TAKING THE COMPLEXITY TURN TO STEER CARBON REDUCTION POLICY

Applying practice theory, complexity theory and cultural practices to policies addressing climate change

A thesis submitted for the degree of Doctor of Philosophy at the University of Edinburgh by

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Declaration

I declare that this thesis has been composed solely by myself and that it has not been submitted, in whole or in part, in any previous application for a degree. Except where stated otherwise by reference or acknowledgment, the work presented is entirely my own.

Signed…………………………..……………………….. 6 July 2018

Abstract

Achieving the Scottish Government's carbon reduction targets requires not only the decarbonisation of industry and electricity generation, which is now largely underway, but also significant changes in the actions and decisions of millions of individuals, whose carbon emissions fall outside the areas which Government can control. Transport, much of it undertaken by individuals, accounts for around 20% of Scotland's carbon emissions. Policy aimed at changing individual travel behaviours will therefore become increasingly important. Commonly applied behaviour change strategies based on rational actor theory face conceptual problems and cannot overcome the lack of agency experienced by individuals buffeted by a range of influences in a complex world. Practice theory relocates the site of analysis from the individual to the social and helps to overcome these problems, but it is not clear how to deliberately change practices to achieve the carbon reductions required. Understanding practices as emergent properties of complex social systems suggests that working to alter the complex social system may lead to different emergent properties, i.e. more sustainable practices.

My research explored this approach by conducting an experiment in Aberdeen that sought to influence the complex social system within which audiences travel to a large theatre in the city. Emergent properties of the system encouraged travel by private car: problems of (in)convenience and insecurity were shaping individuals' travel practices. Collaboration between actors powerful enough to affect the system – a transport provider, a local authority and the theatre itself – was needed to influence it sufficiently to bring about a change in the main travel mode from private cars to public transport.

Analysis of this case identifies the need to acknowledge the relevance of complexity theory when developing carbon reduction policy. Perverse incentives encouraging public organisations to focus on their own 'direct' carbon emissions need to be replaced with a duty to collaborate with others to reduce society's overall carbon emissions. Those making policy and those

implementing it will therefore need to understand and apply complexity theory, and will need highly developed skills in managing long-term collaborative projects rather than 'delivering' one-off changes. These attributes may be found in practitioners from diverse and less obvious fields, including the cultural sector.

Summary and recommendations for policymakers

Achieving the Scottish Government's carbon reduction targets will require significant changes in the actions of millions of individuals, actions which fall outside the areas which Government can control. Standard 'rational actor theory'-based behaviour change approaches are conceptually flawed and cannot overcome the lack of agency experienced by individuals operating in the complex social system that is society. Practice theory and the ISM model help to overcome these problems, but it is not clear how to deliberately change practices to achieve the scale of carbon reductions required. Understanding practices (i.e. behaviours) as emergent properties of complex social systems suggests that working to alter the system within which individuals operate may lead to different emergent properties, i.e. more sustainable practices.

To explore this approach this research employed a case study that sought to influence the complex social system within which audiences travel to a large theatre in Aberdeen. Emergent properties of the system encouraged travel by private car. Collaboration between actors powerful enough to affect the system – a transport provider, a local authority and the theatre itself – was needed to influence it sufficiently to bring about a change in the main travel mode. Evaluation of the project points to the need to consider complexity in the design, implementation and assessment of interventions in complex social systems. Collaborative working is hindered by some aspects of current policy and requires particular skills, including the willingness and ability to manage complexity.

The thesis concludes with the following main recommendations for policymakers:

1. Since all interventions will take place within the complex social system that is society, policy and policy making should fully acknowledge the implications of complexity theory.

2. Policymakers and those implementing it could therefore benefit from learning about complexity theory in higher education and continuing professional development.

3. Results of interventions in complex social systems have long lead-times and cannot be exactly replicated in other circumstances, no matter how similar. The assessment of success may therefore need to change and the range of acceptable evidence widened.

4. Accordingly, methods of evaluating complex interventions in complex system need to be more widely developed.

5. Public Bodies are important agents in complex social systems. Refocusing the Public Bodies Duties in the Climate Change Act, shifting Public Bodies' attention away from reducing their own direct emissions to addressing society's overall ones, would help achieve the overall carbon emissions reductions.

6. A strong Duty to Collaborate, able to encourage Public Bodies to divert resources to relevant projects and to over-ride other less important duties, should be considered to help the Public Bodies in this change.

7. Collaborative projects to intervene in complex social systems may require different skills, qualities and backgrounds from project managers and these may be found in people from a wider range of unexpected areas, including for example the arts.

