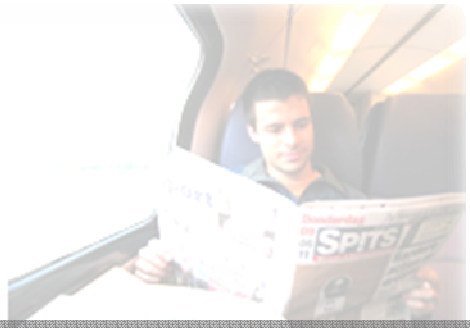
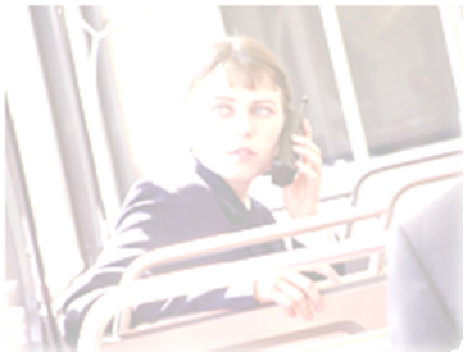



The Positive Utilities of Performing Mobilities


A Study on the Travel Time Use of Dutch Travellers in the Information Age



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Master Thesis
Research Report

Urban Geography
(Dept. of Human Geography)

Title page

The Positive Utilities of Performing Mobilities

A Study on the Travel Time Use of Dutch Travellers in the Information Age

Master Thesis Research Report

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Summary

The importance of mobility and technology in the current Information Age makes it interesting to investigate the interconnections between these aspects. The New Mobilities Paradigm underlines the interconnections between technology-supported virtual mobilities and corporeal mobilities, which encompasses the two important features of our current post-modern society; mobility and ICT. This vision is used to investigate the travel time use of Dutch travellers, the factors that can influence travel time use, the role of ICT in travel time use, the influence of travel time use on journey experience and the differences in these aspects between transport modes.

Many policy makers in the field of transportation see travel time as a disutility and a cost to someone's productive time, which means that they aim to minimise travel time. But it is argued in the present study that travel time can be used to perform activities, which can give travel time a positive utility. The developments of mobile ICT have the potential to increase the productivity of travellers, which can enhance the positive utilities of travel time.

Previous studies have already looked into travel time use and the positive utilities of travel time. Several studies in the UK and a study in Japan have already investigated travel time use and the role of ICT, but the Dutch context was not studied in this respect before. The travel time uses in cars and trains were investigated in previous studies, but more research was needed to gain more insights into travel time use and some associated aspects. Busses and metros were not investigated before, and the differences between transport modes in travel time use and the other investigated aspects could be important to study as well. This is why travel time use, the factors that can influence travel time use, the role of ICT, the influence of travel time use on journey experience and the differences in these aspects between transport modes are investigated among Dutch car, train, bus and metro travellers in the Rotterdam metropolitan area. Questionnaires and observations were used to collect empirical data, as the combination of asking questions and observing behaviour can give more complete information and can prevent problems with biased data outcomes.

The results showed that travellers engaged in all sorts of activities while travelling. Many travellers were looking out of the window, using mobile phones, relaxing, talking to fellow travellers or listening to music during their journeys. Most respondents saw their travel time use as time-out or relaxation, and many of the activities they performed were more for personal benefit than for productivity. More than three quarters of the respondents did not see their travel time as wasted or lost time, but indicated it as either productive or relaxing, which means that most travellers in the present study did seem to get some positive utilities from their travel time.

It was also found that available seating (in public transport), carrying equipment and using well-designed and high-quality vehicles, can positively influence travel time use. But high degrees of crowding (in public transport) and noise were found to have negative influences on travel time use. ICT was found to positively influence travel time productivity and journey experience, which indicates a positive role of ICT in travel time use. Travel time use itself also had a positive influence on the perceived journey experiences of travellers, which again shows that most travellers got some sort of positive utility from their travel time by performing activities on the move.

The data also showed clear differences between transport modes, as most travel time uses showed higher frequencies in public transport modes when compared to cars. Especially train users showed high frequencies in many travel time activities, and the role of ICT also seemed to be the most significant and positive in the travel time use on trains. The respondents perceived the train to be the best transport mode option in terms of travel time use, while the metro was perceived quite negatively.

The present study resulted in valuable new insights into travel time use in the Dutch context, but also found that travel time is mainly used for relaxing activities. This was also concluded in previous studies on travel time use, but it can be argued that these non-productive activities also have important benefits for travellers. The results also showed that people perceive their travel time quite positively and that they often use their time invested in travelling in a useful way, which can lead to a more positive travel experience. And the fast developments of mobile ICT can help to increase productivity and travel time use. Policy makers should stop treating travel time as a disutility and should promote travel time use instead, as the potentials and positive utilities of travel time use were clearly shown in the present study.

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1. Introduction

In our contemporary post-modern society, the roles of mobility and technology are well established. Mobility is everywhere around us today, according to Tim Cresswell in his book *On the Move* (2006). Mobility is increasing in volumes and forms and is becoming increasingly important for more and more people. Cresswell states that: "the modern human is mobile" and that "mobility is a feature of the modern World" (Cresswell, 2006, p.1). But also technology, and especially Information and Communication Technology (ICT), is an important feature of our contemporary society. Manuel Castells describes many important aspects of our post-modern society in his book *The Rise of the Network Society* (1996). He states that due to the rise of new technologies (ICT), the world is now potentially interconnected in the flows of global networks. This changed the world form being based on Industrialism to being based on 'Informationalism'. We are currently living in the "Information Age", and this has important implications for many aspects of people's daily lives (Castells, 1996). In the present study the focus will be on the interconnections between these two important features of our post-modern society: mobility and ICT.

Due to recent ICT developments, the realm of mobility has gained important new features in our post-modern society. According to John Urry (2007), there are currently different forms of mobility which are important to investigate. On the one hand, there are corporeal and physical movements of people and objects. But on the other hand, one can see virtual mobility supported by ICT. And importantly, Urry states that these corporeal and virtual forms of mobility cannot be as seen separated from each other, because both forms are intertwined and form a complex whole (Urry, 2007). This insightful and important understanding of increased and intertwined forms of mobilities is called: the "New Mobilities Paradigm" (Sheller & Urry, 2006; Urry, 2007).

When researching "New Mobilities", there are numerous ways in which interaction between physical and virtual forms of mobility can take place. Many studies focussed on the effects of ICT on patterns of physical travels, through mechanisms such as substitution (De Graaff & Rietveld, 2007; Nobis & Lenz, 2009; Haynes, 2010). In the present study the "New Mobilities Paradigm" will be investigated in the realm of travel time use, which has only recently received significant attention in the academic literature (for example: Lyons & Urry, 2005; Urry, 2006; Lyons et al., 2007; Ohmori & Harata, 2008; Watts & Urry, 2008; Watts, 2008).

Many policymakers in the field of transportation and some mainstream transport researchers, see travel time as a disutility. Travel is understood as an instrument or tool to get to a destination, and the time it takes to travel is seen as "a 'cost' incurred by individuals and society as a means to enjoy the benefits of what is available at the destinations of journeys" (Lyons et al., 2007, p. 108). The time when someone is travelling, also called 'moving time', is thus seen as wasted or valueless because travelling takes time away from economically valuable work opportunities of individuals. 'Stationary time', on the other hand, is seen as valuable for economically measurable and productive work tasks (Watts & Urry, 2008, p. 862). But travel time is viewed in these discussions as being useless for travellers. Policy makers and transport strategists tend to distinguish travel time from activity time, so that travel time seems useless and wasted (Sheller & Urry, 2006, p. 213). But instead, one could argue that activities can be performed while travelling, so that travel time can be seen as useful and even valuable for travellers. People can use their travel time is numerous ways, and in this study it will be investigated how travel time is actually used by travellers in daily life.

In the face of rapid technological developments in the field of ICT and mobile devices, the potentials for travel time use can be expected to increase. Many valuable activities could be conducted while travelling, whether these are of economic value or personal value for individuals. The opportunities and productivity of travel time activities can be increased by the growing possibilities of mobile ICT technologies. Well-equipped travellers could potentially get more 'positive utility' from their time invested in travelling. This indicates the importance of investigating travel time use in the current Information Age.

1.1 Research aim

The interactions between the intertwined physical mobility of daily journeys and the virtual mobility of (ICT-supported) activities on the move will be investigated. An effort is made to gain insights into the influences of ICT on the uses of travel time for some distinct groups of travellers: car users and different public transport users. This research focus is taken because it can be argued that all groups of travellers have different travel time use opportunities (Lyons & Urry, 2005). The aim of this study is to: *Give insights into the travel time uses of Dutch travellers in the current Information Age, the factors influencing these travel time uses, the role of ICT in travel time use, the influence of travel time use on journey experience and the differences in these aspects between people using personal transport modes (cars) and people using different public transport modes (trains, busses or metros) for daily journeys.*
This research aim for the master thesis was inspired by the 'The Travel Time Use in the Information Age Research Project' in the UK. Several researchers (John Urry, Glenn Lyons, Juliet Jain, David Holley and Laura Watts) have been working on this subject for a couple of years now in the UK. And in the present study, the subject is investigated in the Dutch context to put the research into a different context to obtain further insights into travel time use in the Information Age.

1.2 Research questions

Based on the insights gained from the literature study (which will be described in the second chapter on theory and previous studies) and the calls for empirical research by some researchers on important points, the following research questions will be addressed in the present study:

- How do people use their travel time in the Dutch context?
- Which factors can positively or negatively influence the use of travel time?
- What is the role of ICT in travel time use, travel time use perception and the journey experience of travellers?
- Could the use of travel time have positive or negative influences on the perceived journey experience of travellers?
- What are the main differences in travel time use, influencing factors, the role of ICT and journey experiences between people using personal transport modes (cars) and people using different public transport modes (train, bus or metro) for daily journeys?

1.3 Structure of the report

After this introduction, the relevant literature for the present study will be discussed in chapter 2 on theory and previous studies. Several important aspects on the subjects of travel, travel time use, ICT and influencing factors, will be discussed in this theoretical chapter. After the theoretical discussion, a chapter on the research design and methodology is presented in the report. In this third chapter, the research design and the research methodology that was used to gather and analyse the empirical data will be discussed in detail. Following the chapter on research design and methodology, will be the presentation and discussion of the results from the empirical data analysis (chapter 4). The research results will be discussed on the subjects of: travel time use, influencing factors, the role of ICT, the influence of travel time use on journey experiences, differences between transport modes and the observation results. The fifth chapter will present the conclusions and discussion of the results on the basis of the research findings and the aspects that were discussed in the theoretical chapter. The shortcomings and limitations of the present study, the social implications and policy recommendations on the basis of the research findings will also be discussed in this fifth and last chapter. The reference list with the used literature references and the list of tables and figures are included in the report after the chapter on conclusions and discussion. And finally, the appendix with additional information is added at the end of the thesis report. The appendix contains the questionnaire and observation schedules that were used for empirical data collection.

2. Theory and Previous Studies

In this chapter, the theoretical aspects and previous studies on travel time use will be discussed. The research findings and theories from previous studies on the aspects of post-modern society, the New Mobilities Paradigm, the valuation of travel time, travel time use, influencing factors and differences between transport modes will be discussed. The empirical gaps in previous research that lead to the present study will also be given in this chapter. The Dutch context, in which the present study is performed, will also be described on the aspects of population and mobility. This chapter is concluded with the description and presentation of the conceptual model for the present study.

2.1 Our post-modern society of technologies and mobilities

Before elaborating on the theoretical insights into travel time and travel time use in the information age, the context of our contemporary western society and some of its features will be discussed. This will help to put the study into context and will outline some important developments which were of influence on many aspects that are discussed in the present study.

2.1.1 Post-modern society

Our post-modern western society has been described as being part of a new era. The Industrial Age with heavy engineering and industry has largely been replaced with another age: the Information Age. This new age is best characterised by 'Informationalism', technologies and networks, which form important features of contemporary life in many western cities. Access to information, technologies and networks has become the core of productivity in modern times. The features of this 'Network Society' implicates that sociality and activity are increasingly organised in electronically-assisted networks. These networks are becoming increasingly global and flexible, and influence many aspects of people's daily lives (Castells, 1996).

An important aspect of people's daily lives is work. Sellen & Harper (2001) state that one of the great changes in the past few decades has been the shift from manufacturing employment to services and knowledge-based employment in the western world. People today are more likely to work in an office to process information everyday, then to work in a factory manufacturing goods. "Workers are becoming less likely to be using their hands and more likely to be using their minds to monitor, manage and control the flow of information. There are now more knowledge-based activities within organizations than ever … (.) ... Predictions are that the proportion of work that is knowledge-based will continue to increase significantly into the new millennium" (Sellen & Harper, 2001, p. 51). In the light of this development, Holley et al. (2008, p. 31) suggest that this employment shift has implications for the place of travel time in peoples' working days.

This is explained by the fact that the types of knowledge, and the way in which we use them for work tasks, are changing. Blackler (2002) distinguishes five types of knowledge: embedded knowledge (for habitual routine tasks), embodied knowledge (learned from experience), encultured knowledge (from shared understanding), encoded knowledge (e.g. through books or internet) and embrained knowledge (conceptual knowledge). A few decades ago, in the Industrial Age, people mainly relied upon embedded and embodied knowledge for work tasks. But today (in the Information Age) people increasingly use encoded and embrained knowledge for work-related activities. Due to technological developments, discussed later in this paragraph, the opportunities for processing and working with encoded and embrained knowledge are no longer restricted to fixed locations. Knowledge work is thus not only increasing, but is also getting more spatially flexible. This has the potential to influence opportunities for work-related activities to be undertaken on the move (Holley et al., 2008, p. 32). But this development does not only facilitate work-related activities while travelling, but also other activities which could be viewed as 'anti-activities' (like entertainment or breaks) or alternative activities of personal value (Holley et al., 2008, p. 43).

2.1.2 Technologies

The post-modern 'Network Society' is facilitated by Information and Communication Technologies (ICT). The connectivity to people and information is supported by electronic networks of computers, phones and other mobile devices. And these technologies and connectivity have penetrated all aspects of our western society (Castells, 1996).
Due to these technologies, people are now able to access people and information wherever they are. One is not bound to the home- or office-space anymore to work, communicate or perform other activities which require information or contact. The increased use of these technologies can facilitate more and more activities to be undertaken everywhere without being at fixed locations, so we can (for instance) work, relax and communicate while travelling (Holley et al., 2008, p. 35).

2.1.3 Mobilities

Next to technologies, mobilities are another important feature of our post-modern society. Mobility has become the norm in western society, and is growing in importance (Cresswell, 2006, p. 1). And not only people are increasingly travelling the globe, but also objects, information and ideas. Tim Cresswell calls this 'entangled mobilities' (2006, p. 206). Contemporary society features multiple mobilities which influence people's daily lives. Many people today are travelling the globe as never before. The corporeal or physical movements of people and objects are enormous in our contemporary society, as many people are travelling outside of their countries for tourism or work-opportunities. And many goods have travelled thousands of miles before finding a place on the shelves of the department stores on the other side of the globe. But also virtual movements of information and communications are being increased by growing ICT networks. These different mobilities and their interactions are discussed in the New Mobilities Paradigm, which will be discussed next.

2.2 The New Mobilities Paradigm

The "New Mobilities Paradigm" was theorised by Mimi Sheller and John Urry in 2006. In this mobility-based vision on modern society, it is stated that people, objects and information are increasingly mobile. Ongoing socio-technical practices are mobilising the entire context of social research in increasingly mobile material worlds (Sheller & Urry, 2006, p. 211). According to the authors, mobilities comprise mobile bodies, moving objects, people moving by technologies (as cars, trains etc.) and the movements of ideas and information through global media (TV and radio), the internet and phones (which are themselves increasingly *mobile* phones). Mobilities involve heterogeneous geographies of humans and technologies that enable people and materials to move across networks (Urry, 2007, p. 35). According to Urry (2007), social research has tended to focus upon separated mobilities, and thus treated them as independent. But these mobilities are actually intertwined, and they have to be studied as such:

> "it involves examining how the transporting of people and the communicating of messages, information, and images increasingly converge and overlap through recent digitisation and extension of wireless Infrastructures ...(.)... Thus mobilities need to be examined in their fluid interdependence and not in their separate spheres." (Sheller & Urry, 2006, p 212)

New mobilities are facilitated by technological developments. The flows of people, machines, images, information, power, money and ideas are increasing in speed and range and are made possible by technology-supported networks. New devices for communication and information sending and/or receiving are being mobilised, such as I-pods, laptops and mobile phones. And because of this, not only are people's bodies moving through physical space while travelling, but these people are increasingly moving through 'informational space' as well (Sheller & Urry, 2006, pp. 221-222). This means that physical and virtual mobilities can come together when people are accessing people or information at-a-distance while travelling (by using mobile ICT devices).

The most important features of the New Mobilities Paradigm are:

- That all social relationships involve connections, either close or distant, which entail physical movements of people and objects.
- That interdependent mobilities organise social life at-a-distance.
- That mobilities can involve embodied multi-sensory experiences.
- That large parts of social life are organised through technologies that facilitate the movements of objects, people and information.
- And that it is necessary to investigate the varieties of mobilities in peoples' daily lives (Urry, 2007, p. 272).

An example of the appliance of these ideas is given by the study of Laura Watts (2008). Watts investigated 'the art and craft of train travel' in an ethnographic analysis of a train journey across the west of England. She stated that people and their material belongings travel together on the train and form a single meaningful entity (Watts, 2008, p. 714). Another example is given by Tim Cresswell (2006, chapter 8) who discussed how ideas move alongside bodies and objects, so that all three aspects form entangled mobilities. So it is important to investigate the interactions between mobilities. And an important part of this study will dedicated to investigate the entanglement of the physical mobilities of travelling and the virtual mobilities of accessing people and information by using ICT.

2.3 The positive and negative valuations of travel (time)

In the literature on transportation, travel is usually categorised into three groups: commute, business and leisure. Commuting includes journeys which are made by people to and from the workplace. Business travels are made by people in the course of their work and thus usually during work hours. And leisure travels usually include all other journeys that are made for non-work purposes (Holley et al. 2008, p. 28). In the present study, commute travels and business travels will be treated as work-related journeys. Leisure travels will also be included in the study, but one has to consider their different purposes and situations for the individuals involved in those journeys. In leisure travels the journey experience can be as important as the destination (which is reflected in John Urry's concept of the 'tourist gaze' (1990)), in contrast to most commuting and business travels. But leisure travels can also be totally about the destination and not about the journey (like going to the zoo for example). Therefore, the context of leisure travel is quite differentiated and mostly quite different from work-related journeys. Although it has been argued that all sorts of journeys are valued for their own sake, and that differences in positive valuations of travelling are mainly visible across individuals and cultures (Mokhtarian et al., 2001).

2.3.1 Policy views and negative conceptualisations of travel (time)

Many policy makers perceive travel as an instrumental aspect of daily life. People are assumed to just see travel as a means to get to a destination. Travel is viewed as a 'derived demand', as people just demand travel opportunities to reach certain destinations for activity opportunities (Mokhtarian et al., 2001). And due to this point of view, the time it takes to travel is seen as a disutility or as wasteful, because it would take people's time away from activities at stationary locations (Lyons et al., 2007, p. 107-108). For example, the Department of Transport in the UK has the following text in its transport appraisal guidance (which underlines their instrumental and economical conceptualisation of travel time):

> "Time spent travelling during the working day is a cost to the employer's business. It is assumed that savings in travel time convert non-productive time to productive use and that, in a free labour market, the value of an individual's working time to the economy is reflected in the wage rate paid. This benefit is assumed to be passed into the wider economy and to accrue in some proportion to the producer, the consumer and the employee, depending on market conditions." (Taken from: Holley et al., 2008, p. 30)

Policy makers also tend to translate many heterogeneous travellers into aggregations of utility-maximizing passengers (Watts & Urry, 2008, p. 861). Therefore, travel time savings are usually seen as a priority for transport policy makers (Holley et al., 2008).
In many policy appraisals it is usually presumed that:

- Passengers will try to keep travel time to a minimum and are willing to pay for that
- Travel time takes valuable time away from (economically) productive activities (Lyons & Urry, 2005; Watts & Urry, 2008)

Travel time is thus seen as a cost, and travel time savings are seen as a benefit. This restricted and economic conceptualisation of travel time gives clear justifications for large infrastructure projects to speed up transportation and reduce travel time (Jain & Lyons, 2008, p. 82).
But not only policy makers, but also some academics have a rather negative view on travel and travel time. For example: Jara-Días stated the following in his section on the valuation of travel time savings in the *Handbook of Transport Modelling*:

> "The day has 24 hours, and travel time usually consumes a substantial proportion of the truly uncommitted time. In general, individuals would rather be doing something else, either at home, at work or somewhere else, than riding in a bus or driving a car."
> (Jara-Días, 2000, p. 303)

But these negative conceptualisations of 'useless' travel time are context-dependent and have been contested by many authors (e.g. Mokhtarian, 2003; Lyons & Urry, 2005; Ohmori & Harata, 2008).

2.3.2 The positive utility of travel (time)

As discussed above, some policy makers and academics view travel in a rather negative way, as something that costs time and money to get to a destination. In this view, travel is treated as a derived demand which only has a 'derived utility'. This means that the only benefits of travel are found in the activities (performed at a certain destination) which are made possible by travelling. But travelling also has an 'intrinsic utility', which means that benefits can be found in the travels themselves. These benefits can be found in the enjoyment of travelling or the activities that can be performed while travelling (Mokhtarian et al., 2001). It has been argued that policy makers should include the utility and productivity of travel time in their transport appraisals. This productivity and the possible uses of travel time are formed by the passengers, their properties and the environments they are travelling in. Policy makers should not focus on travel time savings anymore: "since passenger travel time is not uniform clock time, but may be stretched and compressed in practices on-the-move (as shown in Watts, 2008)" (Watts & Urry, 2008, p. 871).
Travel time can be enjoyed or used, by which travelling gets an intrinsic and positive utility. Mokhtarian & Solomon (2001) conducted a survey on travel utility among 1900 respondents in the US. They found that over two-thirds of their respondents disagreed with the statement that travelling is only good for arriving at a destination, and almost half of the respondents perceived the journey to be as important as the destination (Mokhtarian & Solomon, 2001).
As can be seen in the above discussion, travel (time) is both positively and negatively valued by people. But the notion that the journey itself can provide benefits for travellers, besides arriving at a destination, is growing among some researchers (e.g. Lyons et al., 2007; Lyons & Chatterjee, 2008; Watts & Urry, 2008). This was shown by Jain & Lyons (2008), as they studied the benefits and uses of travel time and argued that the 'burden of travel time' can be translated into 'the gift of travel time' when travellers gain benefits from their journeys and the possibilities of travel time activities. People engage in activities while travelling, like: listening to music while driving, reading a book on the bus or talking to friends or co-workers on the train. These activities are increasingly supported by ICT and mobile devices, which can increase the positive valuation and utility of travel time (Ohmori & Harata, 2008). And these positive utilities of travel time are true for all modes of transport (Jain & Lyons, 2008, pp. 88-89). Overall, one can confidently state that: "travel time is made in travel time use" (Watts, 2008, p. 720; Watts & Urry, 2008, p. 868), which reflects the importance of investigating travel time use in the present study.

2.4 Travel time use

It was already stated that the New Mobilities Paradigm underlines that physical and virtual mobilities are intertwined, which could have important implications for travel time use. Sheller & Urry emphasise that, in contrast with more traditional views, travel time is not so-called 'dead time' that people want to keep to a minimum. Much of the available literature on transportation tends to distinguish travel time from activity time, so that travel time seems useless and wasted (Sheller & Urry, 2006, p. 213). But instead one could also argue that activities can be performed while travelling, so that the distinction between (economically) valuable activity time and (economically) useless travel time becomes less apparent. People can use their time invested in travel and make this time productive in some way (personal, social or economical for example) (Lyons & Urry, 2005). This is true when someone gains positive value from travel time, by working, socialising or relaxing for instance. Lyons & Urry make their point about travel time use in the Information Age clear in their hypothesis (which was the inspiration for the travel time in the Information Age project):

> "The boundaries between travel time and activity time are increasingly blurred. Specifically, many people are using travel time itself to undertake activities. The cost to the individual of travel time is reduced as travel time is converted into activity time. In turn, less of the individual's travel time budget is used, enabling more travel or encouraging greater use of modes that may enable en-route activities to be undertaken." (Lyons & Urry, 2005, p. 263)

Considering the utilities of travel more broadly, Mokhtarian & Salomon distinguish three aspects of travelling which could bring positive utility: activities conducted at the destination, the activity of travelling itself and activities that can be conducted while travelling (Mokhtarian & Salomon, 2001, p. 701). They conducted a survey on travel utility, and dedicated some statements to travel time use. On the aspect of activities performed while travelling, their empirical data showed promising results for the importance of travel time use. Their findings showed that half of their respondents disagreed with the statement that travel time is wasted time. And, more importantly, a third of their respondents stated that they viewed travel time as useful time and acknowledged that they use this time productively (Mokhtarian & Salomon, 2001, p. 709). Other research showed that people value their travel time more positive due to the activity opportunities while travelling. Some people might even extend their travels so that they have enough time to relax, listen to some music or get some work tasks done (see for example: Salomon & Mokhtarian, 1997; Redmond & Mokhtarian, 2001).

2.4.1 Recorded travel time uses on public transport modes

Their have been some studies devoted to investigate the activities that people perform while travelling on public transport modes. The outcomes of those studies will be discussed in this section.
Lyons, Jain & Holley (2007) conducted a large-scale survey among more than 26.000 train passengers in the UK in 2004. They firstly asked respondents to indicate which activities they had undertaken during their train journey and what the purpose of their journey was (commute, business or leisure). The main results from this survey are presented in table 2.1 (see below).

Comparison, by journey purpose and direction of travel, of the percent of travellers undertaking activities for some time during the train journey and (shown in brackets) for most of the time

Activity	Journey purpose							
	All		Commute		Business		Leisure	
	Out	Return	Out	Return	Out	Return	Out	Return
Reading for leisure	53(33)	56(35)	62(42)	62(42)	43(22)	53(29)	46(27)	51(31)
Window gazing/people watching	56(18)	58(18)	49(12)	48(11)	51(12)	58(14)	66(27)	68(27)
Working/studying	26(13)	25(12)	27(13)	29(13)	55(35)	48(27)	13(6)	12(5)
Talking to other passengers	16(6)	14(5)	11(4)	10(3)	14(5)	11(4)	23(9)	21(8)
Sleeping/snoozing	13(3)	19(4)	16(5)	23(5)	11(2)	17(3)	9(1)	14(3)
Listening to music/radio	9(3)	9(3)	12(4)	13(5)	4(1)	5(1)	7(3)	6(2)
Not answered	1(11)	1(10)	1(9)	1(9)	1(10)	1(10)	1(12)	1(11)

Table 2.1: Activities undertaken by train passengers (compared by journey purpose and direction of travel). Taken from: Lyons et al., 2007, p. 110.

Table 2.1 shows that train passengers in the UK were predominantly reading for leisure, gazing out of the window or looking at other people during their journey. Other important findings are that business travellers were much more productive with working tasks than other passengers, and that leisure travellers were more engaged in window and people gazing than other passengers. This last finding may reflect John Urry's concept of the 'tourist gaze' (1990), because the landscape leisure travellers are traversing might well be part of their experience as leisure travellers (Lyons et al., 2007, p. 110). The data further showed that more than three quarters of rail passengers stated that due to their time uses while travelling, they didn't view their travel time as entirely wasted. And of the people that worked or studied during their train journey, more than 40 percent considered their time use as 'very worthwhile' (Lyons et al., 2007, p. 113 + 119). The overall conclusion of the study was that most train passengers in the UK were getting some positive utility from their travel time.

A similar survey that was conducted by Watts & Urry (2008) largely confirmed the findings from Lyons et al. (2007). But they also investigated to what extent people were 'equipped' with items for travel time use. They found that more than a third of the train passengers were carrying a book with them for reading on the train, more than three quarters of people had a newspaper to read, a third of train passengers were equipped with paperwork, more than two thirds had a mobile phone with them and some business travellers carried a laptops or PDA's. These data show that most train passengers are well equipped to use their travel time (or 'waiting time' (see Gasparini (1995) on this subject)) and gain some positive utility from it (Watts & Urry, 2008, p. 863).

The above mentioned travel time uses were all obtained from self-completion questionnaires in large-scale surveys, which entailed gaining information from peoples' memories and putting it into predetermined categories. These data give good insights into general activities that people engage in while travelling. But to gain deeper insights into the experience and actual uses of travel time on a train journey, Laura Watts conducted ethnographic research on a train journey in the west of England. During the journey she noted down everything she witnessed on the train, to obtain rich data on travel time use and experience. Watts reported how people were using their time during the train journey, and most findings confirm the data from the surveys. People were mainly gazing at the passing landscape through the windows of the train. Some people were reading books or magazines, while others were relaxing or even sleeping until they were disturbed by the sounds of mobile phones. Some people were working on laptops, but only if the available room or design of the train allowed these activities. Watts also reported many people interacting with each other, mostly consciously but sometimes also unintended (some examples were: people being annoyed by or influenced by others listening to music or someone 'munching crisps') (Watts, 200, p. 722).

It can be argued that some people were listening to music, staring out the window or reading books, just to pass the time or just because people now had the time for these activities. It was already argued by Bull (2000) that travel provides people with the time to listen to their own music. Activities like listening to music or window gazing might also just be methods used by people for 'killing time' (see Zerubavel (1981) on this subject). In the study on travel time use on trains by Lyons et al. (2007), it became clear that activities while travelling, like people watching or window gazing, can have different utilities. For some people these activities made the journeys into pleasant experiences by relaxation and time-out, while for others these activities just reflected the boring monotony of being trapped in travel time (Lyons et al., 2007, p. 113).

Next to the discussed studies of travel time use in the UK, Ohmori & Harata (2008) also studied travel time use in Japan. They were interested in the use of travel time by train passengers and the effects of vehicle design, vehicle quality and ICT opportunities. The first part of their research was in the form of structured observations in busy rush-hour trains. The results showed that most people were sleeping for most of their time during these train journeys, and that the second most visible travel time use was reading (mostly newspapers or books). They also observed that some people were using mobile phones to access the internet, but the durations of these activities were relatively short compared to other activities. In most Japanese trains it is not allowed to talk on a mobile phone, and so these activities were not observed. And although using a laptop is not prohibited on the train, they did not find any people that did use a laptop on the train during their observations. They recorded most activities in high grade trains were all passengers have a seat, which seemed to influence certain activities. Most people on the high grade trains were sleeping or reading (Ohmori & Harata, p. 552). So most travel time uses were similar with UK results, although some institutional differences

influenced certain travel time use opportunities (like: the prohibition of talking on a mobile phone in Japanese trains). And sleeping was more prevalent in Japan, but this could be due to average longer journey times in Japan due to large distances between home and work locations for many Japanese workers (Ohmori & Harata, 2008, p. 549).

2.4.2 Recorded travel time uses in cars

Travel time use opportunities for car drivers are obviously more restricted than for public transport users, due to the demanding task of driving itself. But this does not mean that travel time in cars cannot be used for certain activities; travel time for car drivers is not useless (Lyons & Urry, 2005, p. 265). One also has to distinguish between car drivers and car passengers in this respect, because both groups have obvious differences in travel time use opportunities.

Some sociological studies have already commented on travel time in cars and the experience of driving. Some studies focussed on the meaning of time for car drivers, were they found that people use travel time to mentally prepare for social or work activities at the destination (Davies, 2001; Pearce, 2000). Some feminist researchers studied how women use travel time in their cars to shed work-related stress or demands and prepare for the aspects and demands of life at the home (Richter, 1990; Pazy et al., 1996). Activities like listening to the sounds from the car radio or looking at the passing landscapes through the car window, and the effects of these aspects on mental activities during car journeys (like going through memories or contemplating life), were also studied (see Bull (2004), Edensor (2003) and Pearce (2000) on these subjects). These sociological studies gave some insights into certain travel time uses for car drivers, but were not really focussed on purposefully recording or discussing travel time use on car journeys.

Other research was more focussed on travel time use in cars, although not all of it was academic. For instance, a survey under British car drivers by the RAC (a large British motoring organisation) showed that 15 percent of the respondents said to use their car journeys for childcare purposes or work-related activities (RAC, 2001). On the aspect of work related activities, Laurier & Philo (1998) conducted academic research by travelling along with people who used their cars as ‘mobile offices’. Through the use of mobile phones and conversations with people, the car drivers transformed their cars into their offices by bringing the productivity, sociability and culture of the office into the car space. They found that the mobile workers were very productive, and used their travel time (mainly during congestion) to get work tasks done (like checking papers, making calls or preparing for meetings at the destination) (Laurier & Philo, 1998).

More and more people are travelling in cars every day, and many people make their cars into home-like places (Larsen et al., 2006). The Habitable Cars Project was a study group dedicated to find out what people do in their cars and how they do those things. This project was initiated by Eric Laurier et al. (2008), and produced much interesting empirical data. Cars were viewed in this project as more than just ‘tools’ to get us to our destinations, because many aspects of life are partly played out in cars. For many people, the working day starts on the way to work in their cars, as they eat breakfast or call friends or co-workers while driving. It is stated that: “Cars have, in short, become places we inhabit without necessarily being places designed to be habitable” (Laurier et al., 2008, p. 2).

Laurier et al. (2008) begin their analysis with the activity which is always performed during car travel, namely: driving (and paying attention to the traffic). And in contrast with the assumptions in transport policies, the activity of driving involves not only the driver but also the passengers in the car. Passengers help to navigate the correct route or assist in monitoring certain manoeuvres (like parking for instance) (Laurier, 2005). With the influence and role of the passengers, driving and getting to a destination “can become a shared accomplishment” (Laurier et al., 2008, p. 6). Although one could argue the relevance of passengers and navigation in daily commute trips.

Due to the presence of passengers in certain car journeys, talking can also be an important activity while travelling by car. Being with others in a car in silence is not seen as the social norm, so having passengers in the car may initiate a feeling of expectation or even obligation to engage in ‘passenger talk’ (Laurier et al., 2008, p. 7). Social activity or interaction with fellow-travellers, but also with distant others (through mobile phones), is important to acknowledge as a travel time use in cars.

Another important activity while travelling by car is looking out of the window. In the study by Laurier et al. (2008, pp. 9-10) many people were observed to be looking out of the window at the scenery or other drivers and commenting on these aspects. Here they noted the clear differences in

opportunities for drivers and passengers, as the latter had many more opportunities for looking around at everything they notice and the former mainly had to keep their eyes on the traffic. But despite these differences between drivers and passengers, both groups were found to be mainly looking out of the windows as a dominant travel time use during car journeys (Laurier et al., 2008, p. 11).
Besides vision, Laurier et al. (2008) found that hearing is also an important aspect of the car journey. The 'soundscape' of the car was already recognised by Bull (2000; 2004) to be an essential part of the car experience, and listening to music was also found by Laurier et al. (2008) to be a much observed travel time use.
The use of the radio for information or entertainment while driving brings the discussion to the 'equipping' of travel time in cars. Using radios or mobile phones while driving are the most important examples of 'equipped' travel time in cars, according to Salomon & Mokhtarian (1997). These activities may be most performed during traffic jams, which is a similar conceptualisation of time use as made by Gasparini (1995) when he discussed the use of waiting time for train passengers. The problem of delays (in all transport modes) can be transformed into an opportunity to multitask (like combining waiting with calling, listening or reading by having the right equipment) (Kenyon & Lyons, 2007). Laurier (2004) has already observed how the car can be transformed into an office by integrating (office) equipment into the space of the car. Having the right items or devices with you on journeys can substantially influence travel time use, but this will be discussed in more detail in the paragraphs on the factors that can influence travel time use and the role of ICT.

