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Great Britain Rail Passengers' Time Use and Journey Satisfaction: 2010 findings with multivariate analysis

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Keywords: Travel Time use, Rail Passenger, Journey Satisfaction, Great Britain

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Rail Passengers' Time Use and Utility Assessment: 2010 findings from Great Britain with multivariate analysis

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Abstract

Using data from Great Britain's National Passenger Survey 2010 this paper examines the travel time use of rail passengers and their indicative assessment of its utility. The paper explores the impacts of individuals' socio demographic characteristics, types of activity undertaken and the perceived difficulties that may be faced by the travellers on their assessment of travel time use utility. The study shows that only 13% of travellers considered their travel time as wasted. However, this varies by journey purpose, travelling class (first/standard class), gender and journey length. The study shows that the positive or negative appreciation by passengers of their journey time is not only a result of various combinations of on-board activity engagements, but also the smoothness of overall journey experience. Being able to work/study on the train most significantly increases individual appreciation of time use. However, a delay on an individual's train journey also has a major influence in reducing his/her perceived value of travel time spent. ICT devices that enable travellers to watch film/video or play games or check emails are more appreciated than those providing access to music/podcast or access to social networking sites. The paper joins others in questioning assumptions made in economic appraisal that travel time is unproductive. It concludes with a call for more substantive and targeted data collection efforts within travel behaviour research devoted to further unravelling the phenomenon of the positive utility of travel.

INTRODUCTION

The value of travel time plays a fundamental role both in the analysis of travel demand and in the appraisal of transport policy measures and investment proposals. It is common to assume in the appraisal process that travel time is unproductive and that any travel time savings represent a key benefit that has monetary value and offsets investment costs. The theoretical foundation for placing a value on travel time savings rests on models of time allocation, originally developed by Becker (*1*) and subsequently extended by many authors (for a review of this concept and its consideration in practice, see Wardman (*2*) and Mackie et al.(*3*)). However, such treatment of time in economic appraisal continues to be questioned. There is a growing body of literature which highlights the positive utility of travel time (e.g., *4-7*). For example, a large scale survey of rail passengers in Great Britain (*6*) found that that only 18% of respondents agreed with the statement: "*My time spent on this train today is wasted time*". Using data from the San Francisco bay area, Redmond and Mokthariant (*8*) found that commuters did not unequivocally see their travel time as a source of disutility to be minimized, but (also) recognised the benefits it can present (such as a transition between home and work) and they found that most people have a non-zero optimum commute time. Lyons and Urry (*5*) argue that information and communication technologies (ICTs) have blurred the classical distinction between activities and travel, enabling a greater array of activities to be conducted during the course of travel.

Various previous studies endorsing and exploring the notion of positive utility of travel time have painted a picture of how time uses, carried items and assessment of time value compare across samples. This paper seeks to add to this knowledge through examination of a new national dataset. As well as offering descriptive and interpretive accounts of the survey findings the paper employs multinomial logit analysis in order to disentangle the effects of the different factors on how worthwhile time use is considered to be on the train. The paper centres upon analysis of 2010 evidence from a major national survey of rail passengers in Great Britain.

The next section of the paper considers recent developments within the travel time use literature. The following section introduces the 2010 National Passenger Survey. Subsequent sections present the findings of both descriptive analysis and multinomial logit analysis of passengers' time use assessment based on their socio-demographic characteristics, their on-board activities and their wider/overall journey experience. Concluding remarks are then offered.

WHAT WE KNOW SO FAR FROM ANALYSIS OF TRAVEL TIME USE

In modelling travel behaviour, it is widely assumed that travel is a source of disutility and hence individuals will seek to minimize it alongside other travel 'costs', subject to their constraints. However, a growing body of literature considers the proposition and actuality that engagement in activities during travel may make trips more enjoyable or productive, thus offsetting the presumed disutility above (e.g. *4, 6, 8, 9*). Mokhtarian and Salomon (*4*) point out that the positive utility of travel has three components: the utility of engagement in the activity at the destination of a trip, the utility of activities that can be conducted while travelling, and an enjoyment of the act or sensation of

travel itself. The first component has been the focus of transport modelling, underlining the treatment of travel as a 'derived demand', while the latter two elements are typically ignored.

Mokhtarian and Salomon (*4*) and Jain and Lyons (*10*) tested the appeal of the notion of teleportation (i.e. a zero commute time). They found that people's desired commute time was typically around 15-20 minutes. Jain and Lyons (*10*) argue that our journey time can be conceived of as a gift both to others being travelled to and to travellers themselves. They indicate three intrinsic meanings of travel time: '*time out*', '*me time*', and '*transition time*'. The former two can be realised through minimising arousal and trying to achieve a relaxed state (e.g. withdrawing into the soundscape of headphones or the imagined world of a book).

Based on questions included in the autumn 2004 National Passenger Survey (NPS) in Great Britain, Lyons et al. (*6*) found that for nearly one third of individuals travelling during the course of work, their journey time was dominated by working/studying and for over 40 per cent of these they considered their time use on the train to be very worthwhile. In line with this, in Norway, Gripsrud and Hjorthol's (*7*) train survey found well over a third of passengers using travel time for work, with nearly a quarter of commuters having their travel time paid for by employers as part of their working day. In the Netherlands, using travel diaries, Ettema et al. (*11*) found that 20 per cent of rail users used their travel time for working.