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Chapter 1: Introduction

Context

The Scottish Government has a problem. The Climate Change (Scotland) Act 2009 commits it to achieving the world's most ambitious carbon reduction target, a 42% reduction in Scotland's greenhouse gas emissions (generally measured in CO_2-e) by 2020 against a 1990 baseline, which itself is only a step towards an 80% reduction by 2050 (SG, 2009, p1). Even more challenging, the 2017 consultation on a new Climate Change Bill for 2018 raises this target to a 90% reduction by 2050 (SG, 2017b, p9) with support for a future target of net-zero emissions in the second half of the 21st century (*ibid* p11). Yet carbon emissions are caused by every aspect of our national life, from growing food to heating homes to travelling to work (Amundsen et al., 2018). How is the Scottish Government going to achieve this transformational change to our way of life?

By 2015, a reduction of 37.6% against the baseline had been achieved (SG, 2017b, p4). But whilst much of this reduction has been and more will continue to be achieved through a switch to renewable electricity generation (Stark, 2017), a significant part will have to be achieved through changes in behaviour, choices and actions by individuals, households and smaller companies (SG, 2009, p1). These are millions of agents over whom the Government has very little control, unlike the relatively few companies and bodies that generate and manage our electricity; the latter are also much easier politically to control through legislation in a society where energy is a much-regulated field whilst individual behaviour is seen as none of the government's business. The Scottish Government's *Low Carbon Scotland: Public Engagement Strategy* recognises that the next step will require changes not only in smaller-scale infrastructure such as the upgrading of insulation and installation of renewable heating in dwellings and commercial buildings, but also in individual behaviours such as turning down thermostats, changing usage of electrical appliances, making different transport choices,

changing to a 'low-carbon diet', reducing waste production and increasing recycling rates (SG, 2010, pp6-7). The Scottish Government's original Low Carbon Delivery Plan relied on this 'behaviour change' (SG, 2009, p5, paras 1.37-1.41) and in 2010 the Scottish Government set up a Climate Change Behaviours Research Programme to look into this area of work. The 2017 Draft Climate Change Plan continued this approach:

> *The transition to low carbon Scotland will require all of us to take action: changing the ways we get around; the ways we insulate and heat our homes; and the ways we purchase products and services to support the circular economy. Delivering these changes in our behaviours will require cultural shifts and major infrastructural and technological advances over the coming years.* (SG, 2017, p26)

A slightly more nuanced statement of the same featured in the actual Climate Change Plan a year later:

> *Our aims are to encourage public discussion about climate change, and to engage and support people to take low carbon actions in their everyday lives. (SG, 2018, p37)*

Achieving significant reductions through behaviour change is however going to be difficult. The Scottish Government's own research points to interventions being required at individual, social and infrastructural levels as well as working in a coordinated way across sectors to avoid conflicting changes (Southerton et al., 2011, pp3-4). Sorrell et al. (2009) also raise the issue of 'rebound', where financial savings made by improving energy efficiency are 'recycled' by consumers into *increased* consumption, reducing or removing the desired carbon reductions. Behaviour change is more complex than it might seem.

In this thesis I argue that current policy is still focused on individual 'behaviours' despite a changing political-economic landscape that undermines the premise that individuals are rational agents who can will their own actions. I use accounts of first practice theory and then complexity theory to show that neither the standard nor the Scottish Government's more sophisticated approaches to behaviour change take sufficient account of the fact that individuals live their lives and act within the complex social system that is society. I therefore argue that, instead of relying on relatively simple

and linear policy levers that effectively apply 'rational actor theory' to both individuals and public bodies, policy and policy-makers need to embrace complexity and make use of its engagement with non-linearity and system-level effects to act at the system level. And I suggest that this will require policy-makers and those implementing policy to have a better grasp of the implications of complexity theory for their work.

Theoretical underpinning

This has therefore been a very practically-focused research project, but it is built on firm theoretical foundations. I begin my thesis with a review of the standard approaches to behaviour change. These, in keeping with the dominant political-economic orthodoxy of the 1970s onwards, are based on rational actor theories of behaviour which focus on the individual as an agent who can will their own behaviour. More recently, as that orthodoxy has begun to break down, these theories have become more difficult to defend. Following the Scottish Government's own Climate Change Behaviours Research Programme, I therefore find practice theory more convincing.