2.4.3 Productivity of travel time use

Many uses of travel time have been observed, but whether all these activities are productive, or even have to be productive, is debatable. The benefits in terms of productivity can vary across individuals, journey types and transport modes (Lyons & Chatterjee, 2008, pp. 190-191). Five categories have been theorised in this respect. Firstly, travel time can be *counterproductive,* which means that travel time is not only unbeneficial during travel, but that the journey also has negative effects on time use beyond the journey (like the negative effects of stress caused by travelling). Secondly, travel time can be unbeneficial or wasted, which is conceptualised as *unproductive* travel time (simply disused travel time on itself). Thirdly, *productive* travel time means that an individual has gained some benefit from his or her travel time. Fourthly, travel time can be *'fully' productive,* which means that travel time has been as beneficial as it would have been when one wouldn't have travelled in that time. And fifthly and finally, travel time has been conceptualised as *'ultra' productive,* which indicates that travel time has been used more beneficial than the time would have been used if one had not travelled (like working faster on the train because there are no interruptions from co-workers like in the office) (Lyons & Urry, 2005, p. 270; Lyons & Chatterjee, 2008, p. 191). Jain & Lyons (2008) stated that differences in time use on trains or in the office can be positive or negative. On the one hand, the use of laptops and phones is less convenient on trains, but on the other hand they state that travel time can provide uninterrupted time that the office may not always offer (Jain & Lyons, 2008). One can also think of the small amounts of time which can become available during a journey, which can be used productively by reading and responding to emails for instance (Gleick, 1999). In the large-scale survey on travel time use by Lyons et al. (2007), 86 percent of the respondents indicated that they could engage in work tasks while travelling. This indicated that the potential to use travel time productively is there, although most respondents did not actually perform these work activities on the train (Holley et al., 2008, p. 37).
The productivity on public transport journeys is not only important to acknowledge, but also that on car journeys. Laurier & Philo (1998) found in their study on car-based workers, that these people often make highly productive use of their time in the car. Mainly in slow moving traffic or traffic jams, these mobile workers were reading paperwork, making phone calls or were preparing a meeting or presentation while driving. So also car drivers can use their travel time productively, but this is even more so for car passengers who don't have to wait for relatively undemanding traffic situations.

2.4.4 Anti-activities, transition time and time-outs

Travel time is not only useful when certain productive activities or work tasks are performed, but travel time can also be important for 'anti-activities', 'transitions times' or 'time-outs'. Mokhtarian et

al. (2001) suggest that anti-activities (like resting or daydreaming) are important to the utility of travel time because they have definite (yet less measurable) benefits for the individual. These travel time uses may not be economically valuable, but can have positive value for an individual (Lyons & Urry, 2005, pp. 263-264).
Holley et al. (2008) use a 'taskscape' approach to gain insights into the role of travel time in the working day. This means that all activities or anti-activities surrounding work tasks can have an influence on productivity. Breaks, interruptions, relaxation or window gazing all seem to be negative for a person's productivity, but these anti-activities can result in "the subsequent increase, or prevented loss of, productivity" (Holley et al., 2008, pp. 38-39). So these anti-activities are actually quite important for productivity, and are thus also important to acknowledge in a study on travel time use.
Jain & Lyons (2008) also found two travel time use categories which resonate with the discussion on anti-activities above. The first category was distinguished as *transition time*, which was conceptualised as travel time that is used for changing roles (like work-role to home-role) and preparing for activities at the destination (like concentrating or de-stressing) (Jain & Lyons, 2008). The influence of travel on this time use is quite important, because physically traversing space (combined with the provided time) helps to achieve the sense of distance and difference that is needed to effectively change roles (Mokhtarian & Solomon, 2001). The second category distinguished by Jain & Lyons (2008) is *time-out*, which is quite similar to the concept of anti-activities which was discussed above. Time-outs are used to escape from work- or home-obligations, to have some 'me time' or just to do nothing. The increase of ICT use and the growing demands for continuous connectivity have the potential to threaten this time use category, but these developments do not totally evaporate the possibilities for time-outs while travelling (Jain & Lyons, 2008, pp. 86-87).
So there are numerous travel time uses which can be debated on the point of productivity, but it is important to recognise that these (anti-)activities are important travel time uses. Anderson (2004) already observed that people are always active in some way, even if they are bored. Even sleeping can be seen as an important activity while travelling, because also these activities involve "moments of social or material interaction" (Watts, 2008, p. 720). These (anti-)activities can be seen as just 'killing time', as Zerubavel already observed in the 1980's: "Many people today are becoming specialists in the fairly sophisticated art of 'killing time', which involves 'filling' otherwise 'empty' unaccounted-for time such as riding on the subways or waiting in the lobby – with newspapers, crossword puzzles and even business letters" (Zerubavel, 1981, p. 58). But as discussed above, even these (anti-)activities are important time uses to include in the present study.

2.4.5 Hypothesis on travel time use

On the basis of the discussed studies on travel time use, the first hypothesis that will be tested in the present study is: (H1) *A large variety of travel time uses in public transport and cars will be expected in the present study and these activities will vary in the respondents' perception of productivity or anti-activity.*

2.5 Factors that can influence travel time use

In this paragraph, the factors that can potentially influence travel time use will be discussed. The available academic literature is used to investigate which (sometimes interacting or overlapping) factors are observed to influence travel time use and which effects these factors can have on peoples' travel time activities.

2.5.1 Demographics

Demographics could be considered as a factor that can influence travel time use. Lyons et al. (2007) found in their survey among train passengers that, among other factors, age had an influence on travel time use and gender did not (Lyons et al., 2007, p. 114). The factor of age can be linked to the factor of equipment (see section 2.5.2) because they also found that younger people were more equipped for travel time use than older people (Lyons et al., 2007, p. 116). Work characteristics and obligations were also found by Lyons et al. (2007) and Ohmori & Harata (2008, p. 558) to influence travel time

use. The aspects of age and work characteristics will be considered in the present study, but will not be investigated as factors that can influence travel time use (as this was already studied). Demographics are included in the present study to check whether the data sample is balanced on the aspects of age and work characteristics.

2.5.2 Equipment

To enable certain travel time uses, one has to bring the right equipment on the journey. In the focus group research by Jain & Lyons (2008, p. 85), many participants acknowledged that bringing items like mobile devices, documents and books (or even thoughts and ideas) into the travel environment, was essential to enable certain travel time uses. Equipment can be used to transform travel time or waiting time into activity time by 'multitasking', as people can work on a laptop and travel at the same time for instance (Kenyon & Lyons, 2007). Watts observed how 'a well-adapted unpacked passenger' could use an item like a portable music player to transform a train delay into "a musical interlude" (Watts, 2008, p. 716).

In the large-scale survey by Lyons et al. (2007) they found that most people were equipped with items to enable travel time use. The respondents mentioned items like: books, music players, mobile phones, food and drinks. But the survey also showed that many people did not use these items even though they were 'equipped'. For instance: 65 percent of the people carrying a laptop, 62 percent of the people carrying paperwork and 64 percent of the people carrying a mobile phone on the train, did not use these items during their journeys (Lyons et al., 2007, p. 116). The use of equipment can actually vary between passengers. For example, Holley et al. (2008) showed the importance of mobile phones for business travellers, and how travel time sometimes represented a unique opportunity to use them effectively. So most passengers have the right equipment for travel time use, but the use of these items by travellers is not clear at this point. The use of equipment is clearly an important factor for travel time use opportunities, so this factor will be important to investigate in the present study. There is a special focus on ICT equipment in the present study, but the role of ICT will be discussed in more detail in paragraph 2.6.

2.5.3 Abilities

Being equipped for travel time is fairly pointless if one is not able to use these items. Some people cannot effectively work with mobile phones or laptops and some people cannot read or listen to music (like blind or deaf people respectively). But one can also think of travel sickness, which may prevent some people from reading while travelling. This aspect of abilities can also be connected to demographics, because age or employment can determine certain abilities to some extent. But in the present study, the aspect of abilities will only be investigated with respect to the use of mobile ICT devices while travelling.

2.5.4 Planning

The factor of planning (anticipating the use of travel time before departure) can also influence travel time use. In the survey by Lyons et al. (2007) they found planning to be important for travel time use opportunities. People who indicated they did not plan for their journey, were twice as likely to see their travel time as wasted and to be bored while travelling (Lyons et al., 2007, p. 116; Watts & Urry, 2008, p. 872). They also found that 47 percent of the respondents reported they did not plan for travel time use (Lyons et al., 2007, p. 116). So it seems that around half of the passengers do plan for their travel time use, and that planning can influence travel time use opportunities and journey experiences.

2.5.5 Transport mode characteristics

The characteristics of the transport mode also have the potential to influence travel time use opportunities, as all modes can have different environments and designs. One can think of the difference of using personal stereo systems on the train or in a private car, or typing on a laptop while driving or travelling by train. But also within public transport modes, one can see obvious differences. Jain & Lyons (2008, p. 88) found that laptops were used on trains by some travellers, but that busses or planes were not designed for using laptops conveniently. But the factors that differ between transport modes (like crowding, seating, noise, vehicle design or quality and journey duration) will be

discussed in more detail below. The subject of differences between transport modes will be discussed in more detail in paragraph 2.7.

2.5.6 Crowding

The degree of crowding in a public transport vehicle can also have an influence on travel time use. According to Ohmori & Harata (2008, p. 550) the situation in the train can vary depending on the number of passengers present in the vehicle. This can have an effect on privacy for instance, but also on the next two factors that will be discussed: seating availability and noise.

2.5.7 Seating availability

Connected to the above mentioned factor, the availability of seating should also be considered as a factor for travel time use opportunities. In a study on travel time use (and ICT) in Japan by Ohmori & Harata (2008), the data showed that sleeping or using a laptop or PDA on the train was significantly more observed in trains were people were sitting then in trains were people were standing during the journey. But the activities of mobile phone use for internet access, looking at advertisements or people and window gazing were observed to be higher in trains were people were standing (Ohmori & Harata, 2008, p. 554). Watts noted that using a laptop or sleeping is not a viable travel time use option when no seating is available, because these activities are hard to perform while standing (Watts, 2008, p. 720). So the availability of seating can be an important influencing factor for travel time use.

2.5.8 Noise

The presence or absence of noise was observed by Watts (2008) to be an important factor that can influence activities while travelling. In her ethnographic study in a UK train, she noted the differences between a quiet and noisy train carriage. In the quiet carriage, the passengers were mainly reading and were retained from talking. But in other (noisy) carriages the atmosphere was livelier, and people were talking, listening to music or calling on mobile phones (Watts, 2008, p. 722). So noise has an apparent influence on certain travel time uses. Here one also has to take into account the ‘silent carriages’ that are purposefully created and regulated in trains to have silence while travelling.

2.5.9 Design of the vehicle

The design of the vehicle can also have an effect on the opportunities for certain travel time uses. It was already mentioned that certain activities (like typing or sleeping) were only viable when seating was available, which is not only connected to passenger numbers but also to the design of the vehicle. Also the availability of a table (to place a laptop for instance) was found to influence what people do on the train (Watts, 2008). The vehicle has to have certain facilities to make certain travel time uses possible (Ohmori & Harata, 2008, p. 550). Accessing the internet for instance, is for most people only possible when one has the space to place a laptop and a wireless internet connection in the vehicle (Jain & Lyons, 2008, p. 85) (although many people can access the internet more easily today with smart-phones). This limited accessibility of wireless internet connections was also discussed by Dijst (2004) in his conceptualisation of ‘digital boxes’.
But also the design of the car can influence certain travel time use opportunities. Laurier et al. (2008) noted how the design and lay-out of a car does not allow people to sit face-to-face with each other, which partitions the front and back space of the car. This can result in a difficulty of engaging in effective conversations with certain fellow passengers while travelling by car.

2.5.10 Quality of the vehicle

The quality of the vehicle is connected to the transport mode characteristics, the design of the vehicle and sometimes also the noise. According to Lyons et al. (2007), the class of train is an influencing factor for travel time use. They found in their survey that first class passengers were much more likely engage in studying or working activities during their journey time than standard class passengers (28 percent and 15 percent respectively) (Lyons et al., 2007, p. 111). The design, the space, the relative quietness and even the privacy or atmosphere in first class vehicles could promote activities like working while travelling. This can also be the case in cars, as space, comfort and relative privacy can promote more effective travel time use opportunities.

The aspect of privacy and the way this is integrated or not in the vehicle is important for some travel time uses. The degree of privacy and the notion of personal or public space can influence the activities that people can engage in during travelling, according to Ohmori & Harata (2008, p. 549). In their survey they asked people to indicate whether 'private rooms' in potential new trains would influence their activity pattern while travelling. Their results showed that eating, drinking, calling on a mobile phone, using a PC or PDA and watching TV or videos had a significant higher desirability on trains when people had their private space (Ohmori & Hararta, 2008, p. 558). One can argue that people travelling by cars have more private space then people using *public* transport, although the presence of passengers can change that to some extent.

2.5.11 Duration of the journey

Travel time use and the use of ICT while travelling may be context-dependent according to Lyons et al. (2007), and this journey context logically includes journey duration. In their UK survey among train passengers, they found that journey duration can influence travel time use decisions. The longer the journey time was, the greater the variation was in the activities that were performed and the more time was spent on these activities (Lyons et al., 2007, p. 112). This result was also found in the study in Japan by Ohmori & Harata (2008). In-vehicle time influenced the choice set of activities while travelling. Reading books, web-browsing on phones and sleeping, were activities which had increasing participation rates as in-vehicle time increased (Ohmori & Harata, 2008, p. 555). More travel time seems to lead to greater travel time use. The duration of the journey in the form of uninterrupted travel time, is also connected to journey structure. Because if one has many transfers to other vehicles, travel time becomes fragmented into short slices of usable time. Ohmori & Harata (2008) found in their study that people were not productively using short slices of time on trains, and mainly engaged in window gazing. But the journey structure will not be investigated as a separate factor in the present study, because journey structure is closely connected to journey duration (which will be investigated).

2.5.12 Familiarity with the journey

The familiarity with the journey has the potential to influence the efforts of travelling itself. But to better understand this, one has to look at the psychology of travelling. Stradling (2006) gives some important insights into the psychology of commuting. He refers to the three types of efforts required for someone to make a certain journey: physical efforts, cognitive efforts and affective efforts. Stradling (2006) argues that a familiar journey requires less cognitive effort (like actively searching the route) and affective effort (like having uncertainties or worries about the journey), because this journey will be performed in a routine. The individual will travel almost subconsciously (on 'auto-pilot') during familiar journeys. Lyons & Chatterjee (2008) argue that these familiar journeys (like most commuting trips), which are performed as routines by travellers, take less active attention and engagement in the tasks of travelling itself. This means that more attention can be given to other activities while travelling, so that travel time can be effectively used (Lyons & Chatterjee, 2008, p. 193). So the degree of journey familiarity can have an influence on the use of travel time.

2.5.13 Institutional aspects

Institutional aspects can also influence travel time use opportunities, because certain activities can be prohibited in some transport spaces or situations. On the public space of the train, some activities are not allowed in certain parts of the train because of authority constraints (Ohmori & Hararta, 2008, p. 549). On Dutch trains it is not allowed to smoke for instance and in some silent carriages it is not allowed to talk out loud or make phones calls while travelling. And non-hands-free activities are not allowed while driving a car in the Netherlands. So institutional aspects (in the form of rules or regulations in traffic laws or company regulations) can definitely influence travel time use opportunities.

2.5.14 Social aspects

Not only formal regulations, but also informal norms can influence travel time use opportunities. According to Ohmori & Harata (2008, p. 549), people not only have to consider the official regulations of the public transport companies, but also the 'public gaze' of fellow passengers on public

transport journeys. Laura Watts (2008) noted that the 'crafting of train travel rarely occurs in isolation' because 'it is often intensely social'. She also observed how people retained from making noise in a silent train carriage where others were quiet, but would 'strike up a conversation in a socially vibrant carriage' (Watts, 2008, p. 722). So the social aspects concerning informal norms or the effect of the 'public gaze' also form an influencing factor on travel time use, which has to be acknowledged in the present study. The cultural differences between people and countries have to be considered here, because certain aspects of informal norms or the public gaze can be very different between cultures.

2.5.15 Categorising the factors

The factors that can influence travel time use are thus numerous and sometimes interacting or overlapping with each other. Lyons & Urry (2005) however, give a helpful distinction between two types of factors that could influence travel time use: individual factors and journey factors. This can help to categorise the factors discussed above. Under the individual factors one can categorise: equipment, abilities and planning (Lyons & Urry, 2005; Ohmori & Harata, 2008). The other discussed factors can be categorised as journey factors: transport mode, degree of crowding, availability of seating, noise, the duration of the journey, familiarity with the journey (Lyons & Urry, 2005, p. 270), the design of the vehicle and the quality of the vehicle (Ohmori & Harata, 2008). Social and institutional aspects are treated as separate categories. In the present study, the presence and workings of all these factors will be investigated in the realm of travel time use.

2.5.16 Hypothesis on influencing factors

On the basis of the above discussed insights on the influencing factors from the literature, the following hypothesis will be tested in the present study: (H2) *All of the discussed and observed individual and journey factors from the literature are expected to have some influence on travel time use. The social, institutional and individual factors are expected to have the smallest influence on travel time use, and the aspects that are expected to have the largest influence are these four journey factors: degree of crowding, availability of seating, duration of the journey and design of the vehicle.*

2.6 The role of ICT in travel time use

In the previous paragraph, the factor of equipment in travel time use has already been discussed. But due to the technological developments in our contemporary society, the role of ICT in the 'equipping' of people for travel time use will get special attention in the present study. That is why the role of ICT in travel time use opportunities will be discussed in this paragraph.

2.6.1 The Information Age

As was discussed in the previous paragraph, many factors can influence travel time use opportunities. But many of these factors change over time, and the factor of equipment has gained more opportunities and meaning in the current Information Age. Since the 1970's, the travelling environment has changed to a great extent due to technologies (especially ICT). Laptops can be used (for example) to access numerous files and work on them, so travellers can bring the equivalent of a filing cabinet with them on the journey. Similarly, one could argue that MP3 players can contain an entire music collection to be enjoyed while travelling. And mobile phones have connected many people to other people, while having uncoupled communication from fixed locations at the same time (Little, 2006). Bluetooth technologies and hands free kits have also enabled car drivers to use many devices on their journeys. These technologies change the travel experience and enable greater uses of travel time in the current Information Age (Lyons & Chatterjee, 2008, pp. 191-192).

2.6.2 Effects on travel time use

As was discussed before, one can argue that much of the traditional literature and policy views on transportation tend to distinguish travel time from activity time, so that travel time seems useless and wasted (Sheller & Urry, 2006, p. 213). But instead it is argued in the present study that activities can be performed while travelling, so that the distinction between (economically) valuable activity time

and (economically) useless travel time becomes less apparent. Information and Communication Technologies (ICT) increasingly blur this distinction, as mobile devices become increasingly connected to information and communication networks and thus facilitating the opportunities to work and communicate effectively while being on the move. The use of mobile ICT devices can thus lead to a different use and valuation of travel time (Lyons & Urry, 2005; Ohmori & Harata, 2008). This was already stated by Mackie et al. in 2003 (p. 50):

> "The opportunity to use travel time productively can be expected to impact on the value of time, and in this respect the advent and widespread ownership and use of mobile phones and the possibility to use laptop computers on some modes may have had a significant downward influence on the value of time. Future developments may further increase the quality and quantity of useful activities which can be undertaken whilst travelling."

The opportunities for 'equipping' travellers can vary across transport modes, but it can be argued that the opportunities are increasing to some degree in every transport mode. Even small slices of time can be made useful with the right technologies. Although in some cases these technologies may just be substitutes for previous time use items. Watts & Urry (2008) state that many uses of travel time were already visible before ICT developments; one can think of a train journey to do some reading, talking to people, window gazing, eating and drinking. But many new possibilities of travel time use are becoming apparent due to mobile ICT devices, such as: typing, listening to music, calling on a mobile phone or using wireless internet networks (Watts & Urry, 2008). According to multiple studies on travel and technologies, mobile phones seem to be the most important equipment for work tasks or social interactions on the move (Laurier & Philo, 1998; Perry et al., 2001; O'Hara et al., 2002; Brown & O'Hara, 2003). Mobile phone use does not seem to substitute for older travel time uses, because the mobile phone provides instant access to (nearly) everyone from (almost) everywhere (which was not possible in this form before) (Holley et al., 2008, p. 35).

For mobile workers, these new technologies are useful because they can reduce the boundary between the office and the car or public transport space as a workplace. The travel space can be transformed into a workplace similar to the office due to connectivity and mobile devices. This is not only true for passengers on public transport modes, but also for people driving cars (Laurier, 2004). Due to increasing knowledge-based employment and technological developments, the concepts of 'multitasking' (simultaneous realisation of two or more activities during a given time period (Kenyon & Lyons, 2007)) and 'fragmentation' (interruption or cutting-in of one activity by another (Couclelis, 2000; Lenz & Nobis, 2009)) have been recognised as important for the understanding of relationships between ICT, travel time and activities (Ohmori & Hararta, 2008, p. 547-548).

It could also be important to see which possible effects the use of ICT in travel time use can have on journey experience. According to a study by Mokhtarian (2003) on the interactions of mobile telecommunications and travel, the big question in this respect is what the outcomes of the interactions will be. For instance: if there could be a change in experience or demand for certain transport modes (Mokhtarian, 2003, pp. 46-47). In the survey by Lyons et al. (2007) they also asked respondents about the use and experience of ICT and mobile devices on train journeys. Their results showed that a fifth of the respondents stated that mobile electronic devices (like mobile phones or MP3 players) made their train journeys a lot better. Some people were quite positive about these devices, as they stated that it made their travel time seem shorter (Lyons et al., 2007, pp. 117-118). The survey also confirmed that mobile phones were the most important devices for train passengers, because most people carried one with them.

However, the role of ICT in travel time use should not be overstated. Brown & O'Hara (2003) argued that although more and more people were carrying new technologies, they were not being used effectively by most people. The survey by Lyons et al. (2007, p. 117) also showed that the majority of rail passengers who carried a mobile phone or laptop (that can create a work environment) did not use these items on the train. And almost half of the respondents (46 percent) stated that electronic devices did not make their travel time any better (Lyons et al., 2007, pp. 117-118).

According to Holley et al. (2008, p. 36), mobile ICT devices can still achieve higher levels of functionality and flexibility, and because of this it seems that paper was still the most used item for work tasks while travelling. The travel space and the infrastructure required for the use of mobile ICT devices is also important for the opportunities to use them while travelling (Jain & Lyons, 2008, p.

87). Ohmori & Harata (2008, p. 559) argue that the use (or desired use) of laptops or the internet on trains is relatively low today, but that it could be high if power supply and wireless internet (LAN) connectivity were available on trains. So the concept of 'equipped travel time' has two sides: on one side there is the traveller and on the other side there is the transport provider. This is also important to consider when investigating the influence of ICT on the use of travel time, because opportunities can vary across several discussed factors: transport mode, vehicle design, vehicle quality, equipment, personal abilities and certain institutional or social aspects.

2.6.3 Hypothesis on the role of ICT

On the basis of the above discussed aspects of ICT and mobile technologies, the following hypothesis will be tested in the present study: (H3) *The ownership and use of ICT and mobile technologies is expected to have a positive effect on travel time use and will also be expected to result in more people seeing their travel time use as productive and their perceived journey experience as more positive.*

2.7 Differences between transport modes

Travel time use opportunities can vary between transport modes, as was already discussed with the factors that can influence travel time use. The differences between private cars and public transport modes will be discussed in more detail in this paragraph. Also the differences between the various modes of public transport will be discussed, as it can be argued that the different vehicle and journey characteristics can influence travel time use opportunities.

2.7.1 Differences between private cars and public transport modes

Many studies focussed on travel time use on public transport modes and less on cars. Travel time use opportunities while driving a car are obviously different from using public transport modes, because of the physical and psychological differences. But travel time for car drivers is certainly not useless:

> "the scope for time use for a car journey is substantially reduced, especially in the case of a car driver who must devote attention to the driving task itself. Developing the debates cited earlier of Mokhtarian and Salomon, we now dispel any notion that a journey by car cannot yield inherent benefits for the motorist concerned."
> (Lyons & Urry, 2005, p. 265).

Many of the studies by Eric Laurier (2002; 2004; 2005) have shown the diverse travel time uses and experiences of travelling in cars. For most people, the car can be a place to relax and feel at ease, as the car "can facilitate a domestic mode of dwelling" (Lyons & Urry, 2005, p. 265). Additionally, one can use the "soundscape" of the car radio to create and control one's own environment (Bull, 2000; Bull, 2004). The car space is also used for sociality purposes between friends, families or co-workers, which was shown by Laurier et al. (2008) in their detailed study. Ferguson (2010) showed how social care work for children was also performed on car journeys. The car can also be an economically productive place, as mobile technologies (such as mobile phones and laptops with wireless internet connections) become integrated into cars. For some people their cars have become "mobile offices", as large parts of their working days play out in the car (Laurier & Philo, 1998; Laurier, 2002; Laurier, 2004).
But one has to acknowledge that activity opportunities are constrained when someone is driving, as was mentioned by Lyons & Urry (2005). Ohmori & Harata (2008) confirm this point, and also mention that other travellers who don't need to operate the vehicle (like car passengers, bus passengers or train passengers) have a greater variety of possible travel time uses. 'Passengering' is a very different experience and activity than 'driving', as was shown in the study by Laurier et al. (2008). On the subject of sociality, it was discussed that the 'togetherness' as a unit in cars was very different from the 'togetherness' in public transport modes (like busses or trains) (Laurier et al., 2008, p. 10). Cars are often categorised as individualised 'private transport' and people using the bus, metro or train are categorised as communal 'public transport'. But it has been argued that the social experience of travelling by car can be very different when friends, family or co-workers are passengers, so that the car can be a mode of 'collective private transport' (which is not possible on public transport modes)

(Laurier et al., 2008, p. 2). Watts & Urry (2008, p. 867) also note that car travellers have a more stable relationship with fellow passengers than public transport users.
These differences in 'togetherness' and sociality between private and public transport modes can have important influences on certain travel time use opportunities (like talking, sleeping, relaxing or listening to music with or without headphones). The activity of travelling itself is also quite different in cars when compared to public transport modes. Travelling in a car is considered to be a shared accomplishment involving the driver as well as the passenger(s), because the passenger(s) can be involved in tasks like navigating or manoeuvring. This is not the case in public transport modes (like trains, metros or busses), where people have no influence or control over the journey (Laurier et al., 2008, p. 6). This can have an influence on travel time uses, as people on public transport modes do not have to engage in the activity of driving and people driving cars or helping with navigation cannot always engage in certain other activities effectively.

2.7.2 Differences between public transport modes

The design, the experience, the facilities, the sociality and the activity of travelling (as discussed above) can also differ between different modes of public transport (like: trains, busses and metros). But many more factors that can influence travel time use vary across public transport modes. One can imagine that travelling on a train, travelling on a bus or travelling on a metro can create different situations, because the design, the facilities and the journey duration can be very different. And it was already theorised that these factors can influence travel time use opportunities.

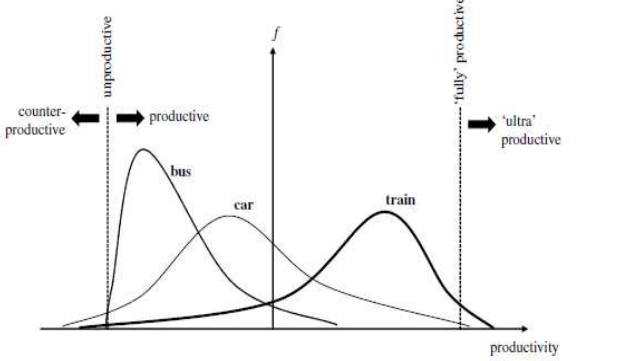

Fig. 1. Illustrative frequency distributions of 'productivity' of travel time by mode.

Figure 2.1: Illustrative distributions in productivity of travel time. Taken from: Lyons & Urry, 2005, p. 270.

Due to the differences in opportunities, experiences and the factors that can influence travel time use between different transport modes, the productivity of travel time can also vary. This is shown in figure 2.1, which is only illustrative in showing how differences between transport modes can be visualised. Figure 1 also underlines the point that it is important to distinguish not only between private cars and public transport modes, but also between different public transport modes. In the present study, the differences in travel time use will be investigated between personal and collective transport modes as well as between different public transport modes. Only trains and cars have been purposefully investigated on the issue of travel time use in previous studies, and not much is currently known on the travel time uses in busses and metros. The present study will try to fill this research gap by investigating the possible different travel time uses on multiple public transport modes and cars.

2.7.3 Hypothesis on differences between transport modes

On the basis of the above discussed aspects from the literature, the following hypothesis will be tested in the present study: (H4) *Clear differences in travel time uses and the other investigated aspects between private transport modes (cars) and different public transport modes will be expected in the research findings. Travel time uses in public transport modes are expected to show higher varieties and frequencies than in cars. Trains are expected to show highest frequencies of travel time uses and are expected to be perceived as the best transport mode option in terms of travel time use.*

2.8 Empirical gaps and present study

Due to the possibility of so many factors influencing travel time use and the rapid developments of ICT, Lyons & Urry (2005, pp. 270-271) point to the need for empirical studies on travel time use and

the factors influencing travel time use in the Information Age. So the main purpose of this study will be to investigate travel time use, the factors influencing travel time use, the role of ICT in travel time use, the influence of travel time use on journey experiences and the differences between car users and different public transport users in this respect. But most importantly, certain academic researchers (Lyons & Urry, 2005 and Ohmori & Harata, 2008) point out that more insight is needed into the types of travel time uses which are performed by travellers and the influences of ICT opportunities on the use of travel time on different modes of transport. The calls for empirical evidence are made here by Lyons & Urry (2005, p. 274) and Ohmori & Harata (2008, p. 548), and this study will try to answer those calls. Lyons et al. (2007) already presented important insights into the aspects of travel time use in their quantitative survey in the UK. But they also acknowledge more studies on the subject of travel time use are needed, to give more insights on the details of travel time use and the experiences of travel (Lyons et al., 2007, p. 119). Existing studies only focussed on the use of travel time in cars and trains, but the present study will also look into travel time use on busses and metros. The investigated aspects will also be compared between the different transport modes, which can uncover important differences and reveal new insights. Ohmori & Harata (2008, p. 559) additionally point out that the differences in cultures and institutions between countries, make international comparisons between travel time uses and other associated aspects interesting. That is why the present study will try to shed light on the Dutch situation of travel time use in the Information Age in a quantitative study on travellers in the Rotterdam metropolitan area.

2.9 The Dutch context

The context of the present study is different from the UK and Japan, which formed the research contexts of previous studies on travel time use that were discussed in this chapter. The Dutch situation (in terms of population and mobility) will be discussed in this paragraph to give some insights into the characteristics of the research context and show the differences with the contexts of previous studies.

2.9.1 Population and density

The Netherlands currently has 16.669.903 registered inhabitants (CBS, 2011). One important aspect of the country is that these people live in a relatively small area, which makes the Netherlands a rather densely populated country. According to data from the Central Bureau for Statistics (CBS, 2009), the population density of the Netherlands is on average 401,4/km². This is substantially more than the UK (251,6/km²) and also Japan (336,3/km²) according to the figures from the CIA World Factbook (2009) and statistics from the United Nations (UN, 2004). So compared to the contexts that were studied before, the Dutch context in the present study is different in that aspect. This high population density can have effects on mobility patterns and characteristics, which will be discussed now.

2.9.2 Mobility

The Central Bureau for Statistics has done a study on mobility in the Netherlands in 2001, in which 84.400 households were approached (of which 70 percent responded). The CBS published the results in a press report in 2002. The total transportation distance in the Netherlands had increased by 30 percent since 1985, which means that the total travel distance of Dutch citizens had grown to almost 188 billion kilometres in 2001 (CBS, 2002). The total travel distance in the UK also rose in that same period with a similar pace (from around 550 billion kilometres to around 750 billion kilometres) (Department for Transport, 2010a). (There were no clear data on the Japanese transportation growth.) The growth of travel distance in the Dutch context can be partly explained by the average increase of distance between the home and the work-place in the Netherlands, which has been a trend for many years (CBS, 2002). The largest contribution to the increasing travel distance in the Netherlands was made by people travelling in cars. Between 1985 and 2001 the distance travelled by car drivers had increased by 43 percent, so the proportion of people travelling by car had grown in the Netherlands. This trend of increasing auto-mobility was expected to continue after 2001 (CBS, 2002). This can be partially explained by the increase in car ownership in the Netherlands between 1985 and 2001. In that period, the amount of cars on Dutch roads had increased with 2 million, which was a growth of 45

percent. More than 75 percent of Dutch households had at least one car in 2001 (CBS, 2002). So car ownership is rather high in the Netherlands, and the proportion of car use in the total travel distance is also substantially higher than other transport modes. Dutch people make on average 3.08 trips per day, and 1.51 of these trips are made by car, while only 0.06 of these trips are made by trains (Brons et al., 2009, p. 138). Of the 187.6 billion kilometres travelled in the Netherlands in 2001, more than 90 billion were made by car drivers and 51.4 billion were made by car passengers. Train passengers only accounted for 15.5 billion kilometres in 2001, and bus, tram and metro passengers together were responsible for just 7.6 billion kilometres in that year. One thing than is important to note in the Dutch situation, is the importance of the bicycle. Cyclists accounted for 13.1 (of the 187.6) billion kilometres in 2001, which means that bicycle users clearly transcended bus, tram and metro users and almost rivalled train users in the distance covered in 2001 (CBS, 2002). This mobility feature is quite unique to the Dutch context, but bicycle users are not included in the present study.

Car use in transportation is proportionally larger in the UK than in the in the Netherlands, as since the 1990's cars have dominated the travel distance statistics (accounting for 88 percent of the total travel distance in 2010) (Department for Transport, 2010b). Busses and trains together accounted for most of the rest, with little over 10 percent of the total distance covered by these public transport modes together in 2010 (Department for Transport, 2010a). So the role of the car is even larger in the UK and public transport accounts for a substantially smaller part of the total travel distance when compared to the Netherlands.

In Japan the car has a substantially smaller role, as the car only accounts for around 60 percent of the total transportation in that country (Department for Transport, 2010b). This means that public transport has a larger role in Japan when compared to the UK and the Netherlands. The Netherlands seem to be in between the UK and Japan on the aspect of modal split. The Netherlands is more car dependent than Japan but less than the UK, according to the statistics. And public transport use in the Dutch context is more than in the UK but less than in Japan.