Fickling et al. (*12*) argue that the ability to work on the train may have contributed to the recent growth in rail travel in the UK, hitherto unexplained by forecasting models, and suggest a need for greater understanding of the employer/employee relationship regarding mobile working. Looking specifically at business travel time, Fickling, et al. (*12*) examined the relationship between working on the train and working in the office to question the values of travel time savings and attributed a growth in reported 'working on the train' to the rise in mobile technology use. While they do not consider the individual response to valuing time, they suggest that the level of working by business travellers on the train makes train travel more economically beneficial to the employer than an equivalent journey by car, where the opportunity to work is more limited. Thus, their argument suggests that for the business traveller and his/her employer, train travel is rarely wasted time. However, they also note that at the beginning and ends of journeys passengers are less likely to work, and that productivity peaks in the first quarter of the journey (see also Lyons et al., *6*). If travel times were shorter, for most of the passengers surveyed (64%) this would not affect their work while travelling, but of this group 23% would work elsewhere (e.g. the office) in the 'saved' time and another 14% would work less. They argue that marginal reductions in travel time are unlikely to produce additional productive work time elsewhere. The implications of their work feed into the debate about revising the appraisal mechanism to recognise the value of travel time, and, just as importantly, there are implications for how employers view working on the move and associated policies towards it.

The appreciation of travel time use, mostly on commute trips, by public transport users has also been investigated using utility-based mode choice models (e.g. *13, 14*), in which the utility of a travel mode is derived from observed choices of this mode. These studies typically find that travel time by public transport is valued more

negatively than travel time by car. However, the lower utility predicted by utility-based models do not necessarily imply that trips made by public transport are negatively experienced by those who deliberately choose to travel by public transport (*15*). Kahneman (*16*) and Ettema et al. (*11*) point out that decision utility, which is the expected utility prior to a trip, is in general not equal to experienced utility, which can be defined as an aggregation of momentary experiences during a trip. It has been shown that individuals usually over-predict the intensity of both positive and negative emotions (*17*). Thus, it is concluded that insight into how public transport commuters experience their commute and the factors that influence their commute experience is limited. Yet, such information is clearly valuable in order to assess transport policies, such as those promoting more sustainable forms of travel (*15*).

Whilst ICTs are helpful in enabling the journey to have a positive utility, space and time constraints are also significant in determining what an individual can and cannot do on the train. Axtell et al. (*18*) and Watts (*19*) indicate how train passengers unpack and spatially configure their travel environment, whether working or not. Holley et al. (*20*) note that the travel space can offer time for thinking, where the mind has time to drift and potentially be more creative; or even giving space to relax away from the everyday pressures of work which could increase productivity when back in the office. This physical and social context of the journey contributes to the way in which travellers 'craft' their travel time activities, and 'doing' on the move is often discontinuous and fragmented, with work only occupying particular parts of the journey, and sometimes outright avoided (*6*). Watts and Lyons (*21*) argue that tempo of journey time changes and can be changed – time can be stretched or compressed depending both upon state of mind as well as carried artefacts (food, cushions, music etc.) which can reconfigure the experience. In line with this argument, Ettema and Verschuren (*22*) found that travel time of car and public transport users is valued as less negative when listening to music.

It is clear from the discussions above that the previous studies have consistently supported the notion of positive utility of travel time and have identified a list of on-board activities that may have positive impacts on individual travel experience. However, we suggest further insight is warranted in relation to the relative extents of impact on utility of different activities and how this can vary for different types of travellers and journey purposes, when other factors are controlled for. We look to address this within the paper.

NATIONAL PASSENGER SURVEY 2010

The National Passenger Survey is a bi-annual survey of rail passengers in Great Britain administered by Passenger Focus (an independent body set up by the Government to protect the interests of passengers).

Each year the survey secures over 50,000 responses across two waves in an effort to gauge passenger satisfaction with rail services. Response data are weighted to be representative of the national profile of rail passengers. Details of the survey design can be found in Lyons et al (*6*) and Continental Research (*23*). The data upon which this paper is based are from the autumn 2010 survey wave.

[Table 1 is about here]

This survey wave included four questions concerning travel time use which explored how people used their time on the train, how worthwhile they considered their time to be, what items they carried with them and used on the train and the extent to which people planned in advance how they would use the time on the train.

The main fieldwork for this wave took place between 2 September and 9 November 2010. Self-completion questionnaires were distributed at some 700 stations across Great Britain (*24*). Passengers are asked to complete the questionnaire when they have completed their journey. Questions in the survey refer specifically to the train the individual was on following receipt of the questionnaire. The effective sample size for the analysis below is 19,715. Response data are weighted by train operating company, journey purpose and day of travel (weekday/weekend) to ensure the national profile of rail passenger travel is matched. Further explanation of how the sample for analysis was prepared can be found in Lyons et al. (*25*) where the authors compare the findings from the 2010 survey with corresponding findings from the 2004 survey. The weighted sample profiles can be seen in Table 1.

TIME USES, SUPPORTING ARTEFACTS AND TIME WORTH

What activities are undertaken on the train?

Respondents were asked to indicate which activities they engaged in on the train and which of these they spent the most time engaged in. There were 19 response categories (including '*other*') available ranging from '*working and studying*' to '*watching film*', '*being bored*' and '*being anxious about the journey*'. The response data are summarised in Table 2. Only types of activities which have participation rate of 10% (Table 2a) and 1% (Table 2b) for all activity and activity that taken most of respondents' time, respectively, are shown on the table. Response categories not shown in the Table are: '*watching a film/video*', '*accessing social networking sites*', '*playing games (electronic or otherwise)*', '*being anxious about the journey*' and '*planning onward or return journey*'.

