), as the independent variables and teleworkers' work motivation as the dependent variable
5. Testing the relationship between micro (place-related) variables including micro spatial, infrastructure and environmental variables, as the independent variables and teleworkers' work motivation as the dependent variable
6. Testing the relationship between macro (place-related) variables including macro spatial and infrastructure variables as the independent variables and teleworkers' work motivation as the dependent variable
7. Testing the relationship between basic variables, micro variables, and macro variables as the independent variables and teleworkers' work motivation as the dependent variable (Model 4).

Table 4.1 summarises the relationships between the research questions and the research empirical analyses. Analysis 1 descriptively examines the status of each of the basic, micro and macro variables separately to respond to research question 1.

Analysis 2 aims to explore the difference between the research sample results on basic and place-related characteristics and the relevant Australian censuses and other survey data. Analysis 2 uses descriptive and inferential statistical techniques to respond to research question 2. Analysis 3 investigates the difference between the two main subgroups of teleworkers, employee and self-employed, through descriptive and inferential statistical exploration to answer research question 2.

Analyses 4 to 7 help answer research question 3. The relationship between each of the basic, micro and macro variables and teleworkers' work motivation is analysed by three separate quantitative predictive models associated with each of the three analyses with several main advantages: the most important factors affecting the work motivation of teleworkers in the basic, micro and macro variable groups are identified, and initial answers to research questions are partly provided; the overall effect of each group of variables (basic, micro and macro) is identified; and an initial understanding of the concurrent effects of these variables on teleworkers' work motivation is derived from prior knowledge of the overall effect of each group of variables and identifying the most important ones. This ultimately helps development of a general statistical model as the last analysis (Analysis 7), which assesses the concurrent relationships between basic, micro and macro variables and teleworkers' work motivation. The final result of this analysis helps to assess the research conceptual model.

Table 4.1 The relationships between research questions and empirical analyses

Analyses	Type	Model(s)	Independent variable(s)	Dependent variable(s)	Related research questions
Analysis 1	Descriptive		Basic variables Micro variables Macro variables		Research question 1
Analysis 2	Descriptive/ Inferential	-	Basic variables Micro variables Macro variables	Australian workforce population	Research question 1
Analysis 3	Descriptive/ Inferential	-	Basic variables Micro variables Macro variables	Employment status	Research question 2
Analysis 4	Predictive	Basic characteristics model	Basic variables	Teleworkers' motivation	Research question 3
Analysis 5	Predictive	Micro characteristics model	Micro variables	Teleworkers' motivation	Research question 3
Analysis 6	Predictive	Macro characteristics model	Macro variables	Teleworkers' motivation	Research question 3
Analysis 7	Predictive	Composite model	All the research independent variables	Teleworkers' motivation	Research question 3

4.4 Survey development

A survey was used as the instrument to collect the data needed in the research analyses. Following the approach suggested by Blair et al. (2013), this section explains three major stages of development of the survey: defining the questions, explaining the structure of the survey, and pilot testing of the survey.

4.4.1 *Defining the questions*

Appropriate questions were designed to collect data associated with each variable of the research analysis. A variety of questions were used in different parts of the survey due to the research data needs. As explained in specialised literature on principles of survey design, questions should be designed in such a way to facilitate understanding and answering the question by respondents as intended by the researcher, and should encourage respondents to provide accurate answers (Dillman, 2011). Hence, the survey format and wording of questions were designed to represent the concepts and variables of the research in the best and most accurate way possible.

In the design of the survey, the following general formats were used:

- **Open-ended questions:** These questions have no definite answers, but allow respondents to provide answers in their own words and express their own ideas (Taylor-Powell, 1998). Open-ended questions are qualitative in nature (Dörnyei & Taguchi, 2010), which provides the possibility to explore different themes, and answers can be extremely worthwhile (Fink, 1995). This type of question was used in different sections of the survey to collect interval data, or data on issues about which no consensus has been reached in the literature on telework, requiring direct responses from respondents.
- **Closed-ended questions:** These questions restrict respondents' response options to a specific list of answers (Dillman, Smyth, & Christian, 2014). Answers to this type of questions are easily standardised, compared and analysed (Fink, 1995). This type of question was used in the survey to collect nominal data, especially for issues where there was consensus in the literature on telework.

- **Partially open-ended questions:** As for closed-ended questions, a specific list of answers is provided for these questions; except there is an additional option of “other”, which allows respondents to give an answer other than those suggested (Bordens & Abbott, 2002). This type of question was used in parts of the survey where highly important answers beyond existing options were likely to be provided by the respondents.
- **Likert-type questions:** A Likert item is a statement evaluated by the respondent. A Likert scale is usually used in assessment of attitudes (Likert, 1932). The survey used a 5-point Likert scale to assess satisfaction with various place-related factors, and a 7-point Likert scale for work motivation. A 5-point Likert scale was chosen over other types of scales to assess satisfaction with place-related factors, to ensure a consistent and an easy to understand scale for the large number of Likert-type questions in the survey, and to help increase the response rate and response quality (Babakus & Mangold, 1992; Buttle, 1996; Marton-Williams, 1986). The Work Extrinsic and Internal Motivation Scale (WEIMS) developed and validated by Tremblay et al. (2009) and adapted to measure the degree of work motivation in this telework research (see Section 4.4.2.6) used a 7-point Likert scale.

4.4.2 Structure of the survey

To ensure quality of data collection, the structure and order of a survey should be appropriately planned and organised. The arrangement of survey questions that collect data on different important issues can improve the validity and reliability of data collected (Brace, 2004). A survey should be organised in such a way that each respondent can answer relevant questions (Brace, 2004). Brace (2004) recommends a specific approach to the appropriate arrangement of a survey form. Based on this approach and according to key research considerations such as research questions, conceptual framework and analytically important variables, the survey had seven main parts in the following order:

- A. Information sheet
- B. Filtering questions
- C. Questions on teleworkers' job-related characteristics

- D. Questions on teleworkers' micro place-related characteristics including their telework place's spatial, physical, infrastructure, and environmental characteristics
- E. Questions on teleworkers' macro place-related characteristics related to some of the spatial and infrastructure features hypothetically effective in teleworkers' work motivation outside the teleworking place at a community and metropolitan level
- F. Questions on the perception of teleworkers about work motivation to telework
- G. Socio-demographic questions.

Each of these parts is explained below.

4.4.2.1 Information sheet

The information sheet on the first page of the survey explained the purpose of the survey, the study subject, and reasons for the survey. Given research ethical considerations, the following important details were provided on the first page:

- purpose of the study and the benefits
- who is carrying out the study
- what is involved in the survey
- how much time the survey takes
- participation and withdrawal
- confidentiality and security of data
- ethics clearance and contacts
- further information about the study (including report on research finding)
- researcher contact information

4.4.2.2 Filtering questions

The survey used filtering and separating questions at the beginning of the survey for two reasons: to identify respondents who did not fit the definition of teleworkers used in this study and exclude them from the survey, and to simplify collection of data on two different groups of teleworkers by providing specific questions for each group.

The research target population was workers who have regular experience of home-based telework. In this study, home-based teleworkers are defined as people who use telecommunication technologies to work from their home maintaining contact and work delivery with employers or clients at a distance. Accordingly, two filtering questions were first asked to identify teleworkers:

1. Does the respondent sometimes work from home?
2. Does the respondent need to use telecommunication technologies to maintain contact and work delivery with the employer or clients?

A negative answer to both of these questions identified a respondent as a non-teleworker and screened them out from the survey. With positive answers to both questions, the eligible respondents were selected and allowed to take the survey. A third question was asked to separate the teleworkers into “employee” and “self-employed” groups in the following form: Is the respondent an employee or self-employed?

The flowchart for filtering teleworkers is presented in Figure 4.2. Figure 4.2 shows the eligible respondents are directed to respond to two different questionnaires based on their teleworking employment status as either employee or self-employed. The questionnaires follow a similar structure and include similar questions to collect data on basic and place-related factors. The questionnaires are only different when gathering relevant data considering a respondent’s employment status as an employee or self-employed. A sample filtering questions form, and employee and self-employed teleworkers’ questionnaires are reproduced in Appendixes A, B, and C.

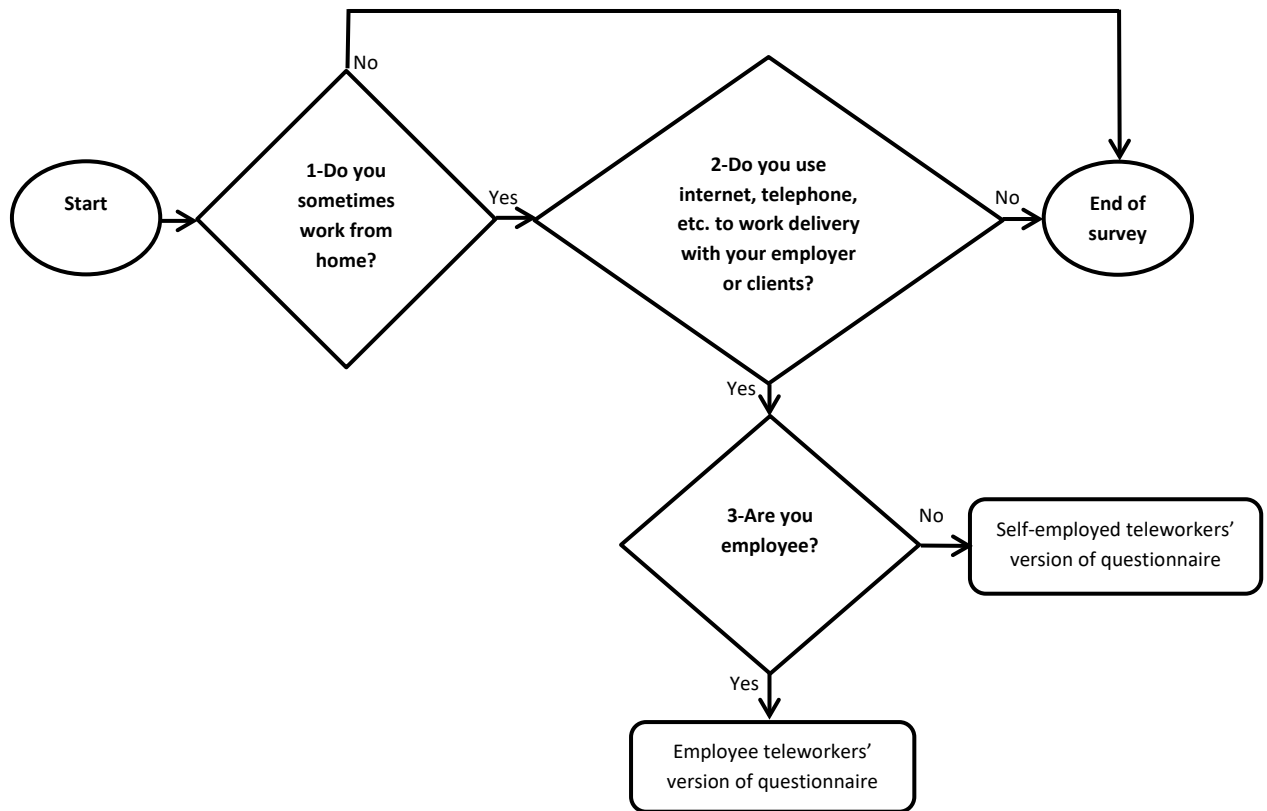


Figure 4.2 Process of filtering appropriate respondents

4.4.2.3 Job-related questions

The third part of the survey contained work-related questions to collect basic data on general conditions governing telework. These questions mostly addressed characteristics relating to the status of telework, such as type of work, time allocated to telework per week, working relationship with employer (including existence of a telework contract), ongoing important issues to the employer, and previous length of experience of teleworking. According to the literature on telework, and based on the research conceptual framework in Chapter 3, work-related characteristics are assumed to affect teleworkers' work motivation, which explains their presence in study analyses. Work-related characteristics are also highly important in identification of different groups of teleworkers with different working conditions.

4.4.2.4 Micro place-related characteristics questions

The fourth part of the survey contained questions on micro place-related characteristics to collect data on the indoor spatial, physical, infrastructure and environmental features of telework. Given the conceptual framework of the study, these features represent various factors assumed to affect the work motivation of teleworkers in the telework place. Questions on micro place-related characteristics collected data from teleworkers about their current conditions and the extent of their satisfaction with them. These questions were about access to internet, workspace form and location, and factors relating to indoor environmental qualities such as noise and temperature.

4.4.2.5 Macro place-related characteristics questions

The fifth part of the survey was on macro place-related characteristics. According to the conceptual framework of the study, certain outdoor spatial and infrastructure factors at the local and the metropolitan levels are assumed to affect teleworkers' work motivation. Questions on macro place-related characteristics collected data on these factors such as satisfaction with quality of local services, and appropriate quality of access to the city.

4.4.2.6 Teleworkers' work motivation questions

The sixth part of the survey collected data through questions about teleworkers' work motivation. Work motivation, as the most central concept and the main dependent variable, was measured using the 18 item Work Extrinsic and Internal Motivation Scale (WEIMS) developed and validated by Tremblay et al. (2009) to answer the question "why do you do work?" (M. A. Tremblay et al., 2009). The WEIMS has six Self Determination Theory subscales of intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation, with three items for each subscale. In WEIMS respondents evaluate and answer each item in the form of a 7-point Likert scale from "does not correspond at all" to "corresponds exactly". To use the scale in the research survey, the items were adapted to teleworkers' conditions in terms of meaning and structure of statements. Because of conceptual inconsistency and lack of conformity on meaning and considerations of telework as a special type of work arrangement, items relating to the Introjected subscale were not used.

In addition to assessing how much of each type of Self Determination Theory motivation workers are experiencing, the scale also allows the computation of a final self-determination index score from the subscales within the WEIMS. This index is calculated to integrate scores from each of the six subscales into one score and it provides a general indication of the level of intrinsic motivation being experienced: higher scores on the index indicate more intrinsic motivation.

4.4.2.7 Socio-demographic and dwelling-related questions

The final part of the survey had questions on teleworkers' socio-demographic and dwelling characteristics. As recommended by social scientists, socio-demographic questions are normally placed at the end of a survey (Brace, 2004). Questions in this category included basic items identified in the literature review including current socio-demographic characteristics and dwelling situations of teleworkers that, according to the literature, may affect teleworkers' degree of work motivation. The majority of these questions were adapted from the format used in Australian Bureau of Statistics surveys and censuses.

4.4.3 Survey approach

There are various ways to disseminate and conduct a survey, including face-to-face, phone, post and online. Each method has advantages and disadvantages. The survey was distributed to respondents online in which respondents were invited by email to answer the survey presented on a web page (Bryman, 2012). The internet-based approach was considered appropriate for the following two reasons:

- Teleworkers, by definition, use telecommunication technologies to conduct their work-related tasks. Hence, it may be assumed that the target population of teleworkers have an acceptable working familiarity with using telecommunication technologies, and also a good level of internet access, and thus can easily take part in the survey.
- Considering the strategies used to identify teleworkers and establish research samples (see Section 4.5), which were all possible through the internet, the survey should be conducted through the internet.

An internet survey has many advantages. It has much lower cost and much faster collection of data compared to other methods (Babbie, 2015; Blair et al., 2013). It is also possible to screen specific questions for different groups of respondents through special programming techniques (Blair et al., 2013). The latter advantage allowed this study to show questions specific to each of the two groups of teleworkers (employee and self-employed) that experience different conditions. However, there could be also some disadvantages for internet survey (see Evans & Mathur, 2005; Fricker & Schonlau, 2002; J. Weber & Bradley, 2006). The current literature has suggested various solutions for overcoming the internet survey limitations (see Evans & Mathur, 2005). Table 4.2 summaries the drawbacks of internet survey and the relevant solutions based on the current literature.

Table 4.2 Drawbacks of online surveys

Drawbacks	Solutions
Perception as junk mail	Opt-in surveys; brief e-mail with URL link
Skewed attributes of internet population: upscale, male, etc.	Demographically balanced panels
Questions about sample selection (representativeness) and implementation	Company selections (not self-election) and randomisation
Respondent lack of online experience/expertise	Simple instructions, “click on” access to survey; easy answer
Technological variations	Use of standard colours and screen dimensions, pop-up technology
Unclear answering instructions	Adequate pre-tests; use of pop-up windows
Impersonal	Include respondent name; send out birthday cards, etc.
Privacy and security issues	Clear, highly visible, respondent-friendly policies
Low response rate	Limited number of contacts, small incentives, good survey techniques

Source: Adapted from Evans & Mathur (2005)

Where possible, the solutions suggested by the literature were considered by the present research in design and implementation of the online survey. This includes the arrangements such as preparing a brief e-mail of invitation to participation with the survey's URL link included, adjusting a "click on" access to the link of survey in the email of invitation, considering simple instruction and easy answers, using standard colours and screen dimensions in the survey, and performing adequate pre-tests through conducting a pilot survey.

4.4.4 Pilot survey

A critical step in the survey design was to undertake a preliminary pilot survey to identify and remove possible problems and calibrate the survey for research considerations. There are many advantages to performing a pilot survey; generally, it can prevent potential errors compromising and complicating administration and analysis of the main survey (Brace, 2004; Malhotra, 2010). According to De Vaus (2013), every pilot survey involves three stages each with a specific task for eliminating potential errors: question development, survey development, and polishing the pilot survey. The first stage identifies issues such as considering sufficient variation in responses, how questions are understood, whether all items are necessary, whether items measure correctly, what response items are not chosen, and the evidence of acquiescence. The second stage examines matters such as whether the survey flows appropriately, whether the skips work well, whether the length of survey is appropriate, and whether all questions later in the survey are completed adequately and respondent interest is sustained. The third stage of conducting a pilot survey can ultimately enhance readability of the survey and review the adequacy of answers provided (De Vaus, 2013).

A pilot survey was designed and implemented, based on the approach proposed by De Vaus (2013), with five phases consisting of determining the participants who pre-test the survey, determining the number of participants to pre-test the survey, determining who should conduct the pilot survey, coding the responses, and respondent debriefing.

Participants for the pilot survey were selected according to two specific criteria: familiarity with telework and having some previous telework experience; and adequate

academic and research background, resulting in the necessary insight and experience needed to complete the survey and give constructive advice.

After selection of pilot participants, they were invited to take part in the pilot survey through an email which provided explanations about the research objectives, purpose of the pilot survey and general details of the survey, and had the link to the online survey. Participants invited were able to answer questions through the link provided. At the end, participants were further requested to answer specific questions about any weaknesses of the survey, and to provide their overall opinion.

A total of seven people took part in the pilot survey, and through their answers to the survey and views expressed at the end, including 32 comments and suggestions, problems overlooked were identified and corrected. This included the following corrections:

- The survey was restructured in terms of the ordering of sections
- English language syntax and overall meaning of the questions were revised
- The questions with less priority were removed; made the survey shorter
- Unnecessary items were removed from the survey questions
- Scaling response issues were corrected
- Further explorative questions were included.
- Skip command issues in the online survey were corrected
- The online survey's graphic was improved

Through the online survey software used, it was also possible to identify the time taken for participants to complete the survey which was 12.87 minutes in average. The responses of the people participated in the pilot survey, were not included in the final research sample.

4.5 Sample recruitment and data collection

This section reviews stages of sampling process performed. The main stages already explained included definition of the study sample, ethics approval, and collection of data.

4.5.1 *Sample definition*

Target population: The research target population included employee and self-employed workers who have regular experience of home-based telework, where home-based telework is defined as working from “home”, using internet, telephone, etc. to maintain contact and work delivery with employers and clients at a distance. Telework has traditionally happened at home. Although other types of telework have emerged during recent years (Shieh & Searle, 2013a), home-based telework is still the most common form of telework. Around 18 per cent of all Australian employees undertook some work from home in 2009 (DBCDE, 2011). The most recent national statistics in Australia (see Toscano, 2016) shows that a large number of Australian teleworkers are people working from home which led the research to focus on home-based teleworkers.

Sample specifications: Statistics and social research literature has identified characteristics for an appropriate sample (Fidell & Tabachnick, 2013; Field, 2013; Yin, 2009). According to the literature and considering the objectives of the research, the research sample should have the following key considerations:

- sufficiency in the size of sample
- balance in socio-demographic characteristics such as age, gender, etc.
- sufficiency in the number of teleworkers with different adopted teleworking experiences, such as variety in terms of employees and self-employed telework practices or both).

Sample size: As the predictive statistical tests were the core of the research quantitative analyses, the estimation of the minimum sample size needed to comply with the pre-assumptions and fundamentals of these tests:

- **Normality of the sample considerations:** Based on central limit theorem, regardless of whether the source population is normal or skewed, provided the sample size is larger than 30 then the distribution of the sample means will be approximately normally distributed (Field, 2013).
- **Statistical power:** Statistical power is the contingency of correctly rejecting the null hypothesis when it is false in a given sample (J. Cohen, 1992; Faul, Erdfelder, Lang, & Buchner, 2007). The sample size can be estimated considering the statistical power in the process of designing a survey. This technique can be used in socio-behavioural research to determine the sample size large enough to allow statistical judgments that are precise and reliable and the extent it is likely the applied statistical test can find the effects of a given size in a situation (Faul et al., 2007).

To correctly estimate the size of the sample, the research has relied on the second criteria and used G* Power software (Mayr, Erdfelder, Buchner, & Faul, 2007). To estimate statistical power for multiple regression analysis, there is a need to pre-determine four variables: number of independent variables (IVs) in the model, effect size (f^2) significance level (α), and statistical power ($1-\beta$) (Faul, Erdfelder, Buchner, & Lang, 2009). To calculate the minimum sample size, the research has allocated the following values to the mentioned variables:

- number of independent variables=35, which is the number of independent variables set in the composite regression model of the research (empirical analysis 7)
- significance level=0.05, which is normally recommended in statistics (Quinn & Keough, 2002)
- effect size=0.15, which is ranked as small (J. Cohen, 1988)
- statistical power=0.80, which is ranked as large (J. Cohen, 1988)

Accordingly, a minimum size of 201 has been finally estimated as the size of the sample.

4.5.2 Ethics approval

The research approach and survey was approved by GPEM ethics officer in July 2014 during the PhD candidature time in the University of Queensland. Once the PhD candidature was transferred, the ethical approval regarding the research approach and using the data also granted by the Human Research Ethics Advisory Panel E of the University of New South Wales in April 2016.

4.5.3 Conducting data collection

Since the sample in the research should be sufficient and balanced, this project has relied on a combination of strategies to establish the sample. Organisational networking and social networking were simultaneously used as major strategies to find potential respondents and gather data. Each major strategy also included two related minor strategies:

Organisational networking:

- A. Private companies and government organisations in Australia which have provided home-based telework arrangements for their employees were contacted and requested to email the survey link to their employees.
- B. Councils of cities and regions in Australia in which, according to news and statistics, telework is occurring at a higher rate, were contacted and requested to email the survey link via their newsletters.

Social networking:

- C. Teleworkers were contacted through digital social networks such as Facebook, LinkedIn and Twitter and a snowball sampling method was used for networking and finding volunteers to participate in the survey.
- D. Teleworkers in digital communities were contacted by using online sampling services to email the survey link to community members.

After obtaining Ethics Committee approval, the process of data collection began in August 2014. Data were initially collected by adopting organisational networking strategies, followed by social networking strategies. In all correspondence in the four

different strategies adopted, the online link of the survey together with a letter of invitation containing an introduction to the study, explanations about the purpose and details of the survey, and ethics considerations were emailed. Importantly, adoption of strategy D as the final strategy contributed to achieving a balanced sample as well as diversity of data. The initial data collected through organisational networking strategies highlighted shortfalls in the samples and especially in diversity of teleworkers' experiences, which were compensated for in the online sampling services strategy.

Collection of data through the four strategies continued until March 2015. A data cleaning process was then run to remove incomplete surveys, address missing data and outliers. To prevent false data by non-eligible respondents, the completed surveys were also checked for the consistency of general information of respondents with common and expected characteristics of a typical teleworker based on literature (e.g. the working tasks teleworkers normally do). Where there was a major contradiction with literature, the respondent was not considered as a teleworker by definition, and the survey was completely removed from the sample.

After data cleaning, a sample size of 277 remained. Table 4.3 summarises the sampling strategies, data sources, and the number of completed surveys after data cleaning. Due to the research ethics consideration, the location of data collection remains confidential.

Table 4.3 Data collection strategies and number of completed surveys after data cleaning

Sampling strategy	Data source	Number of completed surveys after data cleaning
Social networking	Digital communities through online sampling services	254
	Digital social networks	2
	Social connections	7
Organisational networking	Telework Partners Australia	8
	Big IT companies	5
	City and regional councils (newsletters)	1
	Government organisations	-
Total	-	277

4.6 Data analysis techniques

In the empirical analysis, various statistical techniques were used to identify and describe general characteristics of the research sample and to predict the response to questions based on the defined empirical analyses (see Section 4.3 and Table 4.1).

Descriptive statistical techniques: Descriptive statistical techniques quantitatively summarise features of a collection of information (P. S. Mann, 2007). Several descriptive statistical techniques were used to summarise basic and place-related characteristics of Australian telework including frequency distribution analyses, and mean and standard deviation measures to classify data and produce aggregated information related to different characteristics (Gravetter & Wallnau, 2016). The aggregated results based on descriptive statistical techniques are reported in Chapter 5.

One-sample t-test: A one-sample t-test can test whether the mean of an independent continuous normally distributed sample is equal to an assumed population value (Barton & Peat, 2014). It compares the mean of a sample to the hypothesised population value and determines whether the sample mean is statistically different from that known population value. The one-sample t-test was used to determine whether the means of variables assessed on a five-point Likert scale, which are related to the basic and place-related characteristics of telework, are statistically different from a neutral value (test value=3). The results based on one-sample t-test of the research sample's data were applied in empirical analysis 1 (see Section 4.3). The aggregated results based on one-sample t-test are presented in Chapter 5.

Chi-square test for goodness of fit: Chi-square test for goodness of fit is used to determine how the sample data is significantly different from a hypothesised distribution, to test whether the proportion of cases from a sample is consistent with the values obtained from a comparison population (Pallant, 2013). The test was applied in empirical analysis 2 (see Section 4.3) and the results presented in Chapter 6.

Chi-square test for independence: The chi-square test of independence is a nonparametric test to determine whether there is a significant relationship between two categorical variables, each with two or more possible values, from a single population (Gravetter & Wallnau, 2016). The test does not require homoscedasticity in the sample

and equality of variances among the comparison groups (McHugh, 2013). The analysis based on chi-square test can be illustrated in a contingency where each row represents a category for one variable and each column represents a category for the other variable. The minimum of the expected value needs to be 5 or more in at least 80% of the contingency table cells (McHugh, 2013). The test was performed to determine whether there is any significant difference between employee and self-employed teleworker subgroups in the sample on various basic and place-related characteristics. Where the expected values in the cells of contingency tables is lower than 5, a Fisher's exact test was also used (Barton & Peat, 2014). Also, considering the number of rows and columns of contingency matrices, besides the chi-square test results a phi-coefficient or Cramer's V was computed as the effect size of test (Gravetter & Wallnau, 2016). The results based on chi-square test of the research sample data were used in the empirical analysis 3 (see Section 4.3) and are presented in Chapter 7.

Independent samples t-test: The independent samples t-test compares the mean value(s) of independent samples with continuous normally distributed data to determine whether the associated population means are significantly different (Barton & Peat, 2014). It helps identify whether the difference between the two independent samples is true or is only a random effect. It hypothesises that a difference in the mean values of the dependent variable occurs as a result of the influence of the independent variable (Gravetter & Wallnau, 2016). In the research, the independent samples t-test was used to compare one measured basic or place-related characteristic between employee and self-employed teleworker subgroups. The test was applied in empirical analysis 3 (see Section 4.3) and results presented in Chapter 7.

Multiple regression: Standard regression analyses were implemented to explore the significant determinants and predictive variables of teleworkers' degree of work motivation. The standard multiple regression is the most common method of multiple regression analysis. In this method, all the independent variables are entered into the analysis in only one step. Each independent variable is evaluated in terms of its predictive power, over and above that offered by all the other independent variables (Pallant, 2013). The standard multiple regression is useful in showing how much variance in a dependent variable can be explained by a set of variables as a block. The method also helps determine how much unique variance in the dependent variable can be explained by each

of the independent variables (Pallant, 2013). Checking the pre-assumptions such as sufficiency in the size of the sample, absence of outliers, absence of multicollinearity and singularity, and normality, linearity and homoscedasticity of residuals is necessary and critical before implementing multiple regression analyses (Hair, 2010; Tabachnick, Fidell, & Osterlind, 2001). The test was used in empirical analyses 4 to 7 (see Section 4.3) and results presented in Chapter 7.

Bootstrapping: Bootstrapping is a statistical resampling technique (Efron, 1982). It provides a method other than confidence intervals to estimate quantities of a population. It is mostly used when the usual statistical methods for ascertaining statistical significance do not apply (Efron & Tibshirani, 1994). For example, standard parametric assumptions such as the sample size are questionable and not appropriate for straightforward statistical inference (Adèr, 2008). The technique is based on random sampling with replacement. In the bootstrapping method, small samples are iteratively taken, then the statistic is calculated, and finally the average of the calculated statistics is taken (Efron & Tibshirani, 1994). Determining the number of samples could be dependent on the criteria such as computing power and time, and existence of substantial real-world consequences. Increasing the number of samples does not necessarily lead to better results and can only improve the estimation of sampling errors (Goodhue, Lewis, & Thompson, 2012). In the research, the bootstrapping technique was applied where a statistical comparison between employee and self-employed teleworker subgroups was made. As there is an imbalance between the size of the employee teleworker (233 respondents) and self-employed teleworker (44 respondents) subgroups, performing bootstrapping was necessary for accuracy of results. The technique was mostly used in empirical analyses 3 to 7 (see Section 4.3) with results presented in Chapter 7.

Table 4.4 The application of statistical tests and techniques in the research

Empirical analyses	Chapters	Independent variable(s)	Dependent variable(s)	Statistical tests and techniques applied
Analysis 1	Chapter 5	Basic variables Micro variables Macro variables	-	- Descriptive analyses - One-sample t-test
Analysis 2	Chapter 6	Basic variables Micro variables Macro variables	Australian workforce population	-Chi-square test for goodness of fit
Analysis 3	Chapter 7	Basic variables Micro variables Macro variables	Employment status	- Chi-square test for independence - Independent samples t-test - Bootstrapping
Analyses 4 to 7	Chapter 7	Basic variables Micro variables Macro variables	Teleworkers' motivation	- Multiple regression - Bootstrapping

4.6.1 Data analysis software

Different software was used in different phases of the empirical research as follows:

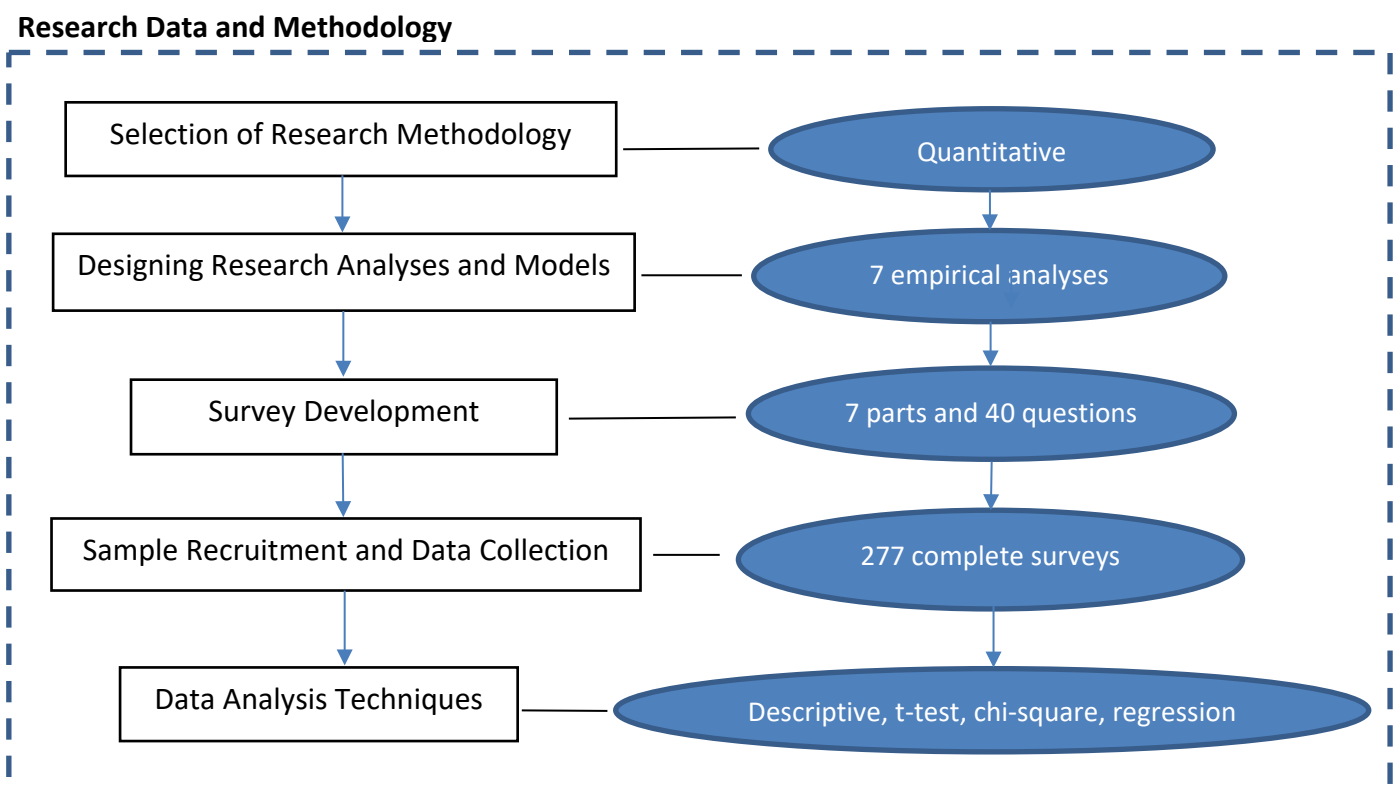
- Microsoft Office Excel 365 ProPlus was used for data cleaning and preliminary preparation of the sample, and for producing numerical charts.
- IBM SPSS Statistics Version 25 was used to finalise the research dataset and perform different statistical analyses and tests.
- GPower 3.1 was used to estimate sample size based on statistical power considerations.
- ABS Table Builder was used to create different types of tables based on Australian Bureau of Statistics (ABS) censuses data.