2.9.3 Transport infrastructure

The transport infrastructure is also important to consider in the Dutch context, because this can have an effect on the mobility patterns and transport mode decisions (which were described above). The Dutch rail network consists of around 2812 kilometres of lines according to the statistics from 2003 (Brons et al., 2009, p. 138). The density of this rail network is approximately 68 metres of lines per square kilometre, which is higher than the averages of the countries of the EU15 (50 metres/km2) and EU25 (47 metres/km2) (EC, 2005). This relatively high density of the Dutch rail network is reflected in the rail network accessibility. The mean distance of peoples' homes to the nearest railway station is approximately 4.5 kilometres (Brons et al., 2009, p. 138). And just 8.4 percent of the Dutch population lives further than 10 kilometres away from a railway station (Keijer & Rietveld, 2000). But despite this high accessibility, only 8.2 percent of total passenger-kilometres in the Netherlands are made by rail (Brons et al., 2009, p. 138). This can be partly explained by the popularity of the car, which accounted for almost three quarters of the total transportation distance in the Netherlands in 2001 (CBS, 2002). The road infrastructure in the Netherlands is also quite extensive. The total length of Dutch roads is around 137.000 kilometres, which is a lot for such a relatively small country. The road network has grown by 5 percent in the last 10 years, and is with 5.000 metres of roads per square kilometre of land also very dense. The highest densities of roads are found in the Randstad area around the four largest cities of the Netherlands: Amsterdam, Rotterdam, Utrecht and The Hague (CBS, 2010).

The road network in the UK only grew 1.3 percent over the last ten years (Department for Transport, 2010c). The total length of UK roads is around 245,100 miles (394432 kilometres), which is more than the Netherlands but covers a much larger area (Department for Transport, 2010c). This means that the Dutch road network is very dense when compared to the UK.

There were no clear statistics on the Japanese infrastructure, but other data show that the road network in Japan is proportionally less important when compared to the UK or the Netherlands. The Japanese rely more on their well developed public transport system when compared to western European countries (Department for Transport, 2010b).

The Dutch context is quite different on certain aspects from the contexts which were studied before. The Netherlands is a very dense and mobile country. Both the rail and road networks are extensive and have a high accessibility, although both are used in different proportions. The car is the most used transport mode in the Netherlands, as in many other western countries, despite the good public transport infrastructure. The high density, mobility and transport infrastructure accessibility and use are distinctive for the Netherlands, and form a different context than studied before on the subject of travel time use in the Information Age. And due to this different research context, new insights into the subject can be expected in the present study.

2.10 Conceptual model

On the basis of the above discussed theory and literature, a conceptual model for the present study is given and discussed in this paragraph. The insights from the literature were combined to create a model that represents the subject matter, the discussed concepts and the relations between the concepts and factors in the realm of travel time use in the Information Age.
The conceptual model in figure 2.2 (see below) shows the aspects that will be discussed in the present study. The individual and journey factors, that can influence travel time use opportunities and ICT use, were discussed before in this theoretical chapter. The individual factors that will be discussed in the present study are: equipment, abilities and planning. The journey factors were also theorised as having an influence on travel time use and ICT. These factors include: transport mode, crowding, seating, noise, design of the vehicle, quality of the vehicle, duration of the journey and familiarity with the journey. The social and institutional factors that can influence travel time use are investigated as separate categories. All the mentioned factors are partly overlapping and interacting. The presence and workings of these factors in the realm of travel time use in the Information Age will be investigated in the present study. The role of ICT in the realm of travel time use will get special attention in the present study, due to its importance in our contemporary society. ICT is conceptualised as having an influence on individual factors, journey factors and travel time use (and associated aspects). The central concept of travel time use opportunities will be divided into car users and public transport users (personal and collective modes). In the group of car users, a distinction is made between drivers and passengers, due to the different opportunities for travel time uses with both subgroups. In the group of public transport users, three subgroups will be distinguished: trains users, bus users and metro users. The differences in travel time use and the other investigated aspects between these groups and subgroups will be investigated and discussed in the present study.

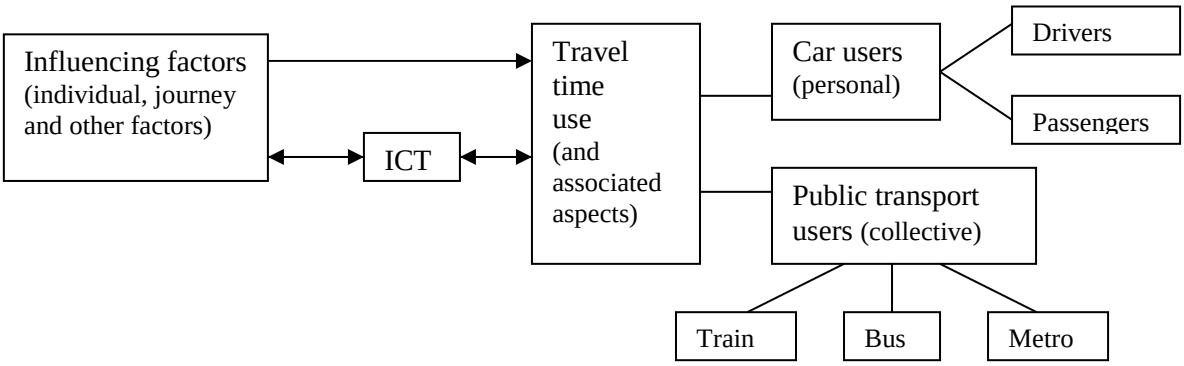

Figure 2.2: Conceptual model of the present study on travel time use in the Information Age.

3. Research Design and Methodology

In this chapter, the design of the research and the methodology for collecting and analysing the empirical data will be discussed. First, the design of the research will be discussed on the basis of social research theory. Secondly, the research methods that could be used for studying travel time use in the Information Age will be discussed on the basis of existing studies. Thirdly, the methods that were used for the data collection in the present study will be presented and discussed. In the fourth paragraph, the factors and concepts that are investigated in the present study will be operationalised, so they can be measured in the data collection and analysis. And finally, the methodology for analysing the empirical data will be briefly discussed in the fifth and last paragraph of this chapter.

3.1 Research design

The research in the present study has a comparative design, as the groups of car users and different public transport users are compared on the issues of travel time use and associated aspects. This research design can entail either quantitative or qualitative research methods (Bryman, 2008, p. 58). In the present study, quantitative methods are used for empirical data collection and analysis, but this will be discussed in more detail later in this chapter.

A comparative design requires the subject-groups and data to be comparable, so that observed differences can be discussed and explained in an effective way. This is the reason that the data collection for the present study was structured and quantitative. The situational context and factors that could influence travel time use are quite different between groups, but this is in line with part of the research aim of the present study (to shed light on the workings of those different factors).

A quantitative research approach is the chosen strategy for the data collection in the present study. Travel time use has already been studied in quantitative studies, but these data were collected in the UK and Japan (see: Lyons et al., 2007; Ohmori & Harata, 2008). The present study is performed in a different context, in which the aspects of mobility and mode decisions are somewhat different. The carrying and use of ICT and mobile technologies, which is an important focus in the present study, is known to change very fast. This means that the role of ICT can be quite different in the year 2011 when compared to the temporal contexts of previous studies from 2007 and 2008.

A quantitative research strategy entails the collection of numerical data from a population sample. These data are usually collected to test a certain theory or hypothesis in the social reality, which is called ‘deductive research’ (Bryman, 2008, p. 140). In the present study, the hypotheses on travel time use, influencing factors, the role of ICT and differences between transport modes that were derived from the theory (see chapter 2 on the theory and previous studies) are tested in the Dutch context. The study is directed to gain insights into travel time use and the factors that could influence it (which were derived from the literature). It is investigated what people do while travelling on different transport modes, which factors the respondents believe to be influencing their travel time use, the role of ICT in travel time use, the influence of travel time use on journey experience and the differences between transport modes. To investigate these aspects, the concepts and factors in the study need to be operationalised so they can be quantitatively measured. The operationalisation of these concepts and factors (to make them researchable), is discussed in the fourth paragraph of this chapter. Measuring these aspects has the advantage of being able to detect clear variations in a consistent manner. This gives a higher level of reliability to the findings, according to social research theory (Bryman, 2008, p. 144). Reliability is an important aspect of quantitative research, and it entails a consistent measurement of the concepts and factors under investigation (Bryman, 2008, pp. 149-150). The consistency and quantitative measurement, which is employed in the methodology of the presents study, is important for making the empirical evidence of the study more robust and transparent, so the data outcomes are solid and replicable.

3.2 Discussion of research methods

Over the recent years, several studies have investigated the subject of travel time use in the Information Age. Many of these studies used different research methods, and the most important methods are discussed in this paragraph to contextualise the methodological decisions of the present study.

Lyons et al. (2007) set out to gain insights into the travel time use of train passengers in the UK, and conducted a large-scale survey among more than 26.000 respondents to collect their data. These large-scale surveys are a common research methodology in transport studies. They are used to collect statistically significant data which represent entire groups of people (in the case of Lyons et al. (2007) this were UK train passengers). These surveys generate robust and quantifiable data to gain general insights into the subject matter, by translating "individual journey experiences into aggregate categories" (Watts & Urry, 2008, p. 862). This makes the findings easier to translate into policy recommendations, which is also important for the present study. But a large scale survey is not possible in the present study, due to the limited amount of time and the limitations of only having one researcher to collect and analyse the data.

Ohmori & Harata (2008) employed questionnaires in their research on travel time use in Japan. These questionnaires were used to obtain information on: demographics, ICT ownership, train use frequencies, travel time activities and desired travel time activities (Ohmori & Harata, 2008, p. 553). Questionnaires can produce solid and quantifiable data on general characteristics of travel time use and certain factors that could influence that. The convenience for the respondents of using self-completion questionnaires is also an important positive aspect of this research method. The problems of this research method are that probing for deeper insights, asking follow-up questions and being able to explain certain difficult aspects to the respondents is not always possible (Bryman, 2008, p. 218). This can be partly resolved by using clearly stated questions in the questionnaire, being available for questions by respondents, conduct the questionnaires as structured interviews and leaving room in the questionnaire schedule for additional questions and remarks.

Another method which was used by Ohmori & Harata (2008), in their study on travel time use in Japan, was structured observation. Structured observations are used to systematically observe the social world and note down the observations into a schedule of pre-determined categories (Bryman, 2008, p. 254). Ohmori & Harata (2008) argue that these observations can produce detailed behavioural data (like duration of activities or sequences of activities), but they acknowledge that the downsides of this research method are: that it is not possible to know the purposes of the activities and that only the activities performed in the observation-time-windows can be recorded. But these two problems can be resolved by combining observations with asking questions (in the case of Ohmori & Harata (2008) in the form of questionnaires). According to Ohmori & Harata (2008, p. 559): "A sophisticated combination of two methods can provide more comprehensive information for better understanding relationships between ICT's, activities and travel." So a combination of observing travellers and asking them questions could produce good insights into travel time use in the Information Age.

A research method which combines observations with asking questions is: ethnography. Sheller & Urry (2006) suggest a number of possible research methods for studying the New Mobilities Paradigm. Among other methods, they suggest to use 'mobile ethnography'. Mobile ethnography entails the participation of the researcher in mobilities while conducting ethnographic research, so the researcher engages in co-present immersion in mobilities (Sheller & Urry, 2006, pp. 217-218). Watts & Urry (2008) conceptualise mobile ethnography as one of the 'moving-methods' for doing research on travel time use. Moving methods are required to take the different interdependent forms of movements into account (like people, information and objects), so the researcher needs to be co-present to obtain the data and experiences of travelling (Watts & Urry, 2008, p. 862). Ethnography entails immersion in a social setting to observe and experience reality as it feels like for the subjects (Bryman, 2008, p. 369). The researcher becomes partially a passenger and partially a researcher, as travelling and taking notes or photographs are combined (Watts & Urry, 2008, p. 868). In the study by Laura Watts (2008), ethnography was used to study the experience of a train journey in the UK. She used field notebook quotations and photographs as evidence in here study (Watts, 2008, p. 713). But the presence and involvement of the researcher in travelling can influence the experience of travelling for other people (Watts, 2008, p. 718). Being present and doing research on trains or cars has effects

on fellow travellers, so the problem of 'reflexivity' when using ethnography as a research method is evident. The data that is produced by this research method is unstructured and detailed instead of aggregated and general. This has a positive side of providing deep insights and developing understanding of the behaviours and contexts of the subjects. But it has also a negative side, as these data are more difficult to translate into policy recommendations (Watts & Urry, 2008, 870). This method does not fit into the strategy and research aims of the present study, because mainly qualitative and unstructured data can be collected with ethnography. But the advantages of investigating and collecting data while travelling can be used in the present study, as travel environments can be good research environments for this research project.

3.3 Methodology of the present study

On the basis of the discussion in the previous paragraph, this paragraph will present the research methods that were employed in the present study to gain insights into travel time use in the Information Age. The considerations to use certain methods and exclude others were based on the advantages and disadvantages of the different research methods which were discussed above.
The collection of empirical data for the present study was done by employing structured questionnaire-based interviews and structured observations. Closed questions and statements with Likert Scale and other ordinal and nominal scale response-categories were used in the questionnaire schedule. A Likert Scale is used to measure attitudes and the intensity of feelings on certain aspects. They are usually presented in a five-point-scale (from very positive to very negative), so the respondents can report their attitude and intensity of feelings on certain aspects (Bryman, 2008, p. 146).
The questionnaire and observation structure of closed questions with pre-determined answer categories had the advantage of minimising variation and error in the resulting data. The resulting quantitative data were also better to analyse, as the methods for data analysis were more structured and transparent (in contrast with the coding of qualitative data) (Bryman, 2008, pp. 194-195). The closed questions also created better comparability of the subgroups in the data (which was important with the research design and aim of the present study). More structure and convenience for the researcher and the respondents (mainly due to the limited amount of time required for conducting structured interviews on the basis of questionnaires) was also an important consideration (Bryman, 2008, p. 235).
But there are also problems with questionnaires and interviews which are important to discuss. Firstly, this research method makes it difficult or even impossible to probe for further insights, although this was partly resolved by adding an open category to certain questions and keeping space at the end of the schedule for further questions or remarks. The second problem is that of social desirability, which means that some respondents might be giving answers that they think the researcher wants to hear instead of telling the truth (Bryman, 2008, p. 211+255). The gap between actual and stated behaviour was the main reason for adding observations to the methodology of the present study, but this will be discussed later. The questionnaires were focussed on all aspects of the research aim, and helped to collect data on travel time use, the attitudes towards the factors that could influence travel time use, the role of ICT, the perceived influence of travel time use on journey experience and the perceived differences between transport modes. The questionnaires were employed as structured interviews, so that the questions were asked by the researcher and the answers were filled in by the researcher in the pre-determined categories of the questionnaire schedule. All the interviews were conducted by the same researcher using the same questionnaire schedule, so variability of the data was minimised and comparability of the data was maximised.
The second method which was employed to collect empirical data for the present study is structured observation, which is: "a method for systematically observing the behaviour of individuals in terms of a schedule of categories" (Bryman, 2008, p. 254). This method can alleviate most of the problems that come with questionnaires and interviews (like memory problems, social desirability and the gap between stated and actual behaviour) (Bryman, 2008, pp. 255-256). According to Ohmori & Harata (2008, p. 269), structured observations are more accurate in recording behaviour than asking questions. And they acknowledge that observations work best in combination with other methods, which is why observations are combined with questionnaires in the present study (as discussed before). To perform the data collection with observations in a structural and systematic manner, the

observations needed be based on an observation schedule. A clear research focus and a categorisation of the concepts and factors were needed for the observation schedule (Bryman, 2008, p. 260). These aspects were both found in the extensive literature study which was presented in the theoretical chapter. In the present study, certain observable travel time uses and the presence of influencing factors were counted and aggregated to certain categories during a set time window. The observations were conducted on different time periods and on different transport modes, so more aspects could be observed and the expected situational differences could be controlled for. The observations were mainly employed to double-check the travel time uses, the role of ICT and certain observable factors that can influence the use of travel time that were found in the questionnaires. This had the advantage of yielding detailed data on travel time use, ICT use and influencing factors, while being able to knit these insights together with data from the questionnaires. It is not able to know the travel purposes and other particulars of people when they are merely observed. But the travel purposes, attitudes on influencing factors and other data on the respondents were already gathered with the questionnaires. This combination of research methods was chosen because of the advantages discussed by Ohmoti & Harata (2008) (see the former paragraph), who also used these two methods in their study on travel time use and ICT in Japan. For the observations during car journeys, the researcher accompanied drivers and passengers who were willing to participate in the study during one of their daily journeys. For the rest of the observations the researcher travelled on all three public transport modes which are investigated in the present study (trains, busses and metros). The respondents and times for conducting the questionnaires and the locations and time-windows for the observations were randomly selected on different transport modes, to minimise problems with biased data.

For the empirical data, 100 questionnaire-based interviews were conducted and 12 structured observations were performed on the transport mode groups in the present study (car drivers, car passengers, train users, bus users and metro users). The questionnaires were conducted as interviews and not as self-completion questionnaires. The main reason for this is the difficulty of certain aspects in the concepts and questions, which could be further explained by an interviewer if this was necessary (and this was not possible when the questionnaires were simply handed out). The answers of the respondents during these interviews were not taped and transcribed, but they were filled into the pre-determined categories of the questionnaire schedule. The observations were also based on structured schedules, so the data could be analysed systematically. These schedules were designed on the basis of the theoretical chapter and the appropriate guidelines from the literature on research methods. The questionnaire schedule (in Dutch and English) and observation schedule (in English) that were used to collect the empirical data for the present study are included in the appendix of this thesis report.

The researcher has been investigating car users and public transport users (in trains, busses and metros) for three weeks in the spring of 2011 to collect the empirical data. In the present study, only busses, metros and trains are included as public transport modes, partly due to the impracticality and financial constrains of researching on ferries and planes. But journeys on ferries and planes are also often contextually different from journeys on busses, trams and trains. The focus in the present study is on daily journeys, and these can be better investigated in cars and public transport modes that are common in the daily commute routines of people. Ferries and planes are generally not part of peoples' daily commute routines and therefore less relevant to the research aim of the present study. The journeys where people were questioned and observed were made at different times to avoid collecting data from only a limited group of travellers.

The research area in the present study is the metropolitan area of the city of Rotterdam in the Netherlands, which is the second largest Dutch city (after Amsterdam). This is one of the most densely populated and economically important parts of the Netherlands, and the metropolitan area features cars, trains, busses and metros in its transport system. This area has not been investigated on the issue of travel time use before, which means that new insights into the subject of travel time use in the Information Age can be expected in the present study.

3.4 Operationalisation of concepts and factors

The operationalisation of the concepts and factors that were measured in the empirical data of the present study will be discussed in this paragraph. The way in which these aspects were translated into

measurable indicators is important to discuss, since this gives a clear view of the procedures that were used to obtain the empirical evidence for the research findings.
Two important aspects need to be considered with the operationalisation of the concepts and factors for the collection and analysis of the data. The first aspect is reliability, which is an important consideration in quantitative research. Reliability means that the measurement of the data is consistent and stable (Bryman, 2008, pp. 149-150). This is why the collection and analysis of the empirical data is done systematically in the present study. The concepts and factors that were measured in the questionnaires and observations were measured and coded in similar ways, so the measurements and analyses were consistent. The second aspect that is important to consider is validity. The validity of measurement means that the indicators or measures for the concepts and factors really measure the aspects for which they are employed (Bryman, 2008, p. 151). This is why the concepts and factors were mostly directly asked and observed in the data collection, so the measurement is a direct translation of the concepts and factors under investigation.
The first things that were recorded in the questionnaires were the socio-demographics and travel information of the respondents. The respondents were firstly asked to report to which age group they belonged (18 to 24, 25 to 39, 40 to 60 or above 60 years) and their gender was also recorded (male or female). Then the respondents were asked to which employment group they belonged: Industry / Construction / Care (physical work), Services / Managing / Education / Science (office / intellectual work), Unemployed or Retired (no work) or Following Education (training or study), because it is important to have a balanced sample in terms of employment types and daytime activities. The transportation type that was used by the respondent (car (driver), car (passenger), train, bus or metro) was very important to record for testing the fourth hypothesis on differences between transport modes. The class of the transport mode (first or second class) was only recorded with train users, because this aspect is clearly marked on trains and not on other transport modes. The journey purposes of the respondents (travelling to or from work (commute), travelling during and for work (business) or travelling in free time (leisure)) were also asked, to keep track of the balance of the data sample in this respect. The last aspect of the travel information that was recorded was the duration of the journey (in a dummy variable with two categories: more or less than 30 minutes).
In the observations, some travel information was also recorded. The transportation type under observation was firstly noted (car driver, car passenger, train, bus or metro) and the points of departure and arrival of that transport mode were also recorded. The time periods when the observations were conducted were categorised on the observation schedule (morning rush-hour, middle of the day, evening rush-hour or evening). The classes of the train carriages in the observations were also recorded (dummy variable with two categories: first or second class). The number of people that were under observation (in the particular transport vehicle) were also noted down, because this makes it possible to calculate the counted travel time uses into percentages (by dividing travel time uses by people under investigation). Finally, some room was left open in the observation schedule for recording other information on the travel situation.
The most important concept that was investigated in the present study is: travel time use. This concept has been thoroughly discussed in the theoretical chapter, but the procedures for measuring this aspect will be presented here. Travel time use was divided into travel time use categories, which were based on the observed travel time uses in previous studies. These categories are: driving or assisting in driving (in cars), navigating/route finding or assisting in navigating/route finding (in cars), looking out of the window and/or at people, reading for leisure, reading for work or study (working or studying with paperwork), calling or texting on a mobile phone, accessing the internet on a mobile phone, using a mobile phone for entertainment, working or studying on a laptop, accessing the internet on a laptop, using a laptop for entertainment, talking to fellow travellers, relaxing, sleeping, listening to music, eating or drinking, doing nothing and ‘other’. These categories were measured in the questionnaires by asking respondents how often they normally performed these activities while travelling on a certain transport mode (using an ordinal scale with four categories: always, often, sometimes or never).
The travel time use categories were slightly changed for the observations, due to the difficulty in observing certain activities (like the difference between texting and accessing the internet on a mobile phone). The observable categories of travel time uses were counted on the basis of the number of people that visibly perform them in a certain transport mode compartment during a period of 15 minutes (with a ratio measuring scale). The outcomes of these measurements were divided by the

number of people that were under observation during that session, so that percentages could be calculated that represent the shares of people that were performing certain activities while travelling.
The concepts of productivity and anti-activity (transition time, time-out or relaxation) were completed by a third interesting concept: wasted/lost time (which was also mentioned in the literature). The respondents were simply asked in the questionnaires whether they saw their overall travel time use as productive, anti-activity (transition time, time-out or relaxation) or wasted/lost time. These concepts were measured in a nominal scale using the three discussed categories. Respondents were also asked whether they saw their travel time as work/school time or free time (using a dummy variable with two categories: work/school time and free time).
The use of mobile ICT devices was measured twice in the questionnaires, and the carrying of these items was measured once. First, the respondents were asked how often they used certain mobile ICT devices while travelling on a certain transport mode (using an ordinal measuring scale with four categories: always, mostly, sometimes or never). Then later in the questionnaire, the respondents were asked whether they owned and carried mobile ICT devices while travelling and if they actually used these devices while travelling (using the same ordinal measuring scale with four categories: always, mostly, sometimes or never). The perceived influence of ICT on peoples' travel time use was also investigated. Respondents were asked what the influence of new mobile ICT opportunities was on their use of travel time (using an ordinal measuring scale with four categories: no influence, small influence, moderate influence or large influence).
The use of mobile ICT devices was also measured in the observations, in which the numbers of people that visibly used certain ICT devices were counted during a 15 minute time-window (with a ratio measuring scale). These outcomes were calculated into percentages by dividing the counted uses by the number of people that were under observation during that session.
The factors that can influence travel time use were discussed in the theoretical chapter, and all these factors that were reported in the literature were investigated in the present study. These factors were categorised in multiple groups: individual factors (equipment (travel time use items), abilities (for operating mobile ICT devices) and planning (to do activities while travelling)), journey factors (transport mode, degree of crowding, availability of seating, noise, the design of the vehicle (here: facilities), the quality of the vehicle (here: space, privacy and comfort), the duration of the journey and the familiarity with the journey) and the two factors of social and institutional aspects.
In the questionnaires, these factors were all investigated by using a Likert Scale, in order to measure the degree of positive, negative or neutral influence of the factors on the degree of travel time use as felt by the respondents. This measuring method produced insights on the attitudes of respondents towards the factors' influence in an ordinal measuring scale (using five categories: large positive influence, small positive influence, no influence (neutral), small negative influence or large negative influence).
Only five of the influencing factors (crowding, seating, noise, design of the vehicle and quality of the vehicle) were also measured in the observations, because the other factors were not measurable with this method (as the other factors were not observable). The factors that could be observed were measured on the basis of their presence and intensity (using an ordinal scale with three categories: high/good, moderate or low/bad).
The differences between transport modes were measured by recording on which transport mode the respondents were travelling and combining this with the collected data on travel time uses and the other investigated aspects from the respondents. In this way, the different travel time uses, factor influences, role of ICT and perceived journey experiences between transport mode users could be investigated.
There was also a question in the questionnaire on the transport mode which the respondents saw as the best option for useful and/or relaxed travel time use (choice between: car (driver), car (passenger), train, bus or metro). Respondents were also asked to report if they think there were large, small or no differences in the degree of travel time use between the different transport modes that were investigated in the present study (using an ordinal measuring scale).
The differences in travel time use and ICT use between transport modes were also recorded in the observations. The travel time uses and ICT uses were calculated into percentages (on the basis of the number of people that performed them and the number of people under observation) and combined with the transport mode variable which indicated in which transport mode the observations took place.

In this way, the observation data could also give insights into the differences in travel time uses, influencing factors and the role of ICT between transport modes.
There was also one question in the questionnaires on the effects of travel time use on the perceived journey experience of people. Respondents could indicate whether the use of travel time had a positive, negative or no influence on their perceived journey experience (creating a nominal variable on journey experience).
Finally, there was some room left open at the end of the questionnaire schedule for further questions and/or remarks from the respondents. This gave the respondents the possibility to add extra information on the subject which could be valuable for the present study.

3.5 Methodology for data analysis

The data from the questionnaires and structured observations were analysed to answer the research questions and provide the empirical evidence for the present study. The data were quantitative, so they were put into a data matrix which can be analysed using statistical research software. The computer program SPSS 16.0 was used in the present study to analyse and test the data. This is the most used statistics program in quantitative academic research and allowed the researcher to run statistical test and analyse the data systematically.
The data sample in the present study contained just a small portion of the population and has not been collected to be representative. The data were collected to give a general insight into travel time use, influencing factors, the role of ICT, the influence of travel time use on journey experience and differences between transport modes in the Dutch context. The representativeness of the data could not be tested using tests in the computer program SPSS, because no data on the entire population under investigation were readily available. But the aim was to have a balanced data sample, and this could be checked using descriptive statistics. Certain aspects (age groups, gender, employment groups and transport subgroups (car driver, car passengers, train users, bus users and metro users)) were checked to see if the data set was balanced. The outcomes of these analyses will be presented at the beginning of chapter 4 on the results, where the sample characteristics of the data set are described and discussed.
The data sets of the questionnaires and observations were also tested on their answer distributions in the variables, using Chi-square testing. This Chi-square test checked the similarity of the answer distributions in the data to a theoretical distribution of data.
The research outcomes, that were needed to answer the research questions and investigate the hypotheses, were created using descriptive methods in SPSS to create tables, charts and percentages that gave clear insights into the outcomes of the gathered data. To look for differences between transport modes or other groups in the data, cross-tabulations were used to present and discuss the differences in answering patterns of respondents. These cross-tabulations present the data outcomes per group or subgroup in the data, so the differences were clearly presented. To further analyse interactions between relevant variables, correlation analyses were performed on certain variables. These analyses resulted in correlation coefficients that represented the strengths and directions of relations between variables. The SPSS output tables of the cross-tabulation and correlation analyses are not all presented in the results chapter, as they would take up to much space and would provide no relevant additional information. The outcomes of the tables and analyses are all presented and discussed in the text. The SPSS output tables from the data analyses are not included in the appendix of this report (due to the large number and volume), but can be provided by the researcher on request.
The data analysis will be discussed in more detail in the result chapter, in which the empirical findings are analysed, presented and discussed to answer the research questions and investigate the hypotheses of the present study. The available insights into travel time use from the discussed studies in the theoretical chapter are used to compare and explain certain aspects of the research findings in the discussion of the research findings in paragraph 5.2. These outcomes from other studies were not used directly as evidence, because of the differences in context and research approach. But the outcomes could be interesting to compare to the empirical findings of the present study and could support or explain certain findings if the outcomes of the empirical data analysis were similar to the theory or findings from the other studies that were discussed in the theoretical chapter.

4. Results

In this chapter, the results from the collected empirical data will be presented and analysed. At the beginning of this chapter, the data set and sample characteristics of the questionnaire data will be discussed, as this can have implications for the relevance and applicability of the conclusions. After the data set discussion, the questionnaire data results will be analysed on the basis of the research questions and hypotheses of the present study. The aspects of travel time use, influencing factors, the role of ICT, the influence of travel time use on the perceived journey experience and the differences between transport modes will be presented and analysed on the basis of the questionnaire data. After these sections, the data from the observations will be analysed and discussed. The observation results will be compared to the questionnaire results, to check for possible differences between stated and actual behaviour and the possible problems of socially desirable answering from the respondents in the questionnaires.

4.1 Data set

The data set for the present study mainly consists of the 100 questionnaires that were collected by the researcher in the metropolitan area of Rotterdam (the Netherlands) in the spring of 2011. The questionnaires contained 46 questions on: background information (socio-demographics and travel information), travel time use, influencing factors, the role of ICT, the differences between transport modes and the influence of travel time use on perceived journey experience. The Dutch questionnaire that was used for the collection of the data as well as the translated English version with data codes, are both included in the appendix of this report. The questionnaire data is complemented by data from the observations that were performed by the researcher in the same period and research area. These data consist of 12 structured observations (on 162 travellers) that were performed on different transport modes, and will be presented and discussed after the questionnaire data (in paragraph 4.8) to discuss the possible differences or similarities between the actual and stated behaviour of travellers. The observation schedule that was used for empirical data collection is also included in the appendix of this report. The main focus in the present study is on the data from the questionnaires, which will be used to answer the research questions. Certain statistical analyses were performed in SPSS to investigate the data, and all the outcomes of these analyses will be discussed in this chapter. Not all the output tables from SPSS are included in the text, as these would take up to much space and would not contribute relevant additional information. These SPSS output tables are also not included in the appendix of this report, but can be provided by the researcher on request.
The data set in the present study is not supposed to be representative for the entire population, as the sample size of 100 cases is to low to confidently achieve representativeness for the Rotterdam metropolitan area. But the sample should be well-balanced on certain important aspects, to be able to come up with solid conclusions on the subject of travel time use in the Information Age. The characteristics of the sample and some statistical measures are discussed in the following section to give a brief overview of the balance of the data set.

4.2 Sample characteristics

In this section, the characteristics of the sample in the collected questionnaire data will be presented and discussed. It is important to discuss the basic characteristics of the respondents in the sample, because this can influence the outcomes of the data and the relevance of the conclusions. The questionnaire contained questions on the following 7 aspects of background information: age, gender, employment type / daytime activities, regularly used transport mode, transport mode class (only for trains), journey purpose and journey duration. The recorded data outcomes on these aspects will be discussed in the following sections.

4.2.1 Age

The respondents of the questionnaires were categorised under four age groups: 18 to 24 years old, 25 to 39 years old, 40 to 60 years old and above 60 years old. The relative percentages of their representation in the sample are shown in figure 4.1 (on the right). One can see that the two middle groups (of 25 to 39 and 40 to 60 years old) both represented between the 20 and 30 percent, so they are proportionally well-represented in the sample. The youngest group (18 to 24 years) is somewhat overrepresented in the sample, and the oldest group (above 60 years old) is slightly underrepresented in the sample. This was also visible in the Chi-square test that was performed on this variable, which indicated that the variable data were not identical to the theoretical (expected) distribution of age groups. The sample of the questionnaire data is a relatively young sample, which has to be considered in the rest of the results chapter and when drawing conclusions on the basis of these data. In the study of Lyons et al. (2007), which was discussed in the theoretical chapter, the factor of age was found to have an influence on some aspects considered in the present study. The most important thing is that young people were found to be more 'equipped' than older people while travelling. This means that that younger people were found to carry more items for travel time use and had a more positive attitude towards new mobile ICT technologies (Lyons et al., 2007). The use of equipment or mobile ICT devices while travelling could thus be higher in this data sample than in the population of the Rotterdam metropolitan area as a whole. But the representation of the youngest group in the sample is below 40 percent, and the group of 60 years and older still had a representation of 13 percent. The age distribution in the data sample is not considered to be too unbalanced to use in the present study.

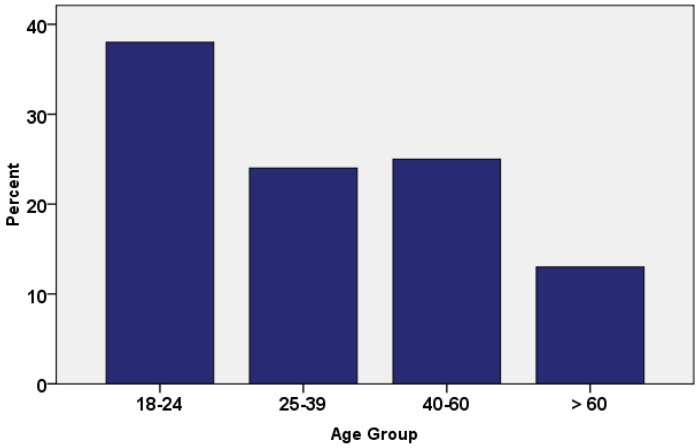

Figure 4.1: Age group distribution (in the questionnaire data).

4.2.2 Gender

The aspect of gender has been used in the present study as a balance point for the data collection. When collecting the questionnaire data, the amount of men and women that were questioned, were kept equal to ensure a gender balance in the sample. This means that there are 50 percent men and 50 percent women in the data sample that is used in the present study. This ensures an equal representation of both sexes in the data, so the aspect of gender is optimally balanced and unbiased in the sample. This was also represented in the Chi-square test, which showed an optimal similarity of the gender variable with the theoretical (equal) distribution.

4.2.3 Employment type / Daytime activities

Employment type / Daytime Activities	Percentage
Industry/Construction/Care (physical work)	10
Services/Managing/Education/Science (office/intellectual work)	40
Following Education (studying or school / training)	37
Unemployed or Retired (no work)	13
Total	100

Table 4.1: Employment type / Daytime activities distribution among the respondents (in the questionnaire data).

The respondents of the questionnaires were asked to report what their employment type or daytime activity was. It is important to see if all kinds of employment types or daytime activities are represented in the data, and to consider the distribution of these aspects when drawing conclusion on the basis of the data. Table 4.1 shows that the respondents were categorised into four groups: physical work (industry / construction / care), office and/or intellectual work (services / managing /

education / science), following education (study / school / training) and people without work (retired or unemployed). The proportion of people doing physical work within the sample was only 10 percent, which seems to be quite low. But the Dutch society as a whole has a fairly low proportion of people working in industry, construction and care, so this low proportion in the sample is not considered to be a problem. The group of people doing office and/or intellectual work was substantially larger, but this is also believed to be connected to the employment characteristics in the Netherlands. The proportion of respondents following education was also quite high, which is probably caused by the high proportion of young people in the sample. The data sample also had a share of 13 percent of people who were retired or unemployed. The representations of the four employment/daytime activity groups in the sample were not equal, which was also represented in the high Chi-square value of this variable. The high proportions of office workers and students are not perceived as problematic for the data sample, but this aspect has to be considered when drawing conclusions on the basis of the data.