[Table 2 is about here]

As shown at Table 2, reading for leisure and window gazing/people watching are the two most prominent activities amongst rail passengers regardless of how substantively they feature in an individual's journey (i.e. Table 2a and Table 2b) – these activities align with Jain and Lyons' notions of 'time out' and 'me time' and achievement of minimised arousal (*10*). Sending text messages (for personal purposes), working/studying and listening to music/radio/podcast are the next most popular activities among rail passengers. It is important to note how the activities within the Table vary in nature and in terms of the extent to which they may interact. For example, listening to music/radio podcast may itself be the focus of an individual's attention or this may instead create a means of acoustic screening as a backdrop for other activities such as window gazing, reading for leisure or texting. The nature of derived achievement/fulfilment from activities may not be apparent from the activities

themselves. For example window gazing / people watching may relate to boredom, to relax 'down time' or to important thinking time either in relation to work or home matters. Such observations underline the challenge of such survey questions being able to capture, unambiguously, insights into the richness of travel time use in the face of multitasking and the distinction between the means and the end, i.e. the difference between what one does and what one seeks to achieve by doing it. This latter point has significance for the growing array of functionality of mobile ICTs potentially to hand in the rail travel environment. In some cases it may be that new for old substitution is occurring – for example in terms of an e-book being used for reading in place of its paper alternative. In other cases the activity engagement may change thanks to ICTs yet the goal may remain broadly the same – for example being able to watch a DVD film on a laptop may substitute for reading for leisure yet both fulfil the purpose of achieving minimised arousal and indulging in 'time out' or 'me time'.

In principle the way in which an individual makes use of time on the train could be independent of what is done immediately before or after the journey – i.e. travel time and the environment of the railway carriage is seen as an activity opportunity in its own right. Indeed there is some suggestion in part that this may be the case in that the results overall show a remarkable consistency between proportions of activity engagement for outbound compared with return journeys across journey purposes. However, the results reveal notable differences across journey purposes themselves. For example, more than half of business travellers were '*working/studying*'; for commuters, '*reading for leisure*' is the most popular activity, whilst '*window gazing/people watching'* is the most popular activity among leisure travellers (see Table 2a). '*Talking to other passengers*' is common among leisure travellers, whilst '*sending text messages for work purpose*' and '*checking emails*' are very popular among business travellers. The results suggest an inter-relationship between the destination activity from which the need for the journey is derived and the travel time activity. However, such inter-relations are not homogenous. For example while a third of business travellers continue in 'work mode' on the train, a quarter revert to 'me time' by reading for leisure. This exposes the challenging matter of how to interpret ownership of time. For example in the UK it is generally taken that commute time does not form part of the working day (hence is not owned or paid for by the employer) and yet over 1 in 10 commuters, by mainly working/studying on the train, are not treating the time as their own. One can suggest that travel time is (or has increasingly become) part of a growing flexibility (for some) in society of where and when activities are undertaken.

In addition to journey purpose, activity participation rates also vary according to journey length (see Figure 1). The participation rate of '*working/studying*' as the activity that took most of the travel time is doubled when the journey duration increased from 15-30 minutes up to about two hours, whilst '*window gazing*' participation is halved. After two hours, the proportion of '*working/studying*' is gradually decreasing and the proportion of '*window gazing*' is increasing. It must be noted that for very short journeys there is a greater likelihood of fewer different activities being engaged in compared to very long journeys. Very short journeys may only lend themselves to certain activities – notably window gazing/people watching with other activities demanding longer time to become immersed in (such as sleeping/snoozing or working/studying). Meanwhile very long journeys potentially 'exhaust' the time an individual wishes to devote to any given activity leading to

engagement in subsequent other activities perhaps for even greater periods of time. This may well be the case for working/studying where for journeys of over two hours the likelihood of this being the dominant activity goes down while reading for leisure in particular goes up.

[Figure 1 is about here]

What artefacts were carried and used whilst travelling?

Table 3 shows which items were carried and used by passengers. '*Mobile phone*' and '*newspaper*' are the most popular items carried and used by any group of travellers. As expected, '*paperwork*' and '*laptop computer*' are markedly more likely to be carried by business travellers compared to other travellers. About 30% of leisure and business travellers carried '*food/drink*', whilst only one fifth of commuters did so. Commuters are more likely to carry and read '*newspaper*' and '*reading book*', whilst there were more leisure travellers reading '*magazine*' than other type of travellers. What is evident overall is that substantial proportions of carried items are not used during the journey. This will reflect in part the fact that the items were not intended for use on the train but relate to the destination activity (e.g. paperwork for the office). However, it is also likely to indicate (and more substantially so) the fact that individuals can be well equipped for their travel such that they can accommodate different time uses depending upon their needs and state of mind at the point of travel itself. Mobile ICTs now represent an appreciable share overall of the repertoire of artefacts carried. New entrants such as eBooks are a reminder of the likely diffusion of innovation from the small number of early adopters to the later wider-spread adoption (as is now being seen by the proportion of those with laptops (notably business travellers). At the same time the reading book is a reminder of the enduring dominance of some old technologies that remain usable and sufficient for the purposes they are used. Returning to a point made earlier regarding new for old substitution. A key question for the attention of on-going data collection is how the composition of carried artefacts is changing and how and to what extent this in turn is changing the utility of the associated travel time use.

[Table 3 is about here]

Time worth assessment by passengers

Table 4 shows how travellers judged the merit of their time spent on the train (an indicative measure of the extent of positive utility) according to trip purpose, ticket class, level of advance preparation and satisfaction with train punctuality and room for seating/standing in the train they travelled on. Overall only 13% of travellers consider their travel time is a waste. A significant minority of travellers across journey purposes indicate making very worthwhile use of their time – a strong signal of positive utility. The majority of travellers indicate making some use of their time. This response option needs some care in its interpretation. It might imply some degree of positive utility. It might instead reflect a level of reduced disutility for the individual as compared against a journey for which the time is simply considered

wasted. In other words an individual has salvaged something from the 'cost' of undertaking the journey rather than positively benefitted.