4.7 Summary

The chapter explained the different stages of the empirical research design and methodology. A quantitative research methodology was selected, mainly because of the importance of this methodology in Self-Determination Theory studies. The research empirical model was introduced (Figure 4.1). The model formulates the relationships between basic and place-related factors of telework and work motivation as the central construct of the research. Based on the research empirical model, seven empirical

analyses of research designed to answer the main research questions (Table 4.1) were introduced. The first three analyses through descriptive and inferential investigation respond to research questions 1 and 2, and the remaining analyses focus on responding to research question 3. The chapter explained the development of an online survey as the empirical research instrument including the type of questions, the general structure of the survey and its parts, and finalisation of the survey through pilot testing. A survey with seven parts including 34 questions was used as the research empirical instrument.

Figure 4.3 The process of empirical research design and outcomes



For statistical power, a homogeneous sample of at least 201 home-based teleworkers was needed for the research. Using different social and organisational networking strategies, and after data cleaning, a sample of 277 completed surveys was available for empirical research (Table 4.3). Statistical techniques for empirical analyses of the research were presented (Table 4.4). Figure 4.3 summarises the different stages of the empirical research method design process and their outcomes.

The next chapter reports the aggregate results of basic and place-related variables of the research.

Chapter 5: The character of Australian home-based telework

5.1 Introduction

Understanding the characteristics of home-based telework in Australia is a first step towards further analysis and interpretation. This chapter provides information on the characteristics of home-based telework based on descriptive analysis of the research sample. In addition to reporting the aggregated results for the entire sample, the chapter also provides results separately for two subgroups: employee and self-employed teleworkers. This is important as some studies on home-based telework (e.g. Gurstein, 1996, 2002; Kawai & Shiozaki, 2004; Mahmood, 2007) have emphasised the difference between employee and self-employed teleworkers from the perspective of place-related preferences. In the research sample, 84.1% of respondents were employee teleworkers, and 15.9% were self-employed teleworkers. Based on this split, inevitably the employee group of teleworkers normally had a similar profile to the total group given their statistical dominance.

The chapter has two sections:

- **Basic characteristics:** Section 5.2 reports the results of descriptive analyses of socio-demographic, dwelling and job-related characteristics of teleworkers. As Australian national censuses provide comprehensive and useful official information at the national level (see Chapter 2), it is possible to compare the research sample to the workforce population in Australia in the next chapter to understand the overall status of home-based telework in Australia.
- **Effectiveness of Australian homes as a telework place:** In general, there is no adequate, reliable and up-to-date information on the status and place-related conditions of teleworkers in Australia. In contrast to countries such as the United States and Canada, empirical studies and censuses on Australian telework have often neglected data on the spatial, environmental, physical and infrastructure factors of place. The present research addresses this information gap. Section 5.3

evaluates the efficiency of the residence as a telework place in Australia in terms of place readiness and preparedness from a variety of aspects at different urban levels. The findings of this section are based on the descriptive analysis of categorical and continuous data in the research sample.

5.2 Characteristics of Australian home-based teleworkers

In the present study, the basic characteristics of telework refer to non-place related factors that represent the socio-demographic, dwelling and job-related status of teleworkers. Many studies have examined these characteristics and investigated the correlation between these characteristics and the consequences such as the motivation to adopt telework, intensity of telework, and productivity (see Tables 3.6 and 3.7). In addition, the existence of these factors has been emphasised in the conceptual framework and empirical analyses of this research (see Figure 3.5).

This section examines home-based teleworkers' basic characteristics using frequency analysis of the research sample in three subsections: socio-demographic characteristics, dwelling characteristics, and job-related characteristics.

5.2.1 Socio-demographic characteristics

Table 5.1 shows the aggregated results of the socio-demographic data in the research sample. The socio-demographic characteristics of teleworkers in the research sample include age, gender, disability, education, life stage and income. The information has been categorised using Australian Bureau of Statistics classifications.

The average age of the respondents in the research sample was 44.2 years (standard deviation=12.2 years), with the most common age category 30–39 years (28.7%), followed by 50–59 years (23.3%) and 40–49 years (22.9%). The average age of the respondents in the employee subgroup was 43.3 years (standard deviation=11.7 years) and 49.6 years (standard deviation=13.5 years) in the self-employed subgroup. Of the sample of self-employed teleworkers, about a quarter (23.8%) were in each of the age categories of 30–39 years, 40–49 years, and 60–69 years (Figure 5.1).

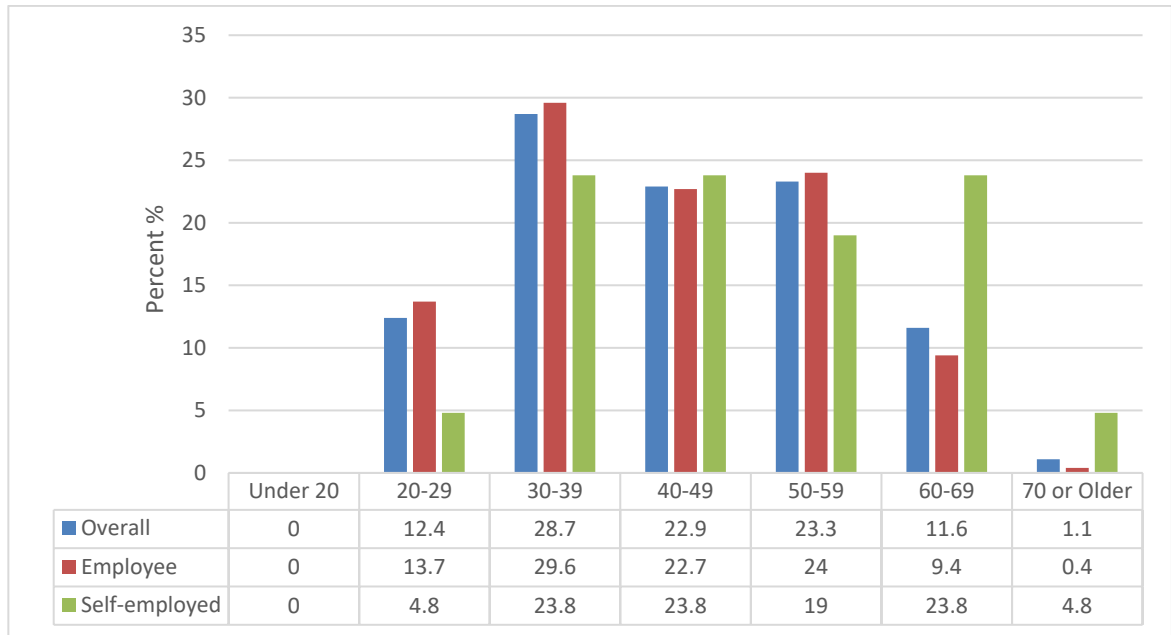


Figure 5.1 Age of teleworkers by subgroup (N=277)

In the research sample, there were slightly more female respondents (53.4%) than male respondents (46.6%) overall, but an equal proportion of female and male respondents in the self-employed teleworker subgroup.

Only one in twenty employee teleworkers (5.6%) reported a physical disability, but the proportion was almost double in the self-employed teleworker subgroup (11.4%).

Almost three-quarters of respondents had a tertiary qualification: bachelor's degree (32.9%), postgraduate degree (23.5%) or graduate diploma/certificate (17%). Over a quarter (26.7%) had a senior high school, certificate, advance diploma. The employee and self-employed teleworkers subgroups were similar, except more self-employed teleworkers had a qualification higher than a bachelor's degree. Figure 5.2 shows the level of education in the whole sample.

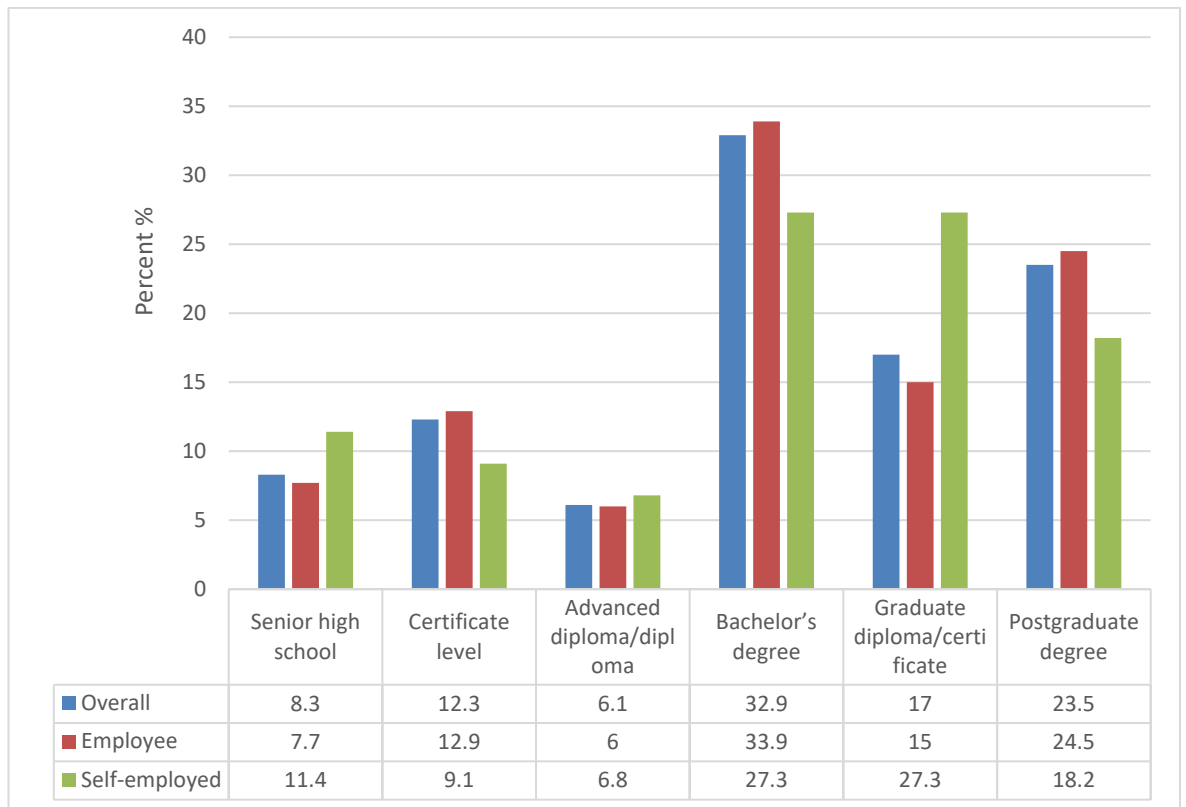


Figure 5.2 Education of teleworkers by subgroup (N=277)

Average household size in the research sample was 2.71 (standard deviation=1.2) and the average number of children under 18 years old was 0.64 (standard deviation=1). The most common household type in the research sample was “Couple, No children” (27.8%), followed by “Couple, Youngest child 18 years or over” (17.7%) and “Single, No children” (15.5%), as shown in Table 5.1. Employee teleworkers were similar to the total group (sum of both subgroups) but for the self-employed teleworker subgroup, “Couple, Youngest child 18 years or over” was most common (25%), followed by “Couple, No children” (22.7%) and “Single, No children” (18.2%). Although more research with larger sample sizes is required, the results suggest couples with children have adopted telework more than singles with children. Telework does not seem to be adopted to any significant extent by singles with children in Australia.

Nearly 70% of respondents earned more than \$A78,000 a year in 2014. In general, in the research sample, the proportion of teleworkers in each decile increases gradually from low-income to high-income deciles, though with a more even distribution for the self-employed subgroup (Figure 5.3).



Figure 5.3 Income of teleworkers in the research sample

Table 5.1 Summary of socio-demographic characteristics of teleworkers

Description		Overall (N=277)		Employees (n=233)	Self-Employed (n=44)
Characteristics	Categories	Frequency	Share %	Share %	Share %
Age	Under 20	0	0	0	0
	20–29	34	12.4	13.7	4.8
	30–39	79	28.7	29.6	23.8
	40–49	63	22.9	22.7	23.8
	50–59	64	23.3	24.0	19.0
	60–69	32	11.6	9.4	23.8
	70 or Older	3	1.1	0.4	4.8
Gender	Male	129	46.6	45.9	50.0
	Female	148	53.4	54.1	50.0
Disability	Disabled	18	6.5	5.6	11.4
	Not Disabled	259	93.5	94.4	88.6
Formal education	Senior high school	23	8.3	7.7	11.4
	Certificate level	34	12.3	12.9	9.1
	Advanced diploma/diploma	17	6.1	6.0	6.8
	Bachelor's degree	91	32.9	33.9	27.3
	Graduate diploma/certificate	47	17.0	15.0	27.3
	Postgraduate degree	65	23.5	24.5	18.2
Life stage	Single, No children	43	15.5	15.0	18.2
	Single, Youngest child 4 years or younger	3	1.1	1.3	0
	Single, Youngest child between 5 to 11 years	4	1.4	1.3	2.3
	Single, Youngest child between 12 to 17 years	4	1.4	1.3	2.3
	Single, Youngest child 18 years or over	14	5.1	4.3	9.1
	Couple, No children	77	27.8	28.8	22.7
	Couple, Youngest child 4 years or younger	30	10.8	11.2	9.1
	Couple, Youngest child between 5 to 11 years	31	11.2	11.6	9.1
	Couple, Youngest child between 12 to 17 years	22	7.9	9.0	2.3
	Couple, Youngest child 18 years or over	49	17.7	16.3	25.0
Annual household income (Australian Dollars)	\$1–\$7,799	3	1.1	1.3	0
	\$7,800–\$15,599	3	1.1	1.3	0
	\$15,600–\$20,799	3	1.1	0.4	4.5
	\$20,800–\$33,799	5	1.8	1.3	4.5
	\$33,800–\$41,599	5	1.8	1.7	2.3
	\$41,600–\$51,999	21	7.6	6.4	13.6
	\$52,000–\$64,999	17	6.1	4.7	13.6
	\$65,000–\$77,999	29	10.5	9.9	13.6
	\$78,000–\$103,999	64	23.1	24.0	18.2
	\$104,000 or more	127	45.8	48.9	29.5

5.2.2 Dwelling characteristics

Table 5.2 summarises dwelling characteristics for the research sample. Dwelling characteristics include location, dwelling type, tenure and length of residence.

The three largest states by population had the most teleworkers: New South Wales (32.9%), Victoria (29.6%) and Queensland (15.9%). In the self-employed teleworker subgroup, 11.4% resided in South Australia, ranked third among the states, and 9.1% resided in Queensland, ranked fourth (Figure 5.4).

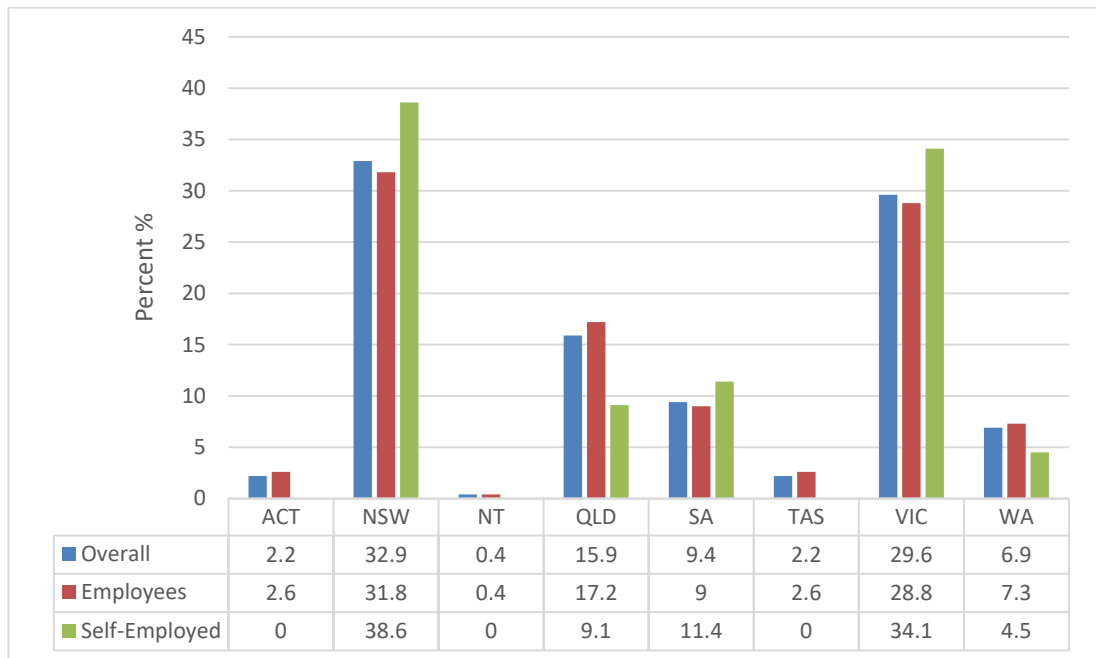


Figure 5.4 Location of teleworkers by Australian state and territories

Figure 5.5 shows that, in almost all Australian states in the research sample, most teleworkers reside in the capital city metropolitan area. There are relatively fewer teleworkers reside in the CBD and the non-metropolitan areas of each state. The only exception is in the ACT, attributed to its relatively small size and population. Outside of the capital cities, the Gold Coast has a high telework tendency and development rate (Figure 5.5), as discussed in Section 2.4.3.

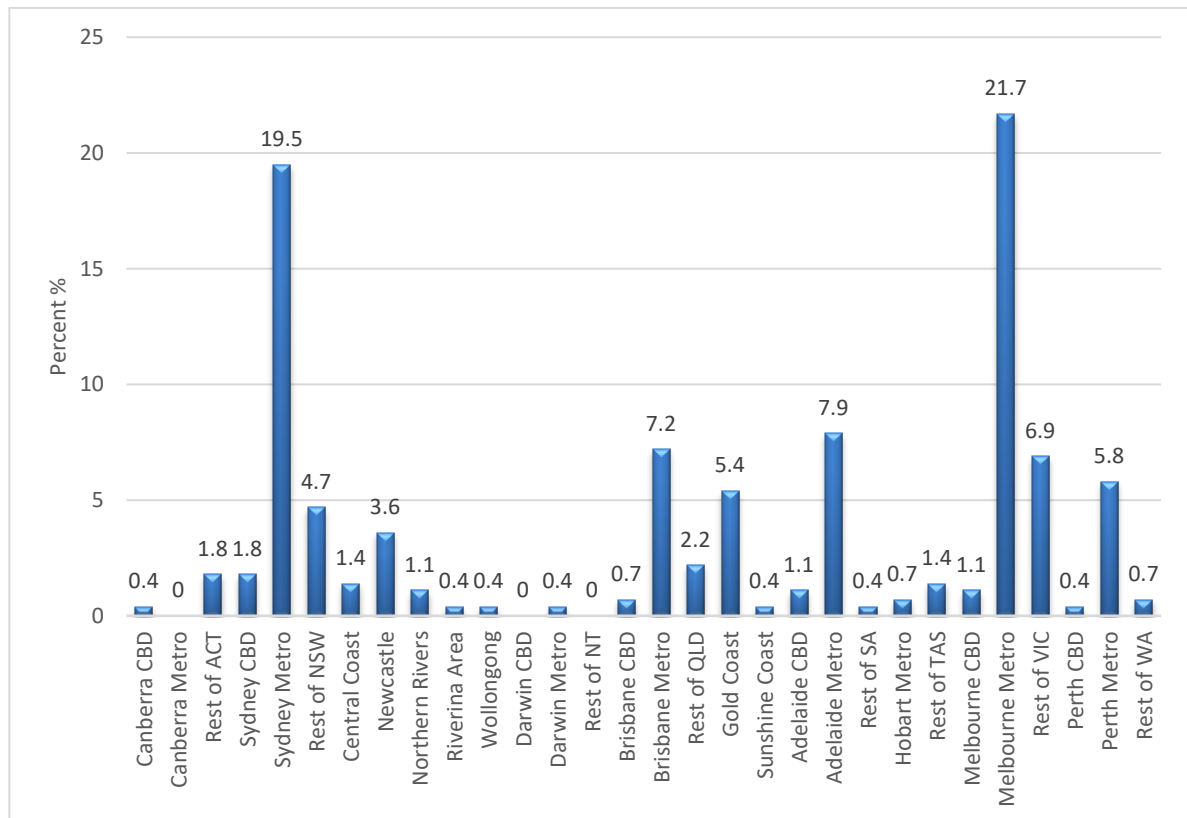


Figure 5.5 Location of teleworkers by major regions in the research sample

The most common dwelling type for teleworkers in the research sample was “separate house” (69%). Less common was “flat, unit, apartment” (20.3%) or “semi-detached, row or terrace house, town house etc” (10.5%). Most respondents (68.8%) owned their home, while 30.1% were tenants, and the residential place of only 1.1% of respondents was provided by their employer. Employee and self-employed subgroups of teleworkers had similar dwelling type. The average length of residence in the current dwelling was about 10 years or 120.5 months (standard deviation=124.9 months), with the most common length “more than 10 years” (32.5%) and the least common “1–2 years” (6.5%). Of the self-employed teleworkers, the most common length was 5–10 years.

Table 5.2 Summary of dwelling characteristics in the research sample

Description		Overall (N=277)		Employees (n=233)	Self-Employed (n=44)
Characteristics	Categories	Frequency	Share %	Share %	Share %
Location of residence (Australian states)	ACT	6	2.2	2.6	0
	NSW	91	32.9	31.8	38.6
	NT	1	0.4	0.4	0
	QLD	44	15.9	17.2	9.1
	SA	26	9.4	9.0	11.4
	TAS	6	2.2	2.6	0
	VIC	82	29.6	28.8	34.1
	WA	19	6.9	7.3	4.5
Location of residence (Australian major regions ^a)	Canberra CBD	1	0.4	0.4	0
	Canberra Metro	0	0	0	0
	Rest of ACT	5	1.8	2.1	0
	Sydney CBD	5	1.8	2.1	0
	Sydney Metro	54	19.5	19.3	20.5
	Rest of NSW	13	4.7	4.3	6.8
	Central Coast	4	1.4	1.3	2.3
	Newcastle	10	3.6	3.0	6.8
	Northern Rivers	3	1.1	.9	2.3
	Riverina Area	1	0.4	0.4	0
	Wollongong	1	0.4	0.4	0
	Darwin CBD	0	0	0	0
	Darwin Metro	1	0.4	0.4	0
	Rest of NT	0	0	0	0
	Brisbane CBD	2	0.7	0.9	0
	Brisbane Metro	20	7.2	8.6	0
	Rest of QLD	6	2.2	2.6	0
	Gold Coast	15	5.4	4.7	9.1
	Sunshine Coast	1	0.4	0.4	0
	Adelaide CBD	3	1.1	0.4	4.5
	Adelaide Metro	22	7.9	8.2	6.8
	Rest of SA	1	0.4	0.4	0
	Hobart Metro	2	0.7	0.9	0
	Rest of TAS	4	1.4	1.7	0
	Melbourne CBD	3	1.1	0.9	2.3
	Melbourne Metro	60	21.7	20.2	29.5
	Rest of VIC	19	6.9	7.7	2.3
	Perth CBD	1	0.4	0.4	0
	Perth Metro	16	5.8	6.0	4.5
	Rest of WA	2	0.7	0.9	0
Dwelling type	Separate house	191	69.0	67.7	77.3
	Flat, unit, apartment	56	20.3	22.8	6.8
	Semi-detached etc.	29	10.5	9.5	15.9
Tenure	Own	190	68.8	67.2	77.3
	Rent	83	30.1	31.9	20.5
	Rented or provided by employer	3	1.1	0.9	2.3
Length of residence	Less than 1 year	28	10.1	12.0	6.8
	1-2 years	18	6.5	6.4	20.5
	2-5 years	75	27.1	28.3	22.7
	5-10 years	66	23.8	24.0	50.0
	More than 10 years	90	32.5	29.2	6.8

^a Categorization is based on ABS Greater Capital City Statistical Areas Classification (UR)

5.2.3 Job-related characteristics

Tables 5.3 and 5.4 summarise job related characteristics for the research sample. Job-related characteristics of the teleworkers include work load, occupational category, time

allocated to telework, official telework arrangements, type of self-employed teleworkers, and geographical location of employer and clients.

Most respondents were full-time workers (84.8%), with only 12.3% of respondents part-time workers working more than half a week and only 2.5% working less than half a week. Employee and self-employed subgroups of teleworkers were similar. However, the overall proportion of part-time workers working more than half a week was considerably higher in the self-employed subgroup of teleworkers than in the employee subgroup of teleworkers.

By occupation, almost half the respondents were professionals (45.1%), followed by managers (32.1%) and clerical and administrative workers (17%). Given the nature of the work, as expected, few teleworkers were sales workers (3.2%) or community and personal service workers (2.5%). Employee and self-employed subgroups of teleworkers were similar in occupation (Figure 5.6).



Figure 5.6 Occupation of teleworkers by subgroup (N=277)

In the research sample, respondents reported allocating an average of 18.31 hours (standard deviation=14.7 hours) per week to telework, with employee teleworkers allocating 16.7 hours (standard deviation=13.1 hours) and self-employed teleworkers allocating 26.4 hours (standard deviation=19.4 hours).

Two different classifications for teleworkers were used to categorise the time spent on telework. In the first classification, which was more detailed and based on 8-hour categories, the most common time category was teleworkers doing telework less than 8 hours per week (34.7%), with very few teleworkers (4.7%) doing telework for more than 40 hours a week. According to Figure 5.7, employee teleworkers followed a similar pattern. However, the subgroup of self-employed teleworkers was different. For self-employed teleworkers, the most common telework time was 25–32 hours a week (29.5%).

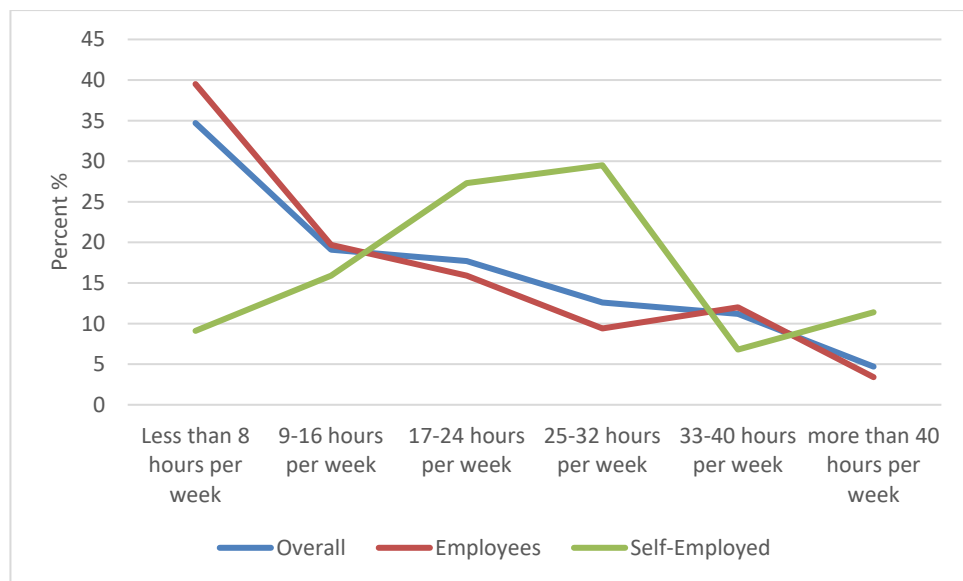


Figure 5.7 Time allocated to telework by teleworkers in the research sample

The telework literature (e.g. Bentley et al., 2013) refers to another classification type of teleworkers in terms of the time devoted to telework with three general categories: low intensity teleworkers teleworking “1 working days per week”, hybrid teleworkers teleworking “1–3 working days per week”, and high intensity teleworkers teleworking “more than 3 working days per week”. Using this classification, the most common type of teleworkers in the sample were hybrid teleworkers (36.8%), followed by low intensity teleworkers (34.7%), and high intensity teleworkers (28.5%). In the subgroup of employee teleworkers, most were low intensity teleworkers (39.5%), while in the subgroup of self-employed teleworkers most were high intensity teleworkers (47.7%).

In the employee subgroup of teleworkers, which naturally had a specific employer, 31.8% of respondents had a formal telework arrangement with their employers, 42.5% did not have a formal telework arrangement with their employers, and 25.8% agreed with their

employers only verbally on telework. Most of the self-employed teleworkers in the research sample (68.3%) lacked an official telework agreement containing various official and legal considerations of telework.

Among self-employed teleworker respondents, who naturally (and by default) do not have a specific employer, work for themselves and have their own clients, 29.5% were “independent contractors”, 29.5% were “entrepreneurs”, 25% were “freelancers” and 15.9% were “consultants”.

The average duration of telework experience in the research sample was about 5.5 years or 66.5 months (standard deviation=64.1 months), with 62.8 months (standard deviation=58.2 months) for employees and 85.6 months (standard deviation=87.5 months) for self-employed teleworkers.

Table 5.3 Job-related characteristics of teleworkers in the research sample

Description		Overall (N=277)		Employees (n=233)	Self-Employed (n=44)
Characteristics	Categories	Frequency	Share %	Share %	Share %
Work load	Full time	235	84.8	90.1	56.8
	Part time 2.5 days or more per week	34	12.3	7.7	36.4
	Part time less than 2.5 days per week	7	2.5	1.7	6.8
Occupational category	Manager	89	32.1	31.8	34.1
	Professional	125	45.1	45.5	43.2
	Community and Personal service worker	7	2.5	2.1	4.5
	Clerical and Administrative worker	47	17.0	17.6	13.6
	Sales worker	9	3.2	3.0	4.5
Time allocated to telework per week (6 categories)	Less than 8 hours per week	96	34.7	39.5	9.1
	9-16 hours per week	53	19.1	19.7	15.9
	17-24 hours per week	49	17.7	15.9	27.3
	25-32 hours per week	35	12.6	9.4	29.5
	33-40 hours per week	31	11.2	12.0	6.8
	More than 40 hours per week	13	4.7	3.4	11.4
Time allocated to telework per week (3 categories)	1 working days per week	96	34.7	39.5	9.1
	1-3 working days per week	102	36.8	35.6	43.2
	More than 3 working days per week	79	28.5	24.9	47.7
Telework arrangements	Yes	74	26.7	31.8	-
	No	99	35.7	42.5	-
	Verbal agreement	60	21.7	25.8	-
	N/A (self-employed)	44	15.9	-	100
Type of self-employed teleworkers	Freelancer	11	4.0	-	25.0
	Independent contractor	13	4.7	-	29.5
	Consultant	7	2.5	-	15.9
	Entrepreneur	13	4.7	-	29.5
	N/A (employees)	233	84.1	100	-

The most common geographical locations of the employer’s office were New South Wales (27.8%) and Victoria (23.8%), followed by Queensland (13.7%). According to Figure 5.8, in the geographical classification of the employers based on Australian main

regions, the Sydney (16.7%) and Melbourne metropolitan regions (15%) had the largest share of the total employee teleworkers in the research sample. The employer offices to which teleworkers reported were often located in metropolitan regions rather than the CBDs or areas outside the metropolitan regions. However, in addition to the ACT, which can be considered a special case due to its relatively smaller size, the state of Queensland is an anomaly according to the sample data. This is probably because the state of Queensland is the most decentralised state in Australia (see Tiernan, 2016).