4.2.4 Transport mode

The respondents of the questionnaires were asked to indicate which transport mode they regularly travelled on, and to answer the rest of the questions in the questionnaire on the basis of that selected transport mode. So the data contains information on travel time use, influencing factors, ICT use while travelling, differences between modes and the journey perception, from people that regularly use a certain mode of transport. The distribution of transport modes in the sample as indicated by the respondents is shown in figure 4.2. The proportion of car drivers was 23 percent, but the proportion of car passengers was only 5 percent. This small proportion means that no solid conclusions (but only first indications) about car passengers' travel time use (as a separate group) can be made. The proportion of train passengers was quite high in the sample, so that results and conclusions on train passengers are supported by a wider base of data. The high share of train passengers in the data was caused by the fact that most public transport users in the Netherlands travel by trains, and substantially less people travel by bus or metro (CBS, 2002) (which is also visible in the sample – see figure 4.2). The high share of train users and low share of car passengers (which was also represented in the high Chi-square value of the variable) have to be considered in when drawing conclusions on the basis of the questionnaire data.

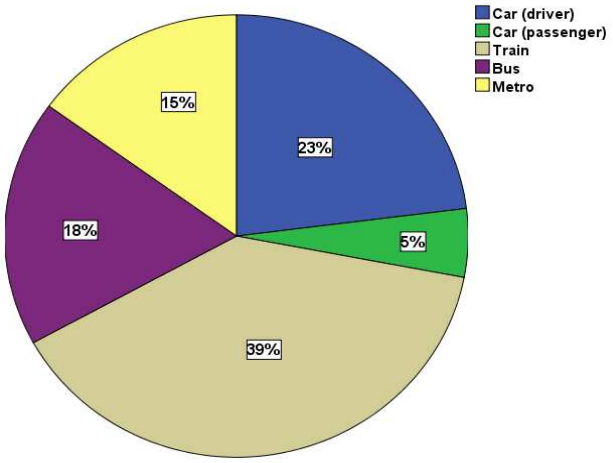

Figure 4.2: Transport modes (in the questionnaire data).

4.2.5 Transport class (only for trains)

The train users in the questionnaires were also asked whether they travelled first or second class. There are differences in crowding, noise, facilities and comfort between first and second class carriages in trains, which were all theorised as factors that could influence travel time use. This is the main reason for recording train class in the questionnaire. The data set should not be too unbalanced on this aspect, because this could influence the research outcomes. Of the train users in the sample, almost 85 percent indicated they travelled in second class and only slight over 15 percent (6 respondents) indicated they travelled first class. This gives a relatively good representation of train users, as far more people travel second class in Dutch trains. But this low number of first class passengers in the data sample means that no solid conclusions can be made on first class passengers as a separate group. This unequal distribution of first and second class train users in the sample is not perceived to be a problem, but it has to be considered when drawing conclusions on the basis of the data.

4.2.6 Journey purpose

Journey Purpose	Percentage
Travelling to or from work/school *(commute)*	61
Travelling during and for work *(business)*	6
Travelling in free time *(leisure)*	33
Total	100

Table 4.2: Journey purposes (in the questionnaire data).

The journey purpose of the respondents was also recorded in the questionnaires. A different journey purpose could create a different travel situation, so it is important to see if all sorts of travellers are represented in the sample. Table 4.2 shows that 61 percent of the respondents were commuters and 33 percent were leisure travellers. Only 6 percent of the respondents were business travellers, which means that no solid conclusions can be made on business travellers (as a separate group) on the basis of the data. But the data reflect that most daily travellers in the sample were commuters, around half as much people were leisure travellers and only a few people that were questioned indicated to be business travellers.

4.2.7 Journey duration

The respondents of the questionnaires were also asked to indicate whether a single journey on their selected transport mode normally lasts more or less than 30 minutes. The journey duration was found to have an influence on travel time use in the studies by Lyons et al. (2007) and Ohmori & Harata (2008), so the journey duration of respondents (on a single transport mode) was considered to be important to record. Of the questionnaire respondents, 53 percent indicated they normally travelled more than 30 minutes with the selected transport mode on a single journey, and 47 percent of the respondents indicated they travelled less than 30 minutes. So these two groups of travellers were both proportionally well-represented in the data sample, which was also visible in the low Chi-square value of this variable during the statistical testing of the data.

4.3 Travel time use

The main subject of the present study is the things that people do while travelling. Multiple uses of travel time have been discussed in the theoretical chapter, but the actual travel time uses that were reported by the respondents of the questionnaires will be presented and discussed here. Based on the existing literature, several categories of travel time use were included in the questionnaire. Respondents could indicate how often they performed these travel time uses, whereby they could choose between the answer-categories of: never, sometimes, often or always.
The research question on travel time use in the present study is: How do people use their travel time in the Dutch context? In this paragraph, an attempt is made to answer that question on the basis of the data results. The hypothesis on this aspect that was formulated in the theoretical chapter is: (H1) *A large variety of travel time uses in public transport and cars will be expected in the present study and these activities will vary in the respondents' perception of productivity or anti-activity*. The data outcomes that will be presented and discussed in this paragraph will help to determine whether this hypothesis will hold or not.

4.3.1 Driving and navigating among car users

To start the discussion on the travel time use results from the data, two categories of travel time use will be discussed separately. The categories of 'driving' (or assisting in driving) and 'navigating or route finding' were only asked to car users in the questionnaire, because these were not considered to be useful to ask to public transport users (as they do not drive or navigate public transport vehicles themselves). There were 28 car users in the data, and the results of their responses on the travel time uses of driving and navigating are shown in table 4.3 (see the next page).

Travel time uses	Never	Sometimes	Often	Always	Total
Driving or Assisting in driving (percentage of car users)	7,1	10,7	0	82,1	100
Count	2	3	0	23	28
Navigating or Route finding (percentage of car users)	42,9	50	7,1	0	100
Count	12	14	2	0	28

Table 4.3: The travel time uses of Driving and Navigating among car users (form the questionnaire data (n = 28)).

The figures in table 4.3 show that 23 of the 28 car users were always engaged in driving their cars. This is easily explained, when considering that there were 23 car drivers in the data sample (who were all mainly engaged in driving during their journeys). Only 11 percent of the car users indicated they were sometimes engaged in driving or assisting in that. These respondents were all car passengers, who indicated they sometimes assisted the drivers of the cars with driving. This is only a small share of the "shared accomplishment" of driving a car, which was discussed by Laurier et al. (2008). Half of the car users indicated that they were sometimes engaged in navigating or route finding in the car, and almost 43 percent said they never navigated during their car journeys. So navigating and route finding does not seem to be a very important travel time use among car users in the sample. This can be partly explained by the high share of commuters in the sample, who often indicated during the short interviews with the questionnaires that they were mainly travelling on known routes (where navigation was not needed).

4.3.2 The travel time uses among all travellers

The rest of the travel time uses could be performed by all travellers, so these categories were investigated within the entire sample among all transport mode groups in the study. Firstly, the travel time use results from the categories that were found in the literature will be presented and discussed. These pre-determined categories represent the most important travel time uses that were found in previous studies. Secondly, the travel time uses that were reported by respondents in the open category will be discussed. And thirdly, the interactions between the different travel time uses will be analysed on the basis of the correlation analyses of the variables.

4.3.2.1 The travel time uses in the pre-determined categories

There were 15 categories of travel time use in the questionnaire that were asked to all respondents. These travel time use categories were extracted from the literature and other studies, and were already discussed in the theoretical chapter. The results of the questionnaire data on these 15 categories of travel time use (among all transport mode users included in the study) are presented in table 4.4 (see the next page).

Travel time uses	Never	Sometimes	Often	Always	Total
Looking out of the window or at people (percentage)	3	41	32	24	100
Reading for leisure (percentage)	39	32	23	6	100
Reading for work or study (percentage)	57	23	17	3	100
Calling or texting with a mobile phone (percentage)	26	45	24	5	100
Accessing the internet on a mobile phone (percentage)	66	17	9	8	100
Using a mobile phone for entertainment (percentage)	64	20	8	8	100
Working or studying on a laptop (percentage)	82	11	6	1	100
Accessing the internet on a laptop (percentage)	90	6	3	1	100
Using a laptop for entertainment (percentage)	94	5	1	0	100
Talking to fellow travellers (percentage)	9	66	15	10	100
Relaxing (percentage)	4	36	46	14	100
Sleeping (percentage)	74	19	7	0	100
Listening to music (percentage)	28	18	26	28	100
Eating and/or drinking (percentage)	19	58	21	2	100
Doing nothing (percentage)	45	40	15	0	100

Table 4.4: The travel time uses among all travellers (from the questionnaire data (n = 100)).

The figures in table 4.4 indicate the frequencies of the activities that people performed while travelling in cars, trains, busses or metros. Firstly, one can see that most people were looking out of the window or at other people around them while travelling; as only 3 percent of the respondents indicated they never look out of the window during their journeys. Almost a quarter of the respondents even indicated they always look out of the window while travelling, which could be out of boredom ('killing time') or the enjoyment of travel time (as in John Urry's 'tourist gaze' (1990)).
Reading was found to be an important use of travel time among UK travellers, and also the Dutch travellers in the Rotterdam area seemed to do some reading while travelling. The results indicated that 32 percent of the respondents read sometimes for leisure and that 23 percent often reads for leisure while travelling. The respondents seem to read less for work or study purposes, as only 23 percent said they sometimes read for work or study and only 17 percent indicated to often read for work or study.
In many existing studies, the mobile phone seemed to play a significant role in the activities that people performed while travelling. The collected data in the present study also show that 45 percent of the respondents sometimes used their mobile phone for calling and/or texting while travelling, and almost a quarter of the respondents did this often. The use of the internet on mobile phones or the use of mobile phones for entertainment seems to be less common while travelling, as more than 60 percent of the respondents indicated that they never perform these activities on the move. But this can be due to the fact that the internet functions on mobile phones are still quite new in the Netherlands, and that these activities are not common practice yet for most people. But 8 percent of the respondents were

already quite familiar with internet on mobile phones, as they indicated to always use this function while travelling.
The use of laptops was quite low among the respondents in the sample, as more than 80 percent indicated they never use a laptop while travelling. This can be partly explained by the fact that the use of laptops is quite unpractical for most travellers, especially for car drivers who are already engaged in the task of driving. But the differences in travel time use between transport modes will be discussed in paragraph 4.7 of this chapter. The people that do use a laptop while travelling, seem to use it more for productive tasks (here: studying and working) than for entertainment. The use of internet on laptops was also quite low among the respondents, as 90 percent of the respondents indicated that they never access the internet on a laptop while travelling.
Many people seem the use their travel time to talk to other passengers, because only 9 percent of the respondents indicated that they never strike up a conversation with fellow travellers. Most respondents (66 percent) said they sometimes talk to other people while travelling and 10 percent of the respondents said they always do, which makes talking to others an important travel time use in the present study.
Relaxing also seems to be an important use of peoples' travel time, as only 4 percent of the respondents indicated to never relax while travelling. Almost half of the respondents (46 percent) indicated they often use their travel time to relax and 14 percent said they always relax while travelling, which makes it a very important use of travel time in the present study. Even though sleeping can be considered as an important form of relaxation, sleeping is not very popular among travellers in the sample. Almost three quarters of the respondents indicated that they never sleep while travelling, which is in sharp contrast with Japanese travellers. Because Ohmori & Harata (2008) showed that sleeping was the most performed travel time use in Japan, although these data were only collected on trains (and not included busses, metros and cars).
Listening to music can also be seen as a form of relaxing (for most people), and the figures in table 4.4 show that this travel time use was quite common in the data sample. Only little over a quarter of the respondents said they never listened to music while travelling. But 26 percent indicated that they often listened to music and a substantial 28 percent of the respondents said they always listened to music while travelling. The use of the car radio or portable music players by travellers was thus quite high, which makes listening to music an important travel time use in the presents study.
Eating and drinking is also quite common among travellers, as 58 percent indicated they sometimes eat or drink something while being on the move. Only 19 percent of the respondents indicated they never eat or drink something during their journeys, which means that eating or drinking seems to be a quite common travel time use for many people.
Respondents of the questionnaires were also asked to indicate how often they did nothing while travelling, to check for the opposite aspect of travel time use. Of all the respondents, 45 percent indicated they were never engaged in 'doing nothing' while travelling (which means they were always engaged in some activity or 'anti-activity'). But 40 percent of the respondents felt they were sometimes doing nothing while travelling, which is quite a high proportion when considering the array of travel time uses they indicated before. But not a single respondent in the sample indicated to always 'do nothing' while travelling, which means that the respondents were mostly doing something with their travel time.

4.3.2.2 The travel time uses in the open category

Next to the pre-formulated categories of travel time use in the questionnaire, there was one open category in which people were able to indicate another use of travel time they performed. There were only 8 people in the sample that indicated they had another travel time use (of which 7 were car drivers), and 92 respondents felt that their travel time uses were covered by the categories that were discussed in table 4.4. The results of these open category answers are also important to discuss, as these give new insights into the things that people do while travelling.
One of the respondents said he was learning often while travelling by train, but this is actually already included in the questionnaire under the category of studying. Another respondent said she was always eating candy (or 'snoepen' as she called it in Dutch) while driving her car, and she felt that this was different from eating something like lunch, which was already in the categories that were discussed

above. But these two things can be considered as already covered under the categories of (working or) studying and eating (and/or drinking) in the questionnaire.
The use of travel time to do some 'thinking' was actually mentioned by two car drivers in the questionnaires. Both respondents indicated they often used their travel time to think over certain things, as they had the time for it while driving. Another respondent said he used his travel time sometimes to 'meditate' while driving. This can be connected to the aspect of relaxing that was already discussed in table 4.4, but it does go a little further than just relaxing. There was also one respondent who confessed that he sometimes engaged in 'nail biting' whilst driving his car. And another car driver confessed he was 'nose picking' sometimes while driving. These two aspects were not considered in the questionnaire, but were actual travel time uses for the two respondents. The last 'other' travel time use which was mentioned by one respondent, was 'smoking' whilst driving a car. The respondent said he always smoked a cigarette in his car to relax, which can be an important use of travel time. This category of 'smoking' as a travel time use could be quite interesting, but was not included in the questionnaire since it is not allowed to smoke in public transport vehicles in the Netherlands. But for car drivers, smoking can be an important travel time use which should be considered in a study on travel time use.

4.3.2.3 Interactions between travel time uses

The travel time use categories that were discussed in this section are not all independent from each other. Certain categories can be connected to each other, which can provide more insights into the possible activity patterns of travellers. On the basis of correlation analyses on the travel time use variables, certain interactions can be discussed. Only the most important correlations that were found to be statistically significant in SPSS will be discussed in this section.
The first important thing to note is that 'driving or assisting in driving' was negatively correlated to many other travel time uses. The most important travel time uses that are negatively correlated to driving or assisting in driving are: looking out the window (-0.5) (e.g. at the scenery or landscape), reading for leisure (-0.43), talking to fellow travellers (-0.62), doing nothing (-0.54) and most importantly 'sleeping' (-0.73). This means that car drivers in the sample were generally not engaging in most of these activities while travelling.
The second important point is that reading for leisure and work/study were positively correlated with each other. This positive correlation means that travellers who are likely to engage in reading for leisure are also likely to engage in reading for work or study (and vice versa). This aspect also applies to the uses of mobile phones for the different categorised purposes, which showed positive correlations between the three variables for calling/texting, internet use and entertainment use. The three variables for the use of laptops for work/study, internet access and entertainment also showed the same positive correlation patterns. These positive correlations mean that travellers who use a mobile phone or laptop for one purpose are also likely to use their mobile phone or laptop (respectively) for other purposes while travelling.
The variable of reading for work or study was also positively correlated to the variables on mobile phone and laptop use. This means that people that are likely to engage in reading for work or study, are also likely to use mobile phones or laptops while travelling (and vice versa).
The variable of 'doing nothing' while travelling is also quite interesting to investigate when looking at correlations with other travel time uses. It was already mentioned that doing nothing was negatively correlated with driving, which is a very logical finding. But doing nothing was also negatively correlated with 'listing to music', which could indicate that travellers that use their time to listen to music are less likely to feel that they do nothing while they are travelling. The variable of 'looking out of the window' was positively correlated to the variable of 'doing nothing', which means that respondents that felt they did nothing during their journeys were likely to spend their travel time on looking out of the window. This could mean that looking out of the window while travelling is one of the aspects of 'killing time' which was discussed in the theoretical chapter.

4.3.3 The perceptions of travel time and travel time use by travellers

After the questions on travel time uses, there was one question in the questionnaire on how people saw their travel time use. The respondents were asked to indicate whether they saw their travel time use

(the activities they performed while travelling): as productive, as time-out/anti-activity/relaxation or as wasted/lost time. The results of this question are presented in table 4.5 (see below).

Do you see your travel time use as productive, time out (relaxing) or lost time?	Productive	Time-out / Anti-activity / Relaxation	Wasted / Lost time	Total
Percentage	22	55	23	100

Table 4.5: Results on how travellers in the sample saw their travel time use (from the questionnaire data).

Table 4.5 shows that most respondents (55 percent) saw their travel time as time-out, anti-activity or relaxation. This can be connected to the relatively high frequencies of reading for leisure, listening to music and of course relaxing among respondents in the sample (see table 4.4). There was also a share of 22 percent that saw their travel time use as productive, in the sense that they got something productive done while travelling. And only 23 percent of the respondents indicated that they saw their travel time uses as wasted or lost time, which means that only this small proportion of the respondents did not get any positive utility from their travel time. So more that three quarters of the respondents in the sample did find positive utility in the use of travel time, by getting some productive tasks done or by taking some time to relax.
There was also one question in the questionnaire on how people saw their travel time on itself. They were asked to indicate whether they saw their travel time as free time or as work time/school time. The distribution of the answers in the sample was exactly equal, because 50 respondents indicated that they saw their travel time as free time and 50 respondents said that they saw their travel time as work or school time (depending on their daily activities). When cross-tabulating this with the question on how people saw their travel time uses, one can see two logical patterns. The first is that respondents which saw their travel time as work time, also saw their travel time uses more frequently as productive. And the second pattern is that people who saw their travel time as free time, more often saw their travel time uses as time-out, relaxation or anti-activity.

4.3.4 Initial conclusions on travel time use

When looking back at the question of how people use their travel time, it can be concluded that people seem to have a wide variety of activities they perform while travelling. Especially driving (for car users), looking out of the window (or at other people), using a mobile phone for calling or texting, relaxing, talking to fellow travellers and listening to music (for all travellers), seem to be important uses of travel time in the data sample. Activities like reading for work or using a laptop were not so common in the data sample, which might also partly explain why only 22 percent of the respondents saw their travel time use as productive. Most people seemed to use travel time to relax, which could point towards an important personal valuation of travel time for daily travellers.
When considering the hypothesis on travel time use (H1); there was a wide variety of travel time uses which was displayed in the data. The respondents seemed to perceive these activities mostly as relaxing, but sometimes also as productive or even lost/wasted time. The open category of travel time uses also added to the conclusion that travel time use showed significant variety. But most importantly, over three quarters of the respondents did not see their travel time use as wasted or lost time, and got some positive utility (in the form of productivity or relaxation) from the activities they engaged in while travelling.

4.4 Factors that can influence travel time use

Having discussed the things that people do while travelling, this paragraph will give insights into the factors that can influence what people do while travelling. The respondents were asked to indicate whether certain factors, which were discussed in the theoretical chapter, could influence their degree of travel time use in a positive or negative way. The research question on these factors is: Which

factors can positively or negatively influence the use of travel time? The hypothesis on the influencing factors that was formulated on the basis of the theory and previous studies is: (H2) *All of the discussed and observed individual and journey factors from the literature are expected to have some influence on travel time use. The social, institutional and individual factors are expected to have the smallest influence on travel time use, and the aspects that are expected to have the largest influence are these four journey factors: degree of crowding, availability of seating, duration of the journey and design of the vehicle.*

To answer the question and investigate the hypothesis, the questionnaire contained 13 questions concerning the influencing factors (of which 12 will be discussed in this paragraph and the last will be discussed in paragraph 4.7). The factors are overlapping and interacting with each other and are not mutually exclusive, but this was already anticipated in the theoretical discussion. The statistical testing of the factor variables showed some significant correlations between certain factor variables, but this will be discussed in section 4.4.3.

The respondents were presented with a certain factor, and could than indicate what the influence of this factor was on their travel time use. The respondents could choose between: a large positive influence, a small positive influence, no influence, a small negative influence or a large negative influence. In this manner, more insights could be obtained into the perception of travellers on the influence of certain factors on their use of travel time. The positive or negative influence of certain factors, as they are felt by the travellers themselves, can be very determining for the actual activities that are performed or not performed by people on the move.

4.4.1 The factors of crowding and seating availability in public transport

The first two factors that are discussed in this paragraph are the influences of crowding and seating availability in public transport vehicles. These two aspects were not asked to car users, as crowding and seating availability are unusual aspects to consider in cars and the aspects have very different and clearer meanings in public transport situations. Crowding is more unusual in cars (and has a different situational meaning due to the absence of actual strangers in cars) and low seating availability does not lead to people standing in cars (as happens in public transport vehicles). The aspects of crowding and seating availability were asked to the 72 public transport users in the sample, and the results from the questionnaire data are presented in table 4.6 (see below).

Factors	Large positive influence	Small positive influence	No influence	Small negative influence	Large negative influence	Total
High degree of crowding (percentage of public transport users)	1,4	1,4	8,3	26,4	62,5	100
High availability of seating (percentage of public transport users)	59,7	31,9	6,9	1,4	0	100

Table 4.6: The influencing factors of crowding and seating availability among public transport users (from the questionnaire data (n = 72)).

Table 4.6 shows that the perceived influence of a high degree of crowding in public transport vehicles was generally negative according to the respondents. More than 62 percent of the public transport users in the sample indicated that having a high degree of crowding in the train, bus or metro, has a large negative influence on their use of travel time. This means that most people are less likely to perform activities during a journey when the public transport vehicle is very crowded. As was discussed in the theoretical chapter, the amount of people that are present in the public transport vehicle can have an influence on the travel situation (Ohmori & Harata, 2008, p. 550). A high degree of crowding can also have an important influence on the other factor that is presented in table 4.6, namely: the availability of seating.

As the figures in table 4.6 show; having a high amount of seating available in the public transport vehicle was perceived as having a positive influence on the use of travel time by the respondents.

Almost 32 percent of the public transport users indicated that having a high level of seating availability has a small positive influence on travel time use and almost 60 percent said that this had a large positive influence on their use of travel time. This means that people are more likely to perform activities during a public transport journey when there are many seats available for them to sit on. The studies by Ohmori & Harata (2008) and Watts (2008) both mentioned that available seating seems to be influential for peoples' activities while travelling. Ohmori & Harata (2008) noted how certain activities (like using a laptop or sleeping) were much less observed in trains were people had to stand because there were no seats available. And Laura Watts (2008) also mentioned that the same activities required people to be seated to make them into viable travel time use options.
The two factors of crowding and seating availability seem to have clear perceived influences on the travel time use of public transport users. The factors are clearly overlapping and interacting with each other, but that was already anticipated in the theoretical discussion. Having a low degree of crowding and a high level of seating available seems to have a positive influence on travel time use in public transport vehicles. This is an anticipated and logical outcome, as these aspects provide people with their own personal space within the public transport vehicle in which they are able to do the things they want or need to do. This aspect was also found in the study by Ohmori & Harata (2008), where people perceived more activities to be desirable when they had some personal space on trains.

4.4.2 Influencing factors for all travellers

Most factors that could theoretically have a positive or negative influence on the travel time use of respondents were asked to all transport mode groups in the questionnaires. These 10 factors could potentially influence the travel time use of all travellers in the sample (car users and public transport users). The results from the questionnaire data on the perceived influence of these 10 factors are presented in table 4.7 (see the next page).

Table 4.7 shows that the factor of carrying equipment or travel time use items had a positive influence on the travel time use of the respondents. The equipment or travel time use items represent the things that people can take with them while travelling (e.g. a book, a laptop or a newspaper). The conceptualisation of being 'equipped' while travelling was already discussed in the theoretical chapter. In the study by Jain & Lyons (2008) they found that people tend to bring items with them to use while travelling, and this was also observed in the study on travel time use by Lyons et al. (2007). But they also found that many people do not use these items while travelling, although they are often 'equipped' to do so (Lyons et al., 2007, p. 116). This could be represented by the 30 percent of respondents in table 4.7 that indicated that the carrying of equipment or travel time use items had no influence on their travel time use. But overall, the respondents said to be positively influenced in their travel time use by the items they carried with them while travelling.
The factor of 'abilities' to use mobile ICT devices or technologies effectively while travelling, did not seem to have an important influence on peoples' travel time use. This factor had only a slight positive influence for some respondents, but most people indicated that this factor had no influence on their travel time use. The factor of 'planning to do activities while travelling' also had a very limited influence in the data sample. Most people indicated that planning had no influence on their use of travel time, and only a few respondents indicted to be positively influenced in their travel time use by planning for travel time activities before starting the journey.
The factors on the transport vehicles both seemed to have an important influence on the travel time use of the respondents. A good design of the vehicle can mean multiple things, but has been conceptualised as a vehicle with many facilities in the present study. Almost half of the respondents (46 percent) indicated that a good design of the vehicle had a large positive influence on their travel time use, and 29 percent said that a good design had a small positive influence on their use of travel time. So three quarters of the respondents indicated that a good vehicle design with many facilities had a positive influence on their travel time use, which makes it an important influencing factor in the present study. The factor of high vehicle quality seems to be of even larger importance for the travel time use of the respondents, as 91 percent indicated that this factor had a positive influence on their use of travel time. A high quality vehicle is conceptualised in the present study as a vehicle that provides people with space, privacy and comfort. More than half of the respondents (53 percent) said that a high quality vehicle had a large positive influence of their travel time use, and another 38

percent indicated that this factor had a small positive influence on the use of travel time. This makes the quality of the vehicle a very important factor that seems to strongly influence the travel time use of the respondents in the data sample.

Factors	Large positive influence	Small positive influence	No influence	Small negative influence	Large negative influence	Total
Equipment or travel time use items (percentage)	43	25	30	2	0	100
The ability to operate new ICT equipment or technologies effectively (percentage)	15	20	60	5	0	100
Planning to do activities while travelling (percentage)	19	26	55	0	0	100
Good design of the vehicle (facilities) (percentage)	46	29	25	0	0	100
High quality of the vehicle (space, privacy and comfort) (percentage)	53	38	9	0	0	100
High degree of noise (no silence) (percentage)	1	0	18	37	44	100
Long duration of the journey (percentage)	24	27	31	15	3	100
High degree of familiarity with the journey (percentage)	19	43	31	6	1	100
Institutional aspects (strict rules or norms) (percentage)	13	26	47	12	2	100
Social aspects (public gaze or desirable behaviour) (percentage)	5	15	58	21	1	100

Table 4.7: The perceived influences of factors on the use of travel time among all travellers (from the questionnaire data).

The factor of noise also seems to be an important factor, as more than 80 percent of the respondents indicated that a high level of noise had a small or large negative influence on their travel time use. This means that the respondents are less likely to perform activities during a journey when there is a lot of noise in the transport vehicle. This makes noise also an important factor that can influence the use of travel time.

The factor of journey duration seems to have a more debateable influence on the use of travel time. Around half of the respondents indicated that a long duration of the journey had a positive influence on their use of travel time. But another 18 percent of the respondents said that a long journey time had a negative influence on their travel time use. This seems to be a quite contradictory result, but can be partly explained. Most people possibly saw a long duration of the journey as a larger time-window to perform more activities, which was discussed in the studies by Lyons et al. (2007) and Ohmori & Harata (2008). But some people might have seen a long duration of the journey as a larger time-window that would increase the boredom or monotony of the journey, which would have a negative

influence on their productivity or activeness. So the factor of journey duration seems to work both positively and negatively on travel time use, according to the questionnaire data in the present study.
The familiarity with the journey was theorised as having a positive influence on the use of travel time, because a familiar journey demands less attention to the journey so the traveller can potentially devote more attention to performing activities while travelling (see the theoretical chapter on this). The figures in table 4.7 show that more than 60 percent of the respondents indicated that a high familiarity with the journey had a positive influence on their travel time use. But almost a third of the respondents (31 percent) said that familiarity with the journey had no influence on their travel time use, which means that this factor was not of great importance to most travellers in the sample.
The last two factors on institutional and social aspects both display a high share of respondents that indicated that these aspects had no influence on their travel time use. The figures in table 4.7 show that the institutional factor on rules and norms was perceived as having both as positive and negative influences on travel time use. On the one hand, rules can make sure that the travel spaces are quiet and orderly, which can be beneficial for certain travel time uses. But on the other hand, rules can also hinder certain travel time uses (like playing music or making phone calls). The social factor on the influence of the 'public gaze' and the performance of socially desirable behaviour also showed both positive and negative responses. On the one hand, people may find it pleasant that there is a little social control on other peoples' behaviour, so there is order and quietness. But on the other hand, people may retain from performing certain activities, because they feel people are gazing at them. Overall, the institutional and social factors seem to be of little influence on the travel time use of the respondents, and these factors are not considered to be important factors in the present study.

4.4.3 Interactions between influencing factors

The influencing factors that are investigated in the present study are not all independent, as some of the factors can relate to each other. On the basis of correlation analyses that were performed on the factor variables that were discussed above, the interactions between some of the factors are discussed. Only the most important correlations that were found to be significant in the SPSS analyses are discussed in this section.
The factor variable of 'equipment and travel time use items' was positively correlated with the factor variable of 'ICT operating abilities' (0.58). This means that respondents who indicated that the carrying of equipment or travel time use items had an influence on their travel time use, were also likely to feel that the abilities to operate ICT technologies had an influence on their travel time use (and vice versa). These two factor variables on equipment and ICT abilities were also found to be both positively correlated with the availability of seating. This means that travellers who are felt to be influenced by equipment or ICT abilities are also likely to be influenced by the availability of seating (and vice versa). This could point towards the importance of seating for the performance of certain activities while travelling, which could be activities that are connected to the use of certain items, equipment or ICT.
The factor of 'good vehicle design' (in terms of facilities), was found to be positively correlated to the factors of seating availability and planning. This means that travellers that feel that their travel time use is influenced by the vehicle design are also likely to be influenced by the availability of seating and the factor of planning to do activities while travelling (and vice versa).
The last significant correlation that is discussed in this section is the positive correlation between the factors of vehicle design and vehicle quality (0.44). This means that respondents that indicated that their travel time use is influenced by the design of the vehicle are also likely to feel that their travel time use is influenced by the quality of the vehicle (and vice versa). This seems to be a logical correlation, as both factors are concerned with the influence of the transport vehicle characteristics on the use of travel time.

4.4.4 Initial conclusions on influencing factors

When considering the question which factors can positively or negatively influence travel time use, most of the discussed factors can be of importance. The factors that can positively influence travel time use are: the availability of seating in public transport vehicles, the carrying of equipment or travel time use items, good vehicle design and high vehicle quality. The factors that can negatively influence

travel time use are: a high degree of crowding in public transport vehicles and a high level of noise. The factors of ICT operating abilities, planning for travel time use, long journey duration, familiarity with the journey, the institutional aspects of rules or norms and the social aspects of the public gaze and socially desirable behaviour all seemed to have a lower and more contradicting influence on travel time use. When looking at the hypothesis on influencing factors (H2); all discussed factors seem to have some influence on travel time use, although the influence of the factors of ICT operating abilities, planning, institutional aspects and social aspects were quite limited in the data sample. This is in line with the hypothesis, which stated that the social, institutional, and individual factors were expected to have the smallest influence on travel time use. The data show that the factors of crowding, seating availability, vehicle design, vehicle quality, noise and to a lesser extent the carrying of equipment or travel time use items can have the most important influences on travel time use. This is partly in line with the hypothesis which stated that the four journey factors of crowding, seating availability, journey duration and vehicle design were expected to have the largest influence on travel time use. The factor of journey duration had a smaller and slightly more contradicting influence then was anticipated, and the factors of vehicle quality, noise and equipment or travel time use items had larger influences on the travel time use of respondents than was anticipated.

4.5 The role of ICT in travel time use

Some aspects of ICT and mobile technologies have already been shortly discussed in the previous paragraphs, but the role of ICT in travel time use will be discussed in more detail in this paragraph. The question that was formulated on the role of ICT is the following: What is the role of ICT in travel time use, travel time use perception and journey experience of travellers? The hypothesis on the role of ICT that was formulated on the basis of the literature is: (H3) *The ownership and use of ICT and mobile technologies is expected to have a positive effect on travel time use and will also be expected to result in more people seeing their travel time use as productive and their perceived journey experience as more positive.* The role of ICT in travel time use will be discussed in this section by searching for an answer to the research question and investigating the hypothesis.
In the paragraph on travel time use, some aspects of the role of ICT and mobile technologies in travel time use were already discussed. A large share of the respondents seemed to use a mobile phone for texting and calling while travelling. The use of laptops was less common among the respondents, as more than 80 percent indicated to never use a laptop while travelling. These data outcomes seem to point towards a quite limited role of ICT and mobile technologies in the use of travel time.
In the previous paragraph on influencing factors, the factor of equipment seemed to have a positive influence on the travel time use of most respondents. But this factor was concerned with all sorts of equipment and travel time use items, and was not solely concerned with ICT equipment. The factor of ICT operating abilities was not considered to be an important influencing factor on travel time use, as most respondents indicated this factor had no influence on them. This also indicated a potentially limited role of ICT in the use of travel time, but more focussed insights into the role of ICT will be presented in this paragraph.

4.5.1 The carrying and use of Mobile ICT devices while travelling

To get a more focussed insight into the role of ICT and mobile technologies in travel time use, the respondents were asked 3 specific questions on the role of ICT. Respondents were first asked to indicate how frequently they carried mobile ICT devices with them while travelling. Secondly, respondents were asked to report how often they used these mobile ICT devices during their journeys. The term ‘mobile ICT devices’ was explained to respondents as being mobile electronic devices for communication, work or entertainment purposes (examples are: mobile phones, laptops, music players, PDA’s etc.). The questionnaire contained the same four answer categories for these two questions as for the questions on travel time uses, namely: never, sometimes, often and always. The results of these two questions are presented in table 4.8 and figure 4.3 (see the next page).

Do you carry any mobile ICT devices while travelling?	Never	Sometimes	Often	Always	Total
Percentage	5,0	2,0	5,0	88,0	100,0

Table 4.8: The indicated frequencies of carrying mobile ICT devices while travelling (from the questionnaire data).

The percentages in table 4.8 show that only 5 percent of the respondents never carried mobile ICT devices, and that 88 percent indicated to always carry mobile ICT devices while travelling. This means that most respondents always have some sort of mobile ICT device with them while travelling by car, train, bus or metro. But it needs to be noted that most respondents added, during the short questionnaire-based interviews, that this was only a mobile phone which they always carried with them. This important role of the mobile phone was also found in the surveys by Lyons et al. (2007) and Watts & Urry (2008). So the high share of carrying mobile ICT devices is largely explained by the high level of mobile phone ownership in the Netherlands.