[Table 4 is about here]

Business travellers appear overall to derive most benefit from their travel time, followed by leisure travellers. This may reflect the less routine nature of such journeys compared to commuting by rail. There is perhaps a greater sense of novelty and indulgence in the mobile experience whereas for the (regular) commuter they may have more time than they wish for in the train environment across a working week in terms of the appeal and uses of that time. There is a marked difference in responses depending upon the class of travel (Table 4b). What is not evident from the data however is whether it is the difference in travel environment according to class of travel of the difference in type of traveller by class of travel that explains the difference? Those who plan a lot in advance how to use their time on the train are three times as likely to consider their time use worthwhile compared to those who do not plan at all (Table 4c). Tables 4d and 4e also show that the travellers' assessment of positive utility is in line with their satisfaction concerning train punctuality and the availability of space to sit/stand (in general, not necessarily for them personally). The latter is in-line with Axtell et al. (*18*) and Watts (*19*) who argued that to use their time, train passengers also need to 'unpack' and have enough space in their travel environment to undertake their chosen activities. Taken together the results in Table 4 would suggest that it is a combination of the travel environment (in turn dictated by both the transport provider and the individual in terms of how they are equipped) and the attitude and choices of the individual that governs how worthwhile time use can be. The fact that the degree of positive utility of time use changes according to such circumstances suggests that influence could be exerted to achieve further change.

MULTIVARIATE ANALYSIS

From the previous sections, it is clear that the appreciation of travel time is different for different groups of people and for each trip purpose. In this section multivariate analysis is used to untangle the relationships between individual assessment of positive utility and socio demographic characteristics, types of activity engaged in whilst travelling, punctuality of the journey and the perceived difficulties that may be faced whilst travelling. A multinomial logit (MNL) model is used for this purpose and all estimations were undertaken using the program SPSS v. 16.

The estimation results are presented in Table 5. The parameters of the MNL models were estimated for the three 'indicative utility' levels, i.e. '*I made very worthwhile use of my time on this train today*', '*I made some use of my time on this train today*', and '*My time spent on this train is wasted time*'. The estimated parameters of the MNL models indicate the propensity of individuals to value their travel time as worthwhile, somewhat useful or wasted. The reference category here is: y = 1 (I made very worthwhile use of my time on this train today) and a higher estimated coefficient indicates the more the respondents deem the time spent is a waste (or less productive). '*People over 65 years old*', '*female*', '*unemployed*' and '*standard class*' travellers were used as the reference variables. Given the different nature of different journey

purposes, the model is estimated separately for commute, business and leisure journey purposes.

[Table 5 is about here]

The estimation results in Table 5 reveal that younger people, especially those aged under 45, are more likely to consider their travel time as wasted compared to older people. On the other hand, people who are older than 65 are the ones who most appreciate their travel time. The age effect is more significant among leisure and business travellers. The model also shows that female rail travellers are more appreciative of their travel time than male travellers.

Unemployed, retired and full-time students are the ones who are most likely to see their time spent on travel as wasted. On the other hand, full-time workers and first class passengers are the ones who valued their time most, despite different journey purposes.

People who mostly spent their time window gazing/people watching are the ones who most considered their time spent as a waste and the people who mostly spent their time on work/study are the ones who appreciate their travel time use most, regardless of journey purpose. People who spent most of their time reading a book or checking emails or texting for work purposes are also seeing their time spent as a positive. Leisure travellers appreciated reading activity more than others, whilst commuters appreciated texting/phoning for work purposes more and business travellers appreciated checking emails/browsing internet more than others. Commuters and leisure travellers who spent most of their time listening to music did not see their time spent as wasted, but did not see it as a well spent either. However, this is not the case with the business travellers. The business travellers did not perceive time that they spent in listening to music, sleeping/snoozing, texting/phoning for personal purposes and talking with other passengers positively. On the other hand, leisure travellers considered texting/phoning for personal purposes and talking with other passengers are a good use of their time. Commuters appreciated the time that they spent on sleeping/snoozing more than leisure travellers.

In-line with the previous studies' findings (e.g. *21, 22*), the positive or negative appreciation of activities is a result of various combinations of on-board activity engagements. The estimated impacts of each activity on the individual's appreciation of their travel time spent are shown in Table 6. Being able to study/work on the train is the one that increases individual appreciation of their time use most significantly. On the other hand, being bored is the one that reduces the value of time spent the most. Comparing the estimated coefficients, the impact of being bored is three times higher than being able to study/work on-board. ICT devices that enable travellers to watch film/video or play games or check emails are more appreciated than those providing access to music/podcast or access to social network sites.

The estimated model (Table 5) also shows that overall journey experience is as important as on-board activity engagement in enhancing individual's value of their travel time use. Suffering a delay reduces individual's value of their travel time, whilst having comfortable seating (especially among leisure travellers), a good treatment from the staff, being pleased with toilet facilities and enough

sitting/standing space (especially among commuters), and luggage spaces have significant impacts in increasing travellers' appreciation of their travel time.

[Table 6 is about here]

Whilst a longer journey length has negative impact to the leisure travellers' appreciation on their time spent, that is not the case with the business travellers. Afternoon peak travellers see their travel time more as a waste compared to morning peak travellers, whilst travellers who were familiar with the route have a better appreciation of their travel time spent than others.

The multivariate analysis results firmly underline that far from a homogenous and widespread experience of rail travel time as wasted, travel time use can derive substantial variation in positive utility according to the characteristics of the traveller, the purpose for which their journey is being made and the travel environment itself.