Practice theory shifts the locus of analysis away from the individual to the social, focusing not on individuals and their behaviours but on 'practices'. It argues that a wide range of social, technological, historical and other factors combine to shape practices which exist outwith the individual, but which individuals both perform and shape through their performance of them. This does avoid the use of rational actor theory but, as I discuss in Chapter 3, practice theorists have shied away from proposing practical applications of their theory, at least partly for political and ethical reasons and the risks of focusing on technological solutions rather than considering the kind of future society we want. I share some of their concerns but also argue that a democratic political decision has been made to reduce carbon emissions. The challenge now is how to achieve that end, with the current science (UNFCCC, 2018) providing ample reasons to work hard to overcome the practical problems. Taking a cue from the language of practice theorists, I therefore turn to complexity theory, which seems to provide a good

description of how practices come about and so effectively shifts the locus of analysis one level higher yet, to the system behind the practices. However, as I discuss in Chapter 4, complexity theory has not been widely adopted in the social sciences or fully applied in a practical context, and my research and this thesis attempt to remedy that.

Complexity theory, practices and my research questions

Complexity theory holds that complex systems are open systems consisting of many elements or agents which interact dynamically between themselves and indeed with influences outside the system. These interactions are rich, so that one agent may influence and be influenced by many others. They will also be non-linear, so that small changes can have large effects or vice versa, which means that the system cannot be collapsed into smaller equivalent systems, and accordingly properties of the system cannot be derived from an analysis of the elements. There are feedback loops which affect the influence of one element on another. These characteristics of complex systems mean that the properties are properties of the system and 'emerge' from the combination of the elements in the system and their patterns of interaction (Cilliers, 1998, p1). Complex systems are path dependent, in that their present and their future are determined by their past.[1]

If complexity theory can be applied to social systems as well as the models in mathematics and the natural sciences where it was developed, then practices can be seen as emergent properties of complex social systems, which are themselves shaped by a wide range of social, technological, historical, commercial and other factors. If this is so, then influencing the complex social system may lead to different practices, and so different 'behaviours'. Asking whether this is indeed the case therefore leads to my first research question: **How can complexity theory be used to inform interventions in social systems in order to help achieve system-level change and reductions in Scotland's carbon emissions?** Even if

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[1] I provide a fuller account of complexity theory below (p47) and both that and this brief version owe a great deal to CILLIERS, P. 1998. *Complexity and postmodernism : understanding complex systems,* London, Routledge.

complexity theory can be used in this way, however, this poses some difficult questions about whether it is possible to identify and influence a complex social system in order to bring about these changes, and if so how to do so. Furthermore, due to the nature of complex systems it is difficult to tell whether any intervention has had any effect. What would be required is a practical smaller scale example that would explore these problems. This leads to my second research question, **What lessons that might be applied to other social systems can be learned from a small experiment treating cultural institutions and events as complex systems?** and in order to answer this I developed and conducted an experiment, the description and analysis of which are discussed in detail in Chapters 6-9 below.

Research project: intervening in a complex social system

Within the wider group of behaviours, individuals' 'transport choices' may prove a particularly difficult nut to crack as they are the result of millions of small decisions by millions of individuals, and they account for a significant proportion of the total. They therefore seemed a promising area to consider for my experiment.

Transport-related carbon emissions in 2015 accounted for 27% of Scotland's total carbon emissions, of which 60% or just under 6Mt CO_2-e derived from cars, meaning that car travel was the cause of over 12% of Scotland's total emissions. This proportion and the actual tonnage of CO_2-e from cars has remained roughly the same since 1990 despite a significant increase in kilometres travelled by road vehicles, a result of increased vehicle efficiency (all figures taken from the Scottish Government's Climate Change Plan (SG, 2018, pp103-4)). But the proportional contribution of travel to the total carbon emissions, which need to be reduced to almost zero, grows as other areas reduce (ibid p2, Figure 1*). Although car travel is one of the elements of transport where emissions reductions are more possible (aviation and heavy goods vehicles posing particular problems), it is also the area where 'behaviour change' is most important. Car travel involves individuals' decisions, whether they be about changing the vehicle, changing the style of driving, deciding not to drive or to car-share, or maybe not to travel by car at

all but to use public transport or stay at home. Although others such as employers may be involved, at some stage individuals will be taking decisions.

My interest in travel is therefore focused on the aspect of it which provides an example of complexity in society and policy: there has of course been a wealth of research about travel, but my research would be using travel as a 'site' for a case study rather than being about it. Combining the importance of travel-related emissions with my knowledge (derived from my day-to-day work) that audience travel is responsible for a significant proportion of arts organisations' carbon emissions, my experiment focused on the complex social system within which audience members travel to His Majesty's Theatre. This is a large theatre in Aberdeen which triggers almost a million individual journeys each year in a city/region where the car is the dominant form of transport. The aim was to try to bring about a modal shift to more sustainable travel, not through a 'behaviour change' intervention that focuses on the individual, but through intervening in the system within which people make their travel decisions.