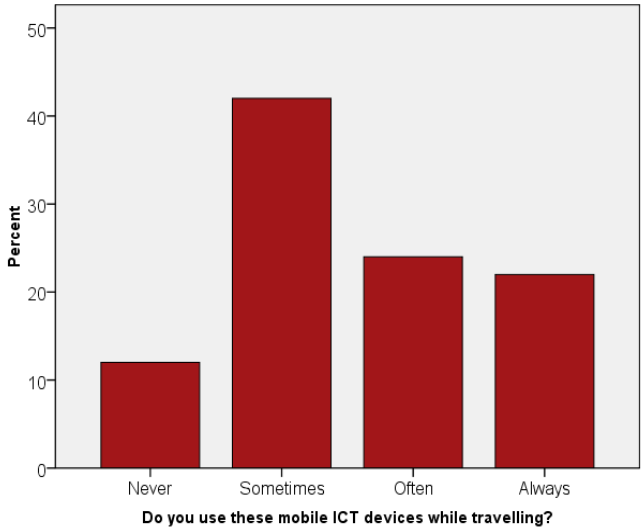

Figure 4.3: The indicated frequencies of using mobile ICT devices while travelling (from the questionnaire data).

Figure 4.3 shows the indicated uses of mobile ICT devices while travelling as reported by the respondents of the questionnaires. The bar chart shows that 12 percent of the respondents never used mobile ICT devices while travelling, which means that 88 percent did use these devices at some point while travelling. Most respondents (42 percent) said that they sometimes use their mobile ICT devices while travelling, while 24 percent indicated to often do that and 22 percent indicated they always used mobile ICT devices during their journeys. This means that most respondents regularly used their mobile ICT devices while travelling, which points towards a relatively large role of ICT in the use of travel time.

4.5.2 The influence of new mobile ICT opportunities on travel time use

The respondents were also asked to indicate to what extent they felt that new mobile ICT opportunities had an influence on the activities they performed while travelling. The new mobile ICT opportunities are the opportunities of communication, information and entertainment that are provided by the mobile ICT devices that were discussed in the section above. Respondents could choose between four answer categories, namely: no influence, small influence, moderate influence or large influence. The results from this question on the perceived influence of ICT on the respondents' travel time use are presented in table 4.9 (see below).

Influence of new mobile ICT opportunities on travel time use	No influence	Small influence	Moderate influence	Large influence	Total
Percentage	26,0	25,0	23,0	26,0	100,0

Table 4.9: The perceived influence of new mobile ICT opportunities on travel time use (from the questionnaire data).

Table 4.9 shows a relatively equal distribution of answers across the influence categories of new mobile ICT opportunities, which was also represented in the low Chi-square value that indicated a high similarity of the variable outcome with a theoretical distribution. Slightly more than a quarter of the respondents (26 percent) indicated that the opportunities of new mobile ICT devices had no influence on their use of travel time. This means that mobile ICT opportunities had a perceived influence on the travel time use of almost three quarters of the respondents in the sample. Of the respondents, a quarter indicated that new mobile ICT opportunities had a small influence on their travel time use, 23 percent said this aspect had a moderate influence and 26 percent of the respondents felt that the new mobile ICT opportunities had a large influence on their use of travel time. This outcome seems to point towards a relatively large role of ICT in the travel time use of the respondents in the data sample.

4.5.3 The interactions between ICT, travel time use and journey experience

To investigate how ICT is connected to how people see their travel time use and how they feel their travel time use influences their journey experience, several statistical tests have been performed on the relevant variables. Cross-tabulations and correlation coefficients of the relevant variables have been analysed to investigate the interactions between the variables of ICT, travel time use perception and journey experience. The relevant outcomes of the SPSS analyses are discussed in this section.

The interactions between ICT and peoples' perceptions of travel time use will be investigated first, by looking at the results from cross-tabulations between the ICT variables and the variable on how people see their travel time use. Due to the formulated hypothesis on the role of ICT in travel time use (H3), the focus will be on the perceived productiveness of travel time use.

The first important result from the analysis, is that all respondents (100 percent) that indicated they saw their travel time use as productive (n = 22) also indicated they always carried mobile ICT devices while travelling. The respondents that indicated to see their travel time use as relaxation (n = 55) represented a share of 84 percent that always carried ICT, and respondents that indicated to see their travel time use as wasted or lost time (n = 23) had a share of 87 percent that always carried ICT. This means that people that always carry mobile ICT devices while travelling are more likely to see their travel time as productive (and vice versa).

The respondents that saw their travel time use as productive are also more likely to use ICT devices while travelling. This can be concluded on the basis of the other analysis results. Of the respondents that indicated to see their travel time use as productive, 36.4 percent said to often use ICT devices while travelling and 27.3 percent said to always use ICT devices during their journeys. But of the respondents that indicated they saw their travel time use as wasted or lost time, only 4.3 percent acknowledged they always used ICT devices while travelling. This could mean that travellers that do not regularly use mobile ICT devices during their journeys are more likely to see their travel time use as wasted or lost time (and thus get no positive utility from performing activities while travelling).

The travellers that saw their travel time use as wasted or lost time are also less likely to feel influenced in their activities by ICT opportunities. Of this group of respondents, 26.1 percent indicated that the opportunities of ICT have no influence on their use of travel time. But of the group of respondents that saw their use of travel time use as productive, 45.5 percent indicated that the opportunities of ICT had a large influence on their use of travel time. This can point towards a relation between ICT opportunities and the productivity of travel time use.

To further investigate this, the data were analysed to look for significant correlations between the variables of ICT and travel time use perception. This analysis showed a significant correlation between the variables of the use of ICT while travelling and the perception of travel time use as productive, relaxation or wasted time. The (Spearman's Rho) correlation coefficient for these two variable had a value of -0.2. This indicated a weak but significant negative correlation between the two variables. This seems contradictory to the above discussed aspects, but one has to consider the coding of the variables in this. The variable on the perception of travel time use is coded as follows: productive = 1, relaxation = 2 and wasted/lost time = 3. The variable on ICT use is coded as: never = 0, sometimes = 1, often = 2 and always = 3. Combining this coding scheme with the negative correlation coefficient leads to the following conclusion: the more the respondents used ICT devices while travelling, the less they saw their travel time uses as wasted and the more they saw their travel time use as productive.

And this also works vice versa, meaning that the more the respondents saw their travel time use as productive and not as wasted time, the more likely they were to use ICT devices regularly during their journeys.
There was also a significant correlation between the variable on the influence of ICT on travel time use and the variable on travel time use perception. The calculated (Spearman's Rho) correlation coefficient of -0.2 indicated a negative relation between the variables. But the above discussed coding of the travel time use perception variable and the coding of the other variable have to be considered. The ICT influence variable is coded as: no influence = 0, small influence = 1, moderate influence = 2 and large influence = 3. This leads to the following conclusion: the more the respondents felt influenced by ICT in their travel time use, the less wasted and more productive they saw their travel time use. And this also works vice versa, meaning that the more respondents saw their use of travel time as productive and less as wasted, the more likely they felt a (large) influence of ICT opportunities on their use of travel time.
The outcomes from the cross-tabulations and correlation analyses point towards an interaction between ICT and the perception of travel time use as productive. Higher levels of carrying, using and feeling influenced by ICT in travel time use, seem to lead towards a perception of travel time use as less wasted and as more productive. This could point towards a positive role of ICT in the perception of travel time use as productive.

The interactions between ICT and the influence of travel time use on the journey experience, was also investigated by looking at the cross-tabulations and correlations. Starting with the cross-tabulations, the analysis showed certain interactions between ICT and the influence of travel time use on journey experience. Of the respondents that indicated to often use ICT while travelling, 95.8 percent indicated that a high use of travel time had a positive influence on their journey experience. And of the respondents that felt that ICT had a large influence on their use of travel time, 88.5 percent indicated that a high use of travel time had a positive influence on their journey experience. The interaction is not as clear as with the above discussed travel time use perceptions, but there could be a relation between ICT and a positive journey experience due to high travel time use.
The correlation analysis revealed that there were no significant correlations between the carrying of ICT and the journey experience variables and neither between the use of ICT and the journey experience variables. But there was a significant correlation between the ICT influence variable and the journey experience variable. The (Spearman's Rho) correlation coefficient value was 0.24, which indicated a weak but significant positive correlation between the influence of ICT on travel time use and the influence of a high use of travel time on the journey experience. The ICT influence variable is coded as: no influence = 0, small influence = 1, moderate influence = 2 and large influence = 3, and that the journey experience variable is coded as: no influence = 0, negative influence = 1 and positive influence = 2. This leads to the following conclusion: respondents that felt that ICT opportunities had a (large) influence on their use of travel time are more likely to feel that a high use of travel time has a positive influence on their journey experience. And this also works vice versa, meaning that respondents who felt that a high use of travel time had a positive influence on their journey experience were more likely to be (largely) influenced by the opportunities of ICT in their travel time use.
The above discussed analyses outcomes point towards an interaction between the influence of ICT on travel time use and the influence of a high level of travel time use on the journey experience. This could point towards a small but positive role of ICT opportunities in the influence of travel time use on a positive journey experience. Respondents that were engaged in the opportunities of ICT during their journeys seemed to be more likely to feel that a high use of travel time (performing many activities during a journey) had a positive influence on their journey experience.

4.5.4 Initial conclusions on the role of ICT

When looking back at the question on the role of ICT in travel time use, travel time use perception and journey experience, one can conclude from the discussion in this paragraph that ICT can have a positive role in these aspects. According to the collected data, most travellers always carried mobile ICT devices with them during their journeys, although these were mostly just mobile phones. Most respondents also indicated to regularly use these mobile ICT devices while travelling. The data also showed that almost three quarters of the respondents felt that ICT opportunities had some degree of

influence on their use of travel time, which seems to point towards an important role of ICT in travel time use.
The formulated hypothesis on the role of ICT in travel time use was: (H3) *The ownership and use of ICT and mobile technologies is expected to have a positive effect on travel time use and will also be expected to result in more people seeing their travel time use as productive and their perceived journey experience as more positive.* The above mentioned conclusions already point towards a positive role of ICT in the use of travel time, but this point was further strengthened by the analysis outcomes that were discussed. These analyses firstly pointed towards an interaction between ICT and the perception of travel time use as productive. The more people carried, used or where influenced by ICT while travelling, the less they saw their travel time use as wasted and the more they saw their use of travel time use as productive. The analyses also pointed towards an interaction between the influence of ICT on travel time use and the influence of a high level of travel time use on peoples' journey experience. Respondents that indicated to be influenced by ICT opportunities or said to be engaged with ICT while travelling, were more likely to feel that performing many activities while travelling had a positive influence on their journey experience. These outcomes are in line with the hypothesis, and seem to point towards a positive role of ICT in the perception of travel time use and the journey experience of most travellers. The role of ICT in travel time use thus seems to be significant and positive in the data sample of the present study.

4.6 The influence of travel time use on journey experience

In this paragraph, the possible influence of travel time use on peoples' perceived journey experience will be shortly discussed. The question that was formulated on this aspect was: Could the use of travel time have positive or negative influences on the perceived journey experience of travellers? There was no hypothesis formulated on this aspect, as there were no clear theoretical discussions on the influence of travel time use on journey experience in the literature. The idea of the possible influence of travel time use on the journey experience of travellers was initiated by the researcher of the present study. It could be important to consider the influence of travel time use on how positive or negative people perceive their journeys.
The questionnaire contained one question to investigate the influence of performing many activities while travelling on the journey experience of respondents. Respondents could indicate what the influence of a high level of travel time use was on their perceived journey experience. The results of this question from the questionnaire data are presented in table 4.10 (see below).

The influence of a high level of travel time use on the perceived journey experience	No influence	Negative influence	Positive influence	Total
Percentage	16	1	83	100

Table 4.10: The indicated influences of a high level of travel time use on the perceived journey experience of travellers (from the questionnaire data).

According to the data results in table 4.10, only one respondent said that a high level of travel time use (performing many activities while travelling) had a negative influence on the journey experience. And 16 percent of the respondents indicated that a high level of travel time use had no influence on how they experienced their journeys. But the most important thing that is shown in table 4.10 is that most respondents in the sample (83 percent) felt that a high level of travel time use had a positive influence on their perceived journey experience. This means that most travellers in the sample indicated that performing (many) activities during their journeys, leads to a better (or more positive) journey experience. This high share of respondents that noted a positive influence of travel time use on their journey experience seems to indicate that most respondents got some sort of positive utility from travelling by using their travel time to perform activities.
One explanation for this highly positive perception of travel time use in the sample can be that most respondents wanted to give a socially desirable answer that was pleasing for the researcher. But

another explanation can be found in the replies that were given by the respondents in the open category question at the end of the questionnaire. After the last question in the questionnaire (that was on the influence of travel time use on journey experience), an open question was included in the questionnaire in which respondents could add further remarks or information on the subject of the present study. Some remarks were quite negative, as public transport and especially the metro was perceived by some respondents in a negative way. But most remarks were very positive, especially when it comes to the opportunities for doing useful or relaxing activities while travelling by public transport (especially trains). With this, it is important to consider the high share of public transport users (especially train users) in the data sample, which could also explain the highly positive perception of travel time use in the data. One respondent said that working was a good option on trains and another respondent was very positive about travelling and doing activities on the train. But most importantly, most respondents that wanted to add extra information to the data said that doing something while travelling made the travel time seem to go by faster. These respondents were all positive about the influence of travel time on their journey experience. They possibly felt that travel time use was a good way of 'killing time' during a journey, and saw travel time use as a positive aspect in this way.

4.7 Differences between transport modes

In this paragraph, the travel time uses, influencing factors, the role of ICT and the influence of travel time use on journey experience will be investigated and compared between the transport modes that are included in the present study. The car (for drivers and passengers) is investigated as the private transport mode, and the train, the bus and the metro are investigated as the public transport modes for daily travellers in the Dutch context. The bicycle plays an exceptionally strong role in the Netherlands, but is not included in the present study as a private transport mode.
The research question on the differences between transport modes was formulated as follows: What are the main differences in travel time use, influencing factors, the role of ICT and journey experiences between people using personal transport modes (cars) and people using different public transport modes (train, bus or metro) for daily journeys? And on the basis of the literature, the following hypothesis on differences between transport modes was formulated: (H4) *Clear differences in travel time uses and the other investigated aspects between private transport modes (cars) and different public transport modes will be expected in the research findings. Travel time uses in public transport modes are expected to show higher varieties and frequencies than in cars. Trains are expected to show highest frequencies of travel time uses and are expected to be perceived as the best transport mode option in terms of travel time use.*
An answer to the research question will be searched for in this paragraph and the hypothesis will be tested in the data sample from the questionnaires. The differences between transport modes in the mentioned aspects will be investigated by analysing the relevant variables in cross-tabulations and by using correlation analyses. Most tables and matrixes will not be presented in this chapter, as these will take up to much space and are not all relevant for the discussion. Only the most important tables, analyses outcomes, percentages and coefficients will be given and discussed in this paragraph.

4.7.1 Differences in travel time use

To start the analysis on the differences between transport modes, the investigated travel time uses in the questionnaire data will be compared between transport modes. The investigated travel time use categories from the data were split up between the different transport modes in cross-tabulations, to check for differences. The variables on travel time uses and the transport mode variable were also tested with correlation analyses to see whether there were significant interactions between the variables. To understand the correlation outcomes, the coding schemes of the variables are important to explain. The transport mode variable is coded as follows: car driver = 1, car passenger = 2, train = 3, bus = 4 and metro = 5. This means that more private modes of transport have low values and more public modes of transport have higher values, which has to be considered when interpreting the correlation coefficients. The travel time use variables are all codes as follows: never = 0, sometimes =

1, often = 2 and always = 3. This means that higher values represent higher frequencies of travel time uses, which is important to understand when interpreting the correlation coefficients that will be discussed in this paragraph.

The travel time uses of driving (or assisting in driving) and navigating (or route finding) were only asked to car users, so these aspects can only be compared between car drivers and car passengers. The other travel time uses were asked to all respondents and can be compared between all transport modes. The activity of driving among the group of car drivers was always performed during their journeys (100 percent), which is a logical outcome. Car passengers were never (n = 2) or sometimes (n = 3) engaged in assisting in driving. The high negative correlation coefficient indicated that driving is mostly performed by drivers and not by passengers, which makes sense. But this contradicts with the 'shared accomplishment' of driver and passengers when driving a car, which was discussed by Laurier et al. (2008). It needs to be noted however that no solid conclusions on car passengers can be made, as there were only 5 respondents in this category in the sample. The activity of navigating (or route finding) was found to be an unimportant travel time use for both groups, as most car drivers and car passengers said to never or only sometimes engage in the activity of navigating during their journeys.
The activity of looking out of the window (or at other people) can be compared between all transport mode users in the sample. The cross-tabulations showed that most car drivers (56.5 percent) sometimes looked out of the window and that only some of them always did that (8.7 percent). Of the group of car passengers, 60 percent always looked out of the window. Slightly more than half of the train users (53.8 percent) indicated to sometimes look out of the window and around a quarter (25.6 percent) of the train users said to always look out of the window (or at people) while travelling. Of the group of bus users, 61.1 percent said to often look out of the window and 16.7 percent indicated they always did that during their journeys. Among metro users, 40 percent indicated to often look out of the window and another 40 percent said to always look out of the window while travelling. This seems to indicate that looking out of the window is more frequently performed in public transport modes (especially busses and metros). The Spearman's correlation coefficient between the transport modes variable and the looking out of the window variable had a value of 0.25 and was statistically significant. Considering the coding schemes of both variables (see the first section of this paragraph), this weak positive correlation means the following: there seem to be higher frequencies of looking out of the window (or at people) in public transport modes when compared to cars. This is because a positive correlation indicates that higher values in one variable (here: meaning public transport modes) seem to be connected to higher variables in the other variable (here: meaning higher frequencies of looking out of the window).
The activity of reading for leisure while travelling was found to be unpopular or unpractical among car users in the cross-tabulations, as 95.7 percent of car drivers indicated to never do that and 60 percent of car passengers replied the same. Public transport users seemed to be more engaged in reading for leisure, as 38.5 percent of the train users indicated to often to that while travelling and more than half of the bus and metro users (55.6 and 53.3 percent respectively) said to sometimes read for leisure while travelling. The Spearman correlation coefficient of the two variables had a value of 0.42 and was statistically significant, which indicated a moderate positive correlation. This means that higher frequencies of reading for leisure seem to be performed in public transport modes (and thus lower frequencies in cars). This correlation outcome is in line with the outcomes from the cross-tabulations.
Reading for work or study was already found to be underrepresented in the data sample, but still has to be investigated in this section. Car users seemed to avoid reading while driving (which seems sensible), because 87 percent of drivers indicated to never perform this activity while travelling and all car passengers (100 percent) said the same. Of the group of train users, only 43.6 percent indicated to never read for work or study while travelling, and 30.8 percent said to often do this while travelling. Of the bus users, 38.9 percent indicated to never read for work or study while travelling, but this proportion was even higher among metro users (53.3 percent). The Spearman correlation coefficient had a value of 0.27 and was statistically significant, which indicated a positive correlation between the variables. This means that higher frequencies of reading for work or study seem to be connected to public transport users in the data sample. So the activity of reading for work or study is more frequently performed in public transport modes (when compared to cars), especially in trains and busses.

The activity of calling or texting on a mobile phone was also investigated among all transport mode users. Of the group of car drivers, 39.1 percent indicated to never call or text while driving and 47.8 percent said to sometimes do this. All car passengers indicated that they sometimes called or texted with a mobile phone while travelling. Of the train users, 35.9 percent said to sometimes call or text and 30.8 percent indicated to often do that while travelling. Most metro users indicated to sometimes call or text with a mobile phone while travelling, and 38.9 percent of bus users said to often do that. The correlation outcome did not show a significant correlation, but presented a small positive value of 0.18. The cross-tabulation and correlation outcomes together seem to indicate that calling or texting on a mobile phone is only slightly more performed in public transport modes when compared to cars, and especially train and bus users showed higher frequencies.

The activities of using a mobile phone to access the internet or for entertainment were indicated to be never performed by most respondents in all groups of transport modes. Train users showed slightly higher frequencies of these activities and car drivers showed lower frequencies (than the average) of performing these activities with mobile phones while travelling. Both variables did not show significant Spearman correlations, but the values where positive (although small). The activities of using mobile phones for internet access or entertainment both showed low frequencies in the data sample, but these ICT-based activities seemed to be slightly more frequently performed in trains.

The use of laptops while travelling was split up into three variables in the questionnaire, but all three variables showed low frequencies in the sample. Among car users, 95.7 percent of the drivers indicated to never use laptops for work or study purposes and all the car passengers (100 percent) replied the same. Of the train users, only 66.7 percent said to never use a laptop for work or study purposes while travelling, while 17.9 percent indicated to sometimes do that and 12.8 percent indicated to often use a laptop for work or study during their journeys. Almost all bus users (94.4 percent) said to never use a laptop for work or study purposes while travelling, and 80 percent of the metro users indicated the same. The correlation analysis showed no significant correlation between the variables, which can be partly explained by the overall low frequency of laptop use for work or study in the sample.

The use of laptops for accessing the internet was also very limited among all transport mode users in the sample, as almost all indicated to never do that while travelling. But train users seemed to be the exception again, as only around three quarters or this group (76.9 percent) indicated to never use a laptop to access the internet while travelling. The same pattern was visible with the variable on using a laptop for entertainment while travelling. All car, bus and metro users in the sample indicated to never use a laptop for entertainment, but this proportion was 84.6 percent (instead of 100 percent) among train users. So when it comes to the use of laptops while travelling (especially for work or study), the group of train users seem to show the highest frequencies, while the other transport mode groups almost never seem to use laptops during their journeys.

The activity of talking to fellow travellers seems to be quite important for car users, as none of the car users indicated to never perform this activity while travelling. Of the group of car drivers, 56.5 percent indicated to sometimes talk to fellow travellers (or passengers) and 30.4 percent said to often do this while driving. In the small group of car passengers (n = 5) all respondents said to always talk to fellow travellers during their journeys, which may represent the importance of ‘passenger talk’ while travelling with others in cars (see the discussion from Laurier et al. (2008, p. 7) in the theoretical chapter on this aspect). In the three included public transport modes, most respondents indicated to sometimes talk to fellow travellers (train users – 69.2 percent, bus users – 61.1 percent and metro users – 100 percent). The higher frequencies of talking to fellow travellers in private transport modes (cars) compared to public transport modes were also represented in the correlation outcomes. The Spearman correlation coefficient between the variables on transport modes and talking to fellow travellers was negative (-0.26) and was statistically significant. This means that frequencies of talking to fellow travellers seem to be lower in public transport modes and higher in cars (according to the data).

Relaxing was already found to be an important use of travel time in the data sample, and this (anti-) activity was also investigated on the aspect of differences between transport modes. Of the group of car drivers, 13 percent said to never relax while driving, which is quite high when considering that other transport mode groups mostly had no respondents indicating to never relax while travelling. But most of the car drivers (52.2 percent) indicated to often relax while driving. Of the car passengers, most indicated to often (60 percent) or always (40 percent) relax while travelling. Most train users (41

percent) said to sometimes relax, while 35.9 percent indicated to often relax and 20.5 percent said to always relax while travelling by train. Most bus users (55.6 percent) said to often relax while travelling, while most metro users indicated to sometimes (46.7 percent) or often (46.7 percent) relax during their journeys. Relaxing thus seems to be an important travel time use for all transport mode users is the sample, which is also represented in the fact that no significant correlations were found between the variables of transport modes and relaxing while travelling.

The (anti-) activity of sleeping was found to be never performed by car drivers in the sample, which is a very logical finding. But most other transport mode users also indicated to never sleep while travelling (car passengers – 40 percent, train users – 59 percent, bus users – 72.2 percent and metro users- 86.7 percent). Train users seemed to perform the most sleeping, with 25.6 percent indicating to sometimes sleep and 15.4 percent indicating to often sleep while travelling. But sleeping as a travel time use showed very low frequencies among most travellers in the sample, and was also not correlated to the transport mode variable.

Listening to music was already found to an important travel time use in the data sample, but will be further investigated here. Most car drivers seem to listen to a lot of music, as 65.2 percent of the respondents in this group indicated to always listen to music while driving. Car passengers also seem to listen to music a lot, as 60 percent indicated to often do that and 40 percent said to always listen to music while travelling. However, 48.7 percent of the train users in the sample indicated to never listen to music, while another 23.1 percent indicated to always listen to music on the train. Bus users mostly indicated to sometimes (33.3 percent) or often (38.9 percent) listen to music while travelling. Metro users mostly (40 percent) indicated to sometimes listen to music while travelling. Listening to music thus seems to be more frequently performed in cars when compared to public transport modes, which was also clearly represented in the correlation analysis. The Spearman correlation coefficient had a value of -0.46, which represented a moderate negative correlation between the transport mode variable and the listening to music variable. Considering the coding of the variables, this means that lower frequencies of listening to music were found in public transport modes and that higher frequencies of listening to music were found in cars.

The activity of eating and drinking while travelling was not found to be an important travel time use in the data sample. In the car users group, most respondents indicated to sometimes eat or drink something during their journeys (car drivers – 60.9 percent and car passenger – 60 percent). Also in the public transport group, most respondents said to only sometimes engage in eating or drinking while travelling (train users – 56.4 percent, bus users – 66.7 percent and metro users – 46.7 percent). So eating or drinking seems to be a relatively unimportant travel time use for all transport mode groups in the data sample.

The aspect of ‘doing nothing’ while travelling is also important to consider, so this variable was also investigated and compared between the transport modes. Of the group of car drivers, 82.6 percent said to never ‘do nothing’ while travelling, which is logical considering the fact that these travellers are always engaged in the activity of driving. Most car passengers (80 percent) indicated they sometimes ‘did nothing’ during their journeys. Of the train users, 33 percent said to never ‘do nothing’ and 48.7 percent said to sometimes ‘do nothing’ while travelling. Within the group of bus users, 38.9 percent indicated to never ‘do nothing’ and half of them (50 percent) said to sometimes ‘do nothing’ during their journeys. Of the metro users, a third (33.3 percent) said to never ‘do nothing’ and 40 percent indicated to sometimes ‘do nothing’ while travelling. From this cross-tabulation it seems that lower frequencies of ‘doing nothing’ are shown among car users. This is also represented in the correlation analysis, as the outcome was a significant correlation coefficient of 0.34. This positive correlation means that higher frequencies of ‘doing nothing’ are shown by public transport users in the sample.

The travel time uses in the ‘other’ category were already discussed in the travel time use paragraph. The most important aspect that should be discussed here is that 7 of the 8 responses in the ‘other’ category were given by car drivers. There were only a few responses in this category, but the fact that almost all responses were by car drivers can mean that car drivers have some distinctive travel time uses. This could be explained by the fact that car drivers have more privacy for their travel time uses. It could also indicate that the questionnaire was more focussed on the travel time uses of public transport users and less on those of car users.

The variables on how people saw their travel time use and how they perceived their travel time were also investigated and compared between transport modes. The aspect on how people saw their travel time use will be discussed first. The cross-tabulation of the travel time use perception variable and the transport mode variable is presented in table 4.11 (see below).

Transport Mode		Do you see your travel time use(s) as productive, time out (relaxation) or lost time?			
		Productive	Time-out/Anti-activity/Relaxation	Wasted/ Lost time	Total
Car (driver)	Count	6	9	8	23
	% within Car drivers	26,1%	39,1%	34,8%	100,0%
Car (passenger)	Count	1	3	1	5
	% within Car passengers	20,0%	60,0%	20,0%	100,0%
Train	Count	10	22	7	39
	% within Train users	25,6%	56,4%	17,9%	100,0%
Bus	Count	5	8	5	18
	% within Bus users	27,8%	44,4%	27,8%	100,0%
Metro	Count	0	13	2	15
	% within Metro users	,0%	86,7%	13,3%	100,0%
Total	Count	22	55	23	100
	% within Transport Mode	22,0%	55,0%	23,0%	100,0%

Table 4.11: Cross-tabulation of travel time use perceptions and transport modes (from the questionnaire data).

The figures in table 4.11 show that most car drivers (39.1 percent) saw their travel time use as time-out or relaxation and almost an equal share (34.8 percent) saw their travel time use as wasted or lost time. Most car passengers (60 percent), train users (56.4 percent), bus users (44.4 percent) and metro users (86.7 percent) also saw their travel time use as time-out or relaxation. Around a quarter of car drivers (26.1 percent), train users (25.6 percent) and bus users 27.8 percent) saw their travel time uses as productive, while not a single metro passenger in the sample indicated to see their travel time use as productive. Quite a large share of car drivers (34.8 percent) saw their travel time use as wasted or lost time. These figures do not show clear indications of differences between transport modes, and the correlation analysis did not show any significant interaction between the variables either. Most travellers in all transport mode groups saw their travel time use as time-out, anti-activity or relaxation.

The aspect on how people perceived their travel time was also analysed on the basis of a cross-tabulation between the two variables. The cross-tabulation of the two variables is presented in table 4.12 (see the next page). The figures in table 4.12 show that most car drivers (65.2 percent) saw their travel time as work or school time, while most car passengers (80 percent) saw their travel time as free time. Among public transport users, the shares of respondents that saw their travel time as work/school time or free time are almost equal in all three groups. There were no significant correlations found between the two variables in the correlation analysis of the data. The outcomes of the above discussed analyses do not provide clear conclusions on the differences in the perception of travel time among the groups of transport mode users. But the higher share of car drivers that saw their travel time as work time is important to recognise from the analysis. Furthermore, around half of the respondents in the public transport mode groups saw their travel time as work or school time and roughly the other half saw their travel time as free time.

Transport Mode		Do you see your travel time as work time/school time or free time?		
		Free time	Work time/ School time	Total
Car (driver)	Count	8	15	23
	% within Car drivers	34,8%	65,2%	100,0%
Car (passenger)	Count	4	1	5
	% within Car passengers	80,0%	20,0%	100,0%
Train	Count	22	17	39
	% within Train users	56,4%	43,6%	100,0%
Bus	Count	9	9	18
	% within Bus users	50,0%	50,0%	100,0%
Metro	Count	7	8	15
	% within Metro users	46,7%	53,3%	100,0%
Total	Count	50	50	100
	% within Transport Mode	50,0%	50,0%	100,0%

Table 4.12: Cross-tabulation of travel time perceptions and transport modes (from the questionnaire data).

4.7.2 Differences in the factors that can influence travel time use

The twelve factors that can influence the use of travel time were also investigated and compared between the different transport modes in the sample. The data on the factor variables were split up between the transport modes in cross-tabulations, to look for differences in the responses of the transport mode groups. The variables were also submitted to correlation analyses to look for interactions between the variables of the influencing factors and the transport modes variable. To be able to interpret the correlation outcomes, it is important to understand the coding of the variables. The transport modes variable is coded as follows: car driver = 1, car passenger = 2, train = 3, bus = 4 and metro = 5. This means that more private modes of transport have lower values and more public modes of transport have higher values. The influencing factor variables are all coded as follows: large negative influence = 1, small negative influence = 2, no influence = 3, small positive influence = 4 and large positive influence = 5. This means that lower values represent more negative perceived influences and higher values represent more positive perceived influences of the factors on travel time use, which has to be considered when interpreting the correlation coefficients.

The first two factors that will be discussed are those of crowding and seating availability, which can only be compared between the different public transport mode groups. These two factors were not asked to public transport users, as the aspects of crowding and seating availability were considered to be less relevant for car users. When looking at the cross-tabulation of the crowding factor, it seemed clear that most public transport users in all subgroups indicated a large negative influence of a high degree crowding on their use of travel time. Of the train users in the sample, 61.5 percent indicated a large negative influence of crowding on their travel time use. For bus users this proportion was 66.7 percent and for metro users it was 60 percent. The correlation analysis did not show any significant interactions between the variables. This means that there are no clear differences between the public transport groups on this factor. All public transport users in the sample perceived a high degree of crowding as very negative for their travel time use.

The cross-tabulation of the seating availability showed that most public transport users perceived a very positive influence of available seating on their travel time use. The large majority of train users in

the sample (66.7 percent) indicated that a high level of available seating (having many free seats) had a large positive influence on their travel time use. Among bus users, 44.4 percent indicated a small positive influence and 50 percent said that available seating had a large positive influence on their use of travel time. Of the metro users, 40 percent indicated a small positive influence and 53.3 percent indicated a large positive influence. The correlation analysis did not show a significant correlation, but did show a small negative value. On the basis of the analysis, one can conclude that available seating had a positive influence on the travel time use of all public transport users. But considering the cross-tabulation percentages and the correlation value (although not significant), the factor of available seating seemed to have the most positive influence on the travel time use of train users in the sample.

The factor of equipment or travel time use items (e.g. books or music players) could be compared between all transport mode groups in the sample. Equipment seemed to have only a very limited influence on car drivers, as 69.6 percent of the car drivers in the sample indicated that this factor had no influence on their use of travel time. Among car passengers, 40 percent indicated that equipment had no influence on their travel time use, while another 40 percent indicated that this factor had a large positive influence. Train users were particularly positive about this factor, as 71.8 percent of the train user in the sample indicated that carrying equipment or travel time use items had a large positive influence on their travel time use. Half of the bus users (50 percent) also said that carrying equipment had a large positive influence on their travel time use, and this proportion was almost the same among metro users (46.7 percent). The correlation analysis did not show a significant correlation, but did result in a small positive value. From the analysis it becomes clear that the factor of equipment or travel time use items had a limited influence on the travel time use of car users and a quite positive influence on that of the public transport users in the sample. Especially train users seemed to be very positively influenced in their use of travel time by carrying equipment or travel time use items.

The factor of ICT operating abilities did not seem to be very important for most transport mode groups in the sample. Especially car users did not seem to be influenced by this factor, as 60.9 percent of the car drivers said that they were not influenced by this factor and all car passengers (100 percent) replied the same. Slightly more than half of the train users in the sample (53.8 percent) indicated that the factor of ICT operating abilities had no influence on their use of travel time, while around a quarter (25.6 percent) said that this factor had a large positive influence on their travel time use. Most of the bus users (66.7 percent) and metro users (53.3 percent) indicated that ICT operating abilities had no influence on their use of travel time. The correlation analysis did not show a significant correlation, which indicated that there are no clear patterns in the differences between transport modes. Most transport mode groups in the sample do not seem to be influenced by the factor of ICT operating abilities, with the exception of a quarter of the train users who indicated a large positive influence of this factor on their travel time use.

The factor of planning to do activities while travelling was already shown to be of limited importance to the respondents in the sample. This particularly seemed to be the case for car users, as 65.2 percent of the car drivers and 60 percent of the car passengers indicated that the factor of planning had no influence on their travel time use. This was also the case for 56.4 percent of the train users, 50 percent of the bus users and 40 percent of the metro users. But some of the public transport users were influenced by this factor, as 20.5 percent of the train users, 22.2 percent of the bus users and 26.7 percent of the metro users indicated that the factor of planning had a large positive influence on their use of travel time. The correlation analysis did not show a significant correlation between the variables, but it did show a small positive value (0.17). The outcomes of the analyses seem to show that most respondents were not influenced by the factor of planning, but that public transport users were slightly more positively influenced in their travel time use by planning than car users.