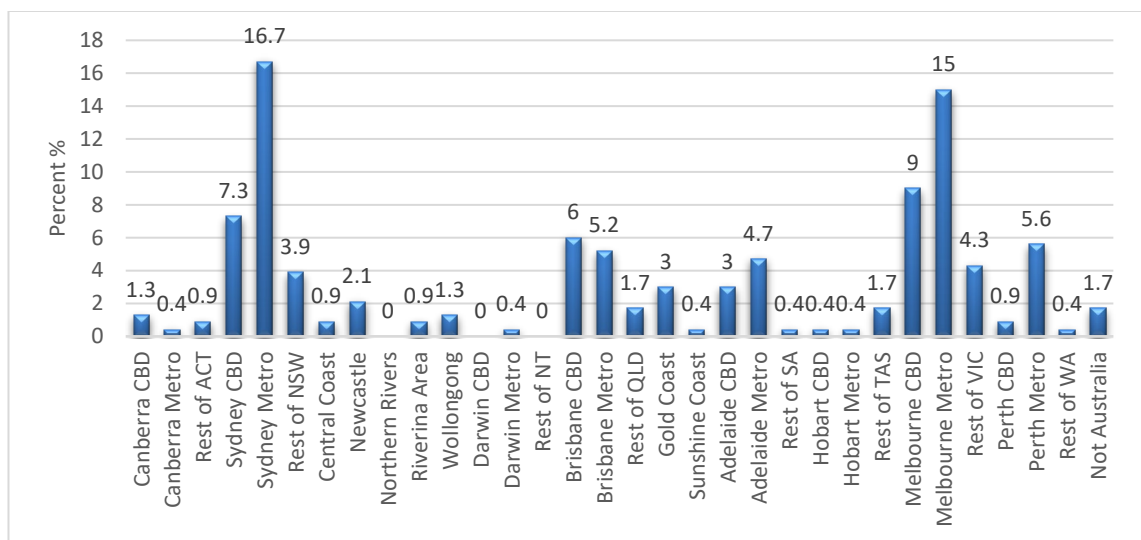


Figure 5.8 Employers' geographical location by major regions for employee teleworker subgroup in the research sample

Self-employed teleworkers were asked to provide three geographical locations where their clients were usually located. According to Figure 5.9, the majority of respondents, at least once, noted that clients were located in the metropolitan regions of Sydney (43.1%) and Melbourne (34%). As Figure 5.8 shows, the clients of self-employed teleworkers were located in the metropolitan regions in each state more than the CBDs and other regions of Australia.

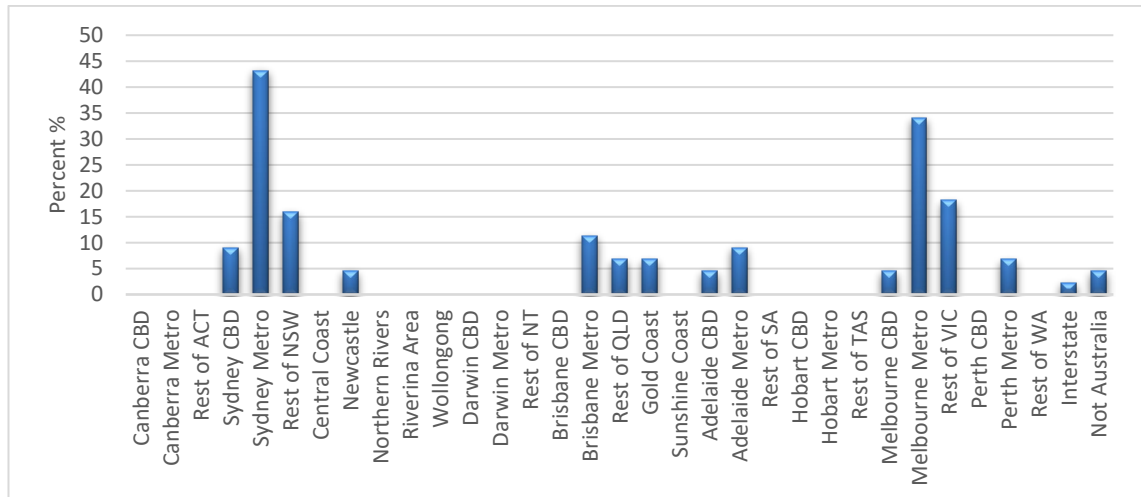


Figure 5.9 Clients' geographical location by Australian region for self-employed teleworker subgroup in the research sample

Table 5.4 Employers' geographical location in the research sample

Description		Overall (N=277)		Employees (n=233)	Self-Employed (n=44)
Characteristics	Categories	Frequency	Share %	Share %	Share %
Location of employer (Australian states)	ACT	6	2.2	2.6	-
	NSW	77	27.8	33.0	-
	NT	1	0.4	0.4	-
	QLD	38	13.7	16.3	-
	SA	19	6.9	8.2	-
	TAS	6	2.2	2.6	-
	VIC	66	23.8	28.3	-
	WA	16	5.8	6.9	-
	Not Australia	4	1.4	1.7	-
	N/A (Self-employed)	44	15.9	-	100
Location of employer (Australian major regions)	Canberra CBD	3	1.1	1.3	-
	Canberra Metro	1	0.4	0.4	-
	Rest of ACT	2	0.7	0.9	-
	Sydney CBD	17	6.1	7.3	-
	Sydney Metro	39	14.1	16.7	-
	Rest of NSW	9	3.2	3.9	-
	Central Coast	2	0.7	0.9	-
	Newcastle	5	1.8	2.1	-
	Northern Rivers	0	0	0	-
	Riverina Area	2	0.7	0.9	-
	Wollongong	3	1.1	1.3	-
	Darwin CBD	0	0	0	-
	Darwin Metro	1	0.4	0.4	-
	Rest of NT	0	0	0	-
	Brisbane CBD	14	5.1	6.0	-
	Brisbane Metro	12	4.3	5.2	-
	Rest of QLD	4	1.4	1.7	-
	Gold Coast	7	2.5	3.0	-
	Sunshine Coast	1	0.4	0.4	-
	Adelaide CBD	7	2.5	3.0	-
	Adelaide Metro	11	4.0	4.7	-
	Rest of SA	1	0.4	0.4	-
	Hobart CBD	1	0.4	0.4	-
	Hobart Metro	1	0.4	0.4	-
	Rest of TAS	4	1.4	1.7	-
	Melbourne CBD	21	7.6	9.0	-
	Melbourne Metro	35	12.6	15.0	-
	Rest of VIC	10	3.6	4.3	-
	Perth CBD	2	0.7	0.9	-
	Perth Metro	13	4.7	5.6	-
	Rest of WA	1	0.4	0.4	-
	Not Australia	4	1.4	1.7	-
	N/A (Self-employed)	44	15.9	-	100

5.3 Effectiveness of Australian homes as a telework place

This second major section of the chapter evaluates the readiness of the Australian home to be used as a telework place at the micro-level, which includes important characteristics facilitating telework inside the home, and also at the macro-level, including important characteristics facilitating telework outside the home. The efficiency and suitability of Australian homes was determined based on the results of descriptive analyses, such as frequency analysis and the one-sample t-test, explained in Chapter 4. Tables 5.5 to 5.10 summarise these results. The graphic representation of some of the results can also be found in the Appendix 4.

5.3.1 Teleworkers' place-related preferences at micro-level

Characteristics associated with the place of telework at the micro level include:

- characteristics related to telecommunication infrastructure such as method of access to the internet and satisfaction with speed and reliability of the internet
- spatial characteristics such as type of workspace at home, and satisfaction with location and size of workspace at home
- physical characteristics such as satisfaction with furniture, equipment and technology
- environmental characteristics including satisfaction with qualities like noise, lighting and temperature
- important psychological characteristics emphasised in the telework literature such as feeling of isolation and distraction.

Tables 5.5 to 5.7 summarise the results of frequency analyses for categorical and continuous variables, and the results of one-sample t-test on the status of and the degree of satisfaction (5-point Likert scale questions) with the characteristics mentioned above. The t-test analysis results reported in this section were obtained using bootstrapping, based on the 1000 sample, and with a value of 3 (Neutral=3).

In the research sample, almost all teleworkers (98.6%) had broadband access to the internet and only 1.4% had dial-up access (Table 5.5). Employee and self-employed subgroups of teleworkers were similar. Almost half of teleworkers (48%) were “satisfied” with the speed of their internet and over half of teleworkers (52%) were “satisfied” with reliability of their internet (Table 5.6). Although, the mean score of speed and reliability of internet in the research sample was higher than the limit of neutral with a 0.69 and 0.80 difference, respectively, they are the lowest values among micro-variables related to the place of telework. Self-employed teleworkers were less satisfied with the speed and reliability of their internet compared to employee teleworkers (Table 5.7).

The most common type of workspace at home was “a separate room” (57%), followed by “an area or corner of a room” (29.6%), “a place in your home that varies” (12.3%), and “a separate building” (1.1%). Similarly, most respondents in the self-employed teleworker subgroup (75%) and most respondents in the employee teleworker subgroup (53.6%) noted their workspace at home was “a separate room”. However, as the results show, there is a difference between the two groups. For instance, a large number of employee teleworkers (33%) used “an area or corner of a room”, unlike the self-employed subgroup (Table 5.5).

Table 5.5 Micro-level place-related characteristics in the research sample

Description		Overall (N=277)		Employees (n=233)	Self-Employed (n=44)
Characteristics	Categories	Frequency	Percent %	Percent %	Percent %
Type of internet access	Broadband	273	98.6	98.7	97.7
	Dial-up	4	1.4	1.3	2.3
Type of workspace	A separate room	158	57.0	53.6	75.0
	An area or corner of a room	82	29.6	33.0	11.4
	A place in your home that varies	34	12.3	12.0	13.6
	A separate building	3	1.1	1.3	0

In general, in the research sample, the majority of teleworkers expressed their satisfaction with the spatial, physical and environmental characteristics of their telework place at the level of “satisfied” (Table 5.6). The highest mean scores of satisfaction, with 4.12 for noise and 4.14 for lighting, were environmental characteristics (Table 5.7), followed by the mean score of 4.06 for satisfaction with technology. The subgroup of employee teleworkers was similar. However, in the self-employed teleworker subgroup, the highest mean score of satisfaction was 4.14 for satisfaction with feeling of noise; and the

equipment and technology variables related to the physical characteristics were second and third.

Comparing employee and self-employed subgroups of teleworkers on the spatial, physical and environmental aspects revealed that in most aspects, the mean scores of satisfactions in the employee subgroup were higher than those in the self-employed group. The only notable exception was related to equipment. The mean score of satisfaction with equipment variable for the self-employed teleworker subgroup was 4.07 and for the employee subgroup it was 3.89 indicating that the self-employed teleworkers were more satisfied with their equipment. Although the condition was the same for furniture and noise characteristics, the difference between these two subgroups was negligible in these areas (Table 5.7).

On psychological characteristics, the feeling of distraction and the feeling of isolation were evaluated in the survey. Based on the research sample, the relative majority of respondents, for the characteristics of the feeling of distraction (40.1%) and the feeling of isolation (36.5%) belonged to the categories of “satisfied” and “very satisfied” respectively (Table 5.6). The mean scores of satisfaction with the feeling of distraction was 3.72 and the feeling of isolation characteristic was 3.78, and had a lower score compared with the averages for most micro-level characteristics. Based on the results, the mean score of satisfaction with the feeling of distraction variable in the employee teleworker subgroup (3.73) was slightly higher than the average in the whole sample (3.72), and the average for the self-employed teleworker subgroup was 3.66. Inversely, the mean score of satisfaction with the feeling of isolation variable in the employee teleworker subgroup (3.75) was lower than the overall average in the whole sample (3.78), and the average for the self-employed teleworker subgroup was 3.93. Most employee teleworkers were satisfied with the feeling of distraction, and most self-employed teleworkers were satisfied with the feeling of isolation in their telework place (Table 5.7).

Table 5.6 Satisfaction with micro-level place-related characteristics in the research sample

Description		Overall (N=277)					Employees (n=233)					Self-Employed (n=44)				
		Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Infr.	Speed	3.6	10.1	18.8	48.4	19.1	3.4	10.3	16.3	48.1	21.9	4.5	9.1	31.8	50.0	4.5
	Reliability	2.5	5.8	19.9	52.0	19.9	1.7	5.6	18.9	51.5	22.3	6.8	6.8	25.0	54.5	6.8
Spt.	Size	1.1	2.5	11.6	60.6	24.2	1.3	2.6	9.9	61.4	24.9	0	2.3	20.5	56.8	20.5
	Location	0.7	3.6	11.2	58.5	26.0	0.9	2.6	11.2	59.2	26.2	0	9.1	11.4	54.5	25.0
Phys	Equipment	0.7	7.2	15.2	53.1	23.8	0.9	6.9	16.3	54.1	21.9	0	9.1	9.1	47.7	34.1
	Technology	0.4	2.2	13.7	58.5	25.3	0.4	2.1	12.4	60.1	24.9	0	2.3	20.5	50.0	27.3
Env.	Furniture	0.7	4.7	13.0	60.3	21.3	0.9	3.9	13.7	60.9	20.6	0	9.1	9.1	56.8	25.0
	Noise	0.7	4.0	11.2	51.3	32.9	0.9	4.3	10.7	51.1	33.0	0	2.3	13.6	52.3	31.8
Psych	Lighting	0.7	1.4	10.8	57.0	30.0	0.4	1.7	9.4	57.5	30.9	2.3	0	18.2	54.5	25.0
	Temperature	0.7	3.6	13.0	56.3	26.4	0.4	3.0	12.4	57.9	26.2	2.3	6.8	15.9	47.7	27.3
Psych	Distraction	0.7	13.0	23.1	40.1	23.1	0	13.7	22.7	40.3	23.2	4.5	9.1	25.0	38.6	22.7
	Isolation	3.2	14.4	19.9	26.0	36.5	3.4	14.6	20.6	26.2	35.2	2.3	13.6	15.9	25.0	43.2

Infr.: Infrastructure, Spt.: Spatial, Phys.: Physical, Env.: Environmental, Psych.: Psychological

Table 5.7 Central tendency scores of satisfaction with place-related characteristics at micro-level

Description		Overall (N=277)					Employees (n=233)					Self-Employed (n=44)				
		Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}	Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}	Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}
Infr.	Speed	3.69	1.00	0.69	11.43	.001**	3.75	1.02	0.74	11.16	.001**	3.41	0.89	0.40	3.02	.007**
	Reliability	3.81	0.90	0.80	14.84	.001**	3.87	0.88	0.87	15.09	.001**	3.48	0.97	0.47	3.24	.007**
Spt.	Size	4.04	0.74	1.04	23.28	.001**	4.06	0.75	1.06	21.52	.001**	3.95	0.71	0.95	8.87	.001**
	Location	4.05	0.76	1.05	23.02	.001**	4.07	0.74	1.07	22.07	.001**	3.95	0.86	0.95	7.35	.001**
Phys	Equipment	3.92	0.86	0.92	17.81	.001**	3.89	0.85	0.89	15.99	.001**	4.07	0.90	1.06	7.87	.001**
	Technology	4.06	0.71	1.06	24.80	.001**	4.07	0.70	1.06	23.17	.001**	4.02	0.76	1.02	8.90	.001**
Env.	Furniture	3.97	0.77	0.96	20.84	.001**	3.97	0.75	0.96	19.41	.001**	3.98	0.84	0.97	7.63	.001**
	Noise	4.12	0.80	1.11	22.91	.001**	4.11	0.82	1.11	20.62	.001**	4.14	0.73	1.13	10.26	.001**
Psych.	Lighting	4.14	0.71	1.14	26.51	.001**	4.17	0.69	1.16	25.59	.001**	4.00	0.80	1.00	8.22	.001**
	Temperature	4.04	0.77	1.04	22.27	.001**	4.06	0.73	1.06	22.04	.001**	3.91	0.96	0.90	6.28	.001**
Psych.	Distraction	3.72	0.98	0.71	12.13	.001**	3.73	0.96	0.73	11.49	.001**	3.66	1.07	0.65	4.05	.001**
	Isolation	3.78	1.17	0.78	11.00	.001**	3.75	1.18	0.75	9.70	.001**	3.93	1.16	0.93	5.28	.001**

Infr.: Infrastructure, Spt.: Spatial, Phys.: Physical, Env.: Environmental, Psych.: Psychological

a. One-sample t-test with test value=3, b. Bootstrap based on 1000 sample

**p < 0.01 (2-tailed)

5.3.2 Teleworkers' place-related preferences at macro-level

Place-related characteristics including the types of transport used by teleworkers to reach the geographical location of employers and clients, the degree of ease with various modes

of transport for reaching the geographical location of employers and clients, and the degree of satisfaction with the local area were investigated at the macro level. Tables 5.8 to 5.12 provide a summary of the results.

In the research sample, the average time reported by teleworkers to reach the geographical location of employers and clients, excluding exceptions such as those who usually travel several hour by airplane, was 40.77 (standard deviation=35.1) minutes, with the average time reported by the subgroup of employee teleworkers to reach the location of employers of 42.80 minutes (standard deviation=36.4), and the average time reported by the subgroup of self-employed teleworkers to reach clients of 24.73 minutes (standard deviation=14.3).

The most common type of transport to reach the geographical location of employers and clients for the whole sample was private car/motorcycle (58.8%) (Table 5.8), followed by trains (18.4%) and buses (12.3%). As Figure 5.10 shows, other types of transport were much less common. In the subgroup of self-employed teleworkers, although the category of private car/motorcycle was most common (59.1%), similar to the whole sample (and the subgroup of non-independent teleworkers), the category of “not travel” (29.5%) was second most common.

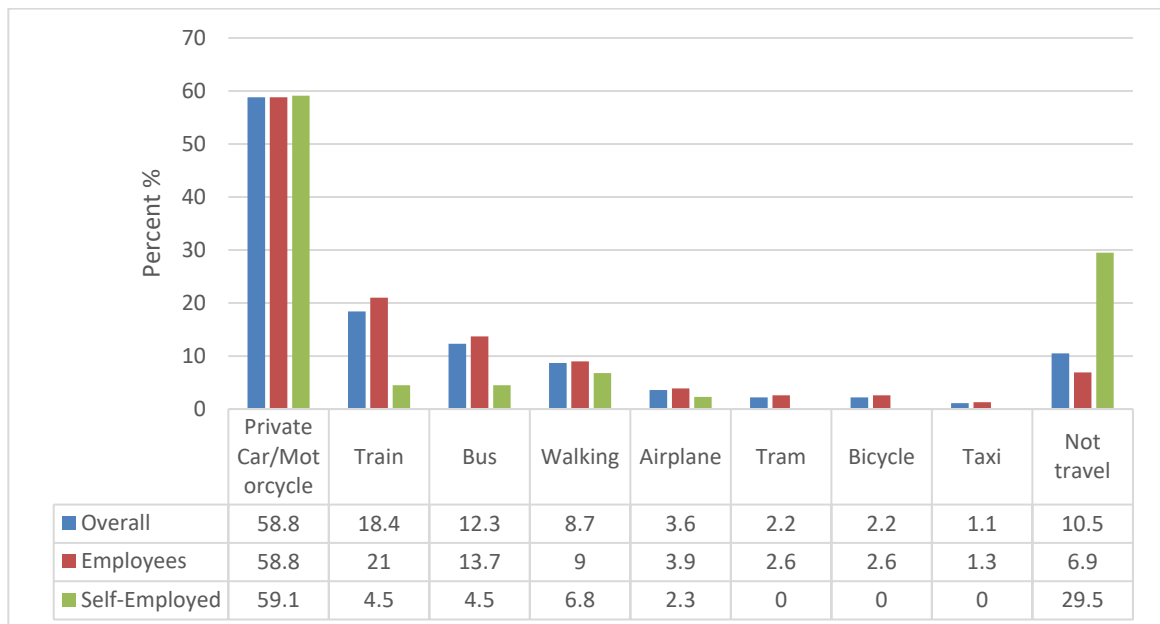


Figure 5.10 Travel by type of transport to reach the geographical location of employers and clients

Table 5.8 Travel by types of transport to reach the geographical location of employers and clients

Description	Overall (N=277)		Employees (n=233)	Self-Employed (n=44)
Categories	Frequency	Percent %	Percent %	Percent %
Walking	24	8.7	9.0	6.8
Bicycle	6	2.2	2.6	0
Bus	34	12.3	13.7	4.5
Train	51	18.4	21.0	4.5
Tram	6	2.2	2.6	0
Taxi	3	1.1	1.3	0
Private Car/Motorcycle	163	58.8	58.8	59.1
Airplane	10	3.6	3.9	2.3
Not travel	29	10.5	6.9	29.5

In the research sample, over a third of teleworkers (37.4%) found it “very easy” to use private car/motorcycle for reaching the geographical location of employers and clients, with only 5.9% finding it “very difficult” (Table 5.9). The mean score of participants finding it easy to use private car/motorcycle was 3.86 (Table 5.10). As Table 5.9, shows, ease of using the modes of walking and bicycle was inverse, and the share of categories from the total frequency had a gradual upward trend from the category of “very easy” to the category of “very difficult”. For the public transport mode, although there were differences in the share of the categories, a balance was observed, to some degree between the share of categories. Compared to other modes of transport, it did not follow a specific trend. The mean score of participants finding it easy to use the public transport mode was 2.77, which is slightly lower than neutral level (Table 5.10). The employee and self-employed subgroups of teleworkers were similar.

Half of teleworkers (50.7%) were “satisfied” with the local area, and the mean satisfaction score of 4.25 was above the level of neutral. There was a difference between the subgroup of employee teleworkers and the subgroup of self-employed teleworkers in satisfaction. In the subgroup of employee teleworkers, the largest category was “satisfied”, while the largest category in the subgroup of employee teleworkers was “very satisfied” (Table 5.11).

Table 5.9 Easiness of using various modes of transport for reaching the geographical location of employers and clients

Description		Overall (N=270)					Employees (n=231)					Self-Employed (n=39)				
		Very Difficult	Difficult	Neutral	Easy	Very Easy	Very Difficult	Difficult	Neutral	Easy	Very Easy	Very Difficult	Difficult	Neutral	Easy	Very Easy
Transport	Walking	63.3	11.5	8.9	10.0	6.3	68.2	10.8	6.9	10.0	6.1	46.2	15.4	20.5	10.3	7.7
	Bicycle	53.7	16.3	11.9	12.2	5.9	55.4	15.6	10.8	12.6	5.6	43.6	20.5	17.9	10.3	7.7
	Public transport	25.2	17.4	22.2	25.6	9.6	22.5	18.2	22.1	27.3	10.0	41.0	12.8	23.1	15.4	7.7
	Private transport	5.9	8.1	17.0	31.5	37.4	6.5	9.1	15.6	31.6	37.2	2.6	2.6	25.6	30.8	38.5

Table 5.10 Central tendency scores of easiness of using various modes of transport for reaching the geographical location of employers and clients

Description		Overall (N=270)					Employees (n=231)					Self-Employed (n=39)				
		Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}	Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}	Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}
Transport	Walking	1.84	1.29	-1.15	-14.68	.001**	1.79	1.28	-1.21	-14.39	.001**	2.18	1.33	-0.82	-3.83	.005**
	Bicycle	2.00	1.29	-0.99	-12.61	.001**	1.97	1.29	-1.02	-12.03	.001**	2.18	1.31	-0.82	-3.89	.003**
	Public transport	2.77	1.33	-0.23	-2.83	.008**	2.84	1.31	-0.16	-1.84	.066	2.36	1.36	-0.64	-2.92	.007**
	Private transport	3.86	1.17	0.86	12.02	.001**	3.84	1.20	0.84	10.57	.001**	4.00	1.00	1.00	6.24	.001**

a. One-sample t-test with test value=3, b. Bootstrap based on 1000 sample
 **p < 0.01 (2-tailed)

Table 5.11 Satisfaction with the local area

Description	Overall (N=270)					Employees (n=231)					Self-Employed (n=39)				
	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Local Area	0.4	1.9	8.5	50.7	38.5	0.4	1.7	8.2	52.4	37.2	0	2.6	10.3	41.0	46.2

Table 5.12 Central tendency scores of satisfaction with the local area

Description	Overall (N=270)					Employees (n=231)					Self-Employed (n=39)				
	Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}	Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}	Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}
Local Area	4.25	0.71	1.25	28.62	.001**	4.24	0.71	1.24	26.54	.001**	4.31	0.76	1.30	10.65	.001**

a. One-sample t-test with test value=3, b. Bootstrap based on 1000 sample

**p < 0.01 (2-tailed)

5.4 Summary

In response to the lack of information in Australia on the characteristics of home-based teleworkers and their working and living conditions, this chapter summarised various characteristics of teleworkers, and differences between employee and self-employed teleworkers, based on a survey of 277 teleworkers. Characteristics were evaluated and discussed in detail in two areas: status of teleworkers, including socio-demographic, dwelling and job-related characteristics, and effectiveness of the Australian home as a telework place at the micro and macro levels. Tables 5.11 to 5.14 summarise important findings.

Table 5.11 Summary of findings on socio-demographic character of Australian teleworkers

Description	Findings
Age	-The higher proportion of most teleworkers in the age groups of 30-39, 40-49, 50-59 compared to other age categories -The relatively higher average age of self-employed teleworkers compared to employee teleworkers -The relatively higher share of most self-employed teleworkers at older age categories compared to employee teleworkers
Gender	-The existence of a balance in the share of both male and female teleworkers
Household	- The higher proportion of teleworkers in the categories of households without children under 18 compared to other life cycle categories in both employee and self-employed teleworkers
Education	- The higher proportion of teleworkers in the categories with education level of Bachelor or above compared to other education categories
Income	-The higher proportion of teleworkers in higher income deciles; especially in the income deciles of \$78,000-\$103,999 and \$104,000 or more compared to other income deciles

Table 5.12 Summary of findings on dwelling character of Australian teleworkers

Description	Findings
Geographical location of home	- The relatively higher share of teleworkers' residence in the two states of New South Wales and Victoria as compared to the rest of the states -The relatively higher share of teleworkers' residence in metropolitan regions compared to CBDs and non-metropolitan regions -The relatively higher share of the residence of teleworkers in the regions such as Gold Coast and Central Coast which had a clear policy of developing and encouraging telework, compared to other non-metropolitan regions
Tenure	-The relatively higher share of home owners compared to home renters among teleworkers
Type of home	-The relatively higher share of teleworkers who live in separate houses, compared to teleworkers who live in apartments or semi-detached houses
Length of residence	-The higher proportion of most teleworkers with 2 to 10 years length of residence compared to other length of residence categories

Table 5.13 Summary of findings on job-related character of Australian teleworkers

Description	Findings
Work load	-The higher share of full-time teleworkers compared to part-time teleworkers
Occupational category	-The higher share of teleworkers in occupational groups of professionals and managers, compared to other occupational groups
Time allocated to telework	-The higher share of low intensity teleworkers compared to high intensity or hybrid workers in the subgroup of employee teleworkers -The higher share of the category of high intensity teleworkers compared to low intensity or hybrid workers in the subgroup of self-employed teleworkers
Telework arrangements	-The higher proportion of teleworkers who do not have a formal telework arrangement
Geographical location of employer/clients	-The higher share of geographical location of employers/clients in the states of New South Wales and Victoria, compared to other states in Australia -The higher proportion of the geographical location of employers/clients in metropolitan regions compared to CBDs and non-metropolitan regions

Table 5.14 Summary of findings on telework place related character of Australian teleworkers

Description	Findings
Micro	-The higher share of “satisfied” in all infrastructure, spatial, physical, and environmental aspects compared to other satisfaction scales degrees -The higher share of those teleworkers who have broadband internet access, compared to those teleworkers with Dial-up access -The higher proportion of those teleworkers who noted their workspace at home was “a separate room” compared to those teleworkers with other type of workspace at home -The higher mean score of satisfaction with equipment for self-employed teleworkers compared to employee teleworkers -The higher share of “very satisfied” in the feeling of isolation compared to other feeling of isolation scale degrees -The higher mean score of satisfaction with feeling of isolation for self-employed teleworkers compared to employee teleworkers
Macro	-The significant higher average time between geographical locations of home and employer for employee teleworkers, compared to the average distance between geographical locations of home and clients for self-employed teleworkers -The higher share of using private car/motorcycle by teleworkers to reach the geographical location of employers/clients compared to other transportation type categories -The higher share of self-employed teleworkers in the category of “not travel” compared to employee teleworkers -The higher share of teleworkers being “very satisfied” with the ease of using private car/motorcycle to reach the location of employers/clients -The higher mean score of satisfaction with the ease of using private car/motorcycle to reach the location of employers/clients compared to other modes of transport -The higher share of self-employed teleworkers “very satisfied” with local area -The higher share of employee teleworkers “satisfied” with local area -The higher mean score of satisfaction with local area for self-employed teleworkers compared to employee teleworkers

The findings of the chapter helped understand the characteristics of Australian home-based telework. However, achieving a broad and reliable picture of Australian home-based telework needs further analyses of the research data at the national level. The next chapter compares the research sample to the Australian population in terms of basic and place-related characteristics to understand the overall status of home-based telework in Australia. Understanding the status and characteristics of Australian home-based telework at the national level provides the basis for better interpretation of the socio-behavioural findings of the research in the final step.

Chapter 6: Overall status of home-based telework in Australia

6.1 Introduction

Chapter 5 presented the basic and place-related characteristics of Australian home-based telework based on the research sample. To ensure the generalisability of findings to the entire Australian home-based telework experience, this chapter compares the results in Chapter 5 to demographic and geographical statistics for the Australian workforce population at the national level, the total Australian population, and to similar results in recent home-based telework research at this scale. This comparison shows how Australian telework is influenced by the Australian socio-geographic context and how it is affected by the inherent technological dynamism of home-based work. Comparisons are made for most of the characteristics previously evaluated, depending on availability and comparability of data.

The first section of the chapter compares the research sample results on basic and place-related characteristics to the relevant Australian censuses and other survey data. Wherever possible, a comparison is made between the research sample and the Australian workforce population or the total Australian population, based on the latest Australian Bureau of Statistics population census in 2016 (ABS, 2016), the national census closest to the time of the research survey. Where data are unavailable in the Australian Bureau of Statistics census for some characteristics, the research results are compared to other recent reliable information at the national level, or to information in the Trans-Tasman telework survey (Bentley et al., 2013), the only existing Australian and New Zealand telework survey close to the time of the research survey. To better compare the results, chi-square tests for goodness of fit (see Section 4.6) are reported and discussed. The second section explains the findings of this comparison for each of the basic characteristics of telework practice while section 6.3 compares place-related characteristics.

6.2 Basic status of Australian home-based telework

The characteristics of Australian home-based teleworkers are here compared to Australian workforce population on age, gender, disability, education, life stage, household income, work load and occupation (summarised in Table 6.1), on location (Table 6.2), on dwelling characteristics (Table 6.3) and on job-related characteristics (Table 6.4).

Age: The chi-square test result in Table 6.1 shows there was a significant difference, at the 1% level, between the research sample of teleworkers and the Australian workforce population in terms of age. This is particularly true for the categories 20–29 years and 30–39 years. Compared to the age distribution of the workforce in Australia, home-based teleworkers are more concentrated in the age category 30–39 years, while fewer home-based teleworkers in the research sample were in the 20–29 years category.

Gender: There was a significant difference, at the 5% level, between the gender of the research sample and the Australian workforce population. The proportion of women in the home-based telework sample (53.4%) was higher than women in the Australian workforce population (47.5%), while the proportion of men was higher in the workforce population (52.5%) than in the sample (46.6%). According to the Australian Bureau of Statistics census 2016, the proportion of women in the “work at home” population (56.8%), which also includes a few occupational categories beyond the usual telework occupational typology, was higher than the proportion of men (43.2%), which was consistent with the research sample. Unlike the overall gender distribution of the Australian workforce population, the Australian home-based telework population has a higher proportion of women than men.