My first task was to understand the system through personal observation, interviews with His Majesty's staff and others in the city, an audience travel survey and focus groups with individual audience members. These highlighted factors affecting individuals' travel, which included the obvious ones such as the cost and scheduling of public transport, but also different ideas of how different travel modes are 'convenient', or sometimes least inconvenient; personal safety on public transport and the streets of Aberdeen; and the geography of the city.

Having built a clear enough understanding of the complex social system I developed an intervention that aimed to change it in such a way as to bring about different emergent properties in the form of different travel practices. No one agent was on its own in control of the factors which were shaping the system. It was therefore necessary to try to influence the whole system by working with a number of agents. Having earlier identified some of these by

developing a 'map' of the complex system it was clear that crucial agents were not well connected. I therefore engaged with transport providers, strategic transport bodies and the local authorities, all of which had significant influence on the system overall. In the end I brought together three partners: His Majesty's itself; Stagecoach, which runs the bus services to Aberdeenshire; and Aberdeenshire Council, which has an interest in improving its residents' access to amenities such as cultural events. I project-managed two phases of a pilot project, 'TheatreBus', in which we ran buses along popular routes out of the city from directly outside the theatre on busy evenings, leaving shortly after the performance ended. The TheatreBus project was only moderately successful, but the research project overall provided a great deal of information about intervening in complex social systems and so provided some useful answers to the research questions.

The researcher

Just as complex systems are path-dependent and unique, so are interventions in them and through the course of the research my decision to treat the experiment as a case study, from which 'useful generalisations' rather than specific 'truths' could be established (Byrne, 2013), became ever more strongly justified. What I was looking for was ways of working that could be applied to other, sufficiently similar situations, as changes to people's ways of doing things in all sorts of fields will be required in order to achieve the necessary carbon emission reductions.

One of the core findings of the research was that intervening in a complex social system is itself a complex business, requiring constant monitoring, tweaking and an alignment of different elements in a dynamic interaction without any certainty of the outcome. Moreover the 'researcher effect' is particularly strong, as the researcher becomes part of the complex system and so changes it, and their own characteristics will influence their tweaking, their choice of elements to align and their ability to do so. This was demonstrated early on by the fact that the reasons for the selection of the site were closely connected to my personal history and situation: a different

researcher, even undertaking a similar piece of research, would quickly have followed a different line.

In this instance I undertook the research part-time over a period of six years from 2011 onwards, permitting a longer-term study than is often possible. During this period I was able to follow the Scottish Government's own work on 'behaviour change', including the development of the practice theory-influenced ISM Model (Darnton and Horne, 2013). Alongside this my other work was as director of a charity which makes connections between climate change and the arts. This meant that the research influenced my work and vice versa, and a feature of the project is that it has been deeply reflexive, as this thesis will discuss. I discovered that the contacts, skills and knowledge that I had gained through my work over 25 years as a theatre director were useful in developing and managing the project. Thus my research led me in my work life to think about the particular skills that artists use when they apply their knowledge and practices in non-arts settings. Towards the end of the thesis I bring this back into the research to suggest that the demands of designing and managing complex interventions in complex social systems may mean that the people and skills required are different to those often considered for more standard 'project management' roles, and I suggest that one – although only one – source of these people may be the world of the arts.

Structure of this thesis

The connections between behaviour change and complexity theory may not be obvious so the first section (Chapters 2-5) reviews the various literatures and makes connections between them showing where gaps in one field point to the need to make use of another. In Chapter 2 I examine theories of behaviour change, which are themselves based on theories of behaviour. The fact that these are generally psychologically based with the individual as the locus of investigation leads to problems as not all the influences on behaviour are within the control of the individual. This leads me towards practice theory (Chapter 3), an idea made use of by the Scottish

Government's Climate Change Behaviours Research Programme in their development of the 'ISM Model' (Darnton and Horne, 2013). Practice theory however perhaps mostly provides an understanding of how practices (and so what are otherwise described as behaviours) come to be adopted whilst what is required for policy purposes is some way of influencing practices and so behaviours. I therefore turn to complexity theory, which I argue in Chapter 4 offers an approach whereby practices can be seen as emergent properties of complex social systems, pointing to a way to influence practices by changing the complex social systems. In Chapter 5 I use this summary of the literature to define my two research questions. My own background and my work with Creative Carbon Scotland identify an experiment looking at audience travel to cultural events to explore these questions.