The influence of noise on peoples' travel time use seemed to be generally negative, although there were some differences. Among car drivers, 39.1 percent indicated that noise had no influence on their use of travel time, while another 34.8 percent said that noise had a large negative influence on their travel time use. Car passengers mostly indicated a small negative influence (60 percent) or a large negative influence (40 percent). The group of train users had the largest share of people that indicated a large negative influence of noise on their travel time use (53.8 percent). Among bus users, 38.9 percent indicated a large negative influence of noise on the use of travel time, and 40 percent of the metro users in the sample indicated the same. The correlation analysis did not show a significant correlation between the transport modes variable and the noise factor variable. The results from the

cross-tabulation seemed to indicate that noise had a negative influence on the travel time use of all transport mode groups. But the negative influence of noise seemed to be the largest for the travel time use of train users and the smallest for that of car drivers in the sample.
A good design of the vehicle (with many facilities) seemed to be quite important for the travel time use of car users, as 56.5 percent of the car drivers indicated a large positive influence and 60 percent of the car passengers indicated a small positive influence of this factor on travel time use. Most of the train users (56.4 percent) said that a good vehicle design had large positive influence on their use of travel time. Among both bus and metro users, a third of the respondents (33.3 percent) indicated that a good vehicle design had no influence on their travel time use, while another third (33.3 percent) in both groups indicated a large positive influence. The correlation analysis did not show a significant correlation, but it did result in a small negative value (-0.13). The discussed analyses seem to indicate that a good vehicle design had a positive influence on the travel time use of all transport mode groups. But considering the cross-tabulation percentages and the correlation value (although not significant), the factor of good vehicle design seemed to have the most positive influence on the travel time use of car drivers and train users in the sample.
The factor of high vehicle quality (conceptualised here as a vehicle with space, privacy and comfort), was already found to be an important influencing factor on travel time use of the respondents. This seemed to be especially true for car drivers, as 78.3 percent of the car drivers in the sample indicated that travelling in a high quality vehicle had a large positive influence on their use of travel time. Most car passengers (80 percent) said that high vehicle quality had a small positive influence on their travel time use. Of the train users, 56.4 percent indicated that the factor of high vehicle quality had a large positive influence on their travel time use. Around half of the bus users (50 percent) and metro users (53.3 percent) indicated that high vehicle quality only had a small positive influence on travel time use. The correlation analysis showed a significant negative correlation of -0.27, which points towards a more positive influence of high vehicle quality among car users in the sample (when considering the variable coding scheme which was presented at the beginning of this section). The discussed analyses indicate that high vehicle quality seemed to have a positive influence on the travel time use of all transport mode groups. But when considering the cross-tabulation percentages and significant negative correlation coefficient, the factor of high vehicle quality seemed to have the most positive influence on the travel time use of car drivers (and to a lesser extent that of train users) in the sample.
Journey duration seemed to have a very limited influence on the travel time use of car drivers, as 69.6 percent of the car drivers in the sample indicated that a long duration of the journey had no influence on their use of travel time. Among car passengers, the influence of a long journey was indicated to be small positive (40 percent) or large positive (40 percent) on the use of travel time. Of the group of train users, 28.2 percent said that a long duration of the journey had a small positive influence and 30.8 percent indicated this aspect had a large positive influence on travel time use. A 44.4 percent share of the bus users indicated that a long duration of the journey had a small positive influence on their use of travel time. There was a quite differentiated pattern among metro users, as 20 percent indicated a small negative influence while another 33.3 percent indicated a large positive influence of long journey duration on their travel time use. The correlation analysis showed a small but significant positive coefficient of 0.2, which could indicate a positive influence of a long duration of the journey on the travel time use of public transport users. The factor of long journey duration did not seem to have a clear influence on the travel time use of most travellers, but there were some differences. Long journey duration seemed to have a low influence on the travel time use of car drivers, a partly negative and partly positive influence on the travel time use of metro passengers and a more positive influence on the travel time use of train users in the sample.
The factor of journey familiarity was already found to have a limited influence on the travel time use of the respondents in the sample. This was also found in the cross-tabulation, which showed that 43.5 percent of the car drivers and 35.9 percent of the train users indicated that their travel time use was not influenced by journey familiarity. But 39.1 percent of the car drivers, 40 percent of the car passengers, 30.8 percent of the train users, a substantial 66.7 percent of the bus users and 53.3 percent of the metro users indicated that a high journey familiarity had a small positive influence on their travel time use. So their seemed to be no clear differences in the influence of this factor between the transport mode groups, which was also represented in the low and insignificant correlation value that was found in the

analysis. Overall, the factor of journey familiarity seemed to have only a small positive influence on the travel time use of all transport mode groups in the sample.
The institutional and social factors were already found to be of limited importance for the respondents in the sample. When looking at the institutional factor (on the influence of rules and norms on travel time use), 65.2 percent of the car drivers, 100 percent of the car passengers, 44.4 percent of the bus users and 46.7 percent of the metro users indicated that the factor of rules and norms had no influence on their use of travel time. But only 30.8 percent of the train users said that institutional aspects had no influence on their travel time use, and 28.2 percent of the train users said that rules and norms had a large positive influence on their use of travel time. The correlation analysis did not show a significant correlation between the variables. It seems that the institutional factor had a very limited influence on the travel time of most transport mode groups, but the influence seemed to be slightly more positive among train users.
The social factor (on the public gaze and socially desirable behaviour) also seemed to have a very limited influence on the travel time of most respondents. The shares of respondents that indicated that this factor has no influence on their travel time were: 60.9 percent of the car users, 80 percent of the car passengers, 59 percent of the train users, 55.6 percent of the bus users and 46.7 percent of the metro users. The indicated influences of the social factor were quite differentiated in all transport groups, as there were respondents that indicated a negative influence and respondents that indicated a positive influence of the social aspects on their travel time use. The correlation analysis did not show a significant correlation between the variables. Overall, the influence of the institutional aspects (the public gaze or socially desirable behaviour) on travel time use was quite limited among all transport groups. The indicated influences were both positive and negative in all transport mode groups. Some respondents could have felt that a watchful eye of others could ensure order and decent behaviour in transport vehicles, which they could have seen as positive for their use of travel time. Others might have perceived a more negative influence of the social aspects, as they might have felt that people were watching them or judging their behaviours (which negatively influenced their travel time use).

4.7.3 Differences in the role of ICT in travel time use

In the section on the differences in travel time use between transport modes, certain aspects of the role of ICT have already been discussed. Mobile phones (especially for calling and texting) were found to be more frequently used in public transport modes, especially train and bus users seemed to use their mobile phones more frequently while travelling. The use of laptops was quite limited among the travellers in the sample, but train users seemed to be the exception as they showed higher frequencies in the use of laptops while travelling (especially for work or study purposes). In the previous section on the differences in influencing factors between transport modes, some aspects of ICT were also mentioned. The factors of carrying equipment or ICT operating abilities did not seem to have a large influence on the travel time use of most travellers, but the exception seemed to be train users again. Train users seemed to be more positively influenced in their travel time use by carrying equipment, and a quarter of this group also said to be very positively influenced in their travel time use by the aspect of ICT operating abilities. So some differences between transport modes in the role of ICT were already discusses, but this section will provide a more focussed investigation of this aspect. The three separate variables on the role of ICT from the questionnaire were compared between the transport modes. Just like in the previous sections, cross-tabulations and correlation analyses were used to look for clear differences between transport modes. The tables on the analyses will not be presented in this section, as they will take up to much space and are not all relevant. Only the relevant outcomes of the analyses (percentages and coefficients) will be presented and discussed in this section.

The variable on carrying mobile ICT devices while travelling was compared between the transport modes in the sample, but the analyses did not show any clear differences. Most of the car drivers (87 percent), car passengers (80 percent), train users (89.7 percent), bus users (88.9 percent) and metro users (86.7 percent) indicated to always carry mobile ICT devices while travelling. The correlation analysis did not show a significant correlation, so there seemed to be no clear differences in the carrying of ICT between the transport mode groups in the data sample.
The use of ICT was also investigated, and these analyses did show clear differences between the transport mode groups. Around a quarter of the car drivers (26.1 percent) indicated to never use ICT

devices while travelling, while most of the car drivers (56.5 percent) said to sometimes use mobile ICT devices during their journeys. Among car passengers, 20 percent said to never use ICT while travelling and 60 percent indicated to sometimes use ICT devices in the car. Of the train users in the sample, only a small share of 7.7 percent said to never use ICT while travelling. And the shares of bus and metro users that never use ICT were also very small (5.6 and 6.7 percent respectively), which already seems to indicate more ICT use in public transport. Most of the public transport users said to sometimes use ICT while travelling (train users – 33.3 percent, bus users – 38.9 percent and metro users – 40 percent). But some of the metro users (26.7 percent) and especially many train users (33.3 percent) indicated to always use mobile ICT devices while travelling. The correlation analysis showed a significant correlation coefficient of 0.27, which indicated a weak to moderate positive correlation between the transport mode variable and the ICT use variable. The coding of the transport modes variable is: car driver = 1, car passenger = 2, train = 3, bus = 4 and metro = 5, which means that more private modes of transport have lower values and more public modes of transport have higher values. The coding of the ICT use variable is: never = 0, sometimes = 1, often = 2 and always = 3, which means that higher values represent higher frequencies of ICT use. This coding scheme is important to understand when interpreting the correlation coefficient. When considering the coding scheme, the positive correlation coefficient means that higher frequencies of ICT use seemed to be performed in public transport modes. ICT thus seemed to be more frequently used is public transport modes when compared to cars, and especially train users seemed to use mobile ICT devices quite frequently.

The influence of new mobile ICT opportunities on the travel time use of respondents was also compared between the different transport modes in the sample. A large share of car drivers in the sample (39.1 percent) indicated they were not influenced by ICT opportunities in their use of travel time. And another 39.1 percent of the car drivers said they only felt a small influence of new mobile ICT opportunities on their travel time use. Of the car passengers, 40 percent indicated no influence and 60 percent indicated a small influence of ICT opportunities on their travel time use. Among the group of train users in the sample, 28.2 percent indicated no influence of ICT opportunities on travel time use. But a substantial 41 percent of the train users said that new mobile ICT opportunities had a large influence on their use of travel time. None of the bus users in the sample (0 percent) indicated that ICT opportunities had no influence on their use of travel time, which is quite striking. Less than half of the bus users (44.4 percent) indicated a moderate influence of ICT, and more than a quarter (27.8 percent) said that new mobile ICT opportunities had a large influence on their travel time use. The shares were more equal among metro users, as the categories of no influence, small influence and moderate influence all had a score of 26.7 percent. A fifth of the metro users (20 percent) indicated that new mobile ICT opportunities had a large influence on their use of travel time. The correlation analysis showed a significant correlation coefficient of 0.25, which indicated a relatively weak but positive interaction between the variables. The coding of the transport modes variable is: car driver = 1, car passenger = 2, train = 3, bus = 4 and metro = 5, which means that more private modes of transport have lower values and more public modes of transport have higher values. The coding of the ICT influence variable is: no influence = 0, small influence = 1, moderate influence = 2 and large influence = 3, which means that higher values represent a larger influence of ICT opportunities on travel time use. Considering this coding scheme, the positive correlation coefficient means that larger influences of new mobile ICT opportunities were felt by public transport users in the sample. New mobile ICT opportunities seemed to have the largest influence on travel time use in public transport modes, and especially train users seemed to be strongly influenced in their travel time use by ICT opportunities. This outcome is also in line with the outcome of the analysis on the differences in the use of ICT between transport modes, where train users were found to use mobile ICT devices most frequently while travelling (when compared to the other transport mode groups in the data sample).

4.7.4 Differences in the influence of travel time use on journey experience

The outcomes of the question on the influence of a high level of travel time use on the perceived journey experience of travellers, was also compared between transport modes. By looking at the cross-tabulation and correlation analysis of the transport modes variable and the journey experience variable, the potential differences could be analysed. The cross-tabulation of the journey experience variable with the transport modes variable is presented in table 4.13 (see the next page).

Transport mode		The influence of a high level of travel time use on the perceived journey experience			
		No influence	Negative influence	Positive influence	Total
Car (driver)	Count	7	1	15	23
	% within Car drivers	30,4%	4,3%	65,2%	100,0%
Car (passenger)	Count	1	0	4	5
	% within Car passengers	20,0%	,0%	80,0%	100,0%
Train	Count	6	0	33	39
	% within Train users	15,4%	,0%	84,6%	100,0%
Bus	Count	0	0	18	18
	% within Bus users	,0%	,0%	100,0%	100,0%
Metro	Count	2	0	13	15
	% within Metro users	13,3%	,0%	86,7%	100,0%
Total	Count	16	1	83	100
	% within Transport modes	16,0%	1,0%	83,0%	100,0%

Table 4.13: Cross-tabulation of the journey experience and transport modes variables (from the questionnaire data).

The figures in table 4.13 show that most respondents in all transport mode groups felt that a high level of travel time use (performing many activities while travelling) had a positive influence on how they perceived their journey experience. But a relatively large share of the car drivers (30.4 percent) and the car passengers (20 percent) indicated that a high level of travel time use had no influence on their perceived journey experience. Among public transport users in the sample, most respondents (more than 80 percent) indicated a positive influence of performing many activities while travelling on their perceived journey experience. Especially bus users, of which 100 percent indicated a positive influence, seemed to perceive a very positive influence of a high level of travel time use on how they experienced their journey.

The correlation analysis showed a significant correlation coefficient of 0.25, which indicated a weak but positive correlation between the variables of transport modes and journey experience. The coding of the transport mode variable is: car driver = 1, car passenger = 2, train = 3, bus = 4 and metro = 5, which means that more private modes of transport have lower values and more public modes of transport have higher values. The coding of the journey experience variable is: no influence = 0, negative influence = 1 and positive influence = 2, which means that more influence of travel time use in general and more positive influence of travel time use on journey experience have higher values than no influence. When considering this coding scheme and the almost non-response in the negative influence category (see table 4.13), the positive correlation coefficient means that a more positive influence of a high level of travel time use on the perceived journey experience was felt among public transport users in the sample. When looking at the analyses above, a generally positive influence of a high level of travel time use on the perceived journey experience was perceived by all transport mode groups. But the most positive influence of travel time use on journey experience was indicated by public transport mode users in the sample.

4.7.5 Differences between transport modes as perceived by respondents

The differences in travel time use, influencing factors, the role of ICT and the influence of travel time use on the journey experience have all been discussed in this paragraph on the basis of data analyses. But it is also important to look at the differences between transport modes (in terms of travel time use) as they were perceived by the respondents in the sample. There were two direct questions on this

aspect in the questionnaire, one about the perceived differences in travel time use between transport modes and one about the best transport mode option in terms of travel time use. The outcomes from these two questions will be discussed on the basis of two presented frequency-tables and the results from analysing cross-tabulations (which are not presented, but only discussed in this chapter). There was also one question on the influence of the transport mode characteristics on the use of travel time. The data on this question was analysed in a cross-tabulation to see whether the respondents perceived the characteristics of their own transport mode to have a positive or negative influence on their travel time use.

The first aspects that will be discussed are the data outcomes of the question on the perceived differences in the degree of travel time use between the transport modes in the sample. The degree of travel time use was explained to the respondents as the amount of activities that are performed while travelling. The results from this question are presented in table 4.14 (see below).

Perceived differences between transport modes in the degree of travel time use	No differences	Small differences	Large differences	Total
Percentage	2	31	67	100

Table 4.14: Perceived differences between transport modes in the degree of travel time use (from the questionnaire

The figures in table 4.14 show that around a third of the respondents (31 percent) indicated to perceive small differences in the degree of travel time use between transport modes. But most respondents (67 percent) said to perceive large differences in the degree of travel time use between transport modes. Most travellers in the sample thought that there were large differences in the amounts of travel time activities that are being performed in cars, trains, busses and metros.
When the outcomes of the cross-tabulations were analysed, there seemed to be some differences in this aspect between transport modes. A substantial share of the car drivers (87 percent) indicated to perceive large differences between transport modes in terms of travel time use. Most public transport users also perceived large differences, but these shares were smaller (train users – 61.5 percent, bus users – 61.1 percent and metro users – 66.7 percent). So it seems that more car drivers seemed to perceive large differences between transport modes in terms of travel time use, when compared to the public transport users in the sample.
Respondents in the questionnaires were also asked to report which transport mode they saw as the best transport mode option in terms of performing useful and/or relaxed travel time activities. Respondents could not choose from all imaginable transport modes, but just from the five transport modes that are included in the present study (car (as a driver), car (as a passenger), train, bus or metro). The results from this question are presented in table 4.15 (see below).

Best transport mode option for useful and/or relaxed travel time use	Car (driver)	Car (passenger)	Train	Bus	Metro	Total
Percentage	3	21	73	1	2	100

Table 4.15: The perceived best transport mode option in terms of travel time use (from the questionnaire data).

The percentages in table 4.15 clearly show that most respondents (73 percent) thought that the train is the best transport mode option in terms of travel time use. Travelling as a car passenger was also seen as a good option by some travellers, as quite a significant share of the respondents (21 percent) indicated this transport option as the best option in terms of travel time use. This could be due to the fact that car passengers combine the advantage of not having to devote attention to driving with the relative privacy of the car. Driving in cars or travelling by bus or metro were not seen as good travel options in terms of travel time use by most respondents. This low score for car driving is probably due to the fact that car drivers need to devote their attention mostly to driving, which severely limits their

travel time use options. Busses and metros are quite cramped and generally have shorter journey times, which might lead most people to not perceive them as good options in terms of travel time use. The train was clearly perceived as the best option in terms of useful and relaxed travel time use, which could be explained by the fact that trains provide more space, comfort and facilities than other public transport modes in the Netherlands.
When looking at the outcomes for the cross-tabulation, most transport mode groups still perceived the train as the best option. Car passengers seem to be the exception, as 60 percent of this group saw travelling as a car passenger as the best option in terms of travel time use. But it has to be noted that there were only 5 car passengers in the sample, so no solid conclusions can be made on the group of car passengers from the sample. A significant share of the train users (28.2 percent) also indicated that they see travelling as a car passenger as the best option in terms of travel time use. But the cross-tabulation did not show large differences, as most transport mode groups still perceived the train to be the best transport mode option in terms of travel time use.

There was one question in the questionnaire about the influence of the characteristics of the transport mode the respondents were using (regularly) on their use of travel time. Respondents could indicate whether the characteristics of their transport mode had a large negative, small negative, small positive, large positive or no influence on their travel time use. This aspect was included in the influencing factors part of the questionnaire, but will be analysed in this section of the chapter. When looking at the data outcomes in a cross-tabulation, the differences in positive or negative perceived influences of the different transport modes on the respondents' travel time use could be discussed. This analysis gave good insights into the influences of certain transport mode characteristics from the users of these transport modes themselves. The cross-tabulation of this influence variable and the transport modes variable is presented in table 4.16 (see the next page).
The cross-tabulation in table 4.16 shows that most transport mode users were quite divided on the perceived influence of the transport mode characteristics on their travel time use. Of the car drivers, 30.4 percent indicated that the characteristics of the car had no influence on their use of travel time. But 21.7 percent of the car drivers indicated a small positive influence and another 21.7 percent even indicated a large positive influence of the characteristics of the car on their travel time use. Car passengers were very divided, as 40 percent indicated a small negative influence, while 20 percent indicated a small positive influence and another 20 percent indicated a large positive influence of the characteristics of the car. Train users were very positive about their transport mode, as 25.6 percent indicated a small positive influence and a substantial 46.2 percent said that the characteristics of the train had a large positive influence on their travel time use. Bus users were divided on their perceived influence, as 33.3 percent indicated a small negative influence and 44.4 percent indicate a small positive influence of the characteristics of the bus on travel time use. Metro users seemed to be the most negative of the transport mode groups, as a third (33.3 percent) indicated no influence and another third (33.3 percent) said that the characteristics of the metro had a small negative influence on their use of travel time.
From this analysis it seems that most transport mode groups in the sample were quite divided on the perceived influence of the characteristics of their transport mode on the use of travel time. It also became clear that metro users were quite negative on their transport mode, and that car drivers are quite positive on the influence of their transport mode characteristics on travel time use. But train users seemed to be exceptionally positive about the influence of the characteristics of the train on the use of travel time. This outcome is very much in line with the outcome of the best perceived transport mode option in terms of travel time use (see table 4.15 on the previous page), which also showed a very positive result for the train in terms of travel time use.

Transport mode		The influence on travel time use of the characteristics of the transport mode you are regularly travelling on					
		Large negative influence	Small negative influence	No influence	Small positive influence	Large positive influence	Total
Car (driver)	Count	2	4	7	5	5	23
	% within Car drivers	8,7%	17,4%	30,4%	21,7%	21,7%	100,0%
Car (passenger)	Count	0	2	1	1	1	5
	% within Car passengers	,0%	40,0%	20,0%	20,0%	20,0%	100,0%
Train	Count	1	3	7	10	18	39
	% within Train users	2,6%	7,7%	17,9%	25,6%	46,2%	100,0%
Bus	Count	1	6	3	8	0	18
	% within Bus users	5,6%	33,3%	16,7%	44,4%	,0%	100,0%
Metro	Count	1	5	5	3	1	15
	% within Metro users	6,7%	33,3%	33,3%	20,0%	6,7%	100,0%
Total	Count	5	20	23	27	25	100
	% within Transport modes	5,0%	20,0%	23,0%	27,0%	25,0%	100,0%

Table 4.16: Cross-tabulation of the influence of the transport mode characteristics on travel time use and transport modes variables (from the questionnaire data).

4.7.6 Initial conclusions on the differences between transport modes

The question on differences between transport modes was: What are the main differences in travel time use, influencing factors, the role of ICT and journey experiences between people using personal transport modes (cars) and people using different public transport modes (train, bus or metro) for daily journeys? From the discussed analysis in this paragraph, certain aspects on the differences between transport modes became clear.

Most travel time uses in the data showed higher frequencies in public transport modes when compared to cars. The activities of looking out of the window, reading for leisure, work or study, using mobile phones, using laptops, sleeping and 'doing nothing', were more frequently performed in public transport modes according to the questionnaire data. Especially train users showed high frequencies of many travel time uses. The activities of talking to fellow travellers, listening to music and travel time uses in the 'other' category, were more frequently performed in cars. Relaxing seemed to an equally important travel time use for all transport mode groups, and the activity of eating and/or drinking was quite unimportant among all groups. The perception of travel time use showed no clear differences between transport mode groups, as most respondents in all transport mode groups saw their travel time use as time-out or relaxation.

The factors that can influence travel time use, also showed certain differences between transport modes. The negative influence of crowding and the positive influence of seating availability were mainly felt by train users in the sample. The factors of equipment and ICT operating abilities only

showed positive influences on the travel time use of train users, while other transport mode groups only reported very limited influences of these factors. The small positive influence of planning, the negative influence of noise, the small positive influence of long journey duration and the small positive influence of journey familiarity were all mainly felt by public transport users in the sample. The factors of good vehicle design and high vehicle quality had positive influences on the travel time use of all transport mode groups, but slightly more on that of car users than that of public transport users. The institutional and social factors had limited influences on the travel time use of all transport mode groups in the sample.
The role of ICT also differed between transport modes, as certain patterns were found in the data. The aspect of carrying mobile ICT devices while travelling showed no clear differences, as most respondents in all transport mode groups always carried these devices. But the use of these mobile ICT devices did show clear differences, as public transport users were found to use ICT more frequently than car users. Especially train users seemed to use mobile ICT devices quite frequent during their journeys. New ICT opportunities had the largest influence on the travel time use of public transport users and especially on the travel time activities of train users in the sample.
The influence of a high level of travel time use was generally perceived to be positive for the journey experience of most travellers in the sample. But the positive influence of performing many activities while travelling was felt more strongly by public transport users when compared to the car users in the sample.
The respondents themselves also perceived significant differences in travel time use between the different transport modes. Especially car users perceived large differences in travel time use between the transport modes. The train was seen by most respondents as the best transport mode option in terms of useful and relaxed travel time use. Train users were also very positive on the influence of the characteristics of their transport mode on the use of travel time. Car drivers were also quite positive (although less than train users) and metro users were quite negative about the influence of the metro characteristics on the use of travel time.
The hypothesis on the differences between transport modes was: (H4) *Clear differences in travel time uses and the other investigated aspects between private transport modes (cars) and different public transport modes will be expected in the research findings. Travel time uses in public transport modes are expected to show higher varieties and frequencies than in cars. Trains are expected to show highest frequencies of travel time uses and are expected to be perceived as the best transport mode option in terms of travel time use.* This hypothesis can largely be confirmed, as there were certainly differences in travel time uses between the different transport modes. Most travel time uses were found to be most frequently performed in public transport modes when compared to cars. The train was found to be the most positive in terms of travel time use opportunities in the analyses of the data. Most travel time uses were most frequently performed on trains, most factors had the most influence on the travel time use of train users and the role of ICT seemed to be the largest and most positive in the travel time use on trains. And most importantly, most respondents in the sample indicated that the train was the best transport mode option in terms of travel time use.

4.8 Observation results

Next to the questionnaire data that were discussed in this chapter so far, there were also data collected by means of observation. These data were collected by performing 12 observations on different transport modes; 3 in cars, 3 in trains, 3 in busses and 3 in metros. The results from the observations will be presented and discussed in this paragraph. The main aim of this paragraph is to compare and discuss the differences or similarities between the reported behaviour of the respondents in the questionnaire data and the actual behaviour of travellers in the observation data.

4.8.1 Sample characteristics

The observation data sample seems to be quite limited in size (with only 12 observations), but in total 162 travellers were observed during the data collection. But as with the questionnaire data, it is important to discuss the characteristics of the sample. These characteristics need to be kept in mind

when discussing the results and drawing conclusions on the basis of the data. The sample characteristics that will be discussed are: transport modes, train class and observation times.

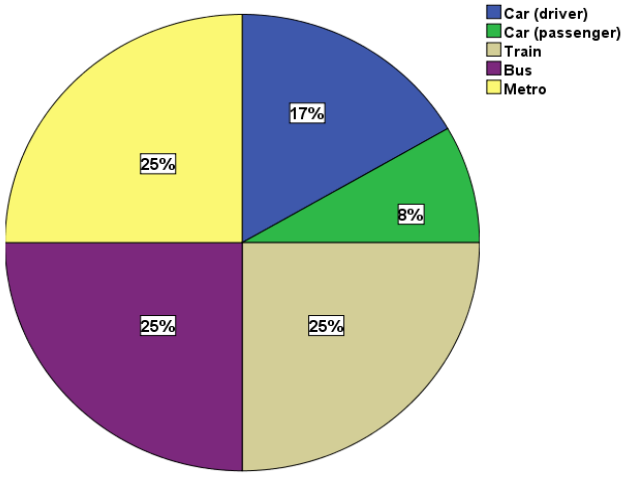

Figure 4.4: Transport modes (in the observation data).

The sample was balanced on the different transport modes, so car users, train users, bus users and metro users have all been observed equally frequent. But car users were subdivided into car drivers and car passengers, so their shares were smaller in the observations. The transport mode distribution in the observation data is presented in figure 4.4 (on the left).
The percentages in figure 4.4 show that all transport mode groups represent a quarter of the sample. But there were only two observations on car drivers and one observation on a number of car passengers during a particular journey, so their shares in the data are lower than a quarter. But the chi-square test of the transport mode variable still showed a quite low value, which indicated a variable that closely represents a theoretical distribution.
Of the observations on trains, two were performed in second class train compartments and one was performed in a first class train compartment. So most train data from the observations were collected in second class, but this was also the case for the questionnaire data sample. The questionnaire data also showed more second class travellers than first class travellers among the group of train users.
The time of day when the observations were performed was also noted in the data. It can be important to consider the times of the observation windows when working with the data, as there could be differences in the behaviour of people at certain times. It was noted on the observation schedule if the observations were performed in the morning rush-hour, the middle of the day, the evening rush-hour or the evening. The results from this are presented in figure 4.5 (on the right). The bar chart in figure 4.5 shows that most observations were performed in the middle of the day (58.3 percent) or the evening rush-hour (25 percent). There was only one observation in the morning rush-hour and only one in the evening time-window, which is mainly due to practical reasons. But this aspect of the observation sample needs to be considered in the rest of this paragraph, when working with the data results and drawing conclusions on the basis of these results.

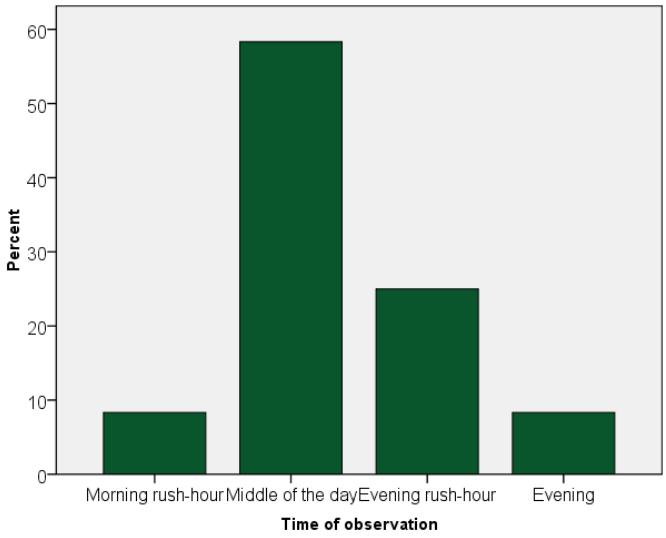

Figure 4.5: Observation time distribution (in the observation data).

4.8.2 Travel time use

The things that people do while travelling was the main aspect that was observed in the data collection. The travel time use categories from the questionnaire were slightly modified for the observation schedule, because not all aspects were clearly observable. But most travel time use categories were kept the same, as this is important for the comparability with the questionnaire data. It was recorded how many people were performing certain activities at some point during a certain time-window. The outcomes of this were divided by the number of people that were under observation (which was also recorded in the observation schedule), so that percentages of all the observed travel

time uses could be calculated. The mean percentages of the observed travel time uses from the observation data are presented in table 4.17 (see below).

Travel time uses	Mean Percentages
Driving (or assisting) (car users) (n = 3)	75,0
Navigating (or route finding) (car users) (n = 3)	0,0
Looking out of the window (n = 12)	83,6
Reading (n = 12)	15,7
Using mobile phones (n = 12)	32,8
Using laptops (n = 12)	1,1
Using other ICT devices (n = 12)	15,4
Working or studying (n = 12)	11,1
Talking to fellow travellers (n = 12)	32,1
Relaxing (n = 12)	46,8
Sleeping (n = 12)	3,4
Listening to music (n = 12)	44,7
Eating and/or drinking (n = 12)	19,1
Doing nothing (n = 12)	12,3
Other activities (n = 12)	62,7
(sometimes multiple activities performed by one person)	

Table 4.17: Travel time use percentages (averages) of all travellers in the sample (from the observation data).

The figures in table 4.17 show that there were only 3 observations on the travel time uses of driving and navigating. But this was due to the fact that these travel time uses were only observed in cars, and there were only 3 car observations in the sample. Of the car users in the sample, on average 75 percent was engaged in the activity of driving (or assisting in driving) during the journey, which makes sense as driving is an indispensable activity while travelling by cars. The fact this percentages is not 100, is due the fact that car passengers are also part of the car users group in the sample. The activity of driving was also found to be important for car users in the questionnaire data.

The activity of navigating was not observed by the researcher during data collection in cars. This might be due to the fact that only 3 car journeys were made for data collection, and that most routes seemed to be known to the drivers. The questionnaire data also showed low frequencies of navigating among car users, as most respondents said to never or sometimes perform this activity while driving.

The activity of looking out of the window was very often observed in the sample, as on average 83.6 percent of the travellers under observation were looking out of the window at some point during their journeys. Looking out of the window was also found to be an important travel time use in the questionnaire data, as only 3 percent of the respondents indicated to never look out of the window while travelling. But the average percentage of people that were looking out of the window while travelling was much higher in the observations than was expected after the questionnaire results.

Reading was only performed by 15.7 percent of the travellers in the sample, which does not make it a very important use of travel time in the sample. Around half of the respondents in the questionnaire data indicated to read (for work/study or leisure) at some point during their journeys, but this activity was not performed that often in the observation time-windows.

On average, around a third of the travellers in the observation data (32.8 percent) were using mobile phones while travelling. This seems to be quite a lot, but this was also found in the questionnaire data. Mobile phone use was quite common among the respondents in the questionnaires, and this was also reflected in the observations. Using mobile phones thus seems to an important travel time use in the present study.

The use of laptops was almost never observed during data collection, as this activity only showed an average percentage of 1.1 percent in the observation data. The use of laptops was also found to be low in the questionnaire data, as 82 percent of the respondents indicated to never use one while travelling. But the actual use of laptops seemed to even less among travellers in the observation data sample. So using laptops seems to be a very unimportant use of travel time, even in the current Information Age.

But (on average) 15.4 percent of the travellers in the observation data did use other mobile ICT devices while travelling. These devices were mostly smart-phones or PDA's, which can be used for

work, entertainment or communication. So these smaller ICT devices seem to be more important in the use of travel time.
It was not always easy to observe if people were working or studying during their journey, but on average 11.1 percent of the people under observation seemed to be working or studying. This seems to indicate that working or studying were not very important travel time uses for most people. This was also found in the questionnaire data, were most respondents indicated to never work or study with paperwork or laptops while travelling.
Talking to fellow travellers during the journey was performed by around a third of the travellers under observation (32.1 percent on average). This seems to be quite a lot, but this was also found in the questionnaire data. Of the respondents in the questionnaires, only 9 percent indicated to never talk to fellow travellers and 66 percent said to sometimes do this while travelling. Talking to fellow travellers thus seems to be a quite important and relatively often performed use of travel time.
The (anti-)activity of relaxing was not always easy to observe, as the researcher could not always clearly see if someone was relaxing. The researcher has been observing if people were for instance: sitting back, doing something to relax (like listening music or reading through a newspaper) or were not working or studying visibly. It seemed that (on average) 46.8 percent of the travellers under observation were relaxing during their journey. This high share of people that were relaxing while travelling was also found in the questionnaire data, were only 4 percent indicated to never relax while travelling. Almost half of the respondents (46 percent) indicated to often relax during their journeys. Relaxing thus seems to be a very important travel time use in the present study.
Sleeping was only performed by 3.4 percent of the travellers under observation, which seems to be quite a low share. But this was also found in the questionnaire data, in which around three quarters of the respondents (74 percent) indicated to never sleep while travelling. The (anti-)activity of sleeping thus seems to be a quite uncommon and unimportant use of travel time in the data sample.
The activity of listening to music while travelling seems to be a quite important use of travel time, as (on average) 44.7 percent of the travellers under observation were listening to music during their journeys. Listening to music was also found to be an important travel time use in the questionnaire data, as 26 percent of the respondents indicated to often do this and 28 percent said to always listen to music while travelling. Listening to music thus seems to be an important use of travel time in both the observed and stated behaviours of the travellers in the data samples.
On average 19.1 percent of the travellers under observation were found to be eating or drinking something while travelling. Quite a large share of the respondents in the questionnaire data (58 percent) indicated to sometimes eat or drink something during a journey. So their seem to be no significant differences in the stated and actual behaviour of travellers on this aspect either, although (on the basis of the data results) the activity of eating or drinking is not perceived to be an important use of travel time in the present study.
It was not straightforward to observe if people were doing nothing while travelling, as mental activities are not observable. But the researcher has been observing if people were not engaged in an observable activities or seemed to be inactive in any way. On average, 12.3 percent of the travellers under observation seemed to be doing nothing with their travel time. In the questionnaire data, 45 percent said to never ‘do nothing’ and 40 percent indicated to sometimes ‘do nothing’ while travelling. Clear conclusions about the share of people ‘doing nothing’ while travelling are hard to make, as it is quite a difficult aspect to clearly report or observe. But it seems that quite a low share of travellers was really doing nothing with their travel time.
The travel time uses in the ‘other’ category showed quite a large average percentage (62.7) among the travellers that were observed. This can be explained by the fact that some people were performing multiple other activities, which sometimes resulted in very high percentages in this category. In the questionnaire data, only 8 out of the 100 respondents indicated a travel time activity in the ‘other’ category. So it seems that the actual behaviour of travellers is different from their stated behaviour on this aspect. This can be partly explained by the memory problems connected to data collection with questionnaires and interviews, as people might not remember everything they did while travelling. It could also be that people might not consider certain activities as actual travel time uses that are worth mentioning. But the observations did result in some interesting alternative travel time uses, namely: looking after belongings, writing notes, checking car-dials, going through personal belongings/bags, making pictures, checking the time, staring at the ground, child caring, reading posters, searching for

seats, playing music out loud, ignoring others and observing the observer. The observations showed much more different travel time uses when compared to the questionnaires. Travel time use thus seems to be more varied than was assumed in some of the theory or was found in the questionnaire data.