Disability: There was a significant difference, at the 5% level, between the research sample of teleworkers and the Australian workforce population in terms of disability. The proportion of people with disabilities in the research sample (6.5%) was eight times higher than the proportion in the total Australian workforce population (0.8%). Despite the disparity between the research sample and the Australian workforce population, there was more similarity between the proportion of people with disabilities in the research sample (6.5%) and in the total Australian population (5.14%), according to Australian

Bureau of Statistics census 2016. This suggests that home-based telework is a strategy used by some people to manage disability and participate in employment.

Formal education: There was a significant difference, at the 5% level, between the research sample of teleworkers and the Australian workforce population in terms of formal education. Home-based teleworkers had higher levels of education than the Australian workforce population as 73.4% had a bachelor's degree or higher compared to only 33% in the total workforce. This considerable disparity suggests that education plays a key role in telework participation and is a specific factor in distinguishing between the population of home-based teleworkers and the entire Australian workforce population, likely due to its relationship with occupations more suited to telework such as professionals and managers. The rate of higher education has increased in Australia in recent years (ABS, 2017). If this trend continues, the Australian workforce population is projected to become more similar to the home-based teleworker population in terms of formal education over time.

Life stage: There was no significant difference between the research sample of teleworkers and the Australian workforce population in terms of life stage. In both groups, the most common life stage is “couple, with children”, at over 50%, while “one parent family” had the lowest proportion in both groups.

Annual income: There was a significant difference, at the 1% level, in household income characteristics between the two groups (Table 6.1). The distribution of annual household income by level in the research sample of teleworkers is similar to the household income distribution in the Australian workforce population, with higher proportions in each successive income level. Almost 70% of the research sample and the workforce population have annual household income in the two highest income levels over \$78,000, but the research sample has fewer people in the very highest household income level of \$104,000 or more. The research sample had twice the proportion of workers in the three lowest income levels (3.3%) than the workforce population (1.5%). The income differences between the two groups may reflect the structure and age of households, as the variable is household income, not individual worker income.

Workload: There was a significant difference, at the 1% level, between the research sample of teleworkers and the Australian workforce population in terms of workload. The

proportion of full-time workers in the research sample of teleworkers (84.8%) was 19.3 percentage points higher than full-time workers in the Australian workforce population (65.5%), and similar to the proportion of full-time workers in the Trans-Tasman telework survey (Bentley et al., 2013). The Household, Income and Labour Dynamics in Australia (HILDA) survey-based review of workload characteristic (Wilkins, 2013) indicates that in the population of people working at home, of which not all can be considered teleworkers, the proportion of full-time workers (about 49%) was even lower than full-time workers in the Australian workforce population. Because of the nature of telework tasks, the Australian home-based telework population is more likely to have full-time workers than the total Australian workforce population.

In addition, based on the results of the workload characteristics in Chapter 5, the proportion of full-time workers amongst self-employed home-based teleworkers in the research sample (56.8%) was lower than that of full-time workers amongst employee home-based teleworkers (90.1%), and was also lower than that of full-time workers in the Australian workforce population (65.5%). The sub-group of Australian employee home-based teleworkers is more likely to have a full-time job compared to self-employed home-based teleworkers. This supports the notion that, for Australian employees, doing home-based telework is often regarded as a complementary strategy to extend working hours and complete a full-time workload, or increase work-life balance whereas for a considerable proportion of self-employed workers doing home-based telework is equivalent to making money and increasing their income through a part-time job.

Occupational category: There was a significant difference, at the 1% level, between the home-based teleworker sample in this study and the Australian workforce population in terms of occupational category. The teleworker sample is more concentrated in fewer occupational categories. Telework naturally only includes some specific occupational categories that do not require face-to-face customer or client contact or physical presence, so a full comparison between the two groups is not possible for occupational categories such as technicians and trades workers, machinery operators and drivers, and labourers. Although the professionals category was the largest occupational category for both groups, the proportion of this category in the research sample (45.1%) was twice the proportion in the Australian workforce population (22.6%).

Another difference was the categories ranked second for each group. In the research sample of home-based teleworkers, managers were the second highest proportion (31.2%), while clerical and administrative workers (13.8%) and technicians and trades workers (13.8%) were ranked second, and managers a little behind (13.2%) in the Australian workforce population. In addition, the proportions of sales workers and community and personal service workers in the research sample were much lower than the proportions of these categories in the Australian workforce population.

According to the Australian Department of Jobs and Small Business (DJSB, 2018), the professionals category had the highest growth among all occupational categories in Australia in recent years. The Australian Bureau of Statistics censuses 2006, 2011 and 2016 also indicate that the proportion of professionals in the population of “people working at home” has been steadily increasing, and grew more than the proportion of managers (see Chapter 2). It is likely that the proportion of professionals in the Australian population of home-based teleworkers will continue to increase more than other occupations.

Household size, and the number of children in family: The size of the household (2.71) and the number of children per family (0.64) in the research sample were relatively similar to the size of the household (2.6) and the number of children per household (0.8) for the total population of Australia according to the Australian Bureau of Statistics census 2016.

Table 6.1 Comparing the research sample of home-based teleworkers and Australian workforce population in terms of basic characteristics

Description		Research sample	Australian workforce ^a	Difference	Value (df)	Sig. (2-tailed)
Characteristics	Categories	Share (%)	Share (%)			
Age (years)	20–29	12.4	21.6	-9.2	17.15 ^b (5)	.004**
	30–39	28.7	23.8	4.9		
	40–49	22.9	23.5	-0.6		
	50–59	23.3	20.4	2.9		
	60–69	11.6	9.2	2.4		
	70 or Older	1.1	1.7	-0.6		
Gender	Male	46.6	52.5	-5.9	3.89 ^b (1)	0.048*
	Female	53.4	47.5	5.9		
Disability	Disabled	6.5	0.8	5.7	115.9 ^b (2)	0.000**
	Not Disabled	93.5	97.9	-4.4		
	Not stated	-	1.2	-1.2		
Formal education	Senior high school	8.3	33.0	-24.7	359.1 ^b (5)	0.000**
	Certificate level	12.3	21.9	-9.6		
	Advanced diploma/diploma	6.1	12.1	-6.0		
	Bachelor's degree	32.9	22.6	10.3		
	Graduate diploma/certificate	17.0	3.0	14.0		
	Postgraduate degree	23.5	7.4	16.1		
Life stage	One parent family	10.7	11.7	-1.0	0.285 ^b (2)	0.86
	Couple family with no children	32.9	33.2	-0.3		
	Couple family with children	56.4	55.1	1.3		
Annual household income (Australian Dollars)	\$1–\$7,799	1.1	0.3	0.8	27.72 ^b (9)	.001**
	\$7,800–\$15,599	1.1	0.6	0.5		
	\$15,600–\$20,799	1.1	0.6	0.5		
	\$20,800–\$33,799	1.8	3.7	-1.9		
	\$33,800–\$41,599	1.8	3.8	-2.0		
	\$41,600–\$51,999	7.6	5.6	2.0		
	\$52,000–\$64,999	6.1	8.1	-2.0		
	\$65,000–\$77,999	10.5	8.9	1.6		
	\$78,000–\$103,999	23.1	16.2	6.9		
	\$104,000 or more	45.8	52.4	-6.6		
Work load	Full-time	84.8	65.5	19.3	47.05 ^b	.000**
	Part-time	14.8	34.5	-19.7		
Occupational category	Managers	32.1	13.2	18.9	249.8 ^b	.000**
	Professionals	45.1	22.6	22.5		
	Community and Personal Service Workers	2.5	11.0	-8.5		
	Clerical and Administrative Workers	17	13.8	3.2		
	Sales Workers	3.2	9.5	-6.3		
	Technicians and Trades Workers	-	13.8	-13.8		
	Machinery Operators and Drivers	-	6.4	-6.4		
	Labourers	-	9.6	-9.6		

a. Based on ABS (2016)

b. Chi-square test for goodness of fit

*p<0.05 (2-tailed); **p<0.01 (2-tailed)

Location of residence: The chi-square test result in Table 6.2 shows there was no significant difference between the research sample of home-based teleworkers and the Australian workforce population in terms of the location of residence. The geographical distribution of home-based teleworkers' residences in the research sample generally followed the geographical distribution of the Australian workforce population, although the proportions of the sample living in Queensland and Western Australia were considerably lower than in the Australian workforce population (about 4 percentage points lower), while the proportion of the sample living in Victoria was higher than the proportion in the Australian workforce population. This difference is mostly due to the

difference in the proportions of the capital cities in the research sample. Brisbane and Perth had a lower than expected percentage of home-based teleworkers, while Melbourne had a higher than expected percentage of home-based teleworkers compared to the rest of Australia. Adelaide had the greatest proportion difference (3.5 percentage points) between the research sample and the Australian workforce population, indicating there was a relatively high concentration of teleworkers' location of residence in this capital city compared to other Australian capital cities. In South Australia, there was an imbalance in the presence of home-based telework between metropolitan and non-metropolitan regions.

Location of employer: The chi-square test result in Table 6.2 shows there was no significant difference between the research sample of teleworkers and the Australian workforce population in terms of the location of employer. The geographical distribution of home-based teleworkers' employers followed, to a large extent, the geographical distribution of the Australian workforce population location of employer. Victoria and New South Wales had slightly higher proportions of the research samples than proportions of the Australian workforce populations in terms of the location of employer characteristic. Instead, the proportions of the research sample with employers in Western Australia and Queensland were slightly lower than the proportions of Australian workforce populations in terms of location of employer. The geographical location of employer by Australian capital cities categorisation (Table 6.2) shows that the over-representation of teleworkers' employers in Victoria and New South Wales was mostly due to relatively high concentration of teleworkers' employers in the metropolitan regions of these two states. In contrast, for Queensland, the under-representation was because of the relatively low presence of teleworkers' employers in the non-metropolitan regions. In general, Melbourne, Sydney and Adelaide capital cities are more likely than other Australian capital cities to be the main place of home-based teleworkers' employers.

Table 6.2 Comparing the research sample and the Australian workforce population in terms of geographical locations of residence and employer

Description		Research sample	Australian workforce ^a	Difference	Value (df)	Sig. (2-tailed)
Characteristics	Categories	Share (%)	Share (%)			
Location of residence (Australian states)	ACT	2.2	1.9	0.3	11.72 ^b (7)	0.11
	NSW	32.9	31.6	1.3		
	NT	0.4	1.0	-0.6		
	QLD	15.9	20.0	-4.1		
	SA	9.4	7.0	2.4		
	TAS	2.2	2.0	0.2		
	VIC	29.6	25.6	4.0		
	WA	6.9	10.8	-3.9		
Location of residence (Australian capital cities)	Australian Capital Territory	2.2	1.9	0.3	19.08 ^b (14)	0.162
	Sydney	22.7	21.3	1.4		
	Rest of NSW	10.2	10.3	-0.1		
	Darwin	0.4	0.7	-0.3		
	Rest of NT	0	0.3	-0.3		
	Brisbane	7.9	10.1	-2.2		
	Rest of QLD	8.0	9.9	-1.9		
	Adelaide	9.0	5.5	3.5		
	Rest of SA	0.4	1.5	-1.1		
	Hobart	0.7	0.9	-0.2		
	Rest of TAS	1.4	1.1	0.3		
	Melbourne	22.8	19.8	3.0		
	Rest of VIC	6.9	5.8	1.1		
	Perth	6.2	8.6	-2.4		
	Rest of WA	0.7	2.2	-1.5		
Location of employer (Australian states)	ACT	2.6	2.1	0.5	7.79 ^b (7)	0.351
	NSW	33.6	31.4	2.2		
	NT	0.4	1.0	-0.6		
	QLD	16.6	20.0	-3.4		
	SA	8.3	7.0	1.3		
	TAS	2.6	2.0	0.6		
	VIC	28.8	25.6	3.3		
	WA	7.0	10.9	-3.9		
Location of employer (Australian capital cities)	Australian Capital Territory	2.7	2.2	0.5	20.26 ^b (14)	0.122
	Sydney	25.3	21.6	3.6		
	Rest of NSW	8.2	9.8	-1.6		
	Darwin	0.5	0.7	-0.2		
	Rest of NT	0.0	0.3	-0.3		
	Brisbane	11.4	10.2	1.2		
	Rest of QLD	5.2	9.7	-4.5		
	Adelaide	7.9	5.5	2.4		
	Rest of SA	0.5	1.5	-1.0		
	Hobart	1.0	1.0	0.0		
	Rest of TAS	1.7	1.0	0.6		
	Melbourne	24.4	20.0	4.4		
	Rest of VIC	4.4	5.5	-1.2		
	Perth	6.5	8.3	-1.8		
	Rest of WA	0.5	2.5	-2.1		

a. Based on ABS (2016)

b. Chi-square test for goodness of fit

*p<0.05 (2-tailed); **p<0.01 (2-tailed)

Dwelling type: The chi-square test result in Table 6.3 shows there was a significant difference, at the 5% level, between the research sample of teleworkers and the Australian workforce population in terms of dwelling type. The research sample had lower proportions living in separate house and semi-detached dwellings than the Australian workforce population but the proportion living in a flat, unit or apartment in the research sample was more than the proportion for the entire Australian population, indicating the greater probability of home-based teleworkers living in a flat, unit or apartment. This

higher density dwelling type is more common in capital cities than non-metropolitan areas, and more common in larger capital cities.

Dwelling tenure: There was a significant difference, at the 1% level, between the research sample of home-based teleworkers and the Australian workforce population in terms of dwelling tenure (Table 6.3). Home-based teleworkers were more likely to be owners than the workforce population, possibly being able to work from home because they have more control over the home environment and security of tenure. However, both groups have a similar proportion of renters (about 30%).

Internet type: There was no significant difference between the research sample of teleworkers and the Australian workforce population in terms of internet type, as at least 98.6% of both groups had broadband (Table 6.3). The very small difference observed was probably due to the much lower sample size of the research sample compared to the Australian population. Indeed, the difference is within the margin of error in terms of the size of the research sample.

Length of residence at home: There was similarity between the average length of residence at home in the research sample of teleworkers and in Australian regions and capital cities. While the average length of residence at home in the research sample was equal to 120.5 months or 10.04 years, the average length of residence at home in regional Australia was 10.0 years and in Australian capital cities was 10.5 years in 2014 (CL, 2015). Considering this similarity and the current low rate of telework in Australia (see Chapter 2), the length of residence at home for Australian teleworkers may be independent from their telework choice, and it probably follows general Australian population length of residence at home patterns.

Table 6.3 Comparing the research sample and the Australian population in terms of dwelling characteristics

Description		Research sample	Australian workforce ^a	Difference	Value (df)	Sig. (2-tailed)
Characteristics	Categories	Share (%)	Share (%)			
Dwelling type	Separate house	69.0	72.5	-3.5	8.45 ^b (2)	0.015*
	Flat, unit, apartment	20.3	14.4	5.9		
	Semi-detached etc.	10.5	13.1	-2.6		
Tenure	Own	68.8	62.0	6.8	23.414 ^b (3)	.000**
	Rent	30.1	29.4	0.7		
	Other tenure type	1.1	0.9	0.2		
	Not stated	-	7.7	-7.7		
Internet type	Broadband	98.6	99.3	-0.7	2.202 ^b (1)	0.138
	Dial-up	1.4	0.7	0.7		

a. Based on ABS (2016)

b. Chi-square test for goodness of fit
*p<0.05 (2-tailed); **p<0.01 (2-tailed)

Telework experience: The average duration of telework experience in the research sample of teleworkers was equal to 66.5 months or 5.5 years, which was close to the average duration of telework experience in the Trans-Tasman telework survey of 5.8 years (Bentley et al., 2013). Considering this similarity and knowing the surveys had different data collection approaches, the research results can be confidently generalised to the Australian home-based teleworker population in terms of telework experience.

Time allocated to home-based telework: The average time allocated to telework in the research sample was equal to 18.31 hours per week (see Chapter 5), 5.3 hours higher than the average time allocated to telework in the Trans-Tasman telework survey which was 13 hours per week (Bentley et al., 2013). However, the chi-square test result in Table 6.4 indicates there was no significant difference between the results of the two surveys in terms of time allocated to home-based telework. Considering the similarity, the research results can be generalised to the Australian home-based teleworker population with more confidence. Despite the difference in included occupational categories, the distribution of the time allocated to telework per week characteristic, which was a steady and gradual downward pattern in relation to the proportion of teleworkers (Figure 5.6), was similar in shape to the distribution of the time allocated to work at home characteristic in HILDA data surveys over the different years (see Figure 2.1). Similarly, in the research sample and HILDA data surveys, the proportion of teleworkers declines as the time allocated to telework time increases.

Telework arrangements: The chi-square test in Table 6.4 shows there was a significant difference at the 1% level between the research sample of teleworkers and the Trans-Tasman telework survey (Bentley et al., 2013), in terms of the telework arrangements. The Trans-Tasman telework data was reclassified in order to be comparable with the research sample results. Although similarities were observed between the two groups (for example, in the category of verbal agreement), the difference between the proportions of other categories (for example, in the category of teleworkers with formal telework agreement) is noticeable. The major difference between the proportions of categories may be due to differences in the type of question asked in the surveys or the surveys' sampling approach. From another point of view, the difference between the proportions of categories may be due to the included New Zealand respondent data in the Trans-Tasman survey. This suggests there could be a possible difference between Australia and New

Zealand telework employers in terms of telework policies, which needs further investigation.

Table 6.4 Comparing the research sample and the Trans-Tasman telework survey in terms of job-related characteristics

Description		Research sample (N=277)	Trans-Tasman survey (N=1827 ^b)	Difference	Value (df)	Sig. (2-tailed)
Characteristics	Categories	Share (%)	Share (%)			
Time allocated to telework (3 categories)	Low-intensity teleworkers (1 working day per week)	34.7	35	-0.3	.0.749 ^a (2)	0.687
	Hybrid teleworkers (1–3 working days per week)	36.8	38	-1.2		
	High-intensity teleworkers (More than 3 working days per week)	28.5	26	2.5		
Telework arrangements	Yes	31.8	22	9.8	12.663 ^a (2)	0.002**
	No	42.5	50	-7.5		
	Verbal agreement	25.8	27	-1.2		

a. chi-square test for goodness of fit

*p<0.05 (2-tailed); **p<0.01 (2-tailed)

b. 1827 respondents from 50 Australian and New Zealand organisations

6.3 Place-related status of Australian home-based telework

This section compares place-related characteristics of the research sample and the Trans-Tasman telework survey sample: indoor environment, social isolation (Table 6.5) and transport to reach employer or clients (Table 6.6).

Indoor environment characteristics: The research sample of teleworkers and the Trans-Tasman telework survey (Bentley et al., 2013) were consistent to some extent in terms of indoor environment characteristics. In both surveys, temperature, noise and lighting characteristics were priority issues for teleworkers. In the research sample, the average values for satisfaction of home-based teleworkers with temperature, noise and lighting characteristics were 4.04, 4.12 and 4.14, respectively, on a five-point Likert scale of 1 (very dissatisfied) to 5 (very satisfied). In the Trans-Tasman telework survey, home-based teleworkers also had the most serious ergonomic problems with thermal environment (39%), noise or vibration (20%), seating comfort (19%) and illumination and lighting (13%). Considering this consistency, the research results on indoor environment characteristics can be generalised with more confidence to the total Australian home-based telework population.

Social isolation: The mean values of social isolation variable classified by the time allocated to telework categories are illustrated in Table 6.5 for the research sample and the Trans-Tasman telework survey. Unfortunately, the average value for the high-intensity teleworkers category was not reported in the Trans-Tasman telework survey, and, therefore, no comparison could be made. The mean values of the social isolation variable for the research sample and the Trans-Tasman telework survey were not similar, probably due to different sample size, different ways of questioning, different types of Likert scale used or because the Trans-Tasman telework survey only had an employer-focused respondent targeting approach. However, for both, the mean value for the low-intensity teleworkers is less than the mean value for hybrid teleworkers. However, for both, the mean value for the low-intensity teleworkers is less than the mean value for hybrid teleworkers.

Table 6.5 Comparing the research sample and Trans-Tasman telework survey in terms of social isolation

Description		Social isolation mean	
Characteristics	Categories	Research sample (N=277)	Trans-Tasman survey (N=1827 ^a)
Time allocated to telework	Low-intensity teleworkers (1 working day per week)	2.18	2.9
	Hybrid teleworkers (1–3 working days per week)	2.26	3.3
	High-intensity teleworkers (More than 3 working days per week)	2.22	-

a. 1827 respondents from 50 Australian and New Zealand organisations

Types of transport to get to employer: The chi-square test result in Table 6.6 shows there was a significant difference, at the 1% level, between the research sample and the Australian workforce population in terms of the types of transport to get to employer locations. Australian home-based teleworkers used public transport (bus, train, tram) much more, and vehicles much less than, the Australian workforce population when commuting [?], possibly related to location of residence in capital cities and location of employer. Fewer Australian home-based teleworkers drive to their employer compared to the Australian workforce population. The major difference between the two groups in the “did not go to work” category was probably due to the presence of “the people working at home” population in the Australian workforce population, whereas they were

not considered in the research sample of teleworkers. Home-based teleworkers were also more likely to use active transport (walking and bicycle) than the Australian workforce population. Home-based teleworkers' choice of transport to get to employer has its own pattern, different from the Australian workforce population transport use, reflecting location of residence in capital cities and type of dwelling where flats and units are located in higher density locations with public transport and active transport options.

Table 6.6 Comparing the research sample and the Australian workforce population in terms of the methods of transport to get to employer

Description		Research sample	Workforce in Australia (ABS, 2016)	Difference	Value (df)	Sig. (2-tailed)
Characteristics	Categories	Share %	Share %			
Types of transport	Public transport	28.8	11.8	17	144.752 ^a (4)	0.000**
	Vehicle	50.0	68.7	-18.7		
	Active transport	9.2	4.5	4.7		
	Did not go to work	8.9	14.2	-5.4		
	Other Mode	3.1	0.7	2.4		

a. chi-square test for goodness of fit
*p<0.05 (2-tailed); **p<0.01 (2-tailed)

6.4 Summary

This chapter has compared the research sample descriptive results on basic and place-related variables with relevant data and information at the Australian national level. The findings indicate that only a few variables including life stage, location of residence, location of employer and internet type were very similar between the two groups. For most of the characteristics, there were significant differences between the research sample and the Australian workforce population (or Australian population). Regardless of the statistical significance (or not) of the variables between the two groups tested through chi-square results, partial similarities or differences were observed in some variables and categories between both groups which were also described in the chapter. Table 6.7 summarises and highlights the main findings of Chapter 6.

Synthesising the findings led to some further understandings about Australian telework practice as follows:

- **Living and dwelling:** Australian home-based teleworkers have high household income and have high education levels. They are most likely to be in a couple family with children. To a large extent, Australian teleworkers are very similar to the Australian workforce population in the location of residence, with a relatively higher presence in Victoria, New South Wales and South Australia and more concentration in the major metropolitan regions such as Melbourne, Sydney and Adelaide. While many Australian teleworkers live in separate houses, compared to the Australian population they are more likely to live in apartments and units. They are more likely to own their home compared to the Australian population. Like the whole Australian population, they have reliable access to high-speed broadband internet.
- **Work:** Australian teleworkers are often professional or managers by occupation and, compared to the Australian workforce population, they mostly work full-time. Most Australian employee teleworkers do not have a formal telework arrangement and do telework through informal or verbal agreement. To a large extent, Australian teleworkers are very similar to the Australian workforce population in the location of employer. However, compared to total Australian employers, Australian telework employers are more likely to be located in Victoria, New South Wales and South Australia, with more concentration in metropolitan regions such as Melbourne, Sydney and Adelaide.
- **Telework place:** Most teleworkers in Australia have a separate workspace for telework, and generally feel satisfied about the indoor environmental qualities of their home as a telework place. For employee teleworkers, using private transport is a common mode of transport to reach the location of employers. But, compared to the Australian workforce population, they rely much more on public transport and active transport to reach the office of their employer, likely reflecting both their location of residence and employer location in higher density cities.

Table 6.7 Main findings on Australian home-based telework at national level

Characteristics	Research sample vs Australia	Significant similarity
Age	- Higher proportion of teleworkers aged 30–39 years (28.7%) compared to the Australian workforce (23.8%) - Lower proportion of teleworkers aged 20–29 years (12.4%) compared to the Australian workforce (21.6%)	××
Gender	- Higher proportion of teleworkers are female (53.4%) compared to the Australian workforce (47.5%)	×
Disability	- Higher proportion of teleworkers have disabilities (6.5%) compared to the Australian workforce (0.8%)	××
Education	- Highest proportion of teleworkers in the bachelor's degree category (28.7%) - Highest proportion of Australian workforce in the senior high school category (33.0%)	××
Life stage	- General similarity between the two populations in terms of life stage - Highest proportion of both populations are couples with children (56.4% vs 55.1%)	✓
Household Income	- Highest proportions of both populations in the highest income categories (\$78,000–\$103,999 and \$104,000 or more)	××
Work load	- Higher proportion of teleworkers are full-time (84.8%) compared to the Australian workforce (65.5%)	××
Occupation	- Major difference between the proportion of the two populations in the professional category and in the manager category	××
Location of residence	- Higher proportions of teleworkers in Victoria, New South Wales and South Australia compared to other states - Higher proportions of teleworkers in Adelaide, Sydney and Melbourne compared to other Australian capital cities	✓
Location of employer	- Higher proportions of teleworkers' employers in Victoria, New South Wales and South Australia compared to other states - Higher proportions of teleworkers' employers in Adelaide, Sydney and Melbourne compared to other Australian capital cities	✓
Dwelling type	- Highest proportion of both groups live in separate house - Higher proportion of teleworkers live in flat, apartment and unit (20.3%) compared to the Australian workforce (14.4%)	×
Tenure	- Higher proportion of teleworkers in owner category (68.8%) compared to the Australian workforce (62.0%)	××
Internet type	- Both groups very similar in internet access, with at least 98.6% with broadband access	✓
Transport to employer	- Highest proportion of both groups drive - Considerably higher proportion of teleworkers use public transport (28.8%) compared to the Australian workforce (11.8%)	××

✓ Significant similarity × Significant difference at the 5% level ×× Significant difference at the 1% level

In most dimensions, Australian telework practice operates in a different context from the Australian socio-demographic and work-related context. Home-based teleworkers are similar to the Australian workforce generally only in terms of the geographical location of home and work, family structure and internet access. The differences between teleworkers and all workers call for a further socio-behavioural investigation of Australian home-based telework places. Chapter 7 provides a socio-behavioural investigation of the key findings.

Chapter 7: Australian home-based telework: factors influencing work motivation

7.1 Introduction

According to the conceptual framework presented in Chapter 3, socio-demographic, dwelling, job-related and telework place-related conditions of telework can increase home-based teleworkers' level of autonomous work motivation which in turn leads to positive outcomes such as increased productivity and well-being. Therefore, an effective Australian planning policy for home-based telework depends on identifying which home-based teleworkers' basic and place-related factors are a priority for further consideration. For this purpose, this research identified the basic and place-related factors that determine Australian home-based teleworkers' level of work motivation. The results are reported in this chapter and are based on the statistical tests performed in empirical analyses 4 to 7 (see Section 4.3).

However, before identification of the factors which significantly affect teleworkers' level of work motivation in empirical analyses 4 to 7, it was also important to differentiate the main groups of home-based teleworkers' current choices. Although the overall sample size of the research was suitable for implementing predictive analyses, it did not allow for a separate regression analysis for the self-employed teleworker subgroup because the small sample size of this subgroup violated the assumptions for the predictive analyses techniques, and it was not possible to compare the results of predictive models between the two subgroups of teleworkers. Exploring the key differences between employee and self-employed home-based teleworkers helped to compensate for this and achieve a preliminary understanding of the different dynamics of home-based telework for employees and self-employed teleworkers. This understanding was helpful in interpreting the findings, especially as it was not possible to compare separate predictive models for each subgroup. This was achieved in research empirical analysis 3, using descriptive and interval statistical techniques.

The results of empirical analyses 3 to 7 are presented in this chapter in the following two sections:

The first section, on key differences between employee and self-employed teleworker subgroups, reports the basic and place-related characteristics that are significantly different between the two main groups of home-based teleworkers.

The second section, on factors influencing work motivation, reports the basic and place-related characteristics that significantly increase (or decrease) teleworkers' degree of work motivation. This was achieved through empirical analyses 4 to 7 using predictive statistical techniques.

7.2 Key differences between employee and self-employed home-based teleworkers

This research designed empirical analysis 3 to identify characteristics that are significant and determining differences between employee and self-employed home-based teleworkers (see Section 4.3). The chi-square test for independence was used to assess the categorical variables and the independent samples t-test for the continuous variables (see Section 4.6 on data analyses techniques). Tables 7.1 and 7.2 summarise the results of the statistical tests performed in this analysis.

7.2.1 Significant categorical variables

Of the categorical variables discussed in Chapter 5, household income, type of dwelling, workload, time allocated to telework, transport by train and no travel were identified as those that are significantly different between the employee and self-employed groups of home-based teleworkers. Table 7.1 shows the results from the chi-square test for independence for each of the significant variables. The interpretation of the results for each of the variables is as follows:

Household income: To interpret the results of the income variable which included many categories, this variable was re-categorised into three categories of “low income”, “middle income” and “high income”. In the research sample, employee home-based teleworkers are more likely to be “high-income” compared to the self-employed home-based teleworkers. Conversely, self-employed home-based teleworkers are more likely to be “low-income” compared to the employee home-based teleworkers. Considering the

degree of freedom (2), the effect size of this variable (0.14) is described as ‘moderate’ (see J. Cohen, 1988).

Dwelling type: In the research sample, employee home-based teleworkers are more likely to be live in a “flat, unit or apartment”, compared to self-employed home-based teleworkers, while self-employed home-based teleworkers are more likely to live in “semi-detached, etc.” compared to self-employed home-based teleworkers. Considering the degree of freedom (2), the effect size of this variable (0.15) is described as ‘moderate’ according to Cohen (1988).

Workload: It is also more likely that, in the research sample, self-employed home-based teleworkers work “full-time” compared to employee home-based teleworkers. It is also more likely that, in the research sample, employee home-based teleworkers work “part time 2.5 days or more per week” compared to self-employed home-based teleworkers. Considering the degree of freedom (2), the effect size of this variable (0.34) is described as ‘large’ according to Cohen (1988), indicating serious and definitive differences between the two groups, employee and self-employed home-based teleworkers, in terms of workload. Workload also has the highest effect size of all the significant categorical variables.

Time allocated to telework: In the research sample, it is more likely that employee home-based teleworkers have “1 working day per week” in terms of time allocated to telework compared to self-employed home-based teleworkers. It is also more likely that, in the research sample, self-employed home-based teleworkers have “more than 3 working days per week” compared to employee home-based teleworkers. Considering the degree of freedom (2), the effect size of this variable (0.24) is described as ‘moderate’ according to Cohen (1988).

Transport by train: It is more likely that, in the research sample, employee home-based teleworkers use “transport by train” to reach their employer workplace when they need to make these journeys. Conversely, it is less likely that, in the research sample, the self-employed home-based teleworkers use “transport by train” to reach their clients. Considering the degree of freedom (1), the effect size of this variable (-0.15) is described as ‘moderate’ according to Cohen (1988).

No travel: In the research sample, it is more likely that the self-employed home-based teleworkers do not travel to reach their clients. Considering the degree of freedom (1), the effect size of this variable (0.27) is described as ‘moderate’ according to Cohen (1988).