The next section describes the genesis and conducting of the experiment itself. In Chapter 6 I explain why I chose the site and describe Aberdeen and His Majesty's Theatre. Over the next two years I would learn about and intervene in the complex social system within which audience members operate when they travel to the theatre. I discuss some methodological issues including the validity of using mixed methods, the inevitability of my influencing the complex social system by studying it and some ethical considerations. I explain that the nature of the project meant that it was not possible to plan my methodology in advance, but it was necessary to take things one stage at a time. In Chapter 7 I describe how a process of coming to understand the site and the complex social system I was studying enabled me to design an appropriate project. Chapter 8 is highly reflexive as I discuss 'the complex business of project management' and how my understanding of complex social systems is closely connected to my own experience of managing projects, and the skills required. This discussion forms part of the 'results' of the research. In Chapter 9 I describe how I evaluated the experiment and provide some results.

In Chapter 10 I return to my research questions and discuss the results of the overall research project, drawing practical conclusions from the experiment which relate to the challenges I outlined earlier in this introduction. This

requires a description of some aspects of Scottish Government policy and leads to some suggestions as to what is necessary to develop and implement it. Chapter 11 concludes with an outline of how this research has contributed to the literatures, some policy recommendations and some areas where further research would be useful.

Section 1 – Literature review: How we got here

Chapter 2: Behaviour change

Although my thesis will concentrate on the application of complexity theory to practice theory, the dominance of social-psychological theories of behaviour means that it is important first to outline these and the standard approaches to 'behaviour change' to understand why a new approach is required. I therefore begin this literature review by outlining these theories and the theoretical and practical problems that they face. In this chapter I broadly follow a temporal approach to demonstrate how as time went on the various theorists struggled increasingly hard to make their theories fit with the facts, resulting in ever more complicated and unwieldy theories. These tweaks however fail to address the problems, so in Chapter 3 I turn to the more promising practice theory, which has been of growing importance in Scottish Government policymaking. The application of practice theory to bring about change is, however, challenging and so in Chapter 4 I look at the literatures of complexity theory to propose that viewing a social system as a complex system is a valid and useful way not only to understand it but also to attempt to influence it. In Chapter 5 I summarise my review of the literatures and define my research questions. To answer them I would conduct an experiment which would consider a social system as a complex social system in which individual agents-in-the-system are humans and the practices they perform (ie their behaviours) are emergent properties of the system. Applying a system-focused approach to move a whole system from one 'basin of attraction' to another, where the emergent properties of the system are more sustainable, may be more effective than focusing on individual practices or behaviours in the manner of current 'behaviour change' interventions.

a) Theories of Behaviour

There is an '*enormous*' literature on behaviour change (Maio et al., 2007, p102) and two thorough reviews (Darnton, 2008, Jackson, 2005) that focus on behaviour change in relation to sustainable behaviours. These agree that

most theories of behaviour change are based on social-psychological theories of behaviour: '*there is growing consensus on what the scope of the relevant evidence base might be; … this study has included thirteen reviews of the literature … predominantly focusing on social-psychological models*' (Darnton, 2008). They also agree that these socio-psychological theories are largely based around the rational choice or 'expectancy-value' model from neoclassical economics (Darnton, 2008, p11, Jackson, 2005, pvi).

This focus reflects the timing of the reviews, as both were written during and looking back upon a period when neoclassical economics was considered the best explanation of most human behaviour. Almost all the references quoted date from the 1970s onwards. A search of the University of Edinburgh library using the term 'behaviour change theory' brings up over 32,000 items published since 1910. Of those, only 385 were published before 1971, of which most were technical items about electrical components and electromagnetics. Chatterton (Spotswood, 2016, p29) notes '*increases in the uses of the term 'behaviour' from 1920 onwards, with interest in 'behaviour change/following about 50 years later*' based on a chart (p30) from the Google Ngram viewer of terms used in English language books, and that both terms declined in use from 1980 onwards.