4.8.3 Factors that can influence travel time use

Many factors that were discussed in the questionnaire results were not included in the observations because these factors were not observable. The 5 factors that were recorded in the observations are: degree of crowding, availability of seating, level of noise, vehicle design and vehicles quality. These are only 5 influencing factors, but these factors were found to be the most important influencing factors on travel time use in the questionnaire data results. The workings of these factors were analysed on the basis of cross-tabulations of the travel time use variables and the factor variables. The status of each factor (for instance: whether it was highly crowded or not) was recorded on the observation schedule, and the outcomes of these variable were cross-tabulated with the average percentages of the performed travel time uses. The cross-tabulations are not presented in this section, as only the relevant results from the analyses will be discussed here.

The factor of the degree of crowding was only recorded and analysed for public transport users in the sample, for the same reason as with the questionnaire data collection. When analysing the cross-tabulation, some travel time uses seemed the show higher average percentages when the degree of crowding was high. Activities like: reading, using mobile phones or laptops, working or studying and eating or drinking showed higher percentages with a high degree of crowding. Other activities like: looking out of the window, talking, relaxing and listening to music showed higher percentages when the there was a low degree of crowding. More relaxing activities seemed to be performed in vehicles with low crowding and more productive activities seemed to be performed in moderately or highly crowded vehicles. This seems to be counterintuitive, because one can imagine being less productive when travelling on a crowded vehicle. But this outcome can be caused by the fact that people might be more often engaged in productive activities when they are commuting in rush-hour for work or study purposes. At these times, the transport vehicles are more crowded (as it is rush-hour). And other travellers (like leisure travellers) might perform more relaxing activities while travelling outside of the rush-hour, so these activities show higher percentages in non-crowded vehicles. This finding might cast doubts on the perceived workings of the crowding factor on travel time use, as it was discussed in the theory. The influence of crowding on travel time use might be more limited than was found in the questionnaire results, as the actual behaviours of travellers showed no clear signs of the perceived negative influence of crowding on the use of travel time.

The availability of seating factor was also only investigated in public transport, as this aspect is less relevant for car users. The cross-tabulation showed no clear patterns on the influence of available seating on the travel time use of the people under observation. More relaxing activities (like: talking, relaxing and listening to music) showed higher average percentages when there was a high amount of seating available. But there were no clear differences in the percentages of most other travel time uses. The questionnaire results indicated a positive influence of available seating on the travel time use of respondents, but this was not directly represented in the observation data.

The factor of noise was investigated on all transport modes, but the analysis of the observation data showed no clear patterns. When there was much noise in the vehicle, there were higher frequencies of looking out of the window, mobile phone use, talking and listening to music. But when there was a low level of noise in the transport vehicle, there were no significant higher frequencies of travel time uses. So there seems to be no clear connection, as a low level of noise does not directly mean more travel time use (as was found in the questionnaire data). It could be that an environment with much noise has a positive influence on certain activities (like: looking out of the window, mobile phone use, talking or listening music), as these activities might not be appealing in silent environments. It could also very well be that the investigated causal relation works the other way around, as the travel time activities of using mobile phones, talking and listening to music might cause the high levels of noise that were recorded in the observations during data collection.

The design of the vehicle (in terms of facilities) was an important influencing factor in the questionnaire data results, and was also investigated for all transport modes in the observations. In vehicles with bad design (insufficient facilities) the activities of looking out of the window, talking to

fellow travellers, relaxing, listening to music and 'doing nothing' showed higher average percentages. In vehicles with good design (many facilities) the activities of reading, using mobile phones, using laptops and working or studying showed higher percentages. So more relaxing activities seemed to be performed in vehicles with bad design and more productive activities seemed to be performed in vehicles with good design. Good vehicle design thus seems to have quite a positive influence on travel time use, which was also found in the questionnaire data results.
The factor of vehicle quality seemed to have a positive influence on travel time use, when looking at the cross-tabulation of the observation data on this aspect. In high quality vehicles, activities like: looking out of the window, reading, using mobile phones, using laptops, using other ICT devices, working or studying, relaxing and listening to music showed higher percentages. In low quality vehicles, only the activities of talking to fellow travellers and 'doing nothing' show higher percentages. The high quality of a vehicle thus seems to have a positive influence on travel time use in general, which was also found in the questionnaire data results.
The factors of crowding, seating and noise showed no clear influences, or sometimes even contrary influences on travel time use when comparing the observation results to the questionnaire results. This can be due to the low number of cases in the observations, which might cause strange outcomes. It might also be that the working of these 3 factors might be more complex than was assumed in the theoretical chapter and in the questionnaire responses. The factors of vehicle design and vehicle quality both showed clear influences on travel time use in both the questionnaire and observation data results. A good design and high quality of the transport vehicles seemed to have the clearest and positive influences on the use of travel time in the data results of the present study.

4.8.4 The role of ICT in travel time use

The role of ICT was already discussed in the questionnaire data results, but will be shortly discussed here as well. The only observable aspect of the role of ICT was the use of mobile ICT devices by travellers. It was not possible to observe how many people were carrying ICT devices and what the influence was on their use of travel time. The researcher has been observing how many people were using mobile phones, laptops or other mobile ICT devices (like: smart-phones or PDA's) to investigate the role of ICT in travel time use.
The amount of people that were using mobile phones, laptops or other mobile ICT devices was counted in the observations. These figures were divided by the amount of people that were under observation, so that percentages of ICT use could be calculated. The average percentages of mobile phone use, laptop use and other ICT use (in the observations) are presented in table 4.18 (see below).

ICT uses	Mean Percentage
Using mobile phones	32,8
Using laptops	1,1
Using other ICT devices	15,4

Table 4.18: The average percentages of mobile phone use, laptop use and other ICT use (from the observation data).

The figures in table 4.18 show that on average almost a third of the travellers under observation (32.8 percent) were using mobile phones during their journeys. Only 1.1 percent (on average) of the people in the observations was seen using a laptop while travelling, which is very limited. And 15.4 percent of the observed travellers were seen using other mobile ICT devices during their journeys (mainly smart-phones and PDA's).
The role of ICT thus seems to be quite limited in the observations, as the results do not show very high percentages of ICT use. And the people that were using mobile ICT devices were mainly using mobile phones or smart phones. This was actually also found in the questionnaires, as most respondents indicated that they mainly carried and used mobile phones when discussing the role of ICT in their use of travel time. In the questionnaire data, only 12 percent of the respondents indicated to never use ICT devices while travelling and 42 percent said they sometimes use these devices during their journeys. Almost a quarter of the respondents (24 percent) said to often use ICT and 22 percent indicated they always use mobile ICT devices while travelling. But the actual use of ICT while travelling seems to be less in the observation data when comparing it to the stated use of ICT in the questionnaire data. So the role of ICT in travel time use seems to be perceived as more important by the respondents in the questionnaire results, than it was found to be in the observation results of the present study.

The observation data also allowed a short analysis of the possible influence of the factors on the use of ICT while travelling. The cross-tabulations showed no clear influences of the crowding, seating and noise factors on the use of ICT. But it seemed that higher percentages of ICT use were observed in transport vehicles with good design and high quality. In vehicles with a good design (with much facilities for the travellers), the use of mobile phones and laptops showed higher average percentages. And in high quality vehicles (with much space, privacy and comfort), the use of mobile phones, laptops and other ICT devices showed significantly higher average percentages when compared to low quality vehicles (which are cramped, give no privacy and are uncomfortable). So the factors of vehicle design and quality also seem to influence the use of ICT while travelling.

4.8.5 Differences between transport modes

The differences between transport modes in certain aspects of travel time use will also be investigated in the observation data. The observed differences between transport modes are analysed and discussed in this section. The outcomes of the analyses will be compared with the differences between transport modes that were found in the questionnaire data analyses.
The observed differences in travel time use between transport modes are presented below in table 4.19.

	Transport modes				
Travel time uses	Car Driver (2) Mean percentage	Car Passenger (4) Mean percentage	Train (48) Mean percentage	Bus (39) Mean percentage	Metro (69) Mean percentage
Driving (or assisting) (car users)	100	25	.	.	.
Navigating (route finding) (car users)	0	0	.	.	.
Looking out of the window	100	100	68,7	90,3	75,3
Reading for work/study or leisure	50	0	12,7	8,2	8,51
Using mobile phones	50	50	38,2	20,5	22,3
Using laptops	0	0	4,55	0	0
Using other ICT devices	50	25	10,5	3,3	6,1
Working or studying	50	0	9,1	1,85	0
Talking to fellow travellers	0	100	35,8	30,6	28,9
Relaxing	100	50	30,8	51,1	22,0
Sleeping	0	0	6,6	1,85	5
Listening to music	100	100	26,5	26,8	25,5
Eating and/or drinking	50	25	29,5	1,85	3,4
Doing nothing	0	0	0	30,6	18,5
Other activities (sometimes multiple other activities performed by one person)	250	75	26,9	4,9	27,3

Table 4.19: Differences in travel time use between transport modes (from the observation data).

Before discussing the contents of table 4.19, it is important to note that there were only 2 car drivers and 4 car passengers in the observations. This was due to the limited amount of people that were present in these transport vehicles and the difficulties of observing car users in general. The public transport users were easier to observe, as they travel in public and easily accessible spaces and many travellers are usually present in one vehicle. This is why there are higher numbers of people in the public transport groups. The low numbers of car users and higher number of public transport users need to be considered when analysing the table. One has to be careful with drawing conclusions about the travel time use of car users from the data results in table 4.19.

The figures in table 4.19 show that driving was performed by all car drivers, which seems to be quite logical. But of the car passengers, 25 percent (which is actually only 1 person in the observations) was assisting in driving during the journey. None of the observed car users was engaged in navigating or route finding during the observation time windows, but navigating was also found to be an unimportant travel time use in the questionnaire data results.
Looking out of the window was performed by all car users in the sample, as car users were observed to almost continually look out of the window (at the traffic or the surroundings). Of the train users, only 68.7 percent was looking out of the window while travelling. Bus users showed a much higher percentage of 90.3 and metro users showed a share of 75.3 percent of people that were looking out of the window during their journey. So contrary to the questionnaire results; car users seemed to be looking out of the window more than most public transport users (with the exception of bus users).
The 50 percent share of the car drivers that were observed to be reading while travelling, actually only represent 1 person in the observations that was reading through some work papers while driving. Among the public transport groups, the train users showed the highest average percentage of people that were reading while travelling (12.7 percent). This was also found in the questionnaire data results. Only 8.2 percent of the bus users and 8.5 percent of the metro users were observed to be reading while travelling.
Half of the car users in the sample (50 percent) were seen using their mobile phone while travelling, which is quite a high percentage (although the limited number of people in this group needs to be kept in mind). Also a large share of the train users (38.2 percent on average) was using a mobile phone while travelling. The use of mobile phones was lower among bus users (20.5 percent) and metro users (22.3 percent) when compared to train users, which was also found in the questionnaire data.
The observation data showed that only train users were using laptops, and this was only an average percentage of 4.55. The use of laptops was also found to be quite low in the questionnaire data, with the exception of train users. The use of other mobile ICT devices seemed to be quite high among car users when looking at table 4.19, but the figures only represent one driver and one passenger that were using smart-phones while travelling. Of the public transport groups, train users showed the highest average percentage of using other ICT devices (10.5 percent), which were mainly smart-phones and PDA's.
The 50 percent share of car drivers in the table that were working or studying while driving is a biased figure, as this actually represents only one car driver who was going through paperwork while doing his delivery round. Car passengers and metro users were never observed to be working while travelling, and bus users only showed an average percentage of 1.85. Train users, on the other hand, showed an average share of 9.1 percent who were working or studying during their journeys.
Car drivers were not seen to be talking while driving, as all car drivers under observation were travelling alone. Car passengers were all talking to fellow travellers during the observations, so this seems to be an important travel time use for this group (which was also found in the questionnaire data). The shares of public transport groups that were talking to fellow travellers were also quite significant (train users – 35.8 percent, bus users – 30.6 percent and metro users – 28.9 percent).
All car drivers under observation were seen to be relaxing while driving, but one has to consider that there were only 2 cases in the observation data. Around half of the car passengers (50 percent) and bus users (51.1 percent) were also relaxing during their journeys, while significantly lower shares of train users (30.8 percent) and metro users (22.2 percent) were relaxing while travelling. This finding is different from the questionnaire results, as relaxing was found to be an important use of travel time for all groups in the questionnaire data.
Sleeping generally showed low percentages among the transport mode groups in the observation data sample. But train users seemed to be the exception, as they were observed to perform the most sleeping while travelling (although the data only showed a low average percentage of 6.6 percent).
Car users were all observed to be listening to music while travelling, as the radio was almost always on in the cars were the observations were performed. Public transport users were found to be listing to music significantly less than car users, as the shares of listening to music among public transport groups were all around a quarter. Listening to music was also found to be more frequently performed by car users in the questionnaire data.
One car driver and one car passenger were seen eating something while driving during the observations, but due to the limited number of cases in the groups this leads to quite high percentages.

Quite a lot of train users (29.5 percent) were also eating or drinking something while travelling, especially when comparing it to the low shares among bus users (1.85 percent) and metro users (3.4 percent). Eating and drinking was found to be a quite unimportant use of travel time among travellers in the questionnaire data, but train users seem to be the exception in the observation data.
None of the car users and train users in the observation data sample were found to be 'doing nothing' while travelling, which is quite an important finding. The shares of people that were 'doing nothing' were quite high among bus users (30.6 percent) and to a lesser extent among metro users (18.5 percent). So it seems that more public transport users are 'doing nothing' when comparing them to car users, although train users were the exception in this respect. The questionnaire data also showed higher frequencies of 'doing nothing' among public transport users (when compared to car users).
The travel time activities in the 'other' category showed an impossibly high share among car drivers (250 percent), but this was due to the fact that the car drivers were performing multiple 'other' activities while travelling. Car drivers were also the transport group that showed the highest frequencies of performing 'other' activities in the questionnaire data. The public transport groups showed significantly lower average percentages in this travel time use category (especially bus users).

The observation data also showed significant differences in travel time use between the transport mode groups in the sample. Most findings were similar to the findings in the questionnaire data, but some aspects were different. Looking out of the window was more frequently performed by car users in the observation data, while the contrary result was found in the questionnaire data. Maybe this is because car drivers are not totally aware they are constantly looking around while driving, as this has become a natural and self-evident activity. The activity of eating or drinking while travelling was quite often observed among train users, but this was not found to be an important use of travel time in the questionnaire data. This could be caused by the fact that most observations were performed in the middle of the day, when people are more likely to have some lunch or snacks while travelling. Or maybe it is caused by the social desirability problem, as respondents in the questionnaires might not want to mention that they eat or drink while travelling.

The differences in the role of ICT between transport modes can best be investigated by looking at the differences in ICT use among the different transport users that were observed. Table 4.20 shows the differences in the average percentages of people that were using certain ICT devices while travelling.

	Transport modes				
ICT uses	Car driver Mean percentage	Car passenger Mean percentage	Train Mean percentage	Bus Mean percentage	Metro Mean percentage
Using mobile phones	50	50	38,2	20,5	22,3
Using laptops	0	0	4,55	0	0
Using other ICT devices	50	25	10,5	3,3	6,1

Table 4.20: Differences in the use of ICT between transport modes (from the observation data).

The figures in table 4.20 show that half of the car drivers in the sample (50 percent) were using mobile phones and other ICT devices while driving. But these are biased percentages, as they only represent one car driver who was calling and using internet functions on a smart-phone in his car during one observation. Car passengers also showed quite high percentages in mobile phone use (50 percent) and other ICT use (25 percent), but these percentages only represent 4 observed car passengers. The use of laptops was not seen among car users in the observations. Around a fifth of the bus users (20.5 percent) and metro users (22.3 percent) were using mobile phones while travelling, but this share was significantly higher among train users (38.2 percent). Train users were also the only group that showed some use of laptops while travelling, although the average percentage was very low (only 4.55 percent). Train users also showed a higher average percentage in using other ICT devices (10.5 percent) when comparing them to bus users (3.3 percent) and metro users (6.1 percent). So the role of ICT does seem to differ between transport modes in the observations data. The role of ICT seems to be especially large among train users in the sample, as they showed high percentages of ICT use in the

observations. The percentages were also quite high among car users, but no solid conclusions about this group can be drawn from the observation data, due to the limited amount of observed car drivers and car passengers in the sample. Car users showed quite low frequencies of ICT use in the questionnaire data, and these data included far more car users than the observations. So the questionnaire data might be more reliable on the role of ICT among car users. The questionnaire data also showed that the role of ICT was the largest among train users, as they indicated to use ICT most frequently while travelling. The observation data also showed much more ICT use among train users when compared to other public transport users, so ICT seems to play the largest role in the travel time use of train users according to both the questionnaire and observation data.

The differences in influencing factors between transport modes are not discussed on the basis of the observation data. The data on these differences could not be effectively analysed, because of the limited amount of observations that were performed for the present study. Due to the limited amount of observations, to many cells in the cross-tabulations of the travel time use, influencing factors and transport modes variables were empty. There were no observations on the following aspects: high crowding conditions in busses, low amounts of available seating in trains and busses, no low noise levels in cars and metros, no high noise levels in trains and busses, no bad design in trains, no good designs in cars, busses and metros, no low quality in cars, trains and busses and no high quality in busses and metros. The lacking observations of these aspects on the different transport modes are also results by themselves, as they give some insights into the conditions or situations on certain transport modes in the Dutch context. But the lack of observation data on the mentioned aspects, does not allow for effective analyses and conclusions on the differences in influencing factors between transport modes. The questionnaire data results have already provided good insights into the differences in influencing factors between transport modes, but these findings cannot be compared to the observation data results.

The influence of travel time use on the perceived journey experience of travellers could not be observed, because this is not a visible effect. This means that the aspect of journey experience cannot be discussed in this section, and can also not be compared between transport modes in the observation data. Due to the fact that this aspect is not observable, the influence of travel time use on perceived journey experience is only discussed in the questionnaire data results (see paragraph 4.6 and section 4.7.4 on this). These outcomes from the questionnaire data can thus not be compared to the observation results, as the aspect of journey experience is not analysed and discussed here.

4.8.6 Initial conclusions on the observation results

The observed aspects of travel time use among travellers in the data sample have been presented and discussed in this paragraph. But the main aim of this paragraph was to compare and discuss the differences or similarities between the stated behaviour of the respondents in the questionnaire data and the actual behaviour of travellers in the observation data.

Most observed travel time uses showed quite similar frequencies to those that were reported by the respondents in the questionnaires. The activities of driving (among car drivers), looking out of the window, using mobile phones, talking to fellow travellers, relaxing, listening to music and performing ‘other activities’ (among all travellers) showed the highest average percentages in the observation data results. However, the average percentages of looking out of the window and performing ‘other activities’ while travelling, were much higher in the observation results than was expected after the questionnaire results. Travellers were observed to be looking out of the window more than they indicated in the questionnaires. And the observed travel time uses in the ‘other’ category showed much more variety than was found in the questionnaire data results, which indicates that travellers seem to perform many more different activities while travelling than was indicated in the questionnaires.

The influence of the most important and observable factors on the use of travel time was also investigated in the observation data. The influences of the degree of crowding, the availability of seating and the degree of noise were not clearly identified in the observation data. But the positive influences of good vehicle design and high vehicle quality were clearly represented in the observation data. These two factors were also found to have the clearest influences on travel time use in the

questionnaire data results, so the aspects of vehicle design and vehicle quality seem to be very important in terms of travel time use in the present study.
The role of ICT was investigated in this paragraph by analysing the observed uses of mobile phones, laptops and other ICT devices among travellers. The role of ICT in travel time use seemed to be quite limited in the observation data, and only mobile phones or smart-phones were regularly used by travellers. The use of ICT was less than expected after the questionnaire results, so the role of ICT might be more limited than it was found to be in the questionnaire data outcomes.
The differences between transport modes were also discussed in the observation data analysis. Most differences in travel time use were similar to those that were found in the questionnaire data, but some aspects were different. Looking out of the window seemed to be performed more by car users than public transport users, which was contradicting with the questionnaire results. And more car users and train users were eating or drinking while travelling, while this was found to be an insignificant travel time use for all transport mode groups in the questionnaire data.
The role of ICT seemed to be the largest among train users, as these travellers were most frequently seen to be using ICT devices during the observations. The use of ICT was also found to be the highest among train users in the questionnaire data results, so the outcomes are similar on this aspect.
The differences in influencing factors could not be analysed in the observation data, due to data gaps in the sample. And the aspect of journey experience was not observable, so this could not be discussed at all in this paragraph.
Most aspects in the observation data results showed clear similarities with the questionnaire data results. There do not seem to be important differences between the stated behaviour of travellers in the questionnaire data and the actual behaviour of travellers in the observation data. This finding strengthens the outcomes of the questionnaire data, as there seem to be no obvious problems with the reliability of the questionnaire results in the present study.

5. Conclusions and Discussion

In this final chapter of the thesis report, the conclusions of the present study will be presented and discussed. The research questions will be answered on the basis of the outcomes from the collected empirical data on travel time use, influencing factors, the role of ICT, the influence of travel time use on journey experience and the differences between transport modes. After the conclusions, the research outcomes from the present study will be discussed and compared to the theory and the outcomes of previous studies that were discussed in the theoretical chapter. The shortcomings of the present study and the methodology will also be discussed in this chapter, to underline the strengths and weaknesses of the study. The discussions on the research findings, the present study shortcomings and the methodology will form the basis of the last paragraph on implications and recommendations for future research, society and policies on transportation.

5.1 Conclusions

Our post-modern society of mobilities and technologies was theorised as having the potential to facilitate life on the move by allowing people and their activities to be disconnected from fixed places. The New Mobilities Paradigm conceptualised this potential by emphasising the interconnected and entangled physical and virtual mobilities in peoples' daily lives in the western world. This vision was used in the present study to investigate the travel time use of daily travellers in the Dutch context. Travel time was theorised as being more than something that travellers try to minimise, as post-modern society allows people to perform all sorts of activities on the move (like: working, communicating, relaxing etc.) and get some positive utility from their time invested in travelling. This vision led to the following research aim of the present study: *Give insights into the travel time uses of Dutch travellers in the current Information Age, the factors influencing these travel time uses, the role of ICT in travel time use, the influence of travel time use on journey experience and the differences in these aspects between people using personal transport modes (cars) and people using different public transport modes (trains, busses or metros) for daily journeys.*

The first and most important research question was how people actually use their travel time in the Dutch context, which was investigated among travellers in the Rotterdam metropolitan area. The data results showed a wide variety of travel time uses among travellers, as many travellers engaged in all sorts of activities while travelling and were not just passively waiting to arrive at point B. Most travellers were looking out of the window, using mobile phones, relaxing, talking to fellow travellers or listening to music during their journeys. More productive activities, like reading or using laptops, were slightly less reported or observed, which could explain that only 22 percent of the respondents saw their travel time use as productive. Most people saw their travel time use as time-out, relaxation or anti-activity, which can indicate important personal benefits of travel time activities for travellers. More than three quarters of the respondents in the present study did not see their travel time use as wasted or lost time, but indicated it as either productive or relaxing. This means that most travellers in the data did seem to get some positive utility from their travel time by performing activities while travelling.

The second research question was on the factors that could positively or negatively influence the use of travel time. Having a lot of seating available, carrying the right equipment or items for travel time use and using a well-designed and high-quality vehicle were found to positively contribute to the use of travel time. But travelling on a crowded vehicle with much noise was found to have a quite negative influence on travel time use. The investigated journey factors seemed to have to most important influence on travel time use, which was largely in line with the hypothesis. Especially the factors of good vehicle design (in terms of facilities) and high vehicle quality (in terms of space, privacy and comfort) were found to have the most clear and positive influence on the use of travel time. This means that vehicle designers and transport providers could play an important role in the promotion of travel time use opportunities.

The role of ICT in travel time use, travel time use perception and journey experience of travellers was covered in the third research question. ICT was theorised as being potentially important for the

enhancement and enrichment of travel time use opportunities in the current Information Age. The research findings showed that most travellers in the sample regularly carried and used mobile ICT devices (mostly mobile phones) while travelling. Almost three quarters of the respondents felt some degree of influence from ICT opportunities on their use of travel time, which seemed to point towards a significant role of ICT in travel time use. It was also found that the more people were carrying, using and being influenced by ICT, the more they saw their travel time use as productive. And the more people were influenced by ICT opportunities in their travel time use, the more they felt that travel time use had a positive influence on their journey experience. The hypothesis on the role of ICT was largely confirmed, as the use of ICT seemed to have a positive influence on the productivity and journey experiences of travellers. But the role of ICT should not be overstated, as the observation results showed a quite limited use of ICT among most travellers. This means that ICT opportunities have the potential to positively influence travellers in their activities and journey experience, but the use of ICT while travelling did not seem to be common practice yet for most travellers in the present study.

It was also investigated if travel time use could have a positive or negative influence on the perceived journey experience of travellers. The research findings showed that a significantly large share of the travellers in the sample felt that a high level of travel time use (performing many activities while travelling) had a positive influence on their journey experience. This finding indicates the positive utility of using travel time to perform activities, which could mean that travel time provides people with the opportunities to perform activities for their personal benefits and improve their journey experience.

The final question of the present study was on the main differences in travel time use, influencing factors, the role of ICT and journey experiences between personal transport mode users (cars) and different public transport mode users (trains, busses or metros). Only cars and trains have been purposefully investigated on the aspect of travel time use in previous studies, and not much was known about travel time use in busses and metros or the differences between transport modes.

Some clear differences in the use of travel time were found between car users, train users, bus users and metro users. Most travel time uses were more frequently performed on public transport modes, when they were compared to cars. Car users were mainly engaged in looking out of the window, talking to fellow travellers, listening to music or performing alternative travel time uses (like thinking, smoking or even nose-picking). Most public transport users were mainly looking out of the window, reading for leisure (books or newspapers), using mobile phones or sleeping. But train users were also found to sometimes read for work or study, access the internet on mobile phones or work on laptops while travelling. So it seems that all transport mode users mostly performed relaxing activities while travelling, but that train users also seemed to perform some productive activities on the move.

The factors that can influence the use of travel time were also compared between transport modes, which also resulted in some significant differences. The factors of good vehicle design and high vehicle quality were found to influence the travel time use of all transport mode groups, but seemed to be especially important for car users. The other journey factors of journey duration, journey familiarity and noise were only important for the travel time use of public transport users. The factors of equipment and ICT operating abilities only showed positive influences on the travel time use of train users, and were not found to be important for other transport mode users in the sample. So it seems that the investigated journey factors were important for all travellers, but that some individual factors could also influence the use of travel time on trains.

The role of ICT was also found to be different between transport modes, because mobile ICT devices were used more frequently by public transport users when compared to car users. The role of ICT seemed to be the largest and most positive in the travel time use of train users, as these travellers used ICT most frequently and were most influenced by the opportunities provided by mobile ICT devices. It was also found that the positive influences of ICT on productivity and journey experience were mainly felt by train users, and that other transport mode users were less influenced by ICT opportunities in their use of travel time.

The influence of travel time use on perceived journey experience was also compared between transport modes. The positive influence of performing many activities while travelling on the journey experience was found to be most strongly felt by public transport users and less by car users. This could indicate that public transport users got more positive utility from their travel time use than car

users, which could represent the differences between private and public transport modes in the opportunities and utilities of performing activities while travelling.
The respondents also perceived significant differences between transport modes on the aspect of travel time use. The train was perceived as the best transport mode option in terms of travel time use by most respondents, and train users themselves were also very positive about the influence of the train characteristics on the use of travel time. Car drivers were also quite positive, but metro users were fairly negative about their transport mode in terms of travel time use. This could mean that travel time use opportunities and their (perceived) positive utilities were quite low in metros and quite high in trains and cars, which could possibly have an effect on the attractiveness and travel experience of these transport modes.
The hypothesis on the differences between transport modes was confirmed, as most findings were in line with the expected outcomes. There were clear differences between transport modes, as public transport mode users seemed to be more frequently engaged in relaxing or productive activities when compared to car users. The train was found to be the best transport mode option in almost all the investigated aspects of travel time use in the present study, which could have important effects on the attractiveness and positive utilities of travelling by train in the Netherlands.

5.2 Discussion of the research findings

The research outcomes of the present study gave new insights into the realm of travel time use for daily travellers in the Dutch context. Travellers seemed to use their time invested in travel for all sorts of activities, and got some positive utility from their travel time in this way. The benefits that travellers got from their activities on the move were mainly personal benefits, as most travellers seemed to perform relaxing or anti- activities while travelling. Only slightly more than a fifth of the respondents saw their travel time use as productive, which was actually quite low when considering the potential to use travel time productively (which was discussed in the theoretical chapter). In the UK study on the travel time use of train users by Lyons et al. (2007), the data showed that 86 percent of the respondents would be able to perform work tasks while travelling (which indicated the potential). But most travellers did not actually use this opportunity and did not perform work tasks or other productive activities while travelling by train (Holley et al., 2008, p. 37). This also seems to apply to Dutch travellers in the present study, as most travellers were quite positive about using their travel time but did not seem to engage in many productive activities while travelling.
Like in many other studies on travel time use (e.g. Lyons et al., 2007; Ohmori & Harata, 2008; Watts, 2008), most travellers in the present study were performing relaxing or non-productive activities while travelling. These (anti-)activities do not have clear productive or economical benefits for travellers, but they can have important personal benefits for those people (Mokhtarian et al., 2001; Lyons & Urry, 2005; Jain & Lyons, 2008). These (anti-)activities can also have indirect effects on productivity, as taking a time-out or relaxing while travelling can help to prevent a loss of productivity or even stimulate a subsequent increase of productivity (Holley et al., 2008, pp. 38-39). So the benefits of time-outs, relaxation or anti-activities, that seemed to be performed by many travellers in the present and in previous studies, should be acknowledged as important aspects of peoples' working and personal lives.
An important finding in the observations was that looking out of the window seemed to be the most important use of travel time for most travellers. Looking out of the window at the passing landscape from the window of the transport vehicle was very frequently observed with all transport mode users in the present study. This could indicate the boring monotony of being trapped in travel time (Lyons et al., 2007, p. 113) or it could indicate the 'intrinsic utility' of travelling, which can be found in the use of travel time or in the enjoyment of travelling (Mokhtarian et al., 2001). The enjoyment of travelling might be represented by the large shares of travellers that were observed to be looking out of the window at the passing landscape and other travellers.
The investigated factors that can influence the use of travel time were not all found to be relevant in the present study. But the influence of carrying equipment or travel time use items was perceived to be quite positive for the travel time use of most travellers (especially for that of train users). In the study by Jain & Lyons (2008), it was already discussed that most people acknowledged that bringing items

into the travel environment was important for enabling certain travel time uses. The role of mobile ICT devices in the 'equipping' of travellers for the use of travel time is important to acknowledge in this respect, but this will be discussed in more detail later in this section. In the study by Lyons et al. (2007) it was also shown that most train users in the UK were quite well equipped to enable travel time use, as many people reported to carry books, music players, mobile phones, food or drinks while travelling. The aspect of being 'equipped' while travelling, was also found to play a significant and positive role in the travel time use of Dutch travellers in the present study.

The fellow travellers, who make up a large part of the travel environment for public transport users, seemed to have an important influence on the use of travel time. Most public transport users indicated that crowding and noise had a quite negative influence, while available seating seemed to positively influence the use of travel time. Certain travel time uses (mainly sleeping or using laptops) were also found to be dependent on the availability of seating in the studies in the UK (Watts, 2008, p. 720) and Japan (Ohmori & Harata, 2008, pp. 550-552). Many activities cannot be performed by travellers when they have no seating and have to stand, so this aspect can be important in facilitating travel time use for public transport users. The aspect of crowding is directly linked to the aspect of available seating, but noise and privacy can also be associated with the degree of crowding. The crowding and noise created by fellow travellers can change the travel situation and have an important influence on the travel time use or desired travel time use of people (which was also found in the studies by Ohmori & Harata (2008) and Watts (2008)). But in the present study, many people were also observed to be talking to fellow travellers quite frequently in the transport vehicle, which makes the direct interaction with fellow travellers also an important aspect of travel time use.

The other part of the travel environment, which is formed by the characteristics of the transport vehicle (mainly in terms of design and quality), seemed to have an even larger influence on travel time use. The factors of good vehicle design (in terms of facilities) and high vehicle quality (in terms of privacy, space and comfort) were found the have the most significant and positive influences on travel time use in the present study. The importance of vehicle design and available facilities was also discussed by Ohmori & Harata (2008) and Jain & Lyons (2008) in their studies on travel time use. To use a laptop for work tasks for instance, one has to have a table to place the laptop and a wireless internet connection to link-up with the company network. The use (or desired use) of laptops or wireless internet seems to be quite low among travellers today, but Ohmori & Harata (2008, p. 559) argue that this could be much higher if power supply and wireless internet would be more readily available in public transport vehicles. This could be an important consideration for public transport providers, but this will be discussed in more detail in the section on policy recommendations. The quality of the transport vehicle can also influence travel time use and even the productivity of travellers, as working and studying showed higher frequencies in first class train carriages when compared to standard train carriages in the large scale UK study on travel time use (Lyons et al., 2007, p. 111). This aspect could not be effectively investigated in the present study, as there were only 6 first class passengers in the data sample. But the aspect of high vehicle quality was found to have a significant and positive influence on travel time use in the present study.

The expected influence of journey duration on travel time use was not found in the present study. The studies in the UK by Lyons et al. (2007) and in Japan by Ohmori & Harata (2008) both found that the longer people were travelling, the more activities they performed. The outcomes of the present study on this aspect were not clear, as some respondents indicated a positive influence of long journey duration while others perceived a negative influence of long journey duration on the use of travel time. The theorised influences of journey familiarity, planning, social aspects and institutional aspects on travel time use were also not found in the present study. This could be caused by the limited data set of the present study, or it could indicate that these factors were not significantly influencing the use of travel time among Dutch travellers in the Rotterdam metropolitan area.