Table 7.1 Categorical variables that significantly distinguish between the two home-based teleworker groups

Description				Employee n (%)	Self- Employed n (%)	N	Value (df)	Sig. (2- tailed)	Effect size
Basic characteristics	Socio-demographic characteristics	Income	Low income (\$1–\$41,599)	14 (73.7)	5 (26.3)	19	6.11 ^a (2)	0.047	0.14 ^c
			Middle income (\$41,600–\$103,999)	105 (80.2)	26 (19.8)	131			
			High income (\$104,000 or more)	114 (89.8)	13 (10.2)	127			
	Dwelling characteristics	Type of dwelling	Separate house	157 (82.2)	34 (17.8)	191	6.62 ^a (2)	0.036	0.15 ^c
			Flat, unit, apartment	53 (94.6)	3 (5.4)	56			
			Semi-detached, etc.	22 (75.9)	7 (24.1)	29			
	Job-related characteristics	Work load	Full-time	210 (89.4)	25 (10.6)	235	33.28 ^a (2)	0.000	0.34 ^c
			Part-time 2.5 days or more per week	18 (52.9)	16 (47.1)	34			
			Part-time less than 2.5 days per week	4 (57.1)	3 (42.9)	7			
		Time allocated to telework	1 working days per week	92 (95.8)	4 (4.2)	96	17.20 ^a (2)	0.000	0.24 ^c
			1–3 working days per week	83 (81.4)	19 (18.6)	102			
			More than 3 working days per week	58 (73.4)	21 (26.6)	79			
Place-related characteristics	Macro-level characteristics	Transport by train	Yes	49 (96.1)	2 (3.9)	51	5.64 ^b (1)	.018	-.15 ^d
			No	184 (81.4)	42 (18.6)	226			
	No travel		Yes	16 (55.2)	13 (44.8)	29	17.96 ^b (1)	0.000	0.27 ^d
			No	217 (87.5)	31 (12.5)	248			

a. Pearson Chi-Square, b. Continuity correction, c. Cramer’s V coefficient, d. phi coefficient

7.2.2 Significant continuous variables

Of the continuous variables discussed in Chapter 5, age, length of residence, time allocated to telework, equipment and time taken to get to employer/clients were identified as variables that are significantly different between employee and self-employed groups of home-based teleworkers. Table 7.2 shows the results from the independent samples t-test for each of the significant variables. The interpretation of the results for each of the variables is as follows:

Age: The average age of self-employed home-based teleworkers was significantly higher than the average age of employee home-based teleworkers. The difference between the two groups was equal to 8.95 years. The effect size of this variable (0.762) is described as ‘large’ according to Cohen (1988), indicating a clear and definitive difference between the two groups of employee and self-employed home-based teleworkers in age.

Length of residence: The length of residence, on average, of self-employed home-based teleworkers was significantly higher than the length of residence on average of employee home-based teleworkers. The difference between the two groups was equal to almost 12 years (142 months). The effect size of this variable (1.173) is described as ‘large’ according to Cohen (1988), indicating a clear and definitive difference between the two groups of employee and self-employed home-based teleworkers in length of residence.

Time allocated to telework: The average time allocated to telework by self-employed home-based teleworkers was significantly higher than the average time allocated to telework by employee home-based teleworkers. The difference between the two groups was equal to 8.82 hours. The effect size of this variable (0.712) is described as ‘moderate’ according to Cohen (1988).

Equipment: The average satisfaction with equipment of self-employed home-based teleworkers was significantly higher than the average satisfaction with equipment of employee home-based teleworkers. The difference between the two groups was equal to 0.37, on a five-point Likert scale of 1 (very dissatisfied) to 5 (very satisfied). The effect size of this variable (0.439) is described as ‘moderate’ according to Cohen (1988).

Time taken to get to employer or clients: The time taken to get to an employer or clients on average for employee home-based teleworkers was significantly higher than the

average time taken to get to employer or clients for self-employed home-based teleworkers. The difference between the two groups was equal to 18.92 minutes. The effect size of this variable (0.538) is described as ‘moderate’ according to Cohen (1988).

Table 7.2 Continuous variables that significantly distinguish between the home-based teleworkers sub-groups

Description		Mean (SD)		Mean difference	t (df)	Sig. (2-tailed) ^{a,b}	Effect size ^c
		Employee (n=233)	Self-Employed (n=44)				
Basic characteristics	Age	42.54 (11.41)	51.50 (13.52)	8.95	-3.56 (226)	0.002	0.762
	Length of residence	104.55 (102.40)	246.79 (193.37)	142.24	-3.54 (24.54)	0.006	1.173
	Time allocated to telework	15.26 (12.34)	24.08 (12.65)	-8.82	-3.30 (226)	0.005	0.712
Micro-level place-related characteristics	Equipment	3.87 (0.86)	4.25 (0.89)	-0.37	-2.02 (226)	0.044	0.439
Macro-level place-related characteristics	Time taken to get to employer/clients	43.00 (36.44)	24.71 (14.91)	18.92	2.43 (226)	0.003	-0.538

a. Independent t-test, b. Bootstrap based on 1000 sample, c. Cohen’s d

7.3 Factors affecting Australian teleworkers’ work motivation

This section describes the results of the empirical analyses to determine the factors significantly affecting Australian home-based teleworkers’ level of work motivation. Empirical analyses 4 to 7 (see Section 4.3) provide four predictive models. The first three models evaluated the influence of basic factors, micro-level place-related factors, and macro-level place-related factors on work motivation, separately. Separate predictive models can reduce the likelihood of errors in neglecting the effects of some factors before developing a comprehensive model. Finally, the fourth model considered the effects of all the basic and place-related factors together on the level of work motivation, simultaneously.

Each of the empirical models was developed using multiple regression analysis. The multiple regression used the standard method in all four empirical models, because of its prevalence and reliability compared to other methods (see Pallant, 2013). In the standard

method, all the independent variables are entered simultaneously and treated on an equal footing in the model. This regression strategy is useful when there is no pre-existing logic and theoretical understanding for considering any variable to be prior to other independent variables (P. Cohen, West, & Aiken, 2014).

The independent variables of the models were the categorical, ordinal and continuous variables described in Chapter 5. The dependent variable in these models was the work motivation continuous variable, which, as explained in Section 4.4.2.6, is obtained by relying on the Tremblay et al. (2009) proposed method (M. A. Tremblay et al., 2009). Components related to the work motivation construct have been adapted to the requirements of telework as a concurrent life and work experience with specific circumstances. Question 20 of the survey (Appendix 2) has items related to this construct. Summary of results on work motivation variable can also be found in the Appendix 5.

As explained in Section 4.6, using the multiple regression analysis technique requires assumptions about the size of the sample, absence of outliers, absence of multicollinearity and singularity, and normality, linearity and homoscedasticity of residuals. The authenticity of these assumptions was checked before the analysis was performed.

In some cases, in order to get a better understanding of the results, the categorical variables were reclassified. In order to use the categorical variables in multiple regression models, it was also necessary to re-code these variables as dummy variables (Field, 2013). Table 7.3 shows the relationship between the categorical variables, their original categories, the dummy categories and the selected reference categories considered in the regression models.

Table 7.3 Relationship between the categorical and dummy variables

Characteristics	Original categories	Dummy categories	Reference category
Employment status	Employee	Employee	Self-employed
	Self-employed	Self-employed	
Gender	Male	Male	Male
	Female	Female	
Disability	Yes	Yes	No
	No	No	
Education	Senior high school	Basic	Basic
	Certificate level		
	Advanced diploma/diploma	Middle	
	Bachelor's degree		
	Graduate diploma/certificate	High	
	Postgraduate degree		
Life stage	Single, No children	Single, No children	Couple, No children
	Single, Youngest child 4 years or younger	Single, With children	
	Single, Youngest child 5–11 years		
	Single, Youngest child 12–17 years		
	Single, Youngest child 18 years or over		
	Couple, No children	Couple, No children	
	Couple, Youngest child 4 years or younger	Couple, With children	
	Couple, Youngest child 5–11 years		
	Couple, Youngest child 12–17 years		
	Couple, Youngest child 18 years or over		
Dwelling type	Separate house	Not unit/apartment	Not unit/apartment
	Semi-detached, row or terrace house, town house etc.	Unit/apartment	
	Flat, unit, apartment		
Tenure	Owner	Owner	Not owner
	Renter	Not owner	
	Rented or provided by employer		
Workload	Full time	Full time	Part time
	Part time 2.5 days or more per week	Part time	
	Part time less than 2.5 days per week		
Occupational category	Manager	Knowledge worker	Not knowledge worker
	Professional	Not knowledge worker	
	Clerical and Administrative worker		
	Sales worker		
	Community and Personal service worker		
Telework arrangements	No, I don't have a formal telework contract	Having telework contract concern	Not having telework contract concern
	Yes, I have a formal telework contract	Not having telework contract concern	
	No, but I have a verbal agreement with my supervisor		
	No, I am a self-employed teleworker		
Type of internet access	Broadband	Broadband	Dial-up
	Dial-up	Dial-up	
Type of workspace	A separate room	Separate space	Not separate space
	A separate building	Not separate space	
	An area or corner of a room		
	A place in your home that varies		

The models were repeatedly implemented considering the composition of the different entered variables, and their results checked to achieve an optimised form. Depending on the results of various implementations, and based on scientific judgment, a final decision was made about the most reasonable and defensible form of the models. The following is a summary of the results of each model.

7.3.1 Basic characteristics model

As explained in Section 4.3, the basic characteristics model focused on the relationship between basic characteristics of home-based telework including socio-demographic, dwelling and job-related characteristics of home-based teleworkers and home-based teleworkers' degree of work motivation. Table 7.4 summarises the results of the basic model. There was a significant relationship between age and work motivation ($\beta = .320$, $p < 0.01$), income and work motivation ($\beta = .239$, $p < 0.01$), and telework arrangement and work motivation ($\beta = -.202$, $p < 0.01$). There was also a relationship at the 10% level of significance between life stage and work motivation ($\beta = .127$, $p = 0.058$). The overall model fit of $R^2 = .24$ indicates 24% of the variation in work motivation can be explained by the basic model. Considering the achieved β , age had the greatest effect on work motivation ($\beta = .320$) of all the significant variables in the model.

Table 7.4 Basic characteristics model results

Variables	Work motivation against basic variables				
	<i>B</i>	<i>Std. Error</i>	<i>Std. Coeff. B</i>	<i>t-value</i>	<i>p-value</i>
Socio-demographic					
Age	.195	.048	.320	4.105	.000**
Gender = Female	1.066	.906	.071	1.177	.240
Disability = Yes	-2.118	1.733	-.070	-1.222	.223
Household size	-.275	.513	-.045	-.536	.592
Number of children	-.317	.640	-.041	-.496	.620
Education = Middle	-1.629	1.170	-.103	-1.393	.165
Education = High	.217	1.106	.014	.196	.845
Life stage = Single, no children	2.608	1.370	.127	1.904	.058
Life stage = Single, with children	2.507	1.759	.097	1.425	.155
Life stage = Couple, with children	1.461	1.277	.098	1.144	.254
Household Income	.923	.240	.239	3.846	.000**
Dwelling					
Dwelling type = Unit/apartment	1.821	1.201	.098	1.517	.131
Tenure = Owner	-.095	1.030	-.006	-.093	.926
Length of residence	-.004	.004	-.073	-1.102	.271
Job-related					
Employment status = Employee	.265	1.360	.013	.195	.846
Work load = Full-time	-2.049	1.211	-.098	-1.693	.092
Occupational category = Knowledge worker	-1.145	1.094	-.065	-1.047	.296
Time allocated to telework per week (hours)	.019	.031	.037	.603	.547
Telework arrangement = Having telework contract concern	-3.140	.910	-.202	-3.451	.001**
Experience of telework	.009	.007	.076	1.244	.215
<i>Constant</i>	-2.010				
<i>R</i>	= .490				
<i>R²</i>	= .240				
<i>Adjusted R²</i>	= .184				
<i>F-value</i>	= 4.232				
<i>SEE</i>	= 6.73432				
<i>n</i>	= 277				

* $p < 0.05$ (2-tailed); ** $p < 0.01$ (2-tailed)

7.3.2 Micro characteristics model

The micro characteristics model examines the impact of micro-level place-related factors, namely, the place-related factors inside the home which may affect home-based teleworkers' level of work motivation. Table 7.5 summarises the results of the micro characteristics model. There was a significant relationship between satisfaction with workspace size and work motivation ($\beta = .165$, $p < 0.05$), satisfaction with equipment and work motivation ($\beta = .161$, $p < 0.05$), the feeling of distraction and work motivation ($\beta = -.259$, $p < 0.01$), and feeling of isolation and work motivation ($\beta = -.170$, $p < 0.01$). The overall model fit of $R^2 = .30$ indicates 30% of the variation in work motivation can be explained by the micro characteristics model. Considering the achieved β , the feeling of distraction had the greatest (negative) effect on work motivation ($\beta = -.259$), of all the significant variables in the model.

Table 7.5 Micro characteristics model results

Variables	Work motivation against micro place-related variables				
	<i>B</i>	<i>Std. Error</i>	<i>Std. Coeff. β</i>	<i>t-value</i>	<i>p-value</i>
Type of Internet = Broadband	-3.118	3.272	-.050	-.953	.342
Internet speed	-1.166	.672	-.158	-1.737	.084
Internet reliability	.672	.752	.082	.894	.372
Type of workspace = Separate space	1.033	.866	.069	1.193	.234
Workspace size	1.649	.816	.165	2.020	.044*
Location of workspace	.108	.792	.011	.137	.891
Noise level	-.005	.718	-.001	-.007	.995
Lighting	-.926	.830	-.089	-1.116	.266
Equipment	1.396	.592	.161	2.358	.019*
Technology	.954	.778	.091	1.227	.221
Furniture	-.011	.772	-.001	-.015	.988
Temperature	.386	.702	.040	.550	.583
Distraction	-1.957	.458	-.259	-4.268	.000**
Isolation	-1.076	.364	-.170	-2.960	.003**
<i>Constant</i>	8.860				
<i>R</i>	= .553				
<i>R</i> ²	= .305				
<i>Adjusted R</i> ²	= .268				
<i>F-value</i>	= 8.226				
<i>SEE</i>	= 6.37583				
<i>N</i>	= 277				

* $p < 0.05$ (2-tailed); ** $p < 0.01$ (2-tailed)

7.3.3 Macro characteristics model

The macro characteristics model examines the effect of macro-level place-related factors, that is, the place-related factors outside the home which may influence home-based teleworkers' level of work motivation. Table 7.6 summarises the results of the macro characteristics model. There was a significant relationship between satisfaction with public transport and work motivation ($\beta = -.171$, $p < 0.05$), satisfaction with private vehicle and work motivation ($\beta = .159$, $p < 0.05$), and satisfaction with local area and work motivation ($\beta = .282$, $p < 0.01$). The overall model fit of $R^2 = .176$ indicates 17% of the variation in work motivation can be explained by the macro characteristics model. Considering the achieved β , the satisfaction with local area variable had the greatest effect on work motivation ($\beta = .282$), of all the significant variables in the model.

Table 7.6 Macro characteristics model results

Variables	Work motivation against macro place-related variables				
	<i>B</i>	<i>Std. Error</i>	<i>Std. Coeff. β</i>	<i>t-value</i>	<i>p-value</i>
Time taken to get to employer	-.005	.014	-.026	-.396	.692
Public transport	-.955	.405	-.171	-2.361	.019*
Private vehicle	1.007	.423	.159	2.381	.018*
Walking	.272	.631	.047	.431	.667
Bicycle	-1.166	.667	-.203	-1.748	.082
Local area	2.934	.639	.282	4.588	.000**
<i>Constant</i>	.257				
<i>R</i>	= .420				
<i>R²</i>	= .176				
<i>Adjusted R²</i>	= .154				
<i>F-value</i>	= 7.908				
<i>SEE</i>	= 6.85613				
<i>N</i>	= 277				

* $p < 0.05$ (2-tailed); ** $p < 0.01$ (2-tailed)

7.3.4 Composite model

The composite model examines the impact of all the basic, micro and macro place-related factors on home-based teleworkers' degree of work motivation. Table 7.7 summarises the results of the composite model achieved through developing the model with the standard regression analysis methods. The following variables had a significant effect on work motivation: life stage ($\beta = .146$, $p < 0.05$), income ($\beta = .146$, $p < 0.05$), dwelling type ($\beta = .180$, $p < 0.01$), length of residence ($\beta = -.130$, $p < 0.05$), work load ($\beta = -.181$, $p < 0.01$), telework arrangement ($\beta = -.169$, $p < 0.01$), feeling of distraction ($\beta = -.205$, $p < 0.01$), feeling of isolation ($\beta = -.161$, $p < 0.05$), satisfaction with public transport ($\beta = -.155$, $p < 0.05$), satisfaction with private vehicle ($\beta = .131$, $p < 0.05$), and satisfaction with local area ($\beta = .156$, $p < 0.05$). The overall model fit of $R^2 = .498$ indicates 49.8% of the variation in work motivation can be explained by the composite model. Considering the achieved β , the feeling of distraction, which is a micro place-related variable, had the greatest (negative) effect ($\beta = -.205$) on work motivation, of all the significant variables in the model. Of the significant basic variables, workload ($\beta = -.181$) had the greatest effect and of the significant macro place-related variables, local area satisfaction ($\beta = .156$) had the greatest effect. According to the results of the model, being a single parent with children, having higher income, living in an apartment and unit, and being more satisfied with private vehicle transport each increased teleworkers' work motivation. In contrast, having longer length of residence, being a full-time worker, having telework arrangement concerns, and being more satisfied with public transport each decreased teleworkers' work motivation.

Table 7.7 Composite model results

Variables	Work motivation against all variables				
	<i>B</i>	<i>Std. Error</i>	<i>Std. Coeff. B</i>	<i>t-value</i>	<i>p-value</i>
Socio-demographic					
Age	.041	.049	.067	.840	.402
Gender = Female	.177	.920	.012	.192	.848
Disability = Yes	-1.009	1.703	-.033	-.593	.554
Household size	.229	.507	.038	.453	.651
Number of children	-.549	.617	-.071	-.890	.375
Education = Medium	-.395	1.161	-.025	-.340	.734
Education = High	.398	1.091	.026	.365	.716
Life stage = Single, no children	1.597	1.376	.078	1.160	.247
Life stage = Single, with children	3.798	1.751	.146	2.169	.031*
Life stage = Couple, with children	2.142	1.278	.144	1.676	.095
Income	.564	.239	.146	2.355	.020*
Dwelling					
Dwelling type = Unit/apartment	3.325	1.188	.180	2.799	.006**
Tenure = Owner	-1.003	1.012	-.062	-.991	.323
Length of residence	-.008	.004	-.130	-2.022	.045*
Job-related					
Telework employment status = Employee	.118	1.384	.006	.085	.932
Work load = Full-time	-3.784	1.215	-.181	-3.114	.002**
Occupational category = Knowledge worker	-.712	1.103	-.040	-.646	.519
Time allocated to telework per week	.004	.031	.008	.132	.895
Telework arrangement = Having telework contract concern	-2.621	.900	-.169	-2.911	.004**
Experience of telework	.008	.007	.070	1.162	.247
Micro-level place-related characteristics					
Type of Internet = Broadband	-1.709	3.389	-.027	-.504	.615
Internet speed	-1.278	.723	-.173	-1.768	.079
Internet reliability	.914	.782	.111	1.170	.244
Type of workspace = Separate space	.287	.946	.019	.303	.762
Workspace size	1.166	.872	.117	1.336	.183
Location of workspace	.991	.852	.101	1.163	.246
Noise level	.005	.750	.001	.007	.994
Lighting	-.435	.889	-.042	-.489	.625
Equipment	.989	.627	.114	1.578	.116
Technology	1.001	.839	.096	1.192	.235
Furniture	-.273	.820	-.028	-.333	.739
Temperature	-.311	.746	-.032	-.417	.677
Distraction	-1.548	.492	-.205	-3.144	.002**
Isolation	-1.019	.397	-.161	-2.566	.011*
Macro-level place-related characteristics					
Time taken to get to employer/clients	-.008	.012	-.036	-.627	.531
Public transport	-.868	.373	-.155	-2.326	.021*
Private vehicle	.828	.389	.131	2.131	.034*
Walking	.418	.574	.073	.729	.467
Bicycle	-.893	.591	-.155	-1.509	.133
Local area	1.619	.655	.156	2.472	.014*
<i>Constant</i>	-2.013				
<i>R</i>	= .706				
<i>R</i> ²	= .498				
<i>Adjusted R</i> ²	= .395				
<i>F-value</i>	= 4.812				
<i>SEE</i>	= 5.79865				
<i>n</i>	= 277				

*p<0.05 (2-tailed); **p<0.01 (2-tailed)

7.4 Summary

The chapter reported the results of empirical analysis on factors influencing the work motivation of Australian home-based teleworkers. Section 7.2 identified variables that differ significantly among employee and self-employed home-based teleworkers using chi-square and t-test techniques. This helped achieve a preliminary understanding of the different dynamics of home-based telework for employees and self-employed teleworkers to inform discussion of the findings of the empirical models. The results of the multiple regression models were reviewed in Section 7.3. These models identified variables that had a significant effect on Australian home-based teleworkers' level of work motivation. Table 7.8 summarises the main findings of Chapter 7.

Table 7.8 Significant variables in different research empirical analyses

Variables	Variables significantly different between employee and self-employed teleworkers (Research empirical analysis 3)	Variables significantly predicting work motivation (Research empirical analyses 4 to 7)			
		Preliminary regression models			Composite regression model (adj. R ² =39.5%)
		Basic (adj. R ² =18.4%)	Micro (adj. R ² =26.8%)	Macro (adj. R ² =15.4%)	
Basic variables					
Age	✓✓	✓✓	-	-	-
Income	✓	✓✓	-	-	✓
Life stage	-	-	-	-	✓
Dwelling type	✓	-	-	-	✓✓
Length of residence	✓✓	-	-	-	✓
Workload	✓✓	-	-	-	✓✓
Time allocated to telework	✓✓	-	-	-	-
Telework arrangement	-	✓✓	-	-	✓✓
Micro-level place-related variables					
Satisfaction with workspace size	-	-	✓	-	-
Satisfaction with equipment	✓	-	✓	-	-
Feeling of distraction	-	-	✓✓	-	✓✓
Feeling of isolation	-	-	✓✓	-	✓
Macro-level place-related variables					
Time taken to get to employer/clients	✓✓	-	-	-	-
Transport by train choice	✓	-	-	-	-
No travel choice	✓✓	-	-	-	-
Satisfaction with public transport	-	-	-	✓	✓
Satisfaction with private vehicle	-	-	-	✓	✓
Satisfaction with local area	-	-	-	✓✓	✓
Significant at the 5% level: ✓					
Significant at the 1% level: ✓✓					
Insignificant: -					

Preliminary interpretation of the empirical results in this chapter led to several key findings:

- The significant differences between Australian employee and self-employed home-based teleworkers on various variables are consistent with previous discussions in the literature (e.g. Gurstein, 1996, 2002; Kawai & Shiozaki, 2004; Mahmood, 2007) on the different dynamics of these two major groups and the need for different planning policy for each. Recognising these differences can also help interpret the reason for the significant effects of the variables on work motivation in the next chapter.
- Comparing the results of the preliminary and composite models, as well as recognising the presence or disappearance of some variables as significant variables in the model results, is important. The composite model considers the interaction of all independent variables, comprehensively. Comparing the results of the composite model with the results of the preliminary models indicates the interaction and replacement effects of variables on each other. For example, age, satisfaction with workspace size, and satisfaction with equipment identified as significant variables in the preliminary models do not appear to be significant in the results of the composite model. Instead, life stage, dwelling type, length of residence and workload which were not significant in the preliminary models appear to be significant in the composite model. The presence of socio-demographic variables such as dwelling type and length of residence in the results of the composite model support the main claim of research about the key effect of place-related factors, as these variables thematically could be related to other telework place-related aspects (workspace size, etc).

In order to better understand the dynamics of Australian home-based telework, the findings of Chapter 7 are discussed further in the next chapter (Chapter 8) in the context of the current literature.

Chapter 8: Discussion of research findings

8.1 Introduction

The research predictive analyses reported in Chapter 7 identified the most important basic and place-related factors influencing the experience of Australian home-based teleworkers. This chapter discusses the findings of Chapter 7, focusing on those aspects likely able to improve understanding of Australian home-based telework place dynamics including all the significant place-related variables as well as the significant basic variables. Considering the gap in the literature on the relationship between teleworkers' basic and place-related characteristics, and teleworkers' work motivation, before interpreting and discussing each finding, the relevant literature and current policies are discussed first in search of reasons and evidence which may help explain the work motivation of Australian home-based teleworkers. In the interpretation of findings, results from other chapters are also cited including the frequency results on the characteristics of home-based telework (Chapter 5), the status of Australian home-based telework at the national level (Chapter 6) and the key differences between employee and self-employed home-based teleworkers (Section 7.2). In addition, explanations are also given for unexpected non-significant variables.

Research findings are discussed in three main sections: significant basic factors in Section 8.2, significant place-related factors in Section 8.3 and non-significant factors in Section 8.4. The chapter concludes in Section 8.5 summarising and synthesising the interpretations to build a holistic picture of Australian home-based telework and which in turn lays the foundation for further theoretical and practical suggestions.

8.2 Discussion of significant basic factors

Several basic factors had a significant effect on teleworkers' work motivation: age, income, life stage, dwelling type and length of residence. Each of these is now discussed in turn.

Age: Organisational psychology studies have found a significant relationship between age and organisational motivation. However, there is ambiguity about the positive or negative aspects of this correlation. Although literature historically has supported the negative relationship between age and work motivation, more recent studies have suggested this is not certain as the effect of age on work motivation follows similar principles among workers of different ages (Kanfer & Ackerman, 2004). Indeed, age-related changes in person characteristics affect the positive or negative relationships between these two variables (Kanfer & Ackerman, 2004). Inceoglu et al. (2012) have also indicated that, although older workers may be extrinsically less motivated to work, they intrinsically have more work motivation considering the rewarding job features (Inceoglu, Segers, & Bartram, 2012). Some studies have emphasised the role of attitudes towards technology on the level of work motivation in older people (e.g. Elias, Smith, & Barney, 2012).

In the literature, there are different results on the influence of age on different outcomes of telework. Age has a negative correlation with telework choice (Garrett & Danziger, 2007), meaning that older people are less likely to adopt telework (Bailey & Kurland, 2002; Caillier, 2012). Age, acting as a moderator, also had a negative effect on the correlation between telework and organisational commitment (Caillier, 2012; Harker Martin & MacDonnell, 2012). However, other studies have shown that age has a positive relationship with telework (e.g. Brijs, Van der Waerden, & Timmermans, 2005). Older teleworkers have reported a superior work-life balance (Maruyama, Hopkinson, & James, 2009), possibly due to workers having a better and more stable position in the work organisation and fewer children-related responsibilities. Some studies have shown that people, particularly older people, have a high degree of satisfaction with telework after adopting it (e.g. D. G. Tremblay, 2002).

In a study on US government teleworkers, Caillier (2012) evaluated the impact of telework on work motivation by referring to social exchange theory. According to Caillier (2012), age affects three components defining work motivation, namely: job satisfaction, organisational commitment and job involvement. Age had a positive effect on job satisfaction and job involvement variables, and a negative effect on organisational commitment, although the extent of these effects has been limited. In general, it was concluded that the relationship between age and the socio-behavioural outcomes of

telework, such as work motivation, can be positive or negative depending on the circumstances.

In this research, age was found to be a significantly positive predictor of work motivation, according to the research preliminary model 1 (basic characteristics model) (see Section 7.3.1). Considering the literature referred to above, age intrinsically and positively can increase Australian home-based teleworkers' level of work motivation, possibly due to the flexibility and the possibility of home-based telework improving work-life balance for older people. There could also be some extrinsic motivations for older Australian home-based teleworkers such as postponing retirement and staying in the job market (Wilkins, 2013). The average age of the self-employed home-based teleworkers group was significantly higher than that of the employee home-based teleworkers group (see Section 7.2.2). In general, it is likely that the importance of home-based telework and its positive outcomes for older workers, such as life-work flexibility and staying in the job market, is more related to self-employed home-based teleworkers.

Although there was a positive relationship between age and work motivation in the basic research model, contrary to expectation, age was not a significant variable in the composite model. This requires further research. However, there are several speculations. First, the higher power of place-related variables in explaining variations of work motivation in the research composite model led to marginalisation of the age variable. Second, the interactive effects of other basic variables such as length of residence and life stage in the composite model overshadowed the explanatory effect of age on work motivation in the model. This is supported by the results of other studies, indicating there could be interactive effects between age and length of residence in explaining environmental psychology variables such as community attachment (e.g. Theodori, 2004).

Income: Telework may appear to create uncertainties in income (Wellman et al., 1996). However, teleworkers are often classified in higher income categories (Bailey & Kurland, 2002; Hjorthol, 2006; White et al., 2010). Higher income is always one of the most important reasons for tendencies towards and adoption of telework (Blakemore, 2003; Brijs et al., 2005; Graaff, 2004; Møller-Jensen, Jensen-Butler, Madsen, Millard, & Schmidt, 2008; White et al., 2007). Regarding the tendency towards selecting telework, income prevails over other factors such as gender (Vilhelmson & Thulin, 2001). There is

also a significant and positive relationship between the time allocated to telework and the amount of revenue from telework (Hjorthol, 2006). According to Tremblay and Genin (2007), permanent teleworkers pay more attention to earning through telework than occasional teleworkers. Instead, occasional teleworkers pay more attention to other benefits such as the flexibility of this work arrangement, work-life balance and autonomy (D. G. Tremblay & Genin, 2007). Characteristics such as occupational category, working tasks and education level mean teleworkers naturally fall into high income categories (Graaff, 2004; White et al., 2010). The benefits of telework are achieved by groups with high income and higher status jobs, which in turn leads to an increase in the tendency towards telework (White et al., 2007). For instance, higher income is usually considered a factor enabling teleworkers to be more likely to select their geographical locations of living and the spatial features of their home such as a separate workspace (Huws, 1996). This can increase the distance between the location of residence and the location of employer (Graaff, 2004; White et al., 2007). Higher income is correlated with the rate of car ownership by teleworkers and can lead teleworkers to travel more than the average employed person (White et al., 2007, 2010). It may also lead to an increase in the average daily travel time for teleworkers (Graaff, 2004). Higher mobility for teleworkers can have secondary impacts such as an increased personal quality of life and, at the same time, increased traffic and congestion for society (Glogger, Zängler, & Karg, 2008).

In the research sample for this study, home-based teleworkers were also more likely to be in high income categories (Section 5.2.1 and Section 6.2). This can be explained by reasons as noted in the literature that occupational categories which allow telework are more likely to be high income (see Graaff, 2004; White et al., 2010). The prevalence of professionals and managers in the Australian teleworker population (see Section 6.2), occupations which normally have high annual income compared to other occupational categories in the Australian workforce (ABS, 2018b), helps explain why teleworkers are more likely to be high income earners.

Higher income was also associated with the significant increase in the level of home-based teleworkers' degree of work motivation (see Section 7.3.4). Increased work motivation with increasing income can also be attributed to high-income home-based teleworkers' greater access to a variety of facilities. High-income home-based teleworkers are likely to have better managerial, organisational, spatial, infrastructure and

transport options, which help them to gain more benefits from home-based telework (see Glogger et al., 2008; Graaff, 2004; White et al., 2007, 2010). However, it is important to note that the impact of income on work motivation may be different between employee and self-employed home-based teleworkers. Employee home-based teleworkers devoted significantly less time to home-based telework than self-employed home-based teleworkers (see Section 7.2.2). In the research sample, employee home-based teleworkers can be considered to be “occasional home-based teleworkers”. As discussed by the literature, factors other than income, such as having more flexibility in work and life, have often been regarded as the main motivations of occasional home-based teleworkers (e.g. D. G. Tremblay & Genin, 2007). This is confirmed by the research results (see Section 7.2.1), as average income of employee home-based teleworkers, or so-called “occasional home-based teleworkers”, was significantly higher than self-employed home-based teleworkers suggesting employee teleworkers were likely to have fewer income-related concerns than self-employed home-based teleworkers.

Life stage: The literature is mixed about the relationship between life stage and telework. Telework can positively enhance flexibility and characteristics such as flexibility, autonomy and sense of control in teleworkers (Morganson et al., 2010), resulting in an improvement in work-life balance (Bailey & Kurland, 2002; Duxbury et al., 1998; Gajendran & Harrison, 2007; Morganson et al., 2010). The flexibility resulting from telework can help teleworkers to better handle work and home demands (Felstead, Jewson, Phizacklea, & Walters, 2002; Ojala, Nätti, & Anttila, 2014). In addition, with adoption of telework, employees can take more care of family affairs and people in need, including physically disabled people, the elderly and young children (Major, Verive, & Joice, 2008). According to some studies, women note work-life balance as their main motivation for telework more than men. For women, telework can increase the sense of autonomy and consequently reduce the risk of depression (Bailey & Kurland, 2002; Mokhtarian, Bagley, & Salomon, 1998a). The highest frequency of telework has been found in child-bearing families (Møller-Jensen et al., 2008; Ojala et al., 2014). Couples with children have significantly adopted telework more than other life stage categories have (Brijs et al., 2005).