That period of the 1970s was when what has been termed as the 'post-war consensus' broke down in the face of the 1973 oil crisis, high inflation and the winter of discontent (in the UK) and a resurgence of market-oriented economics. During and following the second world war, national problems and projects such as ensuring access to electricity or improving the nation's health had been perceived as concerns for government in alliance with members of society and, where necessary, nationalised industries. In the 1970s Keynesian economics was considered discredited and economic theory focused on individuals and their choices, leading to the concentration on the rational choice or expectancy value approach to behaviour change. Moreover, as much of the research into behaviour change has been at the behest of government – which is at heart about controlling unwanted behaviours and encouraging wanted ones – the general trend of

governmental and policymaking thinking has coloured the behaviour change research. Urry (2011, pp1-2) argues that the discussion of climate change has been dominated by natural scientists and economists, and although some would argue that politicians don't take enough account of the sciences, economists and economics certainly are at the heart of government and policymaking. However, as I will point out below, from early on it proved difficult to align theories of behaviour and behaviour change with the realities of how people actually act, and more recent thinking is challenging the assumption that rational choice theory is the right basis. First, however, an outline of rational choice theory is in order.

i. Rational choice theory

Rational choice theory sees the human being as a rational agent, capable of making a choice to act so as to maximise their personal benefit, and fundamentally self-interested, so making that maximisation of personal benefit the reason for all choices and behaviours (Darnton, 2008, Jackson, 2005, Levin and Milgrom, 2004). Thus people constantly weigh up the various options they have in any particular circumstances and choose the course of action expected to result in the highest net benefit or the lowest net cost. This model relies on the individual having good and complete information about the courses of action, and it makes no comment on the 'preferences' that the individual uses to evaluate the various benefits on offer. In an assumption with implications relating to concepts of sustainability it also assumes that the individual has endless, insatiable desire for benefit, for otherwise the whole model would fail to work when there was no longer any further maximisation of benefit that would lead to any behavioural choices (Levin and Milgrom, 2004). Whilst rational choice is at the heart of neoclassical economics, it has also been applied to non-economic areas such as social relations. The economist Gary Becker '*assumes that individuals maximise welfare **as they conceive it**, whether they be selfish, altruistic, loyal, spiteful, or masochistic.*' (Becker, 1993, p386). He applies concepts of rational choice theory to non-economic or consumption issues such as discrimination against minorities, marriage, divorce and fertility

'*though the lens of utility-maximising, forward-looking behavior*' (ibid, and see also Levin and Milgrom, 2004, p2), showing how during this period elements of neoclassical economics were used to explain a much wider range of behaviours and attitudes.

ii.   The problems rational choice theory faces

The rational choice model is however problematic on several levels. Critiques have focused on three central tenets of the model: that individuals necessarily pursue their own self-interest; that behaviour is rational (see for example Kahneman & Tversky, discussed in Kahneman, 2003, and Simon, 1955); and that the locus of analysis is the individual (see for example Giddens, 1984, Kahneman, 2003). I will discuss in this section the most influential of the more sophisticated versions of the model which seek to overcome these problems, to show that in the end they are unable to do so, at least in any practical and useful manner.

Taking first the central idea that individuals necessarily pursue their own interest, this is shown to be erroneous by Shaugnessy (2012) describing a common feature of war stories through the ages, a US soldier displaying altruism by dying whilst saving an Afghan girl. A common defence of the rational choice model using the argument that people acting altruistically must be acting out of self-interest because otherwise they wouldn't do so falls into Popper's category of unverifiable pseudoscience (Popper, 1959). The defence assumes that action is based on self-interest, so cannot logically be used to prove that self-interest is what guides action.

There are many theories that seek to overcome the second group of critiques of rational choice theory, those arguing that people's behaviours are not rational. The various models add factors that influence choice and so explain why choices that seem non-rational may actually make sense. However, they can't address the problem of other factors getting in between intention and action. For example, the Theory of Reasoned Action (Fishbein, 1975) expands the range of factors that are considered to influence the 'expectancy' by incorporating not only beliefs and evaluations about the

outcomes of an action but also a belief about what others will think about the agent's actions. However it still cannot address questions of habit or emotional (affective) and moral (normative) factors, which come between beliefs or aims and actually taking action (Jackson, 2005, pviii). Furthermore studies supporting the theory tend to be based on subjects' reporting of their attitudes, norms and intentions but intention cannot be conflated with actual behaviour (Jackson, 2005). The Means-End Chain Theory (Gutman, 1982) assumes that consumers have certain goals and achieve them through consumption of goods that possess certain attributes, but is still based on the same problematic foundations of rationality and self-interest, ignoring the affective and normative factors. The Theory of Planned Behaviour (Ajzen, 1991) does add to the Theory of Reasoned Action the belief of the actor about their ability to achieve the action (perceived behavioural control), which should help predict actual behaviour, but this has been widely criticised on both empirical and theoretical grounds (Sniehotta et al., 2014). Social psychological research relating to health and diet, for example, has shown that '*people's thoughts, feelings, and actions are guided not only by the conscious, reflective, rule-based system but also by the nonconscious, impulsive, associative system'* (Sheeran et al., 2013, p468). Meanwhile Ogden argues that, amongst others, the Theory of Planned Behaviour and the Theory of Reasoned Action, whilst sometimes useful pragmatically for influencing behaviour, '*cannot be tested, they focus on analytic truths rather than synthetic ones, and they may create and change both cognitions and behavior rather than describe them and as such do not pass the criteria set for a good theory*' (Ogden, 2003, p427).