CONCLUDING REMARKS

Using data from Great Britain's National Passenger Survey 2010 this paper has explored the impacts of individuals' socio demographic characteristics, types of activity engaged in whilst travelling and the perceived difficulties that may be faced by the travellers whilst travelling and effects on individuals' assessment of indicative utility of their travel time. The vast majority (87%) of passengers do not consider their travel time to be wasted, with the most popular activities being reading for leisure, window gazing, sending text messages (for personal purposes), working/studying and listening to music/radio/podcast. The findings reveal a richness and diversity to rail travel experience. Currently, economic appraisal makes the assumption that travel time savings (from investment in a new transport scheme such as high speed rail) reflect a conversion of unproductive time to productive use which has economic value. Studies such as this cannot immediately undermine this core assumption because they do not establish the extent to which productive use of time within a journey might overlap with any savings in travel time that could be brought about. However, such empirical findings as presented do continue to bring into question this assumption.

What is evident from the results is that travel time is used in a variety of ways, supported by a variety of carried items (including, increasingly, ICTs) and that individuals can derive benefit from this time use. However, once one moves beyond the clarity of travel time use being deemed simply as wasted/unproductive, the ability to interpret and value time use becomes considerably more complex.

This evidence is the result of only a small number of specific time use questions included as part of a larger national survey. Within the paper we have highlighted through our interpretive commentary how such questions are constrained in terms of the explanatory insights they can reveal. If we are to better account for travel time use in travel demand analysis, transport modelling and economic appraisal, then it is not sufficient to know what activities people are engaged in. We need to know more about the purpose those activities on the move serve, how they are valued and how they compare with time uses outside of the travel environment. We would suggest that

the mounting body of research focused on the positive utility of travel time merits a yet stronger focus from the travel behaviour research community. This should come with investment from research sponsors in more extensive and dedicated evidence gathering specific to travel time use and its value.

The analysis in this paper has been able to offer as a contribution to the literature some of the most up to date evidence in the context of a continually evolving information age landscape for travel time use. It also offers some clearer insights into how different factors play their part in determining the indicative extent of positive utility of travel time use. This is helpful in providing further insights for rail operators in particular (both in relation to how rail travel is marketed and how service provision is tailored). It too points towards the need for large scale surveys that are more exclusively focused upon travel time use and value and which provide capacity for both closed response questions as well as capturing free-form response text from travellers giving more insight into their motives, behaviours and attitudes surrounding travel time use.

On-going research must further pursue the following important question. Are mobile technologies incidentals or instrumental to whether or not the positive utility of travel time is changing over time? The paper has highlighted that to some extent ICTs are creating substitute means for activity engagement – old wine in new bottles. However, they are also likely to be contributing overall to an erosion of the spatial and temporal constraints of activity engagement and social participation. In other words there is an increasing flexibility to where and when we do things in society as the information age continues to evolve. This could progressively lead to a situation where in-travel and out-of-travel time seamlessly join such that degrees of productivity or positive utility are less defined by whether or not one is travelling but by what one wishes or needs to achieve at a particular point in time.

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FIGURE 1. Activity most engaged in – variation by journey duration

TABLE 1. Weighted sample profiles

Respondents and their trip characteristics		**Percentage of all trips**
Gender	Male	44.9
	Female	52.5
	Not Stated	2.6
Age	16 – 25 years old	11.9
	26 – 34 years old	16.0
	35 – 44 years old	18.4
	45 – 54 years old	21.7
	55 – 59 years old	9.6
	60 – 64 years old	9.7
	65 years old or older	11.1
Travelling	First Class	2.3
Class	Standard Class	93.9
	Not Stated	3.9
Journey Purposes		
Commute	Daily commuting to/from work	32.6
	Less regular commuting to/from work	9.3
	Daily commuting for education (to/from college/school/university)	2.9
	Less regular commuting for education (to/from college/school/university)	2.1
Business	On company business (or own if self-employed)	15.1
Leisure	On personal business	4.3
	Visiting friends or relatives	13.0
	Shopping trip	5.6
	Travel to/from holiday	3.2
	A day out	5.3
	Sport	1.1
	Other leisure trip	5.5

TABLE 2. Activity participation by journey purpose and direction of travel

Activity	All		Commute		Business		Leisure	
	Outward	Return	Outward	Return	Outward	Return	Outward	Return
(a) % of respondents who spent *any* time on activity (only those activities with >10% response shown)								
Reading for leisure	53.6	55.8	63.3	62.4	41.9	46.1	47.2	50.2
Window gazing/people watching	52.7	53.5	44.9	48.4	43.0	49.8	64.6	63.1
Text messages/phone calls - personal	29.0	32.0	32.1	36.9	23.4	30.6	27.6	25.3
Working/studying (reading/writing/thinking)	27.1	27.4	31.4	30.7	56.8	52.1	11.8	10.6
Listening to music/radio/podcast	19.9	21.1	28.4	28.0	13.9	14.7	12.6	13.5
Checking emails	16.8	17.3	20.8	20.0	31.1	32.5	7.3	6.1
Eating/drinking	16.5	17.2	11.6	13.6	22.3	23.5	19.9	19.9
Text messages/phone calls - work	14.9	14.9	17.9	16.2	31.4	34.8	5.6	3.6
Talking to other passengers	14.1	13.1	10.5	9.8	11.3	9.5	19.0	19.8
Sleeping/snoozing	12.6	16.4	16.6	19.2	12.6	14.4	8.1	12.9
Being bored	10.2	11.4	13.0	13.9	7.2	8.5	8.1	9.0
Internet browsing	9.5	10.4	12.8	13.3	10.9	11.7	5.5	5.2
(b) % of respondents who spent *most* time on given activity (only those activities with >1% response shown)								
Reading for leisure	37.7	38.1	45.5	44.0	23.0	27.7	34.4	33.8
Window gazing/people watching	20.0	18.5	12.0	11.6	10.7	14.7	32.1	30.9
Working/studying (reading/writing/thinking)	13.5	13.5	12.8	14.1	37.6	30.7	5.7	4.3
Listening to music/radio/podcast	7.6	8.0	10.4	10.2	5.4	4.9	5.3	6.2
Talking to other passengers	5.7	4.9	2.6	2.7	6.0	3.9	9.0	8.7
Sleeping/snoozing	2.9	3.9	4.4	4.1	2.7	2.7	1.4	4.1
Checking emails	2.2	2.1	2.8	2.1	4.4	5.3	0.7	0.5
Text messages/phone calls - personal	1.8	2.1	1.7	2.7	1.5	0.8	2.2	1.9
Being bored	1.6	1.9	2.2	1.8	0.6	2.0	1.4	1.8
Text messages/phone calls - work	1.3	1.0	1.5	1.1	3.2	2.5	0.4	0.2
Caring for someone travelling with you (including children)	1.3	1.4	0.1	0.3	0.3	0.2	3.0	3.6