Along with the positive effects mentioned, telework can also exacerbate work-life conflict (Russell, O'Connell, & McGinnity, 2009), resulting in negative consequences such as

increased stress and decreased mental health (S. Mann & Holdsworth, 2003). The probability of conflict is greater for those with caring responsibilities (Standen, Daniels, & Lamond, 1999). The literature on work and family studies generally indicates a lower level of work-family conflict and, at the same time, a higher level of facilitation in couples without children (Innstrand, Langballe, Espnes, Aasland, & Falkum, 2010). Greater work-family conflict was also found in couples with children (Innstrand et al., 2010). The motivation to telework has also been recognised as stronger in childless couples than in couples with children (Bailey & Kurland, 2002; Huws, Korte, & Robinson, 1990).

Therefore, as recognised by Morganson et al. (2010), the contradictory and dual nature of telework can be associated with the probability of both improved work-life balance or work-life conflict, which consequently increases or decreases teleworkers' job satisfaction and motivation. The role of mediating factors can be decisive and critical in the realisation of either outcome. For example, as the literature suggests, family support has been effective in managing work-family conflict (S. Mann & Holdsworth, 2003; Standen et al., 1999). Similarly, it is expected that government support policies, which tend to promote general social trends, can play a key role in facilitating or exacerbating the paradoxical elements of telework.

According to the research results reported in Section 6.2, there is no significant difference between the research sample and Australian workforce population in terms of life stage characteristics, indicating that the family structure of Australian home-based teleworkers is similar to the family structure of the entire Australian workforce population. Thus, more home-based teleworkers are expected in the couple with children category than in other life stage categories. On the other hand, the research results (see Section 7.3.4) indicated the single with children category significantly and positively affected home-based teleworkers' degree of work motivation. As discussed, achieving an increased feeling of autonomy plays a pivotal role in increasing the level of work motivation in teleworkers. Accordingly, the positive and significant relationship between the dummy life stage variable of single with children and the work motivation variable is likely to mean a positive impact on home-based telework and resulting flexibility in the Australian single parents' level of autonomy, and therefore their work-life balance.

The status of single parents in Australia who are more likely to be women than men, provides supporting evidence. Single parent families account for about 10.4% of

Australian households (ABS, 2016). Single parents with children older than 8 years old are not legally eligible for government single parenting payments (DHS, 2018; RCN, 2018) and many need to work to afford family expenses. In addition, as some recent analyses suggest (Stewart & Ingles, 2016), for a variety of reasons, welfare-to-work policies are not suitable for those single parents who are eligible to receive parenting payments; and therefore, a large number of these people may prefer to be employed instead of receiving government financial assistance. Therefore, for sole parents, who are more likely to be women than men, telework at home is likely a very efficient and smart way of working because, in addition to having more time at home for caring responsibilities, they have the opportunity to work and earn money for household expenses.

Dwelling type: There are few studies on the association between dwelling type and telework experience. Existing references often refer to the high percentage of teleworkers living in separate detached houses (Gurstein, 1996; Moos & Skaburskis, 2008). Considering the dominant housing form of metropolitan regions in North America where most of these studies have been conducted, it is not unexpected that most teleworkers live in detached houses. Moos and Skaburskis (2008), one of the few empirical studies on the relationship between dwelling type and telework, showed Canadian teleworkers have often tended to reside in single-family detached houses, at a significantly higher rate than rest of population. As Moos and Skaburskis (2008) discussed, telework should be considered as one of many factors in the occurrence and intensification of sprawl, the unsustainability of urban form, and the weakening of urban consolidation. However, it is important to note that the Canadian research methodology focused only on single-family detached houses, and the role of other common dwelling types (e.g. such as apartments and units) was not included in the analyses. The tendency for detached houses does not necessarily mean home-based teleworkers have greater satisfaction with living and working in single-family detached houses, because home-based teleworkers mostly only have this type of dwelling to choose from, due to its overwhelming prevalence.

From another perspective, dwelling type represents the probable level of housing density in a metropolitan area, because urban plans usually determine the same density policies for neighbouring urban residential blocks, and promote homogeneity through zoning. Higher housing density can lead to concentration of population in an urban area and

probably an increased urban density. A few studies have identified a significant relationship between urban density and the propensity toward telework, so that with increased urban density in an urban area, the amount of engaging in telework activities increases in that specific area (e.g. Brijs et al., 2005). These studies did not provide reasons for this significant association, but it is likely because of the better access to critical public infrastructure, particularly public transport, for teleworkers. Convenient access to public transport can be important for those teleworkers who need to be physically present in their employer's main office during the week.

According to the results of this research (see Section 6.2), the majority of home-based Australian teleworkers live in separate detached houses, which is the predominant dwelling type in Australia. The dummy variable for dwelling type of apartment and unit was significantly and positively related to home-based teleworkers' level of work motivation (see Section 7.3.4), meaning Australian home-based teleworkers living and working in apartments or units had more work motivation than detached housing dwellers. This needs further investigation, however, there are possible speculations to explain this positive association.

The smaller size of apartment and units compared to other dwelling types means that small households, such as singles and couples without children, are more likely to live in them. Smaller household size is also likely to correspond to lower work-family conflict (Innstrand et al., 2010), which positively affected Australian home-based teleworkers' level of work motivation. In addition, apartments and units are generally cheaper than detached and semi-detached houses in rent and bills. They are normally more affordable for small size households (e.g. singles without children) because of their smaller size. As some studies have shown, small homes such as apartments and units can be more affordable in energy costs and more effective in teleworkers' overall satisfaction with the telework experience (e.g. Moos, Andrey, & Johnson, 2006). This is also supported by the findings of recent Australian studies on inappropriate energy consumption in home offices in single-storey houses (e.g. Samaratunga, Ding, Bishop, Prasad, & Yee, 2017). Therefore, more efficient use of energy and lower related costs could also explain the positive association between living and working in apartments and increased level of work motivation among Australian home-based teleworkers.

In another interpretation and related to urban density, living in apartments and units, which are more likely to be located in higher density urban areas, can facilitate spatial access to office and business services such as copying, printing and scanning, especially for those Australian home-based teleworkers who need office equipment at home (see Section 8.3 on equipment). This situation may lead to a greater level of work motivation see Section 8.3 given the equipment needs of Australian home-based teleworkers. Living in apartments and units also provides more opportunities for social interaction, especially for those Australian home-based teleworkers (e.g. singles or couples without children) who may experience social isolation (see Section 8.3 on isolation). This can lead to an increase in the level of autonomy and sense of control and consequently, in view of the conceptual framework of the present research (see Section 3.4.1), to increased work motivation for Australian home-based teleworkers.

Length of residence in home: There is little about the relationship between length of residence and telework in the literature. The literature about length of residence mostly focuses on health and cultural adjustment (e.g. Bella, 2011; Schulz et al., 2006; Thamer, Richard, Casebeer, & Ray, 1997; Williams, 1993; Wilton & Constantine, 2003). Studies have shown a negative association between length of residence and negative outcomes such as psychological distress (e.g. Wilton & Constantine, 2003). Length of residence can also positively affect social integration in an area (Keene, Bader, & Ailshire, 2013). Studies on the built environment have emphasised the high correlation between length of residence and community attachment (e.g. Ahlbrandt, 2013; Kasarda & Janowitz, 1974; Manzo & Perkins, 2006; Taylor, 1996). Indeed, length of residence can positively increase community attachment, although how length of residence increases community attachment may differ depending on other variables such as age and income (Theodori, 2004) and probably life stage.

In the research sample, there was a significant negative relationship between length of residence and work motivation (see Section 6.3.4), although it was not a strong relationship by itself as the B coefficient value was -0.008 at the 5% level of significance. The Beta standard coefficient value for this relationship also was -0.130, which was the lowest of the significant relationships. As the literature suggests length of residence can positively increase place attachment, the negative relationship between length of residence and work motivation may seem questionable and needs further research.

However, those Australian home-based teleworkers who have more length of residence may over time become more physically and socially bound to their community, in turn leading to more place attachment. In other words, when workers already have a very good attachment to place of living, telework may not be considered as a motivating experience and may be perceived as a threat to local social living as it may push them to stay at home more. This speculation can also be supported by comparing the length of residence and the duration of telework experience. In the research sample (see Chapter 5), the average length of residence was about 10 years or 120.5 months, the average duration of telework experience was about 5.5 years or 66.5 months. In other words, the average length of residence is almost double the average duration of telework experience. This is also confirmed by individually comparing the length of residence and telework experience of respondents in the research sample (Table 8.1). As shown in Table 8.1, most Australian home-based teleworkers adopted telework when they had already been living in their home for a considerable time.

Table 8.1 Comparing the length of residence and telework experience of respondents in the research sample

Categories	Frequency	Share (%)
Length of residence is less than telework experience	14	5.1
Length of residence is more than telework experience (0-5 years)	117	42.2
Length of residence is more than telework experience (5 years or more)	146	52.7

But, as the results of the research empirical models also show (see Section 7.3), the low negative effects of length of residence on the level of work motivation can be compensated by the relatively higher positive effects of local area satisfaction. This could suggest, despite the negative impact of telework on the feeling of attachment to community, if there is a good quality of life in a community, telework could still be a favourable experience for Australian teleworkers, even for those with longer residence in an area.

8.3 Discussion of significant place-related factors

Several place-related factors had a significant effect on teleworkers' work motivation: workspace size, work equipment, distraction, isolation, transport and local area satisfaction.

Workspace size: Small homes and workspaces have always been a challenge to teleworkers (Gurstein, 1996, 2002; Magee & Arch, 2000). Teleworkers often unconsciously tend to compensate for the small size of their workspace at their homes relative to the workspace at their employer's main office. Studies have pointed to the similarity between teleworkers' preferred workspace size at home and the average workspace occupied by an employee in the main workplace (e.g. Fan Ng, 2010). Teleworkers often have three different solutions to address their workspace requirement. First, some teleworkers move and relocate to a new residential area (Salaff, 2002) and live in a larger dwelling with more rooms (Moos & Skaburskis, 2008). Second, some teleworkers have a functional reorganisation and reallocation of the house to acquire free spaces like a room (L. C. Johnson, Andrey, & Shaw, 2007). Third, teleworkers may physically restructure and renovate a home to add further spaces such as a room (Gurstein, 1996; L. C. Johnson et al., 2007). Due to the need for more workspace at home, a direct correlation is expected between the choice of telework and the size of a teleworker's residence (Moos et al., 2006; Moos & Skaburskis, 2008; Nilles, 2000). On the one hand, teleworkers working at home often have larger houses than other employees (Moos & Skaburskis, 2008; Nilles, 2000). On the other hand, people often feel the need to have a more spacious dwelling after adopting telework (Moos et al., 2006).

The research results (see Section 7.3.4) indicate there is a significant positive relationship between satisfaction with workspace size at home and work motivation. This means that increased satisfaction with workspace size significantly increases the level of work motivation in home-based teleworkers. There was also no significant difference between employee and self-employed home-based teleworkers in terms of satisfaction with workspace. Considering the literature reviewed, the positive significance of the relationship between satisfaction with workspace and telework is expected and normal. However, the preferences of home-based teleworkers on how to increase the workspace size at home (the selected strategy) are unclear as this was outside the scope of the research. There was also little information on this in other Australian sources and reports.

The factor that can be decisive in selecting one of the three strategies in the literature of relocation, reallocation or renovation is the cost of each strategy to the household. Relocation of home to increase the size of workspace is not convenient for all household types and can have different financial and socio-behavioural risks for households. The success of a renovation strategy is related to government financial support to a great extent. The Australian Tax Office (2018) allows deductions against taxable income for some service costs such as internet, electricity, and technology for workers who use a home office (ATO, 2018). Current tax policies and regulations differentiate between employees and home-business owners on home offices. However, for both groups, current tax policies do not include home renovation costs. As also shown by Alizadeh and Sipe (2013) in relation to life/work communities, the lack of effective tax deduction policies for renovation has been reported by teleworkers as a big obstacle for a successful teleworking. Therefore, renovation may not be a cost effective solution to provide an appropriate workspace for Australian teleworkers, despite them having high household incomes. A reallocation strategy is undoubtedly the least costly of the three strategies, although it may not be the most efficient one because of its behavioural and spatial implications. As most teleworkers in the research sample had a separate work room (see Section 5.3.1), it is likely that many Australian teleworkers have already adopted a reallocation strategy before using the other strategies. This is also supported by the fact that most Australian home-based teleworkers adopted telework when they had already been living in their home for a considerable time (see Section 8.2 on length residence), and suggests that Australian people become teleworkers because they do already have the space. The extent to which a reallocation strategy is effective in increasing Australian teleworkers' workspace size at home would critically determine their level of work motivation.

Equipment: The telework literature emphasises the importance of teleworkers' access to work-related equipment at home (Fan Ng, 2010; Hill et al., 1998). Studies have often identified various teleworkers' preferences and ideals for work equipment. According to the literature, teleworkers generally have concerns in three areas:

- the physical availability of equipment: the adequacy of storage, furniture, communication equipment (telephone line, internet, Wi-Fi, etc), electrical

equipment, and office equipment (copier, printer, scanner, etc.) (Gurstein, 1996; Magee & Arch, 2000; D. G. Tremblay & Genin, 2007)

- suitability of use: quality, safety and ergonomic design of equipment (Gurstein, 1996; Harrington & Walker, 2004; Magee & Arch, 2000)
- support: training in the use of equipment as well as technical assistance in case of problems (Montreuil & Lippel, 2003; Nilles, 2000).

The degree of teleworkers' satisfaction with their work equipment reflects all three areas and not just physical availability.

The research results (see Section 7.3.4) indicated that among satisfaction with office equipment (copier, printer, scanner, etc.), furniture and internet (reliability and speed) variables, there was only a significant positive relationship between satisfaction with office equipment and teleworkers' work motivation. There was also a significant difference between employee and self-employed teleworkers in satisfaction with equipment (see Section 7.2.2), with the mean of satisfaction with office equipment for self-employed teleworkers significantly higher than for employee teleworkers. It is not clear which of the teleworkers' areas of concern regarding equipment – availability, suitability or support – contributed most to the satisfaction of the respondents.

Previous studies, based on case-specific evidence, have suggested that more hours of telework will increase the need for more local access to copy centres and office supply stores (e.g. Ahrentzen, 1989). According to some previous surveys, teleworkers in North America often have long distances to office services (e.g. copy centres) compared to other services (Gurstein, 2002), even though office services have been reported by individuals as the most widely-used services after the adoption of telework (Gurstein, 2002). The similarities between Australian and North American urban forms allow for generalisation of this finding. The lack of easy and sufficient access to office services could be a reason for the significant positive relationship between satisfaction with equipment and work motivation in the research sample.

On the other hand, the lack of storage space could be another reason for this significant association. As reported by some studies, the shortage of storage space has been a major problem for teleworkers (e.g. Gurstein, 1996; Magee & Arch, 2000). In this context,

teleworkers' satisfaction with equipment can be, on the one hand, associated with the availability of physical storage equipment and on the other hand with the need for more storage space. This is also confirmed by the result on the positive relationship between satisfaction with the office equipment and work motivation. The more satisfaction with the office equipment seems to be largely due to the need for more storage space. In addition, it should be noted that even with Australian Tax Office tax deductions, preparing and maintaining costly equipment such as copy machines may not be cost effective for many teleworkers. From another perspective, as discussed earlier, the major physical changes leading to an increase in the workspace size, and hence in the storage space, are also not subject to a specific tax rebate. The statistically significant higher satisfaction level of self-employed teleworkers compared to employee teleworkers in the research sample can be attributed to the greater readiness of this group to organise their own office equipment. Whereas employee teleworkers usually expect their employers to provide technical assistance and equipment. This is confirmed by the research result (see Sections 5.2.3 and 6.2) showing over two-thirds of employee teleworkers (68.3%) do not have a supporting formal agreement with their employer.

Distraction: Distraction has always been noted as one of the negative consequences of telework in the literature (Gurstein, 1996, 2002). This often occurs in two ways: first, face-to-face interaction of teleworkers with family members and occasionally with neighbours and friends, and second, sudden indoor or outdoor stimuli such as sounds, smells and music (Ammons & Markham, 2004; L. C. Johnson et al., 2007). Family composition can be influential in the way that the stimuli such as noise occur (Fan Ng, 2010), as households with children are possibly noisier and have more interruptions. Family size often negatively modifies the relationships between telework and work-family conflict (Fan Ng, 2010; Golden et al., 2006) leading to reduced satisfaction with telework (Hartman, Stoner, & Arora, 1991). Having a separate room (Gurstein, 1996; Olson & Primps, 1984) for work away from the source of possible noise at home (for example, children's voices) (Ahrentzen, 1989) has often been noted as a way to control and reduce distraction.

The results of the present research (see Section 7.3.4) indicated a significant negative relationship between the feeling of distraction and the level of work motivation. In other words, respondents' work motivation reduced with increased distraction. No significant

relationship was found between the level of work motivation and satisfaction with noise and location of workspace at home (see Sections 7.3.2 and 7.3.4). Accordingly, it seems that the level of work motivation was not directly influenced by the cognitive stimuli such as noise. Since over half the respondents in the research sample (57%) had a separate room or space for telework (see Section 5.3), it is expected that teleworkers would be influenced by a controlled level of noise. The type of workspace was also not one of the significant variables affecting the level of teleworkers' motivation. Having a separate workspace could play a facilitating, rather than determining, role in achieving an appropriate controllable level of distraction. Unexpectedly, there was also no significant negative relationship between household size and number of children in the household, and the variable work motivation, which indicates the number of household members has no direct effect on work motivation. It is likely that the variable feeling of distraction plays a mediating role for the relationship between satisfaction with noise and household size, and work motivation. This requires further investigation. The lack of difference between employee and self-employed teleworkers in terms of satisfaction with distraction (see Section 7.2.2) also indicates that the level of distraction is not related to employer and employee working contacts and interactions and is mostly influenced by the other factors such as home place or family.

Isolation: Historically, isolation is mentioned in the literature as one of the most common and negative consequences of telework (Baruch & Nicholson, 1997; Crossan & Burton, 1993; DeSanctis, 1984; Gainey, Kelley, & Hill, 1999; Metzger & Von Glinow, 1988; Salomon & Salomon, 1984; Turban & Wang, 1995). Isolation can be in the form of professional isolation, that is separation from the main workplace atmosphere and colleagues (Ammons & Markham, 2004; Cooper & Kurland, 2002), or social isolation (Ahrentzen, 1989), that is separation from the usual human social interactions. However, according to some studies, teleworkers enjoy contacts with friends and family members to compensate for professional isolation and the need for human contact (Ammons & Markham, 2004; Fan Ng, 2010; Omari & Standen, 2000). Isolation can lead to negative psychological outcomes and, consequently, a decrease in mental health (Baruch, 2000; Grant et al., 2013; S. Mann & Holdsworth, 2003; Simpson et al., 2001). While isolation and its consequences could lead to an increase in dissatisfaction with telework, this dissatisfaction can be moderated by factors such as telework intensity (Bailey & Kurland,

2002). Working in a separate room can physically exacerbate isolation (Fan Ng, 2010; Hill, Hawkins, & Miller, 1996).

In the present study, the relationship between isolation and the level of work motivation was negative and statistically significant (see Section 7.3.4). This means that with increased isolation, the level of work motivation was lower. In addition, there was no significant difference between employee and self-employed teleworkers in terms of feeling of isolation (see Section 7.2.2). It is not clear how much this feeling of isolation was influenced by and related to professional isolation. But the lack of a significant difference between employee and self-employed teleworkers in terms of isolation increases the possibility that isolation was not to a great extent affected by professional isolation even though self-employed teleworkers do not have access to an employer's workplace. Therefore, it is likely that the level of isolation mostly means separation from usual social communication and interactions. It is also unclear how much the social interaction of teleworkers with family members and friends influenced the feeling of isolation in the research sample. However, it is likely that the feeling of isolation was related to family size and composition, such that people with a larger family size would have less feeling of isolation. This is supported by the earlier discussions on dwelling type and life stage. Living and working in higher density urban areas probably would be more preferred and motivating for those Australian home-based teleworkers such as singles or single parents with few children that are at risk of isolation. This is also consistent with the other research finding on the relatively higher work motivation of single parents compared to other life stage categories. By teleworking at home single parents may address the lack of autonomy and sense of marginalisation from society felt when they were at home with only caring responsibilities. Last but not the least, most respondents in the research sample had separate work rooms (see Section 5.3). However, the type of workspace had no significant influence on the motivation level of Australian home-based teleworkers. It seems that having a separate workspace has a more intensifying role on feeling of isolation rather than being its main cause.

Transport: Replacing commuting to the workplace with working from home to avoid time travelling long distances in traffic and fuel costs is usually the starting point for encouraging telework, at the individual level and society-wide (Baruch & Yuen, 2000; DBCDE, 2011; Gurstein, 1996; Mokhtarian, 1992; Jack M Nilles, F Roy Carlson, Paul

Gray, & Gerhard Hanneman, 1976; Scholefield & Peel, 2009). Telework has been considered as a solution to avoid congestion and health problems related to long distance travel as well as to reduce adverse environmental effects from traffic such as excessive consumption of fossil fuels and emission of greenhouse gases (Caillier, 2012; Gareis & Kordey, 1999; Geels & Smit, 2000; Grippaldi, 2002; Kowalski & Swanson, 2005; Perez, Sánchez, Carnicer, & Jiménez, 2004). Different research has identified varied and sometimes contradictory results on the extent of these benefits, and there have been many debates (Bailey & Kurland, 2002; Horvath, 2010; Kim, 2016; Moos et al., 2006). However, such transport-related benefits have always been the most important motivations for adopting telework. Using private vehicle has been reported as the most common transport mode used by teleworkers for all activities in previous studies (e.g. Gurstein, 1996; Hamer et al., 1991). However, studies have highlighted fundamental differences between major groups of teleworkers such as employee and self-employed in use of private vehicle (e.g. Gurstein, 1996) and public transport (e.g. Mahmood, 2007).

The results of the present study (see Section 5.3.2) indicated that teleworkers were more likely to use private transport to reach the location of their employer or clients than other types of transport. However, teleworkers used private vehicles less than the Australian workforce population; instead, teleworkers used public transport (bus, train, etc.) and active transport (walking, cycling, etc.) more (see Section 6.3). In addition, the level of satisfaction with private transport to reach the location of their employer or clients was significantly and positively related to work motivation (see Section 7.3.4). In contrast, satisfaction with public transport had a significant negative effect on work motivation. Employee home-based teleworkers used public transport significantly more than self-employed teleworkers (see Section 7.2.1).

Australian employee home-based teleworkers seem to be more dependent on metropolitan areas for their work activities and responsibilities than self-employed home-based teleworkers. They are more likely to be a full-time worker; devote significantly less time to working from home; significantly need to allocate more time to work-related transport and are more likely to rely on public transport to commute (see Section 7.2). As a result, distance from home to employer and related issues such as the cost and time spent are likely the major reason why employee teleworkers are more likely to use public transport compared to self-employed home-based teleworkers. This suggests if employee

home-based teleworkers are satisfied with the accessibility and affordability of public transport, it may positively motivate them to travel to the main place of employer by public transport, and correspondingly allocate less of their time to telework. It may also negatively affect their level of work motivation when working from home.

This can also be generalised to those self-employed home-based teleworkers who, like employee home-based teleworkers, need to travel a longer distance to meet their clients. Some recent Australian studies have shown how factors such as satisfaction with train fares can influence the overall satisfaction of Australian people with choice of public transport (e.g. Paramita, Zheng, Haque, Washington, & Hyland, 2018).

Local area satisfaction: The possibility of telework changing the structure of the local area has always been recognised in the literature. With increased adoption and more involvement in telework, the need for services such as office services, legal services, community libraries, parks, safe playgrounds, neighbourhood grocery stores and childcare increases at the local level (Ahrentzen, 1989; Gurstein, 1996, 2002; Kawai & Shiozaki, 2004; Mahmood, 2007). The preferences of different groups of teleworkers for the required facilities can be different, so that the so-called extensive outside-contact teleworkers will need more of such facilities at the local level compared to limited outside-contact teleworkers (Mahmood, 2007). In addition, by adopting telework, a teleworker's tendency to have a neighbourhood with better environmental and aesthetic qualities is likely to increase (Ahrentzen, 1989). Lack of proper access to services and environmental qualities can directly reduce the satisfaction of teleworkers. On the other hand, more involvement in telework and its related flexibility that can lead to a more and active social presence of teleworkers at the local level can change the neighbourhood through policy making and urban design, and present a higher quality and more attractive lifestyle.

A review of existing practices such as the American and Australian life/work communities introduced and discussed in the literature is helpful (e.g. Alizadeh, 2009, 2012b; Kawai, 2008). The relevant studies considered urban design qualities such as diversity, accessibility and mixed-use development as the facilitators in line with the needs of teleworkers (e.g. Alizadeh, 2009), and emphasised the importance of teleworkers' access to collective work centres at the local level (e.g. Gurstein, 2002; L. C. Johnson, 2003). The studies also highlighted the role of tax policies in realising land

use policies and regulations at the local level (e.g. Alizadeh & Sipe, 2013). Teleworkers' residence in new communities that are master-planned and designed to be more responsive to general or telework-related needs are likely to positively influence teleworkers' overall satisfaction with their work experience at home. However, what is still unclear is the extent to which the policies and design principles for pre-planned telework-oriented communities are adaptable to the needs of home-based teleworkers residing in the existing communities of metropolitan or rural regions.

The results of the present research (see Section 7.3.4) indicated there was a significant positive relationship between satisfaction with local area and Australian home-based teleworkers' work motivation. With increased local area satisfaction, Australian home-based teleworkers' level of work motivation also increases. It is expected that the determinants of the level of local area satisfaction of home-based teleworkers discussed in the literature to a great extent can affect Australian home-based teleworkers' level of work motivation. However, further investigation is needed on the level of significance and strength of each factor. Although this investigation is beyond the scope of the present research, there are several reasons for the role of local area satisfaction in the context of current research findings.

- Australian home-based teleworkers had a higher level of work motivation in those communities that have larger homes and offer greater diversity in terms of the size of homes. In the literature, dwelling size is correlated with workspace size (Fan Ng, 2010). Larger homes located on larger blocks can greatly facilitate access to larger and separate workspaces at home for home-based teleworkers, particularly for those self-employed Australian home-based teleworkers who have a large home business. On the other hand, for those Australian home-based teleworkers with larger households, communities with larger homes would be more satisfying as that helps them better manage the work-family interface, interruptions and distractions through spatial reconfiguration strategies.
- Australian home-based teleworkers had a higher level of work motivation in communities with proper access to office facilities such as copy and printing services, particularly for those employee home-based teleworkers who, according to research results, are less satisfied with their office equipment at home (see the earlier discussions on equipment).

- The possibility of spending more time during the day in the local area helped teleworkers overcome a feeling of isolation, leading to an increase in work motivation. Those Australian communities that provided more social vitality for different reasons and offered more diversity in terms of public places (plazas, cafes, restaurants), coworking spaces, cultural facilities (libraries, etc), and sport centres probably were more desirable for those teleworkers who, for some reason, are subjected to a greater feeling of isolation, because these communities created more opportunities for social interaction.
- The possibility of spending more time during the day in the local area helped teleworkers experience less work-family conflict and overcome a feeling of distraction, particularly for teleworkers with a larger household size, as by being away from home in the local area, they can better manage the work-life interface and distractions while they are still not far from home for work-life balance intentions such as caring responsibilities.

8.4 Discussion of important non-significant factors

The distance factor was expected by the present research to be important in work motivation, but it was not significant in the research empirical models results.

Distance: Telework has always been considered an efficient way to overcome the challenge of distance between home and the main place of work, and to avoid the time, cost, fatigue and stress of commuting for people located in remote areas. However, contrary to expectations, distance did not have a significant relationship with work motivation in the research sample. This may be associated with transport-related variables, as the effects of distance on work motivation can be mediated by private and public transport. Both satisfaction with private transport and satisfaction with public transport had a significant relationship with work motivation. However, these two relationships are different in terms of direction: satisfaction with private transport had a significant positive relationship with teleworkers' level of work motivation, while satisfaction with public transport had a negative relationship with teleworkers' work motivation. In other words, those respondents who had more satisfaction with public transport to get to their employer probably had a lower work motivation when working

from home. This may mean that if teleworkers do not have appropriate access to public transport and its advantages to get to their employer or clients, and are still private vehicle-dependent, telework is preferred to commuting. Although teleworkers often used private transport to get to their employer or clients (Section 6.2), there was a significant difference in the methods of transport between the research sample and the commuting modes of the Australian working population. Teleworkers in the research sample generally use public transport more than the Australian workforce. There was also a difference between the main groups of teleworkers (employee vs self-employed) in using public transport, with employee teleworkers using public transport significantly more than self-employed teleworkers.

According to the results of the present study (Section 7.2), the time taken to get to their employer was significantly greater for employee teleworkers than the time taken to get to clients for self-employed teleworkers. This means that employee teleworkers, as compared to self-employed teleworkers, are more dependent on the metropolitan level trips for work-related tasks and responsibilities; and public transport plays a key role in this. Employee teleworkers devote significantly more time to telework (see Section 7.2). In general, for reasons that require more research, employee teleworkers are not concerned by the distance between home and main place of work (to employers or clients), and they prefer to commute if they have satisfactory access to public transport.

8.5 Summary

The empirical findings of the research regression models were discussed in detail in qualitative terms in this chapter, focusing on those findings that provide further understanding of the place-related dynamism of Australian home-based telework. Each finding was interpreted in the context of the current literature, other research results and current Australian government policies. These discussions were provided in two major sections on basic factors (Section 8.2) and place-related factors (Section 8.3). Distance was also discussed as an important non-significant factor (Section 8.4). Tables 8.2 and 8.3 summarise the research interpretations in Chapter 8.

Table 8.2 Summary of research discussions on the basic variables significantly affecting Australian teleworkers' work motivation

Significant variables	Category	Direction of relationship with work motivation	Probable motivators/prohibitors
Age	N/A	(+)	- Increased flexibility and work-life balance - Ability to postpone retirement and stay in the labour force
Income	N/A	(+)	Greater access to a variety of facilities
Life stage	Singles, with children	(+)	- Less effective welfare-to-work and sole parenting payment policies - Earning money motivations - Caring responsibility motivations - Increased autonomy, control and flexibility - Improved work-life balance
Dwelling type	Apartment and unit	(+)	- Less work-family conflict - Higher saving on home-related costs (e.g. energy) - Better access to office-related services - More social interactions
Length of residence	N/A	(-)	Negative effects of home-based teleworking on social ties to community

(+) Positive relationship
(-) Negative relationship

Table 8.3 Summary of research discussions on the place-related variables significantly affecting Australian teleworkers' work motivation

Significant variables	Category	Direction of relationship with work motivation	Probable motivators/prohibitors
Workspace size	N/A	(+)	- Shortage of storage space at home - Success of space reallocation strategy at home
Equipment	N/A	(+)	- Tax deduction policies for home offices - Lack of access to office services (copy shops, etc.) at local level - Employers' financial and technical support
Distraction	N/A	(-)	- Indoor and outdoor cognitive stimuli (noise, etc.) - Household size
Isolation	N/A	(-)	Family composition
Transport	Public transport	(+)	- Distance to the main location of employer - Saving time and travel cost - Pro-environmental behaviours
Local area	N/A	(+)	- Usual local area services - Aesthetic and environmental qualities - Urban design qualities (e.g. diversity, accessibility and mixed-use) - Local development tax policies - Local collective telework place - Home and block sizes - Office-related services - Social vitality and facilities

(+) Positive relationship
(-) Negative relationship

As also noted in the summary of Chapter 7, it is important to recognise the presence and disappearance of the variables in the preliminary and composite models because it can highlight the possibility of interactive effects between the significant variables. The discussion in this chapter identified how the significant variables may contribute to other variables in explaining work motivation variation. This led to the researcher to assume and propose a possible mediating role for some significant variables. Table 8.4 summarises some of these propositions. The table differentiates between the possible mediating relationships based on significant variables in the research empirical models and the possible mediating relationships based on the relevant significant variables noted in the literature. Also, considering the research empirical findings and the discussion in this chapter, particularly how variables such as transport and dwelling type can be influenced, the research presumes a possible moderating role for variables such as telework employment status, work load, and time allocated to telework. Further empirical research is needed to test each of the propositions, and identify how the mediated and mediating variables are interconnected in the form of a bigger structure to explain variation in work motivation.