The Theory of Planned Behaviour accounts for moral drivers for behaviour on the grounds that self-interest prompts someone to behave in a certain way if they think others will disapprove of any other action. But people behave pro-environmentally for other reasons. For example, ecological value theory holds that pro-environmental attitudes drive pro-environmental behaviour. In addition, Schwartz' Norm Activation Theory (Schwartz, 1977) distinguished between a 'self-enhancement' and a 'self-transcendent' value orientation, the

former implying self-interest whilst the latter could explain non self-interested behaviour. The agent has an awareness of the consequences of an action and an ascription to him/herself of responsibility for them. This combination forms a personal norm, which drives behaviour. However, this assumes that the norm leads directly to behaviour, but external circumstances can intervene. Stern writes that in the 1990s increasing awareness of the need for environmental protection meant that pro-environmental action was taking different forms and influenced by different factors: '*It is necessary to adopt an intent-oriented definition that focuses on people's beliefs, motives, and so forth in order to understand and change the target behaviors*' (Stern, 2000, p406). He therefore builds on the Norm Activation Theory, arguing that adherence to a 'New Environmental Paradigm' (NEP), as opposed to the dominant economically liberal, materialist, laissez-faire, self-interested social paradigm (Dunlap and Van Liere, 2008), is correlated with biospheric and altruistic values and negatively correlated with egoistic values. This acceptance of the NEP leads to awareness of the consequences of actions and acceptance of responsibility for them and so to a behaviour-driving personal norm. His wording shows how adding another form of benefit that the individual is seeking to gain by their actions, in this case the self-satisfaction that they are behaving according to the NEP, is simply extending the reach of rational choice theory to include less obvious benefits: '*Through human history, environmental impact has largely been a by-product of human desires for physical comfort, mobility, relief from labor, enjoyment, power, status, personal security, maintenance of tradition and family, and so forth, and of the organizations and technologies humanity has created to meet these desires. Only relatively recently has environmental protection become an important consideration in human decision making.*' (Stern, 2000, p408). However Stern's Value Belief Norm theory combined with the Theory of Planned Behaviour does seem to fairly accurately explain actual behaviours in several studies (Han, 2015, López-Mosquera and Sánchez, 2012).

Elsewhere Stern noted that people may hold different value-orientations simultaneously and that '*individual action may depend on the belief or value*

set that receives attention in a given context' (Stern et al., 1993, p336) – contextual factors have bearing on actions in addition to attitudes and rational choices. Cialdini's Focus Theory of Normative Conduct (Cialdini et al., 1990) to some extent accounts for this. He identifies two forms of norm: the descriptive social norm, which affects someone's actions because it is what other people tend to do, with no moral imperative attached; and the injunctive social norm, which affects behaviour because it explicitly expresses the moral rules of the group, and thereby the sanctions and penalties that will be exacted if the norm is breached. The salience of one or other norm will affect our response to a particular context.

A second problem with the rationality of behaviour is that all the above theories assume that behaviour is a willed action, whereas more recently it has been shown empirically that many actions are involuntary, habitual and almost automatic. Libet (2006) demonstrated that neural activity started well before subjects made a decision to lift their finger or not, casting doubt on the norm-intention-behaviour chain of events. Willed behaviours may become automatic: when people learn to drive they have to think about changing gear but before long they do it without considering it, and once established, avoiding habitual behaviours is notoriously hard. People have long been known to use heuristics to help them make decisions, particularly when the choice is simple (using price to determine which product to buy in a supermarket), time is short (we are more likely to fall back on habit if under time pressure) (both Tversky, 1969) or if a stimulus seems to demand immediate action *'although subjects spontaneously become more selective when highly aroused, the effectiveness of their selections is likely to deteriorate, if the selection requires a fine discrimination.'* (Kahneman, 1973, p39). In a busy and complicated world, this is a rational approach, but poses problems for those wanting to promote pro-environmental – ie willed – behaviour; and casts doubt on the validity of all the adjusted expectancy value theories of behaviour. This combination of economics and psychology paid much more attention to the reality of how people behave in the real world rather than focus on theoretical models based on limited experiments.