TABLE 3. Item carried and used on–board

Items	**Commute**		**Business**		**Leisure**		**All**	
	Carried	Used	Carried	Used	Carried	Used	Carried	Used
Mobile phone	72.8	38.9	79.9	47.6	60.6	31.5	69.2	37.4
Newspaper	52.0	38.0	45.1	32.1	36.9	24.9	45.2	32.1
Reading book	39.8	24.1	30.8	16.6	32.9	19.0	35.8	21.0
MP3 player/personal stereo	28.7	16.8	21.4	9.8	15.0	9.6	22.4	13.0
Paperwork	22.4	9.7	45.8	27.0	8.5	5.0	20.6	10.5
Food/drink	21.8	11.2	30.0	21.7	30.3	20.4	26.3	16.3
Laptop computer	12.0	3.3	28.0	10.4	3.4	1.0	11.1	3.5
Magazine	9.8	4.5	12.2	6.4	15.7	9.1	12.4	6.6
Text book	9.3	3.7	7.1	3.3	3.3	1.7	6.7	2.9
Games/puzzles	6.4	1.8	5.0	2.0	6.1	2.8	6.1	2.2
eBook/iPad	3.0	1.7	2.6	1.6	1.3	0.8	2.3	1.3
Netbook	1.7	0.5	2.8	1.3	0.8	0.3	1.5	0.6
Games console	1.3	0.6	0.5	0.3	1.0	0.5	1.1	0.5
Portable DVD player	1.0	0.5	0.5	0.2	0.5	0.2	0.7	0.3

TABLE 4. Indicative assessment by passengers of positive utility of travel time

a. by Trip purpose

	All	Commute	Business	Leisure
I made very worthwhile use of my time on this train today	30.1	27.4	34.3	31.8
I made some use of my time on this train today	54.6	55.2	56.8	53.0
My time spent on this train is wasted time	13.3	16.0	8.0	12.1

b. by Ticket class

	All	First Class	Standard Class	Not Stated
I made very worthwhile use of my time on this train today	30.1	43.7	29.9	27.5
I made some use of my time on this train today	54.6	50.5	54.8	52.4
My time spent on this train is wasted time	13.3	4.5	13.6	10.9

c. by Level of journey preparation in advance

	A lot	A little	Very little	Not at all
I made very worthwhile use of my time on this train today	63.8	29.2	30.9	20.7
I made some use of my time on this train today	31.9	62.7	56.0	53.3
My time spent on this train is wasted time	3.4	7.2	11.9	22.3

d. by Satisfaction with train punctuality/reliability (i.e. the train arriving/departing on time)

	Very satisfied	Fairly satisfied	Neither	Fairly dissatisfied	Very dissatisfied
I made very worthwhile use of my time on this train today	36.3	27.1	21.7	20.7	19.7
I made some use of my time on this train today	52.2	57.5	56.8	54.8	53.2
My time spent on this train is wasted time	9.4	13.9	18.6	22.9	26.1

e. by Level of room sufficiency for all the passengers to sit/stand

	Very good	Fairly good	Neither	Fairly poor	Very poor
I made very worthwhile use of my time on this train today	40.5	29.3	24.9	21.7	19.2
I made some use of my time on this train today	48.7	58.0	55.7	58.8	50.2
My time spent on this train is wasted time	8.6	11.1	17.3	18.6	28.0

Note: There were 2% of travellers who did not provide a response.

TABLE 5. Multinomial logit model on individual satisfaction on their train journey