Table 8.4 Possible mediating associations with Australian home-based teleworkers' level of work motivation

Mediating variables	Independent variables empirically significant in the research empirical models	Independent variables theoretically relevant according to the current literature
Life stage	Age	Gender Household size Number of children in family Work-family conflict Autonomy and sense of control
Length of residence	Age Income	Place attachment Sense of place Tenure
Dwelling type	Income Life stage Equipment satisfaction Workspace size satisfaction Isolation Distraction	Dwelling size Cognitive stimuli (noise, etc)
Transport satisfaction	Public transport satisfaction Private transport satisfaction	Distance Transport choice
Local area satisfaction	Life stage Dwelling type Equipment satisfaction Workspace size satisfaction Isolation Distraction	Work-life balance Work-family conflict Dwelling size

Beyond all the possible mediating relationships, the role of three variables of dwelling type, satisfaction with transport and satisfaction with local area, which represent three main components of urban form at the macro level (urban density, accessibility and community), needs to be highlighted. As illustrated in Table 8.4, the three variables were supposed to possibly mediate the effects of many other significant variables in the research. This is a critical point, as it shows a considerable proportion of teleworkers' level of work motivation can be explained by specific urban form features. This can lead to a new understanding, suggesting teleworkers' level of work motivation can be largely influenced by planning interventions, and supports calls for a review of the position of telework in the local and metropolitan levels of Australian planning policy. Socio-economic forces can also affect teleworkers' choice of living and working in urban and regional areas to a large extent, which in turn influences a certain level of work motivation. Planning for density, accessibility and community recognising the key preferences of different populations of Australian home-based teleworkers can facilitate achieving a higher level of work motivation through telework in Australian cities.

The next chapter (Chapter 9) is the concluding chapter. It reviews important findings of this research and provides preliminary insights and suggestions on how Australian cities can be better prepared for effective telework.

Chapter 9: Conclusion

9.1 Introduction

This chapter reviews the thesis findings and conclusions, and provides practical policy suggestions and recommendations for further research.

Section 9.2 is a summary of the main research developments and findings. It explains how the research objectives were met through different research processes. The key steps in the research process and the final achievements of each step are reviewed.

Section 9.3 on theoretical contributions addresses the major achievements of this study on knowledge of home-based telework. This section explains why it was important to investigate the research problem, and how the research theoretical developments and the research conceptual framework are applicable for future studies. This section also highlights the importance of research empirical findings for the telework literature, and the extent to which the findings can be generalised.

Section 9.4 on policy implications explains the significance of the research empirical achievements for Australian planning policy. To highlight the importance of the findings and their application in Australian planning, preliminary strategy and policy suggestions are provided for Australian metropolitan regions by considering the existing concerns of Australian metropolitan regions, and current local and regional strategies and policies.

Section 9.5 on research limitations addresses the research barriers and constraints. Some of these limitations were resolved by adopting solutions during the research to counteract their consequences. In other cases, the barriers prevented the research from achieving the anticipated results. Reviewing the existing limitations and barriers can guide researchers in conducting future research.

Section 9.6 makes recommendations for further research. Given the achievements as well as the research limitations, this section advises on future research including recommendations on possible research directions, and methods for dealing with obstacles. The chapter ends with concluding remarks.

9.2 Summary of research main developments and achievements

The research expanded the understanding of Australian home-based telework by achieving the four research objectives:

Objective I: Developing a conceptual framework to adequately understand the relationship between the place-related aspects of telework and socio-behavioural outcomes

Objective II: Understanding the nature and scale of telework phenomena in Australia

Objective III: Identifying the primary factors affecting teleworkers' work motivation in Australia

Objective IV: Contributing to planning policy implications of telework in Australia

The following subsections review how each of the objectives was achieved through the research process.

9.2.1 Objective I – Developing a conceptual framework to adequately understand the relationship between the place-related aspects of telework and socio-behavioural outcomes

Considering the research problem and the need to respond to the research questions, a conceptual framework was developed in Chapter 3 to guide the research in the empirical phase. To do so, the findings of studies were reviewed to highlight the role of place factors in determining telework socio-behavioural outcomes. The research then reviewed place-related factors impacting on effective telework including both teleworkers' place-related preferences inside the home, and teleworkers' place-related preferences at the local and metropolitan level. The theoretical frameworks and models proposed in the telework literature were then compared and discussed. This led to further understanding of socio-demographic and job-related factors other than place-related factors which need to be considered in the structure of the conceptual framework. The work motivation concept was used as a pivot in the explanatory and predictive structure due to the importance of

this variable in studies on organisational psychology and work psychology, and its strong correlations with other socio-behavioural qualities such as job satisfaction, job performance, productivity and health. The conceptual framework was guided by Self-Determination Theory defined as “a macro-theory of human motivation, emotion, and development that takes interest in factors that either facilitate or forestall the assimilative and growth-oriented processes in people” (Niemiec & Ryan, 2009a, p. 134).

9.2.2 Objective II – Understanding the nature and scale of telework phenomena in Australia

To set the foundation for empirical research into telework, the research needed to analyse the current status of telework in Australia. Available literature, reports and statistics on Australian developments in telework were reviewed in Chapter 2. The research sample of teleworkers was analysed to understand the character and status of telework in Australia including the basic (socio-demographic, dwelling, job-related) and place-related characteristics of employee and self-employed home-based teleworkers (Chapter 5). The key differences between two groups of teleworkers, employee and self-employed home-based teleworkers, were also identified using descriptive and interval statistical techniques (Chapter 7).

Characteristics significantly different between employee and self-employed home-based teleworkers were household income, dwelling type, workload, time allocated to telework, transport by train, no travel, age, length of residence, equipment, and time taken to get to employer or clients. Corroborating the previous discussions in the literature (e.g. Gurstein, 1996, 2002; Kawai & Shiozaki, 2004; Mahmood, 2007), the differences between the two groups highlighted the need for different planning policy for each.

The research sample and Australian national statistics and information were compared to identify similarities and differences (Chapter 6). In most dimensions, Australian telework socio-demographic characteristics and work-related context is significantly different from the Australian socio-demographic and work-related context, apart from a few characteristics such as life stage, location of residence, location of employer and internet type. The comparisons led to further understanding about Australian telework practice in terms of living, working, and telework place.

9.2.3 Objective III – Identifying the primary factors affecting teleworkers' work motivation in Australia

The research main aim was to investigate basic and place-related factors influencing the work motivation of Australian home-based teleworkers. Based on a sample of 277 teleworkers, multiple regression models were tested in Chapter 4 to identify such factors. The relationship between each of the basic, micro and macro variables and teleworkers' work motivation was analysed by three separate multiple regression models in Chapter 7. This led to preliminary identification of the most important factors affecting the work motivation of teleworkers in the basic, micro and macro variable groups. The fourth and final multiple regression model (composite model) also helped assess the concurrent relationships between basic, micro and macro variables and teleworkers' work motivation (Chapter 7). The results of the composite model led to final identification of the most important factors affecting the work motivation of teleworkers. Significant variables were life stage, household income, dwelling type, length of residence, work load, telework arrangement, feeling of distraction, feeling of isolation, satisfaction with public transport, satisfaction with private vehicle, and satisfaction with local area.

9.2.4 Objective IV – Contributing to planning policy implications of telework in Australia

Discussion of the research findings on the most important basic and place-related factors affecting Australian teleworkers' work motivation achieved a deeper understanding of place-related dynamism of Australian home-based telework, which calls for a review of the position of telework in Australian planning policy at the local and metropolitan level (Chapter 9). Separate interpretation of each of the findings in the context of current literature, Australian government policies and the other research empirical findings led to speculation about possible causes of their significant relationship with telework motivation (see Tables 8.1 and 8.2). Separate interpretation of each of the findings also led to speculation on the possible interconnections between significant and non-significant variables and recognition of main mediators. The critical mediating roles of the variables dwelling type, satisfaction with public and private transport, and satisfaction with local area, which represent the main components of urban form at the macro level

(urban density, accessibility, and community), were supported to be important as it shows that a considerable variation of teleworkers' level of work motivation can be influenced by effective planning policies at the local and metropolitan level. As proposed, planning for density, accessibility and community to better meet the key preferences of different populations of Australian home-based teleworkers can facilitate achieving a higher level of work motivation through telework in Australian cities. Based on this proposition, preliminary suggestions are provided on the policy implications in Section 9.4 of this chapter.

9.3 Theoretical contributions

The research is considered to have contributed to current knowledge in two main areas.

9.3.1 Research theoretical developments

The research contributed to current knowledge by firstly introducing and testing a conceptual framework for telework motivation. This framework can be useful for further research on telework as it comprehensively includes the role of telework place-related factors, whereas the majority of telework socio-behavioural research has neglected the role of these factors. The research approach to the concept of telework place is comprehensive since it considers both micro and macro place-related factors associated with teleworkers' preferences inside and outside the home. The conceptual framework's focus was on the autonomous work motivation concept that has been overlooked in most socio-behavioural telework studies. The research conceptual framework was guided by Self-Determination Theory (Ryan & Deci, 2000), an authentic human-centric theory of motivation, and its model of work motivation (Gagné & Deci, 2005) which is new to the area of telework research. The research used the Work Extrinsic and Internal Motivation Scale (WEIMS) developed and validated by Tremblay et al. (2009) to measure the level of autonomous work motivation. To use the scale in the research survey, the items were adapted to teleworkers' conditions in terms of meaning and structure of statements. Considering the successful application of the adapted scale in the research, the scale items can be referred to and used in future telework research.

9.3.2 Research findings and discussions

The literature review showed that the role of place-related factors has been overlooked in most telework socio-behavioural studies contributing to organisational psychology, work studies and management. The empirical research showed how place-related factors were influential in explaining important socio-behavioural variables like work motivation (Chapter 7). Comparing the results of the research empirical models - including the overall model fits achieved and the strength of significant variables - indicated that a considerable amount of the variation in work motivation can be explained by micro and macro place-related factors, or those basic variables that thematically can be associated with place-related factors such as dwelling type.

This general finding is of great importance as it shows why future socio-behavioural studies on telework need to consider the role of place in designing their theoretical framework, empirical analyses and models. Whereas previous socio-behavioural studies have only included a few factors like distance in their modelling, future socio-behavioural research on telework needs to consider place factors more comprehensively. Apart from this general understanding, the primary basic and place-related factors identified through research empirical analyses individually add to contemporary understanding of urban teleworking.

Built environment research on telework mostly descriptively investigates teleworkers' place-related preferences. There is little conceptualisation of telework place and little classification of the factors shaping this phenomenon in present research. Studies mostly lack predictive analysis to adequately investigate the influence of place-related factors on important socio-behavioural variables such as work motivation or productivity. As a result, there have been uncertainties about the extent to which different place-related factors determine and can interactively work to explain socio-behavioural variables.

The present research contributes to current knowledge of the built environment and fills the gap by identifying the most important place-related factors influencing teleworkers' work motivation (see Chapter 7), which can be separately investigated in future. The discussion of findings in Chapter 8 also sets a foundation to understand the possible mediating associations between basic and place-related significant factors which can help shape a structural model for further research.

9.4 Policy implications

The previous chapters provide a basis for presenting practical and executive recommendations for further planning policy in the field of home-based telework. In order to illustrate how and to what extent the research achievements can contribute to Australian planning policy, some preliminary policy directions are proposed. As addressing all possible policy directions is beyond the scope of this research, the proposed policy directions are limited to some specific areas and are in the form of general suggestions, with the exact form of each policy direction requiring further research. Policy suggestions for federal and state governments in urban and regional planning are presented.

9.4.1 Policy suggestions for Australian federal and state governments

Flexible work is becoming a more common practice in Australian society (Fitzsimmons, 2018) and an increasing percentage of Australian employees benefit from the possibility of flexible work for a variety of reasons (Wilson, 2018). For reasons such as diversity, creativity and productivity of the workplace, the possibility of flexible work has been taken into consideration by federal and state governments in recent years which could result in financial savings (Donaldson, 2018). The federal Fair Work Act 2009 protects the right to demand flexible working arrangements for Australian employees under certain circumstances (AG, 2009). Changes in work arrangements include changes in the location of work, such as the possibility of working from home (AG, 2018; Calderon, 2018).

However, government policies appear to pay less attention to the place-related aspects and requirements of flexible work. In order to promote government policies in the field of flexible work, and in particular work from home arrangements, the following policy directions are suggested according to the findings of the research.

Encouraging formal telework agreements: Despite official government support for flexible work and telework, most Australian employee teleworkers still do not have a formal telework contract with their employers (see Sections 2.4.2, 5.2.3 and 6.2). The reasons for this situation are uncertain and require further study. The existence of an official contract between teleworkers and employers that addresses place-related considerations can increase the work motivation of Australian employee teleworkers (see Section 8.3 on workspace size and equipment), and encourage them to devote more time

to home-based telework. Otherwise, the home-based telework experience, even with encouragement by government, may not be successful and may even have negative consequences for home-based teleworkers and employers.

Australian policy needs to create a specific legal mechanism to ensure the completion of telework contracts between employee teleworkers and employers. The existing working rules on the relationship between employers and teleworkers must also be reviewed to ensure suitable workspace for teleworkers at home. The most important issues that new rules and regulations must address in the field of employers' responsibilities include ensuring the access of home-based teleworkers to a separate and suitable space in terms of size at home, providing and procuring appropriate work equipment and telecommunication infrastructure, ensuring the quality and suitability of this equipment and infrastructure for home use, providing technical assistance and support, and paying the costs of home office utilities such as energy and electricity. Employers can alternatively cover the cost of using local and regional collective and shared work hubs. In taking on these responsibilities, employers can still likely reduce the overall cost of space, equipment and infrastructure at traditional headquarter locations.

Modifying homes for telework for vulnerable social groups: Australian tax deduction policies cover internet, electricity and technology, but these policies do not cover the capital costs associated with home renovations made to provide a home office or telework space. However, such a fundamental change is of great importance in achieving successful and effective home-based telework (see Section 8.3 on workspace size and equipment). In practice, home-based teleworkers are often left alone by the government and employers when it comes to these important changes. Therefore, in most cases, home-based teleworkers must rely on the space reallocation strategy inside the home which is not an ideal and efficient strategy for all home-based teleworkers and the success of which varies for all home-based teleworkers.

While there is no tax-related support for making essential changes, other government policies do not provide many more choices and solutions other than just work from home for some social groups including sole parents who are mostly women (see Section 8.3 on life stage). These people are inevitably left at home with some negative consequences that could have place-related reasons. The situation is similar for other vulnerable groups, such as those with physical disabilities (see Section 6.2 on disability) or elderly people

who choose more home-based telework for certain reasons (see Section 8.2 on age). The situation is similar for other vulnerable groups, such as people with physical disabilities (see Section 6.2 on disability) or older people who choose more home-based telework (see Section 8.2 on age). Although there are no Australian planning studies on home modification specifically for teleworkers (either with or without disability), there are at least some Australian planning studies on home modification in general for elderly people and people with disabilities, which address the cost-effectiveness of this strategy for individuals and social welfare and caring systems (e.g. Carnemolla & Bridge, 2011).

The results of these studies further clarify the need to develop and adopt home modification policies that address the specific needs and concerns of vulnerable social groups for telework. Many of these specific concerns and how to fix them are likely to be similar for different vulnerable social groups. In general, Australian policy should seek to coordinate and integrate existing policies in different areas in order to enable changes to homes for maximum use of telework potential and capabilities. Coordination and integration should be based on the overlaps between the needs of particular vulnerable groups such as sole parents, people with disability and older people. Identifying common needs requires more empirical research.

9.4.2 Policy suggestions for Australian urban and regional planning

The research helped to further understand the place-related dynamics of home-based telework in Australia. The Australian workforce adopts home-based telework, based on goals such as more income or more flexibility in working, as well as social and family life. Depending on household composition, income, the geographical location of employers or clients, and the availability of different types of transport, the Australian workforce chooses the geographical location of their residence before adopting home-based telework. The primary goals and intentions of adopting home-based telework, the social and job-related characteristics, as well as the existing location of home-based teleworkers' residence, affect the intensity of doing home-based telework, the frequency of commuting at the local and urban level, and the use of different types of transport. The experience of doing home-based telework in different situations and the different social-behavioural needs of home-based teleworkers generate a certain level of satisfaction and

preferences over the various place-related dimensions of home-based telework. This provides the basis for successful teleworking over time.

The main objective of the research was to identify the main place-related factors affecting the home-based teleworker's work motivation and pave the way for a more successful home-based telework experience through planning to improve the state of these factors. As the research findings proposed (see Section 8.5), successful home-based telework can be greatly facilitated by macro-level planning interventions, especially paying simultaneous attention to the three factors of accessibility, density and local area characteristics. Some preliminary policy suggestions on home-based telework are presented for accessibility, density and local level factors to illustrate the application of the findings of the study, as addressing all the various suggestions is beyond the scope of this research. The suggestions take into account prevailing Australian urban and regional concerns.

Developing telework on the outskirts of Australian capital cities and in small regional cities: Difficult and inappropriate access to the main places of work in urban and regional centres through public transport is the main factor affecting the increase in home-based teleworker's work motivation (see Section 7.3.4). Given the general urban and regional residential conditions in Australia, it is expected that many home-based teleworkers often live on the outskirts of Australian metropolitan regions and in small regional cities. Although most home-based teleworkers are concentrated in the inner urban areas of the Australian metropolitan regions, similar to that of the Australian workforce population (see Sections 6.2 and 5.2.2), policies to develop home-based telework in the peripheral metropolitan areas and small regional cities are necessary if there is a willingness to use the maximum advantages of home-based telework (including increased employment through launching home-based businesses at local levels, equal access to job opportunities at regional and metropolitan scales and increased flexibility and work-life balance). Some metropolitan plans confirm that many people in the peripheral urban areas spend much time commuting to work (see NSWG, 2018). Development of home-based telework in peripheral metropolitan areas is consistent with the strategic plans of metropolitan areas in Australia to achieve goals such as liveability, productivity and sustainability (see Hamnett & Freestone, 2017). These plans do seek to reduce the distance and time spent travelling between home and workplaces through

spatial organisation and development of public transport infrastructure strategies, in order to achieve their main goals. The development of home-based telework can play, in the medium term, a contributory role in achieving these goals.

Immigration policies in Australia also clarify the importance of paying attention to the development of home-based telework in small regional cities. In response to the challenge of overcrowding in large Australian cities and the high cost of urban infrastructure, the Australian government announced in 2018 it intends to encourage some immigrants to settle in small towns (Karp, 2018). The settlement of immigrants in small towns is also seen as a strategy to prevent population and economic decline in regional Australia (Longstaff, 2017; RAI, 2018). Over half of immigrants (55%) are professionals (Wylde, 2017), who, even if they live in small cities, may still need to work with the offices of employers in large metropolitan areas. Considering this, the suggestion to develop home-based telework in small regional cities seems reasonable and could be accompanied by an increase in the home-based teleworker's work motivation, as the daily commuting of people living in regional Australia to metropolitan centres is time consuming by public transport if available, and it is costly, inconvenient and unsustainable to travel by private vehicle.

Encouraging compact urban form incorporated with telework: Compact urban form has been a subject of controversy in recent decades. Experts and urban thinkers have criticised or supported this concept from various aspects. The successful development of home-based telework is consistent with compact urban form, which has been the focus of urban development in Australia in recent decades. Home-based teleworkers live in apartments and densely populated areas more than the Australian workforce population (see Section 6.2 on dwelling type). For a variety of reasons, home-based telework in densely populated urban areas has been accompanied by increased work motivation for Australian home-based teleworkers (see Section 7.3.4, and Section 8.2 on dwelling type). However, Australian planning policy seems to have neglected home-based teleworkers' desire to live and work in densely populated apartments and areas at the local level.

Research in this study suggests that only a very few councils in Australia have considered certain regulations for working from home (e.g. GCCC, 2011). Existing regulations often assume home-based telework is an independent business that occurs in low density communities and in detached houses. Accordingly, the rules and regulations focus more

on controlling the internal and external changes of existing houses to establish a home business (for example, adding a home office). It is suggested that Australian planning policy reviews the existing local development regulations, to support home-based telework to capture its benefits.

Local planning policy should not be limited to controlling changes in existing homes to make them suitable for businesses of self-employed workforce and should take into account the needs of employee and self-employed teleworkers that deal with home-based telework with different purposes and intensities and have their specific place-related requirements. Planning policies should make new medium and high-density developments aware of home-based telework-related considerations. Typically, allocating a percentage of new compact form development to a variety of apartments and units that are tailored to the needs of home-based teleworkers is reasonable. This is more feasible in the peripheral areas of capital cities or in small regional centres where lower land prices allow for larger, but more affordable, apartments.

Incorporating opportunities for home-based telework in compact form development does contradict some notions about the relationship between home-based telework and the rise of urban sprawl (see Moos & Skaburskis, 2008). Compact urban development in turn shows that the impact of home-based telework as a cause of the expansion of cities is not clear, and it depends on the outcome of centripetal and centrifugal forces (see Rhee, 2009). Appropriate planning policy can affect and orientate the overall outcome of these opposing forces toward greater urban consolidation and more efficient cities.

Developing collective work hubs at the local level: The combination of home-based telework and compact urban development due to the market absorbing mechanism in the medium term can be associated with concentration of population and activities, as well as the availability of retailers and some of the necessary services related to the daily life of home-based teleworkers. However, home-based teleworkers may still have trouble accessing office facilities at a local level.

On the other hand, home-based teleworkers may need to spend part of their working time outside the home in local public places like cafés for reasons such as better management of work-family conflict, avoidance of distraction, or reduced feelings of isolation (see Section 8.3 on local area satisfaction). However, while doing light and short-term work

may be possible in cafés, generally cafés do not have the conditions for an ideal working space for longer periods of time. To take advantage of the benefits of home-based telework and to prevent some of its potential problems, it is necessary to plan and design local areas that are suitable and prepared for the needs of home-based teleworkers.

Collective and shared telework places will play a key role in this field. These workplaces, known as telework centres, coworking space, smart work centres, digital work hubs and co-workplaces, have already emerged in Australia, as in other parts of the world, especially in the last two decades (see Section 2.4.3). They allow for a better work-life balance due to having close access to home and family as well as providing standard and equipped workspaces (see Gurstein, 2002). Strategic plans for some Australian cities (e.g. NSWG, 2018) have taken into consideration the potential for further development of shared offices in the future. Collective shared telework places, which can be private or public, are currently located mostly in regional and urban centres, and are not accessible to most Australian local areas (see Buksh & Davidson, 2013; Buksh & Mouat, 2015; Fitzgerald, 2017; Houghton, Foth, & Hearn, 2015; Shieh & Searle, 2013b; Wilmot et al., 2014). Therefore, Australian planning policy needs to pay more attention to the development and localisation of these places. The spatial location and placement of these shared workplaces in the form of new private start-ups is subject to market mechanisms, and perhaps the concentration of population, higher density and compact urban form will help to further develop them. However, ensuring equitable distribution of these places in Australian urban and rural regions requires the attention of government. There are policy suggestions to facilitate the development of these shared workplaces.

At the local level, Australian planning policy can encourage future compact development to include these accessible shared places in the separate floors of residential buildings with moderate density (see CMHC, 2000; Moos & Skaburskis, 2008) or within the shared parts of high rise and highly populated residential buildings. These workplaces can also be developed more widely in local area centres, along with some other local activities (see L. C. Johnson, 2003). New solutions are needed for current residential areas that lack such shared workplaces. Some studies have suggested the potential use of existing cultural infrastructure, such as public libraries, by turning them into suitable space for coworking (see Bilandzic & Foth, 2013). In addition, such workplaces can easily be established in urban and regional areas affected by downturns in development with low

price lands and used as a strategy for urban revitalisation and orienting the concentration of a knowledge-based workforce (see Buksh & Mouat, 2015).

Ultimately, the development and expansion of suitable working spaces at the local level, either through home modification or through the development of local shared workplaces, can greatly add to local-level spatial capacity in support of urban resilience. The experience of using home-based telework in urban crises and shocks such as natural and human-made disasters (see Carstens, 2010; Donnelly & Proctor-Thomson, 2013; Green, 2014) with its resilience in avoiding negative consequences including interruption of the daily urban work cycle calls for more attention to developing place-related aspects. The planning and design of hybrid shared workplaces that can be provided as reserved respiratory places at the local level may play a key role in responding and reacting to crises and ensuring the continuity of the urban work cycle in conditions of high uncertainty. This is more consistent with the goals of Australian urban strategic plans for urban resilience (see NSWG, 2018).

9.5 Research limitations

The study encountered some limitations and challenges. Many of them were overcome by adopting appropriate methodological and technical solutions.

Although the scope of telework literature is very broad, it is nonetheless narrow in the available research on place-related factors. In particular, telework studies have overlooked exploring the impact of place-related factors on fundamental socio-behavioural variables such as work motivation. This theoretical gap made it impossible to accurately compare the research empirical findings with the findings of previous telework studies and identify similarities and differences.

There are few national statistics on the socio-demographic characteristics and geographical distribution of teleworkers in Australia. There are also few surveys at the national level on place-related aspects of telework including physical, spatial, infrastructure and environmental conditions. This made it difficult to understand the status of Australian telework in all aspects and to ensure the generalisability of research findings to the entire Australian home-based telework experience in various dimensions.

To collect data on a wide range of variables to respond to the main research questions, a long survey was inevitable, which could be associated with the risk of being time-consuming and risking a low response rate. In addition, the differences between employee and self-employed teleworkers increased the complexity of designing surveys and collecting data for comparison of the two groups.

In order to evaluate and measure teleworkers' level of work motivation, the components of Work Extrinsic and Internal Motivation Scale (WEIMS) (see Section 4.4.2.6) were adapted, while taking into account the conditions of telework. Adapting this scale in a way that did not go beyond the meaning of the main items of the scale, while ensuring the new items were suitable for telework, was one of the main challenges of the research.

The research data collection in the early stages using organisational strategy methods (see Section 4.5.3) encountered some difficulties. The process of finding, contacting and getting support from private companies and public organisations that have introduced telework arrangements as an option to their employees was often frustrating. Organisations and companies often had a conservative approach in agreeing to send the link to the research survey to potential respondents. Despite extensive contacts and correspondence, few companies and organisations agreed to send the electronic survey link to their employee teleworkers. In addition, the data collection through the organisational strategy was associated with a low response rate and incomplete surveys. Although the low response rate was overcome by using the social networking strategy, a rigorous approach was used in the data cleaning process to recognise the suitability and completeness of the surveys by targeted respondents.

Although the overall sample size of the research was suitable for the main analyses of the research, it was not sufficient for some of the complementary analyses. In particular, the smaller sample size of the self-employed teleworker subgroup, compared to the employee teleworkers subgroup, was a concern. Although the adoption and application of the bootstrapping technique (see Section 4.6) made it possible to compare the two groups in terms of the mean of variables with a relatively high degree of reliability (see Section 7.2), it was not possible to compare the results of predictive models between the two groups (see Section 7.3), as the small sample size of the self-employed teleworker subgroup violated the multiple regression analyses technique assumptions, and did not allow for a separate regression analysis for this subgroup. However, the insignificance of

the employment status variable in the research regression analyses (see Section 7.3) supported the finding of no difference between the two subgroups in terms of the final results.

9.6 Recommendations for further research

Based on the understanding from different parts of the research, some recommendations for further research in two areas can be made. Firstly, new studies can be implemented to continue the theoretical development and empirical findings of the present research to contribute to existing knowledge. Secondly, studies can be conducted on the proposed policy directions, to lead to an elaboration of the form of policies and how they can be achieved.

- **Further Self-Determination Theory research on telework:** The Self-Determination Theory (SDT), which guided the research in the theoretical and empirical phases, can provide further possibilities for a deeper socio-behavioural understanding and interpretation of the research findings. Future research should explore the relationship between the basic and place-related variables with different types of work motivations based on Self-Determination Theory including external, identified, integrated and intrinsic work motivations (see Section 3.4.1). The relationship between basic and place-based factors and the core human needs emphasised by Self-Determination Theory including autonomy, competence and relatedness (see Section 3.4.1) can also be investigated through defining new predictive models.
- **Structural Equation Modelling:** Discussions on empirical findings allowed for the formulation of propositions highlighting the probable structural relationships between the research significant variables and other important variables in the literature (see Chapter 8). These propositions can be investigated further in the form of a broad structural equation model which is “a form of causal modeling that includes a diverse set of mathematical models, computer algorithms, and statistical methods that fit networks of constructs to data” (Kaplan, 2008, p. 79).

This model can evolve in four general stages: 1) Forming and testing a preliminary structural model based on the proposed relationships between the mediating variables and independent variables of the present research (the first and second columns in Tables 8.4); 2) Implementing separate empirical investigations to explore how each mediating variable is associated with the significant independent variables of the present research and important independent variables of the literature (the five different rows in Table 8.4); 3) Expanding the preliminary structural model of stage 1 based on the empirical findings of stage 2 to form and test an intermediate structural model; and 4) Extending the intermediate model of stage 3 to include the Self-Determination Theory main human needs constructs of autonomy, competence and relatedness, and formulating and calibrating a final structural model. Establishing the final structural model of stage 4 can help shape a socio-behavioural theory of telework place.

- **Further telework policy research at the local level:** The important role of the local area in explaining Australian teleworkers' level of work motivation highlighted the need for further planning policy on teleworkers' needs at the local level (see Chapter 8). There have previously been some research and policy suggestions on how to plan a local area for teleworkers in Australia. However, these studies focused on low density pre-designed communities for telework and did not consider how telework can be incorporated in ordinary existing urban communities. Further policy research should consider the needs of home-based teleworkers who reside in urban communities which have not been designed and prepared for telework from the beginning. These home-based teleworkers may not necessarily be the few home-based businesses owners who allocate a lot of time to telework for their business intentions. They can be the many ordinary employees who normally allocate a short time to telework and pay more attention to the telework benefits such as increasing work-life balance. Therefore, if Australian planning policy considers telework as a flexible working experience with positive outcomes for a wide range of citizens, more policy research needs to be conducted on preparing existing communities for efficient teleworking. The new policy research should investigate the local area factors that affect Australian teleworkers' work motivation. The priority could be research which focuses on

the integration of the home-based telework experience with different levels of urban density, and the development of collective work hubs at the local level (see Section 9.4.2).

- **Comparative study on telework policy at the global level:** The extensive policy gaps on telework, call for learning from other countries' experiences. Comparing different planning policy experiences at the global level and identification of similarities and differences helps with understanding of how planning theory needs to respond to the telework needs in the future. As comprehensively reviewed in Chapter 3, some meta-analysis studies attempted to harmonise the current knowledge of the telework's concept, typology, advantages/disadvantages, place-related characteristics, applications, socio-behavioural outcomes and organisational management. However, not much inclusive research has been done on the area of policy, where the fundamental differences between the countries and the lack of empirical understandings seems to be the main obstacles to reach a cohesive conclusion. Therefore, it is recommended that further comparative study on planning policy for telework at the global level performed in the future. It is also recommended that these research needs to go beyond the common organisational and management policy makings for telework and consider the place-related aspects of telework as well.
- **Further qualitative research on the Australian teleworkers' work motivation determinants:** This research's quantitative investigations highlighted the basic as well as place-related factors that determine the work motivation of Australian teleworkers. Although the existing literature helped this research discuss many of these quantitative findings, there is still some unclarities resulted from lack of information/evidence which calls for a secondary qualitative exploration by other researchers. The current knowledge of telework especially surrounding place-related aspects is not current and should inevitably be updated to address software/hardware technology advancements, and new organisational and business management models which have been introduced during recent years. Besides, there are still some inconsistencies between the empirical findings in the current literature which needs to be resolved through conducting further qualitative investigations. Therefore, it is recommended that further qualitative

research work performed to deepen the understanding of the present research empirical findings.

9.7 Concluding remarks

Based on the experiences, achievements and understandings of this research, the following points are briefly highlighted.

In the 18th to 20th centuries, the industrial revolution led to the division of social work and the separation of the workplace from home, and the negative consequences of degradation of the environment, social inequality and the alienation of people in cities. Planning for better telework and taking advantage of its benefits and potential can be seen as an opportunity to re-align work with human life. Paying attention to deep human needs in a transitional hybrid situation that is largely affected by the place as a holistic matter is a necessary condition for any success.

The concept of telework began in early 1970s in response to the socio-economic shock of the fuel and energy crisis in the Middle East. In a world characterised by high natural, economic, political and social uncertainties for many reasons, telework can still remain loyal to its own philosophy of existence. Making better policies for telework can be a type of insurance for citizens, communities and societies against possible crises.