The aspect of equipment was already discussed as having a generally positive influence on travel time use. But the role of ICT was given special attention in the present study, due to the importance of ICT and mobile technologies in the current Information Age. ICT can provide access to information and communication for travellers through mobile technologies, which can lead to a different use and valuation of travel time (Lyons & Urry, 2005; Ohmori & Harata, 2008). The data results in the present study showed that most travellers carried mobile ICT devices with them while travelling, and that a significant proportion of travellers used these devices frequently during their journeys. The mobile

phone seemed to be the most important mobile device in travel time use, which was also found in several other studies (e.g. Laurier & Philo, 1998; Perry et al., 2001; O'Hara et al., 2002; Brown & O'Hara, 2003; Lyons et al., 2007). Mobile phones provide instant access to (almost) everyone from (almost) everywhere, which seems to make the mobile phone an important piece of equipment for contemporary travellers (Holley et al., 2008, p. 35). The use of laptops and other ICT devices was observed to be quite low in the present study, but this can change when the use of these devices becomes more common and important in peoples' working and personal lives (as happened with mobile phones). But overall, the role of ICT in travel time use seemed to be significant and positive, as the use and opportunities of mobile ICT devices seemed to lead to more productivity and more positive journey experiences of travellers. This was also found by Lyons et al. (2007, pp. 117-118), as a fifth of their respondents indicated that using mobile devices (like phones and music players) made their train journeys a lot better. So the role of ICT in travel time use seems to be positive and significant in the current Information Age, and this can be expected to increase in the coming years due to the fast developments in mobile ICT technologies and opportunities.

The influence of travel time use on the perceived journey experience of travellers could have important implications for the valuation of travelling and travel time. This aspect was not purposefully investigated in previous studies, but it has been argued that travel time can be enjoyed or used, by which travel time can get a positive and intrinsic utility for people (Mokhtarian & Solomon, 2001). Most travellers in the present study indicated that performing many activities while travelling had a positive influence on their journey experience, which seems to indicate that most travellers got some sort of positive utility from their journeys by using their travel time. Some of the respondents in the questionnaires indicated that doing something while travelling made the time seem to go by faster, which was also found in the ethnographic study by Laura Watts (2008). Travel time can be stretched and compressed when people are performing activities during their journeys (Watts, 2008; Watts & Urry, 2008), which means that travel time use can have an important influence on peoples' journey experience.

Travel time use has only been purposefully investigated on trains and cars in previous studies, and the differences in travel time use between transport modes have not been purposefully studied before by other researchers. An important goal for the present study was to fill this gap of empirical information and give insights into the travel time uses of car, train, bus and metro users and the differences between these groups. Public transport users were found to be more frequently engaged in travel time activities than car users. This is probably due to the fact that travel time use opportunities for car drivers are more restricted when they are engaged in the task of driving (Lyons & Urry, 2005, p. 265). But it was found in the present study that talking to others in the car and listening to music on the radio, were important activities for most car users. The importance of 'passenger talk' was already observed and discussed by Laurier et al. (2008), as the distinctive 'togetherness' of people in cars leads to an expectation or even obligation to engage in conversation during a journey. And talking is of course more easily combined with the activity of driving than many other activities, which is also true for the activity of listening to music in cars. The radio was already found to be an important aspect of the car experience by Bull (2000; 2004), and listening to the radio was also a much observed travel time use among car users in the study by Laurier et al. (2008). These findings were confirmed in the present study, as car users were found to be frequently listing to music while travelling.

Looking out of the window, reading (books or newspapers) and using mobile phones seemed to be important travel time uses in public transport vehicles, which was also found in the other studies on travel time use that were discussed in the theoretical chapter (e.g. Lyons et al.. 2007; Ohmori & Harata, 2008). These activities seem to show a certain use of 'equipment' (like books, newspapers and mobile phones), which was already found to be an important aspect in the use of travel time.

Not only travel time use, but also the factors that could influence travel time use seemed to differ between transport modes. Car users seemed to be more influenced by the design and quality of their vehicles, while public transport users also felt the influences of fellow travellers on their use of travel time (through crowding, seating availability and noise). This underlines the fact that travel situations and travel time use opportunities can vary significantly between transport modes. This was also shown by the fact that the role of ICT in travel time use was stronger and more positive among public transport users (when compared to car users). Especially train users seemed to indicate the positive influence of ICT opportunities in their use of travel time, while this influence seemed to be quite low

among car users. The opportunities to use ICT seem to be more prevalent in trains then in cars, and it can be argued that the travel situations and facilities on trains better support the use of ICT. The train was also found to be the best perceived transport mode option in terms of travel time use, which supported the other positive findings of the train in terms of travel time use and ICT opportunities. Travel time uses showed the highest frequencies in trains and the role of ICT was the strongest and most positive among train users. The metro was found to be perceived quite negative in terms of travel time use, and busses and cars were found to be less positively perceived than trains in terms of travel time use. These differences between transport modes are important to consider, because they can have implications for future research on travel time use or future policies on transportation (but these aspects will be discussed in paragraph 5.4).

5.3 Research shortcomings

The present study has provided new insights into the realm of travel time use in the Dutch context, and thereby contributed important new findings to the knowledge on travel time use in the current Information Age. But there are some issues, shortcomings and limitations within the research of the present study that have to be discussed and considered.

5.3.1 Data set issues

An important point of discussion is the limited size of the data set that was used in the present study. The data set contained questionnaire data from 100 respondents and data from 12 observations (on 162 travellers) that were collected by the researcher in the Rotterdam metropolitan area. The low numbers of respondents and observed travellers means that the used data sample was not representative for Dutch travellers (or even for all travellers in the Rotterdam metropolitan area). But it was never the aim of the researcher to achieve representativeness, as the available time and research capacity were quite limited. To be able to present relevant outcomes, the goal was to collect and analyse balanced data samples of the questionnaires and observations. The samples were well-balanced on most aspects, but some points need to be discussed.

Firstly, the questionnaire data sample that was used in the present study was quite a young sample, as there was a slight overrepresentation in the youngest group and a slight underrepresentation in the oldest group. This can have consequences for the relevance and characteristics of the data outcomes which need to be mentioned here. In the study by Lyons et al. (2007), it was found that the aspect of age had an influence on the travel time use and the use of equipment (especially ICT) among train users in the UK. Younger people seemed to engage in more activities while travelling, and they also carried and used more ‘equipment’ on their journeys (Lyons et al. (2007, pp. 114-116). The factor of age was not purposefully investigated in the present study, but the positive outcomes on travel time use and the role of ICT could partially be explained by the young data sample that was used.

Secondly, the questionnaire sample mainly contained commuters and included less leisure and business travellers. But this was in line with the research aim; to investigate the travel time use on daily journeys. Most daily journeys are made by commuters and less by leisure travellers. Business travellers were underrepresented in the sample, so no solid conclusions could be made on business travellers as a separate group. The study by Holley et al. (2008), which was also discussed in the theoretical chapter, is purposefully focussed on business travellers and provides good insights into the travel time use of this group.

Thirdly, the questionnaire sample showed large shares of car and train users, when compared to the shares of bus and metro users. But this is largely in line with the Dutch context of transportation (which was discussed in the theoretical chapter), as the most distance is travelled by cars and trains in the Netherlands (and far less by busses and metros) (CBS, 2002). It seems logical that the most important transport modes had the highest shares in the data sample of the present study. The low share of car passengers could be considered as an issue, as no solid conclusions could be made on car passengers as a separate group.

Fourthly, the questionnaire data sample showed high shares of office workers and students, when compared to the shares of physical workers and people without work. But the high share of office

workers is not considered to be a problem, as it was already discussed in the theoretical chapter that an important feature of our post-modern society (in the western world) is the high level of knowledge-based employment. According to Sellen & Harper (2001), people today are more likely to work in an office with information then to do physical work. The high share of students in the sample is probably caused by the large share of young people in the data sample, but this was not considered to be a problem.
And fifthly, the observation data sample contained less car users than public transport users. This was caused by the difficulty of observing large numbers of car users during empirical data collection. It was relatively straightforward to observe many travellers in public transport vehicles, but cars simply contain less travellers and required more negotiation when organising an observation. The observations were also mainly performed on the middle of the day and less in rush-hour, but this was caused by practical considerations. The aspect of the observation times could have an effect on the outcomes, but was not considered to be a problem in the present study.

5.3.2 Methodology

The methodology of the present study, and its positive and negative aspects, also has to be discussed in this paragraph. The combination of questionnaires and observations to collect the empirical data was already discussed in the methodological chapter of this report. This methodology has the advantage of being able to observe certain aspects in detail and also ask travellers about their attitudes and reasons behind certain behaviours. The combination of the two research methods created the possibility of investigating both the stated and actual behaviours of travellers (and the differences between them), which also made it possible to control for the possible problems of socially desirable answering. This provided the most complete information on travel time use and the other investigated aspects, as was also discussed by Ohmori & Harata (2008, p. 559) (see the methodological chapter). Most investigated aspects showed clear similarities in the questionnaire and observation data, which showed that there were no significant differences in the stated and actual behaviours of travellers in the present study. The findings in both samples supported each other on most aspects, which strengthened the reliability of the research findings.
The quantitative research approach that was employed in the present study resulted in structured interviews on the basis of questionnaires and structured observations. These methods provided structured and quantitative data, which made it easier to perform structured and transparent analyses on the data and enhanced the comparability of the outcomes. The quantitative data also provided the possibility of performing statistical analyses and tests in SPSS, which provided important insights into the interactions and workings of certain aspects in the data. But qualitative data could also have provided interesting insights into the subject of travel time use in the present study. The open category in the questionnaires and observations of the present study already showed that open questions can provide interesting findings, as many alternative travel time uses and attitudes towards travel time use were reported by the respondents. The present study was only based on quantitative data, and not on qualitative data, which can be considered as a shortcoming of the selected methodology.

5.3.3 Limitations of the present study

Based on the above discussions on the data set and methodology, certain limitations of the present study need to be noted and considered. These research limitations also provide the basis for the recommendations for future research on travel time use (which will be discussed in the next paragraph).
As was already discussed above, the size of the data set in the present study was quite limited and was only collected in the Rotterdam metropolitan area of the Netherlands. A larger data set that can be representative for all Dutch travellers would have provided a more complete picture on travel time use and the other investigated aspects. The outcomes from a larger and representative data set could also be generalised to a larger group of travellers, which would add to the relevance of the study. But due to time constraints and limited research capacity, the collection of a large and representative data set was not possible in the present study. The outcomes of the present study give good indications on travel time use, the factors that can influence travel time use, the role of ICT in travel time use, the influence of travel time use on journey experience and the differences in these aspects between

different transport modes in the Dutch context. But these research findings cannot be generalised to all Dutch travellers, which slightly limits the social and scientific relevance of the present study.
The observation data in the present study contained 12 observations on 162 people, and produced interesting outcomes on travel time use, influencing factors and the role of ICT. But the observations only included a few car users, which was caused by practical and organisational issues. This meant that the observation data had limited power to describe the travel time use, the role of ICT and the influencing factors among car users in the present study. More observation data on car users would have provided a more complete picture of the investigated travel time use aspects within this group.
The quantitative strategy that was chosen for the present study has resulted in the collection and analysis of structured and numerical data. These data provided the possibilities to perform statistical analyses on the data and enhanced the comparability of the results. But this quantitative strategy also limited the scope of the researcher and has lead to a pre-conceptualised look into the reality of travel time use. Qualitative data collection was not the chosen strategy in the present study, because a qualitative strategy did not fit into the research aim. But qualitative data could have provided broader and deeper insights into the realm of travel time use in the Dutch context (as was found in the ethnographic study by Laura Watts (2008) in the UK).
The differences in the investigated aspects of travel time use have only been compared between the different transport modes in the present study. But these aspects of travel time use were not compared between different age groups, different employment groups or people with different journey purposes (commuters, leisure travellers or business travellers) in the present study. This was caused by the fact that the data set was too small to confidently draw conclusions on these separate groups. It was also not the aim of the present study to make comparisons between these groups. But more comparisons between different groups of travellers on the investigated aspects of travel time use could have resulted in interesting outcomes in the present study.
Previous studies have only investigated travel time use in cars and trains, while the present study also included busses and metros. The inclusion of these transport modes was chosen because of the importance of all these modes in daily travels in the Dutch context. Other transport modes, which are less often used in daily journeys (like: planes and ferries), could not be included in the present study due to practical reasons. The bicycle was also not investigated in the present study, even tough this transport mode plays a significant role in daily journeys for many Dutch travellers. The exclusion of certain transport modes in the present study can be considered as a limitation, but it was not possible to investigate all transport modes in the Dutch context (due to the limited availability of time and research capacity).

5.4 Future research, social implications and policy recommendations

The final section of this chapter will be used to discuss the implications and recommendations for future research, society and policy, on the basis of the research findings from the present study. The possible directions that can be taken in future research will be discussed first, and these directions can be used to guide future studies on travel time use. The social implications of the research findings will also be discussed, as there are some findings that could have its effects on society in the future. The recommendations for future policies on transportation will be discussed in the last section of this paragraph.

5.4.1 Future research on travel time use

The present study has resulted in interesting findings on the investigated aspects of travel time use in the Dutch context. But more research on this subject is needed in the future, as there were some gaps and shortcomings in the present study.
The first important point for future research is the large scale collection of data on travel time use in the Dutch context and the contexts of other countries (as was done by Lyons et al. (2007) in the UK). Researchers could focus on the collection of data among large groups of travellers by employing questionnaires, interviews, observations or other methods, to come up with a representative data sample. This could provide more complete information and more solid conclusions on travel time use

in the Information Age. An important goal could be the collection of more data on the groups that were slightly underrepresented in the data sample of the present study, which would mainly concern car users (especially car passengers) and business travellers.
Another direction for future research could be the collection of qualitative data on the discussed aspects of travel time use. Qualitative data collection was already done in the UK context in the studies by Watts (2008) and Laurier et al. (2008), but these studies could be replicated in other contexts or transport situations. Especially the use of 'mobile ethnography', where the researcher immerses in the travel experience with the subjects, seems to be a promising method for collecting qualitative data. This method allows the researcher to freely take notes of everything that is happening in the transport vehicle and also take pictures of relevant situations. The rich and diverse data, which can be collected by employing a qualitative research methodology, could be very useful for future research and could provide new and interesting insights into travel time use.
The differences in travel time use between transport mode groups were investigated in the present study, but it was already noted that the differences between age groups, employment groups or journey purpose groups were not studied. The comparison of travel time use and other associated aspects between certain groups could be a direction for future research as well. A larger data set, with enough cases for every group, could provide the opportunity to effectively compare certain aspects of travel time use between these groups.
The present study included cars, trains, busses and metros as the investigated transport modes on the aspects of travel time use. But future research could also focus on other transport modes that were not studied before, as the results from the present study showed interesting differences between transport modes in many aspects of travel time use. Airplanes are currently often used by many business and leisure travellers around the world, and the amount of air travel is likely to continue to grow in the future. Travelling by plane could even become more common among certain other groups of travellers. The fact that air travel seems to be increasing in importance, and the realisation that the travel situation on planes is quite different from other transport modes, makes it interesting to investigate travel time use on planes in future research. The travel time use on ferries could also be investigated in future studies, although this transport mode seems to be less relevant for most travellers. Even the use of travel time among people that are walking or cycling (which is especially important in the Dutch context) could be an interesting direction for future research on travel time use.

5.4.2 Social implications of the research findings

Some possible implications of travel time research were already discussed in previous studies. Lyons & Urry (2005, p. 272) pointed towards the possibility of a more positive perception of public transportation due to the travel time use opportunities on these transport modes, which might be a legitimate point when considering the outcomes of the present study. Public transport modes (especially the train) were found to facilitate more travel time use opportunities and were also perceived to be more positive in terms of travel time use when compared to cars. This could mean that when opportunities, facilities and attitudes towards the use of travel time become more positive in the future, the attractiveness and use of public transport modes might increase at the expense of the private car. This could be positive for the support and use of a good public transport system in cities, which might alleviate some of the problems associated with car traffic (like: congestion and pollution).
Another point can be the influence of changes in the perception of travel time use on the demand for transportation. The possible growth in the importance and possibilities of productive or otherwise beneficial travel time activities might lead to higher travel demands. This might lead to more crowding in public transport, which was found to have a negative influence on travel time use and could also negatively influence the attractiveness and journey experiences of public transportation. It might also lead to more car use, when the opportunities for travel time use in cars also become more positively perceived in the future. The overall increase in transportation might not be desirable in the future, as the problems of congestion, pollution and climate change might increase when this happens.
The role of ICT in travel time use was found to be quite important and positive in the present study. The possible increase in applications of ICT and mobile technologies in travel time use could have the positive effect of facilitating more productive or otherwise beneficial travel time activities. This could mean that people would be able to perform work tasks (or other useful activities) while travelling, which might change the 'burden of travel time' into the 'gift of travel time' (Jain & Lyons, 2008).

Travel time can possibly acquire an important and beneficial place in peoples' daily lives in the future, because of the possibilities of useful and productive travel time use. By turning travel time into productive time through travel time use, the obtained personal and financial benefits of travel time activities might decrease the personal, financial and temporal costs of travelling. But an increase of ICT use in public transport might also have negative effects, as this might diminish the sociality of public transport and might be perceived negative by fellow travellers (Lyons & Urry, 2005; Berry & Hamilton, 2010).

5.4.3 Policy recommendations based on the research findings

Many policy makers seem to have a quite negative perception of travel time. People are expected to want to travel from A to B as soon as possible, as the time it takes to travel is assumed to be useless and wasteful for people. The time invested in travelling is treated as a black box, and people are expected to passively sit in their seat until point B is reached. People are also assumed to only be productive or active at stationary locations, which means that travel time is negatively conceptualised in terms of peoples' (economical) productivity (Lyons & Urry, 2005; Watts & Urry, 2008). But just as many previous studies on travel time use, the present study has provided evidence that travel time is not useless or wasted, because people perform many beneficial activities while travelling. Most respondents in the present study indicated that they got some sort of positive utility from their travel time by performing relaxing or productive activities. The performance of these activities also had a positive influence on the journey experience of most travellers in the present study.

Policy makers should stop treating travel time as a negative aspect of peoples' daily lives, and they should start recognising the positive utilities of travel time. An important goal could be the promotion of productive travel time use, as this can increase peoples' productivity and positive journey experiences. A lot of money is currently invested in speeding up transportation to cut travel times, but it could be more useful to use this money to promote travel time use instead. This could increase the productivity of many travellers and could also decrease the relative or perceived journey durations of travellers; "since passenger travel time is not uniform clock time, but may be stretched and compressed in practices on-the-move (as shown in Watts, 2008)" (Watts & Urry, 2008, p. 871).

The use of travel time for productive activities has great potential, as many people in our post-modern society are employed in knowledge- and information-based work and mostly carry devices with them to access and work with knowledge and information wherever they are. But these activities need to be facilitated by transport providers, as the aspects of vehicle design (in terms of facilities) and vehicle quality (in terms of space, privacy and comfort) were found to have the most significant influences on travel time use. The provision of certain facilities (like: tables, power sockets and wireless internet networks) in high-quality travelling environments (with enough space, privacy and comfort) could help to promote productive travel time use. But this requires a shift in the vision of policy makers in the field of transportation, as they have to start acknowledging the positive utilities of travel time by recognising the potentials of travel time use. As was mentioned before; travel time can be turned into productive time through travel time use, so that the personal and financial benefits of the performed activities might decrease the personal, financial and temporal costs of travelling.

The findings in the present study indicated that trains showed the most positive results in terms of travel time use and ICT opportunities, and that the train was perceived to be the best transport mode option in terms of travel time use. This could be due to the fact that trains in the Netherlands have relatively high levels of space and comfort for passengers, and that the first class compartments provide travellers with power supply and wireless internet connections. If these aspects of design and quality are expanded in all compartments of trains and are also integrated into busses and metros, the opportunities and desirability of travel time use might increase. This means that policy makers should work with transport providers to invest in designing public transport vehicles for easy and productive use of travel time. This might also contribute to the above discussed increase in public transport attractiveness and use, which might help to decrease the amount of car travel and its associated problems for people and the environment. But to make the effective and productive use of travel time more prevalent in the future, policy makers and travellers should all acknowledge the positive utilities of performing mobilities.

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Appendix

The questionnaire and observation schedules that were used for the empirical data collection of the present study are included in this appendix. The Dutch version of the questionnaire (that was used in the field during empirical data collection) is included in appendix 1 (see the next page). The English version of the questionnaire with data codes (that was used for data coding) is included in appendix 2. The observation schedule that was used in the field during empirical data collection (in English and with data codes) is included in appendix 3.

Appendix 1: Questionnaire schedule – Dutch version without data codes:

Questionnaire: Universiteit Utrecht – Master Thesis Onderzoek 'Reistijdgebruik' – 2011

Achtergrond informatie

1. Leeftijdsgroep: ☐ 18-24 ☐ 25-39 ☐ 40-60 ☐ Ouder dan 60 jaar
2. Geslacht: ☐ Man ☐ Vrouw
3. Werk type/Dagbesteding: ☐ Industrie/Bouw/Zorg (fysiek werk)
   ☐ Services/Managing/Onderwijs/Wetenschap (kantoor/intellectueel werk)
   ☐ Bezig met een opleiding (studeren of volgen van scholing)
   ☐ Werkloos of met Pensioen (geen werk)
4. Transportmiddel (regelmatig): ☐ Auto (bestuurder) ☐ Auto (passagier) ☐ Trein ☐ Bus ☐ Metro
5. (Alleen trein) Klasse: ☐ Eerste klasse ☐ Tweede klasse
6. Reisdoel (regelmatig): ☐ Reizen van of naar werk/school ☐ Reizen tijdens en voor werk
   ☐ Reizen in vrije tijd
7. Reisduur (enkele reis): ☐ Minder dan 30 minuten ☐ Meer dan 30 minuten

Reistijdgebruik:

Wat doet u normaal gesproken tijdens het reizen met het transportmiddel dat u regelmatig gebruikt (en dus hebt aangegeven bij vraag 4)?

8. (Alleen voor auto) Rijden / Assisteren met rijden
   ☐ Altijd ☐ Vaak ☐ Soms ☐ Nooit

9. (Alleen voor auto) Navigeren / Route zoeken (of assisteren daarbij)
   ☐ Altijd ☐ Vaak ☐ Soms ☐ Nooit

10. Uit het raam en/of naar mensen kijken
    ☐ Altijd ☐ Vaak ☐ Soms ☐ Nooit

11. Lezen voor ontspanning
    ☐ Altijd ☐ Vaak ☐ Soms ☐ Nooit

12. Lezen voor werk of opleiding (werken of studeren met papierwerk)
    ☐ Altijd ☐ Vaak ☐ Soms ☐ Nooit

13. Bellen of SMS-en met een mobiele telefoon
    ☐ Altijd ☐ Vaak ☐ Soms ☐ Nooit

14. Internet gebruiken op een mobiele telefoon
    ☐ Altijd ☐ Vaak ☐ Soms ☐ Nooit

15. Een mobiele telefoon voor vermaak gebruiken
    ☐ Altijd ☐ Vaak ☐ Soms ☐ Nooit

16. Werken of studeren op een laptop
- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

17. Internet gebruiken op een laptop
- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

18. Een laptop gebruiken voor vermaak
- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

19. Met anderen reizigers praten (vreemden/vrienden/familie/collega's)
- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

20. Ontspannen
- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

21. Slapen
- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

22. Muziek luisteren
- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

23. Eten en/of drinken
- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

24. Niets doen
- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

25. Anders, namelijk:.....
- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

26. Ziet u uw reistijdgebruik als productief, time-out/ anti-activiteit/ontspanning of verspilde/verloren tijd?
- ☐ Productief
- ☐ Time-out/Anti-activiteit/Ontspanning
- ☐ Verspilde/Verloren tijd

27. Ziet u uw reistijd als werktijd/schooltijd of vrije tijd?
- ☐ Werktijd/Schooltijd
- ☐ Vrije tijd

Factoren die reistijdgebruik kunnen beïnvloeden

Hoe beïnvloeden de volgende factoren uw mate van reistijdgebruik wanneer u reist met het transportmiddel dat u regelmatig gebruikt (en dus hebt aangegeven bij vraag 4)?

28. Apparatuur of items voor reistijdgebruik bij u dragen?
(zoals: een boek, laptop, spel/puzzel, krant, Mp3 etc.)

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

29. De vaardigheden om nieuw mobiele ICT apparatuur of technologie te gebruiken?
(zoals: smart-phones, PDA's of laptops)

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

30. Plannen om activiteiten te doen tijdens het reizen?
(het anticiperen op reistijdgebruik voordat u vertrekt)

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

31. De kenmerken van het transportmiddel waar u regelmatig mee reist? *(zie vraag 4)*

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

32. (Alleen voor openbaar vervoer) Grote drukte?
(veel mensen aanwezig)

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

33. (Alleen voor openbaar vervoer) Beschikbare zitplaatsen?

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

34. Veel herrie/lawaai?
(geen stilte)

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

35. Goed ontwerp van het voertuig?
(faciliteiten zoals: tafels, stroom aansluitingen, internet verbinding, Bluetooth of hands-free-set)

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

36. Hoge kwaliteit van het voertuig?
(hier: ruimte, privacy en comfort)

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

37. Lange tijdsduur van de reis?
(lang onderweg en aanwezig is het voertuig)

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

38. Hoge bekendheid met de reis?
(zoals: bekende en vaak gemaakte reis)

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

39. De aanwezigheid van strikte regels of normen?
(regels zoals: verboden (bijv. roken of bellen))

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

40. Sociale aspecten? (blik van anderen of wenselijk gedrag)
(zoals: het gevoel dat u stil moet zijn of dingen
niet moet doen vanwege andere reizigers)

- ☐ Grote positieve invloed
- ☐ Kleine positieve invloed
- ☐ Geen invloed
- ☐ Kleine negatieve invloed
- ☐ Grote negatieve invloed

<u>ICT en mobiele technologieën</u> (zoals: mobiele telefoon, smart-phone, laptop, PDA, Mp3 etc.)

41. Heeft u mobiele ICT apparaten bij u tijdens het reizen?

- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

42. Gebruikt u deze mobiele ICT apparaten tijden het reizen?

- ☐ Altijd
- ☐ Vaak
- ☐ Soms
- ☐ Nooit

43. Wat is de invloed van de mogelijkheden van nieuwe
mobiele ICT apparaten op uw mate van reistijdgebruik?
(zoals: de mogelijkheden van communicatie of internet)

- ☐ Grote invloed
- ☐ Middelmatige invloed
- ☐ Kleine invloed
- ☐ Geen invloed

<u>Verschillen tussen transportmiddelen</u>

44. Welk transportmiddel ziet u als de beste optie voor
nuttig en/of ontspannen reistijdgebruik?

- ☐ Auto (bestuurder)
- ☐ Auto (passagier)
- ☐ Trein
- ☐ Bus
- ☐ Metro

45. Denkt u dat er grote, kleine of geen verschillen zijn in de mate
van reistijdgebruik tussen de boven genoemde transportmiddelen?

- ☐ Grote verschillen
- ☐ Kleine verschillen
- ☐ Geen verschillen

<u>Perceptie</u>

46. Heeft een hoog gebruik van reistijd volgens u een positieve,
negatieve of geen invloed op hoe u een reis ervaart?

- ☐ Positieve invloed
- ☐ Negatieve invloed
- ☐ Geen invloed

<u>47. Dank u wel voor uw tijd en moeite. Heeft u nog aanvullende opmerkingen en/of informatie?</u>

Appendix 2: Questionnaire schedule – English version with data codes:

Questionnaire - Utrecht University – Master Thesis Research 'Travel Time Use' – 2011

Background information

1. Age group: ☐ 18-24 (1) ☐ 25-39 (2) ☐ 40-60 (3) ☐ Older than 60 years (4)
2. Gender: ☐ Male (1) ☐ Female (0)
3. Employment type/ Daytime activities: ☐ Industry/Construction/Care (physical work) (1)
   ☐ Services/Managing/Education/Science (office/intellectual work) (2)
   ☐ Following Education (studying or school/training) (3)
   ☐ Unemployed or retired (no work) (4)
4. Transport mode (regularly): ☐ Car (driver) (1) ☐ Car (passenger) (2) ☐ Train (3) ☐ Bus (4) ☐ Metro (5)
5. Transport class (only trains): ☐ First class (1) ☐ Second Class (0)
6. Journey purpose (regularly): ☐ Travelling to or from work/school (commute) (1)
   ☐ Travelling during and for work (business) (2)
   ☐ Travelling in free time (leisure) (3)
7. Journey duration (single journey): ☐ Less than 30 minutes (1) ☐ More than 30 minutes (0)

Travel time use

What do you normally do while travelling on the transport mode you are regularly using (and thus have indicated at question 4)?

8. (Only for car users) Driving / Assisting in driving
   ☐ Always (3) ☐ Often (2) ☐ Sometimes (1) ☐ Never (0)
9. (Only for car users) Navigating / Route finding or checking (or assisting)
   ☐ Always (3) ☐ Often (2) ☐ Sometimes (1) ☐ Never (0)
10. Looking out of the window and/or at other people
    ☐ Always (3) ☐ Often (2) ☐ Sometimes (1) ☐ Never (0)
11. Reading for leisure
    ☐ Always (3) ☐ Often (2) ☐ Sometimes (1) ☐ Never (0)
12. Reading for work or study (Working or studying with paperwork)
    ☐ Always (3) ☐ Often (2) ☐ Sometimes (1) ☐ Never (0)
13. Calling or texting on a mobile phone
    ☐ Always (3) ☐ Often (2) ☐ Sometimes (1) ☐ Never (0)
14. Accessing the internet on a mobile phone
    ☐ Always (3) ☐ Often (2) ☐ Sometimes (1) ☐ Never (0)
15. Using a mobile phone for entertainment
    ☐ Always (3) ☐ Often (2) ☐ Sometimes (1) ☐ Never (0)

16. Working or studying on a laptop

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

17. Accessing the internet on a laptop

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

18. Using a laptop for entertainment

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

19. Talking to fellow travellers (strangers/friends/family/co-workers)

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

20. Relaxing

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

21. Sleeping

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

22. Listening to music

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

23. Eating and/or drinking

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

24. Doing nothing

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

25. Other, namely:……

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

26. Do you see your travel time uses as productive, time-out/anti-activity/relaxation or wasted/lost time?

- ☐ Productive (1)
- ☐ Time-out/Anti-activity/Relaxation (2)
- ☐ Wasted/Lost time (3)

27. Do you see your travel time as work time/school time or free time?

- ☐ Work time/School time (1)
- ☐ Free time (0)

Factors that can influence travel time use

How do the following factors influence your degree of travel time use when you are travelling on the transport mode you are regularly using (and thus have indicated at question 4)?

28. Equipment or carrying items for travel time use?
(like: a book, laptop, game/puzzle, newspaper, Mp3 etc.)

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

29. The abilities to operate new ICT equipment or technologies effectively?
(like: smart-phones, PDA's or laptops)

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

30. Planning to do activities while travelling?
(anticipating travel time use before departure)

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

31. The characteristics of the transport mode you are regularly travelling on? *(see question 4)*

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

32. (Only for public transport) High degree of crowding?
(many people present)

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

33. (Only for public transport) The availability of seating?

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

34. High degree of noise?
(no silence)

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

35. Good design of the vehicle?
(facilities like: tables, power sockets, internet connection, Bluetooth or hands-free-set)

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

36. High quality of the vehicle?
(here: space, privacy and comfort)

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

37. Long duration of the journey?
(long time travelling and present in the vehicle)

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

38. High degree of familiarity with the journey?
(like: well-known and often made journey)

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

39. The presence of strict rules or norms?
(regulations like: prohibitions (e.g. smoking or calling))

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

40. Social aspects? (public gaze or desirable behaviour)
(like: feeling you should be quiet or refrain
from doing something for the sake of fellow travellers)

- ☐ Large positive influence (5)
- ☐ Small positive influence (4)
- ☐ No influence (3)
- ☐ Small negative influence (2)
- ☐ Large negative influence (1)

ICT and mobile technologies (like: mobile phone, smart-phone, laptop, PDA, Mp3 player etc.)

41. Do you carry any mobile ICT devices while travelling?

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

42. Do you use these mobile ICT devices while travelling?

- ☐ Always (3)
- ☐ Often (2)
- ☐ Sometimes (1)
- ☐ Never (0)

43. What is the influence of the opportunities provided by
new mobile ICT devices on your travel time use?
(like: the possibilities of communication or the internet)

- ☐ Large influence (3)
- ☐ Moderate influence (2)
- ☐ Small influence (1)
- ☐ No influence (0)

Differences between transport modes

44. Which transport mode do you see as the best option
for useful and/or relaxed travel time use?

- ☐ Car (driver) (5)
- ☐ Car (passenger) (4)
- ☐ Train (3)
- ☐ Bus (2)
- ☐ Metro (1)

45. Do you think there are large, small or no differences
in the degree of travel time use between the above
mentioned transport modes?

- ☐ Large differences (2)
- ☐ Small differences (1)
- ☐ No differences (0)

Perception

46. Does a high use of travel time have a positive, negative
or no influence on how you experience a journey?

- ☐ Positive influence (2)
- ☐ Negative influence (1)
- ☐ No influence (0)

47. Thank you for your time and effort. Do you have any further remarks and/or information?

Appendix 3: Observation schedule – English version with data codes:

Observation schedule 'Travel Time Use'
Utrecht University – Master Thesis Urban Geography 2011

Travel information
Transportation: ☐ Car driver (1) / ☐ Car passenger (2) / ☐ Train (3) / ☐ Bus (4) / ☐ Metro (5)
From: To:
Times: ☐ Morning rush-hour (1) / ☐ Middle of the day (2) / ☐ Evening rush-hour (3) / ☐ Evening (4)
(Train only) Transport class: ☐ First Class (1) / ☐ Second class (0)
Number of people under observation:
Other information:……

Observation notes:
Travel time uses: (in 15 minutes of the journey)

Travel time uses:	*Number of people performing them:*
(Car) Driving or assisting in driving	
(Car) Navigating / Route finding or checking (or assisting in that)	
Looking out of the window and/or at people	
Reading for leisure or work	
Using a mobile phone	
Using a laptop	
Using other ICT devices or mobile technologies	
Working or studying	
Talking to fellow travellers	
Relaxing	
Sleeping	
Listening to music	
Eating or drinking	
Doing nothing	
Other, namely:	

Observable factors that can influence travel time use:

Observable factors:	*Observed categories:*
Degree of crowding	☐ High degree of crowding (3) ☐ Moderate degree of crowding (2) ☐ Low degree of crowding (1)
Availability of seating	☐ High amount of available seating (3) ☐ Moderate amount of available seating (2) ☐ Low amount of available seating (1)
Noise/Silence	☐ Much noise (3) ☐ Moderate noise (2) ☐ Low noise / Silence (1)
The design of the vehicle	☐ Good design with much facilities(3) ☐ Moderate design (2) ☐ Bad design without facilities (1)
The quality of the vehicle	☐ High quality (space, privacy and comfort) (3) ☐ Moderate quality (2) ☐ Low quality (cramped, no privacy and not comfortable) (1)