	Commuters				Business Travellers				Leisure Travellers			
	I made some use of my time on this train today (y=2)		My time spent on this train is wasted time (y=3)		I made some use of my time on this train today (y=2)		My time spent on this train is wasted time (y=3)		I made some use of my time on this train today (y=2)		My time spent on this train is wasted time (y=3)	
	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats
Constant	0,697	19,27	0,075	1,41	-0,177	-3,43	-0,238	-2,97	0,357	13,60	-0,244	-6,12
Travellers' socio-demographic characteristics:												
Age between 16-25	0,355	13,26	1,312	29,07	0,023	0,45	0,143	1,70	0,595	25,44	1,477	40,64
Age between 26-34	0,290	11,67	1,149	26,33	0,535	14,84	0,572	8,96	0,419	20,67	0,978	29,14
Age between 35-44	0,088	3,63	0,507	11,64	0,557	16,90	0,202	3,27	0,054	2,99	0,581	18,44
Age between 45-54	0,042	1,73	0,374	8,61	0,467	14,62	-0,011	-0,18	-0,021	-1,24	0,159	5,21
Age between 55-59	0,152	5,92	0,580	12,74	0,222	6,53	-0,498	-7,35	0,004	0,26	0,176	5,75
Age between 60-64	0,180	6,59	0,223	4,48	0,427	12,36	-0,214	-3,08	-0,116	-9,16	-0,030	-1,29
Male dummy	0,239	29,54	0,263	22,20	0,354	24,91	0,000	0,00	0,113	12,93	0,071	4,94
Full time worker dummy	-0,172	-5,64	0,057	1,15	0,062	1,84	-0,266	-4,69	0,208	14,30	0,122	5,34
Part-time worker dummy	-0,259	-8,41	-0,050	-0,99	0,212	6,09	-0,091	-1,48	0,340	21,07	-0,360	-12,93
Retired dummy	-0,523	-10,82	0,521	7,01					0,329	20,13	0,141	5,06
Full time student dummy	-0,040	-1,16	0,572	10,68					0,431	16,10	0,198	5,40
First class travellers	0,187	5,64	-0,441	-6,20	-0,213	-7,24	0,090	1,22	-0,380	-15,32	-1,033	-15,58
Most time allocation on the train:												
The passenger **mostly** slept/snoozed on the train	0,222	7,70	0,065	1,98	0,608	10,34	1,532	19,30	0,043	1,31	0,318	6,98
The passenger **mostly** reading on the train	0,010	0,47	-1,570	-62,64	0,345	8,94	-0,394	-6,83	-0,106	-5,38	-1,864	-59,59
The passenger **mostly** worked/studied on the train	-0,490	-21,38	-3,055	-90,84	-0,348	-9,12	-2,373	-36,78	-0,766	-31,48	-2,322	-43,89
The passenger **mostly** talked to other passengers on the train	0,064	2,02	-0,849	-21,60	0,000	0,01	-0,013	-0,19	-0,086	-3,84	-0,249	-7,85
The passenger **mostly** window gazing/people watching	0,792	31,43	0,450	15,91	1,185	27,84	1,740	30,15	0,526	26,36	0,830	30,10
The passenger **mostly** listen to music on the train	0,451	18,00	-0,335	-11,57	1,007	18,74	1,638	22,88	0,380	13,76	0,057	1,52

The passenger **mostly** texting/phoning for work purposes	-0,493	-13,29	-1,898	-29,34	-0,365	-7,08	-1,856	-11,65	0,340	4,75	-0,527	-4,01
The passenger **mostly** texting/phoning for personal purposes	0,908	23,80	-0,309	-6,63	0,505	6,24	1,295	11,46	-0,177	-5,35	-0,798	-15,60
The passenger **mostly** checking email/browsing internet	0,086	3,06	-1,057	-28,47	-0,202	-4,44	-0,654	-7,70	0,172	4,23	-0,693	-10,29
Involved on the other following activities on the train (beside activity that took the time most):												
Sleeping/snoozing	0,304	24,95	0,492	28,59	0,278	11,83	0,953	23,82	0,037	2,35	0,018	0,64
Reading for leisure	0,159	13,94	-0,276	-17,33	0,341	18,38	-0,373	-9,34	0,120	9,48	-0,871	-40,59
Working/studying (reading/writing/thinking)	-0,103	-9,73	-0,760	-45,66	0,188	10,03	-1,430	-34,81	-0,140	-8,30	-1,097	-32,68
Talking to other passengers	-0,395	-27,96	-0,241	-11,68	-0,154	-5,32	-0,752	-11,51	-0,326	-24,93	-0,603	-25,07
Window gazing/people watching	0,280	32,38	0,250	19,04	0,564	38,09	0,105	3,19	0,323	32,56	0,272	14,28
Listening to music/radio/podcast	0,008	0,76	-0,031	-1,96	-0,026	-1,06	0,725	14,68	-0,163	-9,50	-0,020	-0,73
Watching a film/video	-0,477	-19,42	-0,555	-15,69	0,347	5,54	-0,110	-0,90	-0,429	-9,50	0,216	3,15
Text messages/phone calls – work	-0,246	-20,72	-0,394	-20,90	-0,123	-6,94	-0,489	-12,87	0,141	6,76	-0,769	-17,25
Text messages/phone calls – personal	0,190	19,63	-0,008	-0,54	0,424	23,53	0,113	3,13	0,191	17,30	-0,201	-10,71
Checking emails	-0,033	-2,80	-0,271	-14,30	-0,032	-1,77	0,001	0,03	-0,334	-15,52	-0,620	-16,98
Internet browsing	0,249	15,31	0,166	7,18	-0,130	-4,57	-0,811	-12,96	-0,164	-6,27	0,026	0,64
Accessing social networking sites	-0,436	-23,11	-0,450	-17,17	0,102	2,18	0,626	8,29	0,278	9,09	1,025	23,15
Eating/drinking	0,054	4,27	-0,137	-7,27	-0,189	-11,11	-0,160	-4,44	-0,149	-12,84	-0,255	-12,35
Caring for someone travelling with you (including children)	-0,119	-2,56	-0,552	-8,18	-2,311	-21,55	-3,023	-10,99	-0,019	-0,90	-0,500	-14,51
Playing games (electronic or otherwise)	0,137	7,33	0,035	1,38	0,292	6,13	1,062	15,15	0,316	11,47	0,219	5,30
Being bored	0,857	51,03	1,844	98,23	1,554	39,42	2,606	53,33	0,937	40,46	2,423	92,27
Being anxious about the journey (e.g. delays or where to get off)	0,229	13,90	0,614	29,77	0,652	20,15	1,359	28,67	0,028	1,58	0,350	13,78
Planning onward or return journey	0,166	8,21	-0,090	-3,28	0,266	9,68	0,732	15,98	0,095	5,86	-0,180	-7,04
Overall Journey Characteristics:												
Journey length (min)	-0,0001	-0,42	0,002	6,10	-0,001	-6,93	0,0003	1,00	0,001	15,61	0,002	9,32
Travelled in AM peak	0,010	1,09	0,188	13,16	-0,175	-9,38	0,333	9,52	0,358	14,39	-0,263	-5,55
Travelled in PM peak	0,059	6,21	0,299	21,57	0,092	5,21	0,277	8,37	0,095	7,44	0,053	2,50
Familiar with the route	-0,064	-8,34	-0,231	-20,37	0,049	3,18	-0,437	-13,38	-0,128	-14,17	-0,342	-21,08