Telework literature has highlighted some unusual and paradoxical dilemmas: Is telework the cause of work-life balance or the main source of work-family conflict? Does telework lead to more urban concentration or more urban expansion? According to the research in any case, although telework can have an intensifying or facilitating role, it is not the main cause. Which of these scenarios will be realised is a function of the socio-technical trends and the active forces in the deeper socio-economic layers that affect the phenomenon of telework itself. However, the effective role of government at various levels and the policies adopted to overcome the balance between forces are undeniable. The successful development of telework and its numerous benefits depends largely on government's serious commitment to develop telework, its effective and coordinated policy in various fields, and adoption of necessary rules and regulations for organisational and place-related developments.

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Appendix 1—Survey filtering Questions

1. Do you sometimes work from home?

- ☐ Yes
- ☐ No

2. Do you need to use internet, telephone, etc. to maintain contact and work delivery with your employer or your clients?

- ☐ Yes, I do.
- ☐ No, I don't need to use internet, telephone and etc. to maintain contact and work delivery with my employer or my clients.

3. What is your employment status?

- ☐ Employee (I regularly work for an employer and I do all or part of my work through teleworking)
- ☐ Self-employed (I am an independent teleworker and/or I have my own clients)

Appendix 2—Survey questionnaire (employee teleworkers version)

4. Where is the office of your employer that you normally work with or that you report to?

Post code _____

Suburb/ Town _____

Country _____

5. How many years and/or months have you been teleworking?

Number of years _____

Number of months _____

6. On average, about how many hours per week do you work from home? (please only write the number of hours)

Number of hours _____

7. What type of work task/activity does your telework involve? (please specify)

8. Do you have any official or formal written teleworking arrangements and considerations in your job contract?

☐ Yes

☐ No

☐ No, but I have a verbal agreement with my supervisor

9. What type of internet access do you currently have at home?

☐ Dial up

☐ Broadband (ADSL, cable, fibre, satellite, mobile)

☐ Other (please specify): _____

☐ I don't know

10. How satisfied are you with the speed of your internet access at home while you are teleworking?

Very Dissatisfied ☐	Dissatisfied ☐	Neutral ☐	Satisfied ☐	Very Satisfied ☐
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11. How satisfied are you with the reliability of your internet access at home while you are teleworking?

Very Dissatisfied ☐	Dissatisfied ☐	Neutral ☐	Satisfied ☐	Very Satisfied ☐
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12. Please describe your workspace at home:

- ☐ A separate room in your home
- ☐ An area or corner of a room in your home
- ☐ A place in your home that varies according to need
- ☐ A separate building (e.g. backyard studio)
- ☐ Other (please specify): _____

13. Now we would like to ask questions about how satisfied you are with the main place that you do all or most of your telework. How satisfied are you with:

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
a) The size of your workspace at home?	☐	☐	☐	☐	☐
b) The location of your workspace at home?	☐	☐	☐	☐	☐
c) The noise level in your workspace while you are teleworking?	☐	☐	☐	☐	☐
d) The lighting of your workspace at home?	☐	☐	☐	☐	☐
e) The office equipment such as printer, scanner and copier in your workspace?	☐	☐	☐	☐	☐
f) The technologies in your workspace including computer, laptop, mobile, telephone, Wi-Fi access, etc.?	☐	☐	☐	☐	☐
g) The furniture in your workspace?	☐	☐	☐	☐	☐
h) The temperature of your workspace?	☐	☐	☐	☐	☐

14. How do you generally assess your level of distraction/interruption when you are working at home?

not at all distracted 1	2	3	4	very distracted 5
☐	☐	☐	☐	☐

15. To what extent do you feel isolated when you are teleworking?

not at all isolated 1	2	3	4	very isolated 5
☐	☐	☐	☐	☐

16. On average, how many minutes does it take you if you want/need to travel from home to the office of employer that you normally work with or that you report to? (Put N/A if you don't need to travel to the office of employer)

Number of minutes _____

17. Which type of transport do you mainly use if you want/need to get from home to the office of your employer that you normally work with or report to?

- ☐ Bus
- ☐ Private Car/Motorcycle
- ☐ Train
- ☐ Taxi
- ☐ Bicycle
- ☐ Walking
- ☐ Other (please specify): _____
- ☐ Not applicable – don't need to travel to the office of employer

18. How easy is it for you to get from home to the office of your employer using the following types of transportation?

	very difficult	difficult	neither easy nor difficult	easy	very easy
-by walking:	☐	☐	☐	☐	☐
-by bicycle:	☐	☐	☐	☐	☐
-by public transportation:	☐	☐	☐	☐	☐
-by private car/motorcycle:	☐	☐	☐	☐	☐

19. In general, how satisfied are you with the local area in which you live?

Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
☐	☐	☐	☐	☐

20. The following items focus on the reasons that people might telework. Some of these items might seem repetitive but each provides important information. Using the scale below, please indicate to what extent each of the following items corresponds to the reasons why you presently telework at home (1 does not correspond at all, 4 corresponds moderately, 7 corresponds exactly). Why do you telework?

	Doesn't correspond at all 1	2	3	Corresponds moderately 4	5	6	Corresponds exactly 7
a) Because teleworking allows me to be more flexible in choosing my lifestyle.	☐	☐	☐	☐	☐	☐	☐
b) Because teleworking saves me money.	☐	☐	☐	☐	☐	☐	☐
c) I ask myself this question, I don't seem to be able to manage my work tasks when I telework.	☐	☐	☐	☐	☐	☐	☐
d) Because I get pleasure from teleworking.	☐	☐	☐	☐	☐	☐	☐
e) Because teleworking has become an important part of the way I live my life.	☐	☐	☐	☐	☐	☐	☐
f) Because I choose to telework to attain my career goals.	☐	☐	☐	☐	☐	☐	☐
g) Because teleworking allows me to take on interesting challenges that are satisfying.	☐	☐	☐	☐	☐	☐	☐
h) Because teleworking allows me to earn money.	☐	☐	☐	☐	☐	☐	☐
i) Because teleworking is part of the way in which I have chosen to live my life.	☐	☐	☐	☐	☐	☐	☐
j) I don't know why, my working conditions are unrealistic when I'm teleworking.	☐	☐	☐	☐	☐	☐	☐
k) Because teleworking is a way of work I have chosen to attain certain important objectives.	☐	☐	☐	☐	☐	☐	☐
l) For the satisfaction I experience through doing difficult tasks while teleworking.	☐	☐	☐	☐	☐	☐	☐
m) Because teleworking provides me with job security.	☐	☐	☐	☐	☐	☐	☐
n) I don't know, too much is expected of me when I telework.	☐	☐	☐	☐	☐	☐	☐
o) Because teleworking is part of my life.	☐	☐	☐	☐	☐	☐	☐

Finally we would like to ask you some demographic questions. These allow us to describe who took part in the study.

21. Please indicate your gender.

- ☐ Male
- ☐ Female

22. What year were you born?

23. Do you have a disability that impacts on your ability to travel and/or work at your main office workplace?

- ☐ Yes
- ☐ No

24. What is the highest level of formal education you have completed?

- ☐ Postgraduate degree
- ☐ Graduate diploma/certificate
- ☐ Bachelor degree
- ☐ Advanced diploma/diploma
- ☐ Certificate level
- ☐ Senior high school
- ☐ Other (please specify): _____

25. How many people currently live in your household, including yourself?

Number of people live in your household? _____

Of these people, how many are under 18 years old? _____

26. Which life stage best describes you?

- ☐ Single, No children
- ☐ Single, Youngest children 4 years or younger
- ☐ Single, Youngest children between 5 to 11 years
- ☐ Single, Youngest children between 12 to 17 years
- ☐ Single, Youngest children 18 years or over
- ☐ Couple, No children
- ☐ Couple, Youngest children 4 years or younger
- ☐ Couple, Youngest children between 5 to 11 years
- ☐ Couple, Youngest children between 12 to 17 years
- ☐ Couple, Youngest children 18 years or over

27. What is your average before-tax household income per year?

- | | |
|---|--|
| ☐ \$1-\$7,799 | ☐ \$41600-\$51999 |
| ☐ \$7,800-\$15,599 | ☐ \$52000-\$64999 |
| ☐ \$15,600-\$20,799 | ☐ \$65000-\$77999 |
| ☐ \$20,800-\$33,799 | ☐ \$78000-\$103999 |
| ☐ \$33,800-\$41,599 | ☐ \$104000 or more |

28. Where do you live?

Post code _____

Suburb/ Town _____

29. How many years and/or months have you lived in this area?

Number of years _____

Number of months _____

30. What kind of dwelling are you living in?

- ☐ Separate house
- ☐ Semi-detached, row or terrace house, town house etc.
- ☐ Flat, unit, apartment
- ☐ Other (please specify) _____

31. Do you rent or own the place where you live?

- ☐ Own
- ☐ Rent
- ☐ Other (please specify) _____

32. What is your work load?

- ☐ Full time
- ☐ Part time 2.5 days or more per week
- ☐ Part time less than 2.5 days per week

33. What is your usual occupational category?

- | | |
|---|--|
| ☐ Manager | ☐ Clerical and Administrative worker |
| ☐ Professional | ☐ Sales worker |
| ☐ Community and Personal service worker | ☐ Other (please specify) _____ |

34. Is there anything else you would like to tell us about your experience of teleworking or completing this survey?

Thank you for your participation

Appendix 3—Survey questionnaire (self-employed teleworkers version)

4-What type of self-employed teleworker are you?

- ☐ Freelancer
- ☐ Independent contractor
- ☐ Consultant
- ☐ Entrepreneur
- ☐ Other (please specify): _____

5-How many years and/or months have you been teleworking?

Number of years _____

Number of months _____

6.On average, about how many hours per week do you work from home? (please only write the number of hours)

Number of hours _____

7. What type of work task/activity does your telework involve? (please specify)

8. Do you have any official or formal written teleworking arrangements and considerations in your job contract?

- ☐ Yes
- ☐ No
- ☐ No, but I have a verbal agreement with my supervisor

9. What type of internet access do you currently have at home?

- ☐ Dial up
- ☐ Broadband (ADSL, cable, fibre, satellite, mobile)
- ☐ Other (please specify): _____
- ☐ I don't know

10. How satisfied are you with the speed of your internet access at home while you are teleworking?

Very Dissatisfied ☐	Dissatisfied ☐	Neutral ☐	Satisfied ☐	Very Satisfied ☐
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11. How satisfied are you with the reliability of your internet access at home while you are teleworking?

Very Dissatisfied ☐	Dissatisfied ☐	Neutral ☐	Satisfied ☐	Very Satisfied ☐
--	---------------------------------------	----------------------------------	------------------------------------	---

12. Please describe your workspace at home:

- ☐ A separate room in your home
- ☐ An area or corner of a room in your home
- ☐ A place in your home that varies according to need
- ☐ A separate building (e.g. backyard studio)
- ☐ Other (please specify): _____

13. Now we would like to ask questions about how satisfied you are with the main place that you do all or most of your telework. How satisfied are you with:

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
a) The size of your workspace at home?	☐	☐	☐	☐	☐
b) The location of your workspace at home?	☐	☐	☐	☐	☐
c) The noise level in your workspace while you are teleworking?	☐	☐	☐	☐	☐
d) The lighting of your workspace at home?	☐	☐	☐	☐	☐
e) The office equipment such as printer, scanner and copier in your workspace?	☐	☐	☐	☐	☐
f) The technologies in your workspace including computer, laptop, mobile, telephone, Wi-Fi access, etc.?	☐	☐	☐	☐	☐
g) The furniture in your workspace?	☐	☐	☐	☐	☐
h) The temperature of your workspace?	☐	☐	☐	☐	☐

14. How do you generally assess your level of distraction/interruption when you are working at home?

not at all distracted 1	2	3	4	very distracted 5
☐	☐	☐	☐	☐

15. To what extent do you feel isolated when you are teleworking?

not at all isolated 1	2	3	4	very isolated 5
☐	☐	☐	☐	☐

16. Where are the three main areas that your clients are mostly located?

- 1- Suburb/ Town _____
 2- Suburb/ Town _____
 3- Suburb/ Town _____

17. On average, how many minutes does it take you if you want to travel from home to where you normally meet with your clients? (Put N/A if you don't need to travel)

Number of minutes _____

18. Which type of transport do you mainly use if you want to get from home to where you normally meet with your clients?

- ☐ Bus
☐ Private Car/Motorcycle
☐ Train
☐ Taxi
☐ Bicycle
☐ Walking
☐ Other (please specify): _____
☐ Not applicable – don't need to travel to meet with the clients

19. How easy is it for you normally to get from home to where you meet with your clients using the following types of transportation?

	very difficult	difficult	neither easy nor difficult	easy	very easy
-by walking:	☐	☐	☐	☐	☐
-by bicycle:	☐	☐	☐	☐	☐
-by public transportation:	☐	☐	☐	☐	☐
-by private car/motorcycle:	☐	☐	☐	☐	☐

20. In general, how satisfied are you with the local area in which you live?

Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
☐	☐	☐	☐	☐

21. The following items focus on the reasons that people might telework. Some of these items might seem repetitive but each provides important information. Using the scale below, please indicate to what extent each of the following items corresponds to the reasons why you presently telework at home (1 does not correspond at all, 4 corresponds moderately, 7 corresponds exactly). Why do you telework?

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b) Because teleworking saves me money.	☐	☐	☐	☐	☐	☐	☐
c) I ask myself this question, I don't seem to be able to manage my work tasks when I telework.	☐	☐	☐	☐	☐	☐	☐
d) Because I get pleasure from teleworking.	☐	☐	☐	☐	☐	☐	☐
e) Because teleworking has become an important part of the way I live my life.	☐	☐	☐	☐	☐	☐	☐
f) Because I choose to telework to attain my career goals.	☐	☐	☐	☐	☐	☐	☐
g) Because teleworking allows me to take on interesting challenges that are satisfying.	☐	☐	☐	☐	☐	☐	☐
h) Because teleworking allows me to earn money.	☐	☐	☐	☐	☐	☐	☐
i) Because teleworking is part of the way in which I have chosen to live my life.	☐	☐	☐	☐	☐	☐	☐
j) I don't know why, my working conditions are unrealistic when I'm teleworking.	☐	☐	☐	☐	☐	☐	☐
k) Because teleworking is a way of work I have chosen to attain certain important objectives.	☐	☐	☐	☐	☐	☐	☐
l) For the satisfaction I experience through doing difficult tasks while teleworking.	☐	☐	☐	☐	☐	☐	☐
m) Because teleworking provides me with job security.	☐	☐	☐	☐	☐	☐	☐
n) I don't know, too much is expected of me when I telework.	☐	☐	☐	☐	☐	☐	☐
o) Because teleworking is part of my life.	☐	☐	☐	☐	☐	☐	☐

Finally we would like to ask you some demographic questions. These allow us to describe who took part in the study.

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- ☐ Male
- ☐ Female

23. What year were you born?

24. Do you have a disability that impacts on your ability to travel and/or work at your main office workplace?

- ☐ Yes
- ☐ No

25. What is the highest level of formal education you have completed?

- ☐ Postgraduate degree
- ☐ Graduate diploma/certificate
- ☐ Bachelor degree
- ☐ Advanced diploma/diploma
- ☐ Certificate level
- ☐ Senior high school
- ☐ Other (please specify): _____

26. How many people currently live in your household, including yourself?

Number of people live in your household? _____

Of these people, how many are under 18 years old? _____

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- ☐ Single, No children
- ☐ Single, Youngest children 4 years or younger
- ☐ Single, Youngest children between 5 to 11 years
- ☐ Single, Youngest children between 12 to 17 years
- ☐ Single, Youngest children 18 years or over
- ☐ Couple, No children
- ☐ Couple, Youngest children 4 years or younger
- ☐ Couple, Youngest children between 5 to 11 years
- ☐ Couple, Youngest children between 12 to 17 years
- ☐ Couple, Youngest children 18 years or over

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- | | |
|---|--|
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| ☐ \$7,800-\$15,599 | ☐ \$52000-\$64999 |
| ☐ \$15,600-\$20,799 | ☐ \$65000-\$77999 |
| ☐ \$20,800-\$33,799 | ☐ \$78000-\$103999 |
| ☐ \$33,800-\$41,599 | ☐ \$104000 or more |

29. Where do you live?

Post code _____

Suburb/ Town _____

30. How many years and/or months have you lived in this area?

Number of years _____

Number of months _____

31. What kind of dwelling are you living in?

- ☐ Separate house
- ☐ Semi-detached, row or terrace house, town house etc.
- ☐ Flat, unit, apartment
- ☐ Other (please specify) _____

32. Do you rent or own the place where you live?

- ☐ Own
- ☐ Rent
- ☐ Other (please specify) _____

33. What is your work load?

- ☐ Full time
- ☐ Part time 2.5 days or more per week
- ☐ Part time less than 2.5 days per week

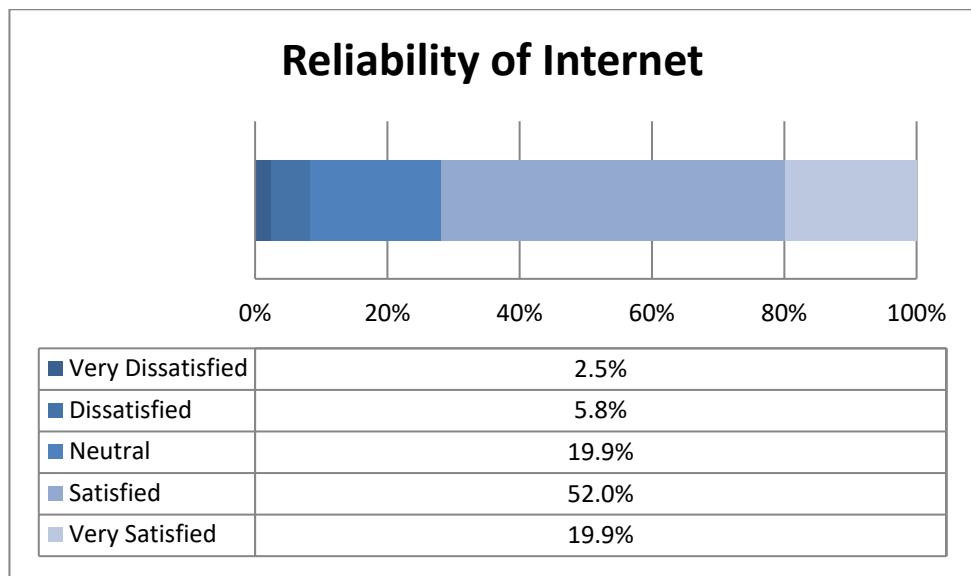
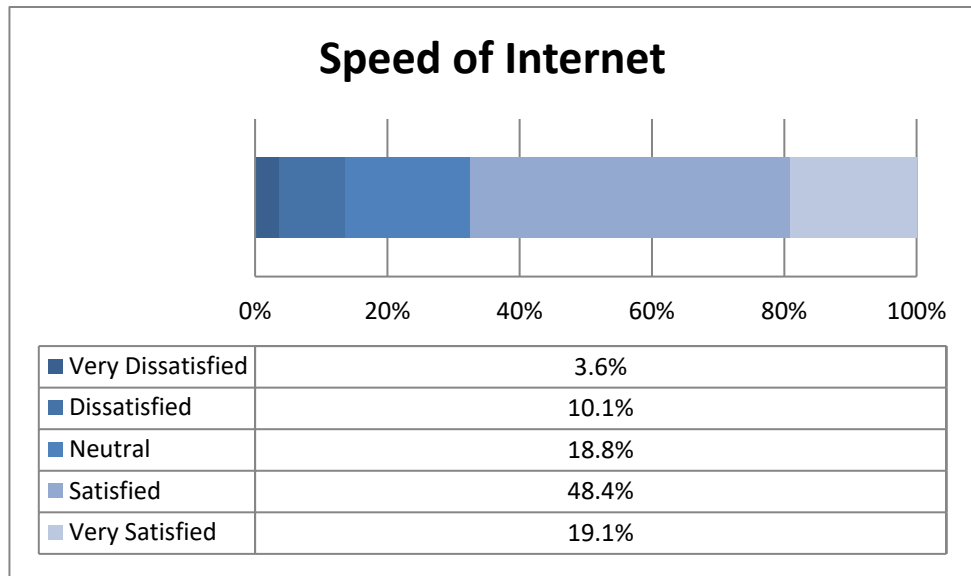
34. What is your usual occupational category?

- | | |
|---|--|
| ☐ Manager | ☐ Clerical and Administrative worker |
| ☐ Professional | ☐ Sales worker |
| ☐ Community and Personal service worker | ☐ Other (please specify) _____ |

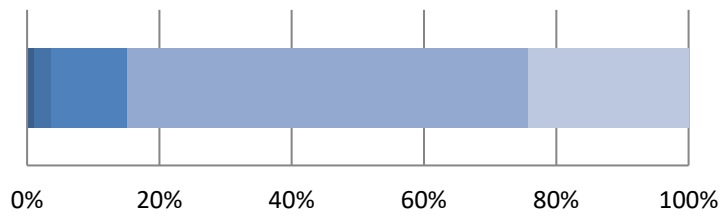
35. Is there anything else you would like to tell us about your experience of teleworking or completing this survey?

Thank you for your participation

Appendix 4— Overall degree of satisfaction with place-related characteristics of Australian telework (N=277)

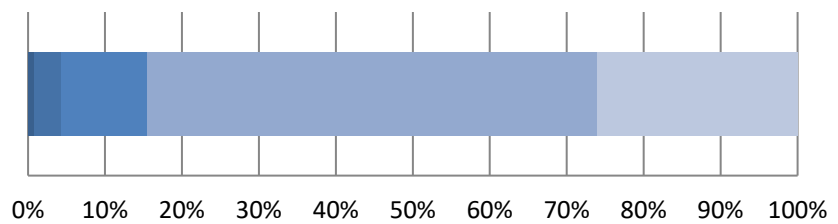


Size of workspace



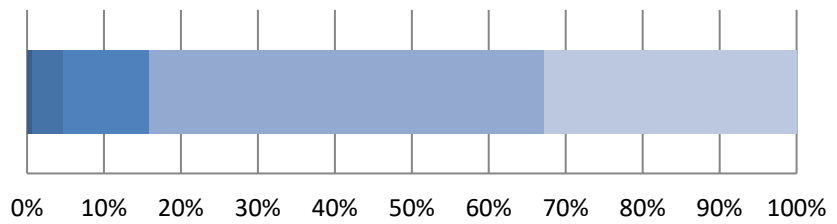
Very Dissatisfied	1.1%
Dissatisfied	2.5%
Neutral	11.6%
Satisfied	60.6%
Very Satisfied	24.2%

Location of workspace within the building



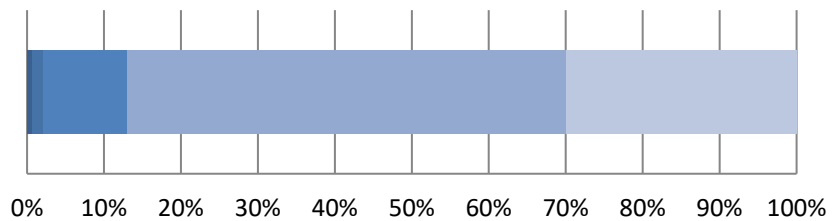
Very Dissatisfied	0.7%
Dissatisfied	3.6%
Neutral	11.2%
Satisfied	58.5%
Very Satisfied	26.0%

Noise level in workspace



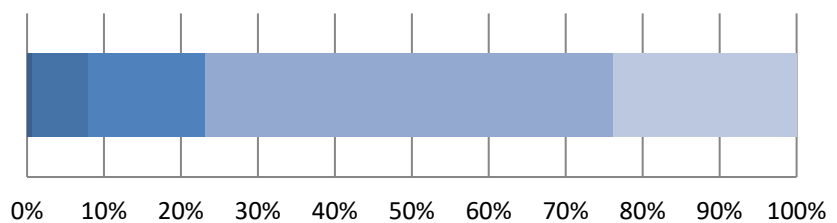
Very Dissatisfied	0.7%
Dissatisfied	4.0%
Neutral	11.2%
Satisfied	51.3%
Very Satisfied	32.9%

Lighting of workspace



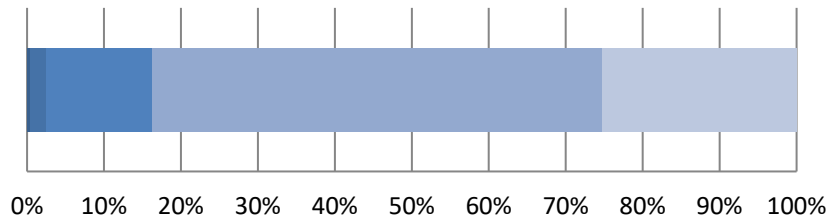
Very Dissatisfied	0.7%
Dissatisfied	1.4%
Neutral	10.8%
Satisfied	57.0%
Very Satisfied	30.0%

Office equipment



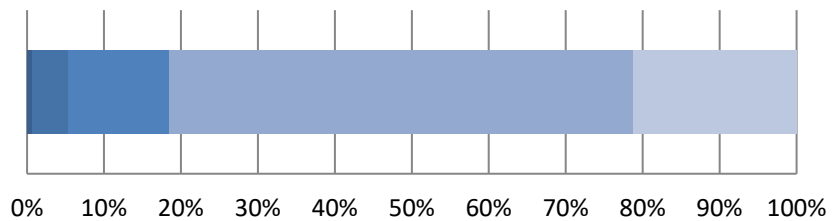
Very Dissatisfied	0.7%
Dissatisfied	7.2%
Neutral	15.2%
Satisfied	53.1%
Very Satisfied	23.8%

Technologies in workspace



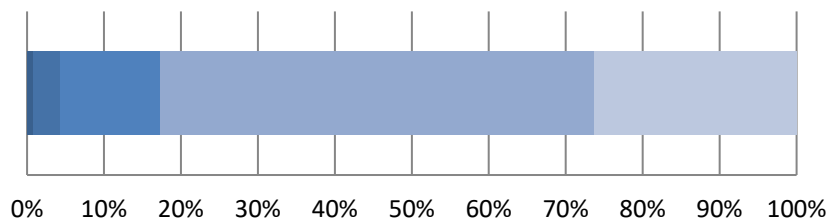
Very Dissatisfied	0.4%
Dissatisfied	2.2%
Neutral	13.7%
Satisfied	58.5%
Very Satisfied	25.3%

Furniture in workspace



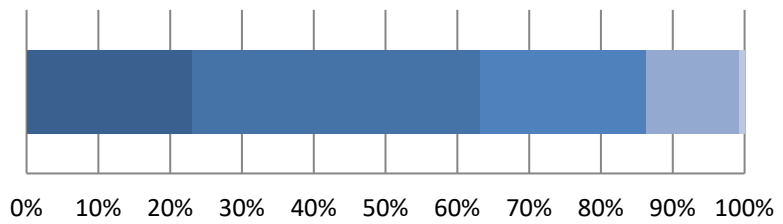
Very Dissatisfied	0.7%
Dissatisfied	4.7%
Neutral	13.0%
Satisfied	60.3%
Very Satisfied	21.3%

Temperature in workspace



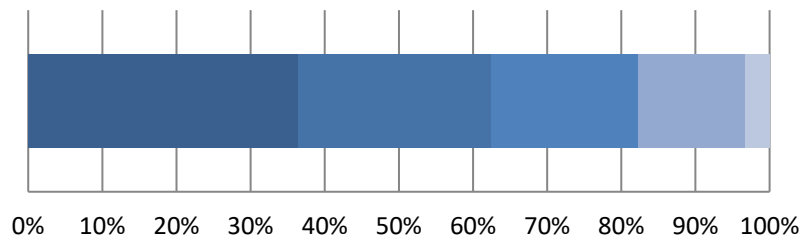
Very Dissatisfied	0.7%
Dissatisfied	3.6%
Neutral	13.0%
Satisfied	56.3%
Very Satisfied	26.4%

Level of distraction in workspace



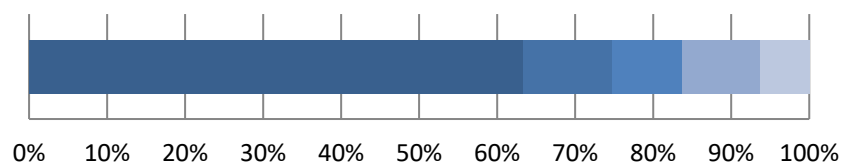
■ 1 not at all distracted	23.1%
■ 2	40.1%
■ 3	23.1%
■ 4	13.0%
■ 5 very distracted	0.7%

Level of isolation in workspace



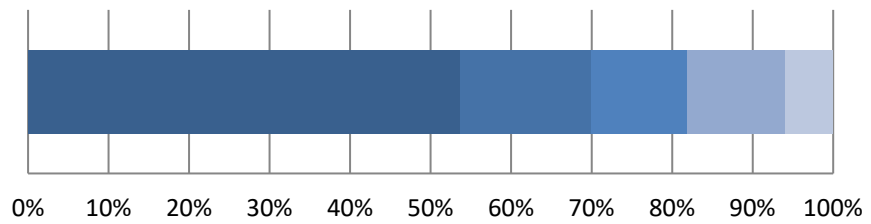
■ 1 not at all isolated	36.5%
■ 2	26.0%
■ 3	19.9%
■ 4	14.4%
■ 5 very isolated	3.2%

How easy to get to where report by walking



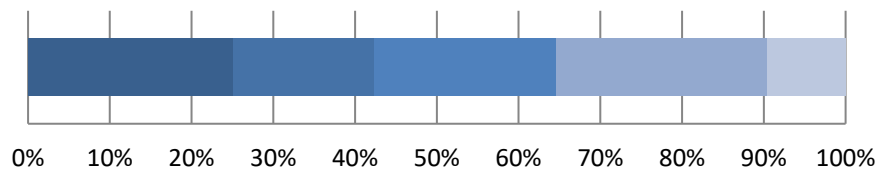
■ Very Dissatisfied	63.3%
■ Dissatisfied	11.5%
■ Neutral	8.9%
■ Satisfied	10.0%
■ Very Satisfied	6.3%

How easy to get to where report by bicycle



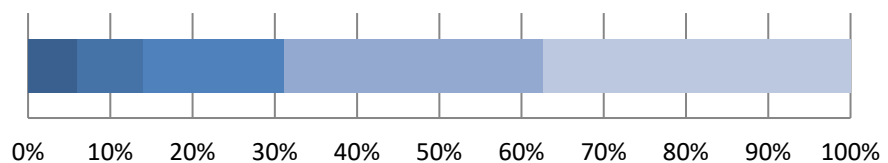
Very Dissatisfied	53.7%
Dissatisfied	16.3%
Neutral	11.9%
Satisfied	12.2%
Very Satisfied	5.9%

How easy to get to where report by public transportation



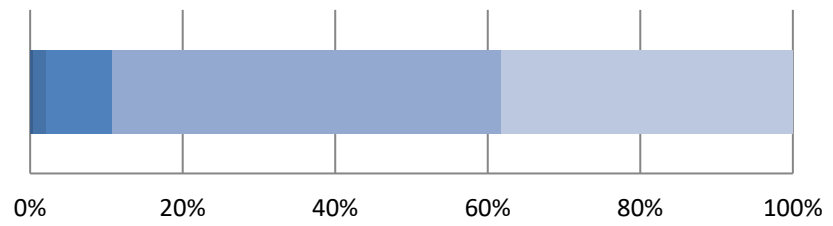
Very Dissatisfied	25.1%
Dissatisfied	17.3%
Neutral	22.1%
Satisfied	25.8%
Very Satisfied	9.6%

How easy to get to where report by private car



Very Dissatisfied	5.9%
Dissatisfied	8.1%
Neutral	17.0%
Satisfied	31.5%
Very Satisfied	37.4%

Satisfaction with local area



Very Dissatisfied	0.4%
Dissatisfied	1.8%
Neutral	8.7%
Satisfied	50.9%
Very Satisfied	38.3%

Appendix 5— Summary of results on work motivation variable

Description	Overall (N=277)					Employees (n=233)					Self-Employed (n=44)				
	Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}	Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}	Mean	Std. Deviation	Mean Difference	t-value	Sig. (2-tailed) ^{a,b}
Work motivation	11.9	7.45	11.90	26.57	.000**	11.54	7.40	11.54	23.79	.000**	13.78	7.50	13.78	12.18	.000**

a. One-sample t-test with test value=0, b. Bootstrap based on 1000 sample
 **p < 0.01 (2-tailed)