The train suffered delay	0,101	10,57	0,392	29,36	0,401	22,89	0,148	4,45	0,027	2,23	0,326	17,41
Pleased with amount of space for sit/stand	-0,245	-26,11	-0,780	-57,23	-0,295	-16,48	-0,508	-15,42	-0,096	-8,57	-0,181	-10,54
Had a comfort seating	-0,062	-6,47	-0,327	-24,21	-0,148	-8,90	-0,682	-21,80	-0,245	-21,21	-0,718	-41,68
Pleased with amount of space for luggage	-0,182	-21,20	-0,191	-14,54	-0,135	-9,20	-0,418	-13,37	-0,127	-14,13	-0,346	-22,45
Good treatment by staff	-0,223	-25,49	-0,415	-30,78	-0,430	-29,09	-0,281	-9,48	-0,276	-30,69	-0,367	-24,27
Pleased with toilet facilities	-0,127	-10,72	-0,361	-18,33	-0,216	-11,04	-1,025	-18,28	-0,168	-14,86	-0,468	-21,55
N *(weighted)*, subpopulation	412333.5, 7632				130840.9, 2894				320608.5, 7936			
Chi-square, df, sig	97651, 98				40594, 94				74437, 98			
L(0)	801945.9				233066.8				605415.2			
L(β)	704294.9				192472.4				530978.3			

Note: The reference category is: ‘I made very worthwhile use of my time on this train today’. The model for business travellers not includes ‘full-time students’ and ‘retired’ travellers.

TABLE 6. Impact of each activity involvement on individuals' indicative assessment of utility

Activity	Impacts		
	Commuters	Business Travellers	Leisure Travellers
Sleeping/snoozing	--	--	Neutral
Reading for leisure	+	+	++
Working/studying (reading/writing/thinking)	++	++	++
Talking to other passengers	++	+	++
Window gazing/people watching	--	--	--
Listening to music/radio/podcast	+	-	+
Watching a film/video	++	+	+
Text messages/phone calls - work	++	++	+
Text messages/phone calls - personal	+	--	++
Checking emails	++	+	++
Internet browsing	-	++	+
Accessing social networking sites	++	--	--
Eating/drinking	+	++	++
Caring for someone travelling with you (including children)	++	++	+
Playing games (electronic or otherwise)	+	--	--
Being bored	--	--	--
Being anxious about the journey (e.g. delays or where to get off)	--	--	-
Planning onward or return journey	+	--	+

Note: '++': very positive; '+': somewhat positive; 'neutral': neither positive or negative; '-': somewhat negative; '--': very negative

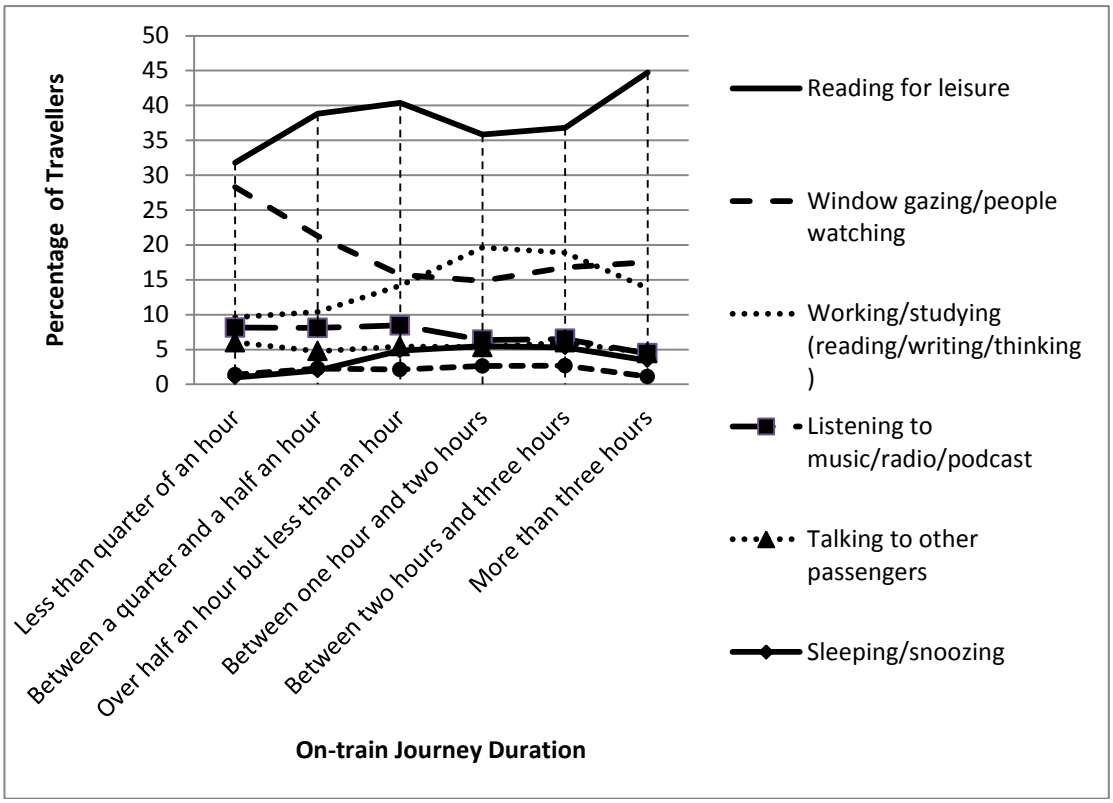

FIGURE 1. Activity most engaged in – variation by journey duration