Broadly termed behavioural economics this field has been around since the 1950s (Hosseini, 2003) but the insights have taken time to break through the rational choice consensus, perhaps reflecting the dominance of more mainstream economic approaches.

The third category of criticism of the rational choice approach, that the locus of analysis is the individual, is most important for this thesis and related to the context of the late 20th century during which many of these theories were developed. All the theories noted so far assume an individualistic approach to behaviour, but individuals are guided by and live within social worlds and it is widely accepted that concepts of self are at best socially constructed and at worst mired in a complex social logic (Blumer, 1969, Mead, 1934, Stringer, 1982). Sociology is interested in the balance between the ability of individuals to act and the constraints placed upon them by society. Awareness of this agency-structure dilemma leads to a dissatisfaction with simple models that leave out the social, a process which perhaps mirrors the behavioural economists' dissatisfaction with over-simple economic models. Structuration theories such as that proposed by Giddens (1984) solve this dilemma by understanding that individuals constantly both produce and reproduce social structures in their actions. Individuals are conscious of social structures such as convention and language and make use of them to achieve their aims, yet by acting they also change those structures incrementally. Similarly, integrative theories of behaviour create yet more sophisticated models that seek to capture the dynamic relationship between self and society to enable more accurate predictions of behaviour. Stern's Attitude-Behaviour-Context Theory (Stern, 2000) for example starts with the view that behaviour is a function of attitudinal variables and contextual factors: various *individual* attitudes ('I'm a green, I care about others, I take responsibility') plus *social* contexts (norms, infrastructure, taxes, incentives) lead to behaviour. A meta-analysis of over 60 studies of household recycling behaviours partially confirms this, showing that behavioural intention and personal (moral) norms are most strongly correlated with high levels of recycling, but that factors such as *social* norms and infrastructure like kerbside collection facilities have

a lower correlation but 'are still important for predicting the recycling behaviour of householders' (Miafodzyeva and Brandt, 2013)

In addition to conscious influences on behaviour there are others that we are less able to control, and more and more complex and ultimately unwieldy models are needed to accommodate these. During the 1970s Triandis' theory of interpersonal behaviour (Triandis, 1977) had already raised the question of habit, another constraint on agency which Kahneman and the other behavioural economists were similarly interested in. For Triandis 'intentions' immediately precede behaviour, and 'facilitating conditions' influence it, but habits also mediate behaviour and these too are mediated by facilitating conditions. According to Triandis intentions include attitudes (or the value of the expected outcome of behaviour); social factors – norms, roles (that are expected of someone in a particular group) and self-concept (the image I have of myself and the corresponding behaviours); and affective factors – emotional responses to a decision situation or decision itself. Olander and Thogersen (1995) extend this by proposing the Motivation-Opportunity-Abilities model in which its predictive power is increased by incorporating concepts of ability and opportunity into the model. Motivation (informed by attitudes, norms etc) is all very well but ability (knowledge, habit, skills) and opportunity (situational conditions) also influence behaviour. Reflecting structuration theories, behaviour itself in this model leads back to ability (it forms habits, increases skills and knowledge) and influences motivation through attitudes and norms.

Ability to act is also included in Bagozzi's theory of trying, which breaks down actions of consumption into stages of intention to do something and failure or success in achieving it – all of which are both influenced by previous experiences and influence future ones, creating emotional sensations. His more recent work (Bagozzi, 2002) incorporates unconscious cerebral factors, where the intention to act seems to post-cede the physical and mental processes which start the action itself. In this case, the intention is to allow or not the action to go ahead. These sub-conscious processes may also have pleasant or unpleasant sensations attached to them, inducing positive or

negative biases. However, to sum up this section and point towards the problems with all these theories of behaviour, Bagozzi's work is inclusive in that it seems to incorporate all the influences above, but very complex and so difficult to test, as Figure 1 below indicates. Jackson (2005, p100) writes: '*As the conceptual complexity of the models rise, however, their empirical applicability diminishes. Designing, testing and corroborating a sophisticated multivariable social-psychological model (with feedback) of the type illustrated [in Figure 1] is a daunting empirical task. To date, it has not been carried out'*. The Department for Transport's Behavioural Insights Toolkit agrees: '*'Comprehensive models', which have tried to account for <u>all</u> the factors which determine behaviour, have effectively proved inoperable'* (Savage et al., 2011, pp8-9).
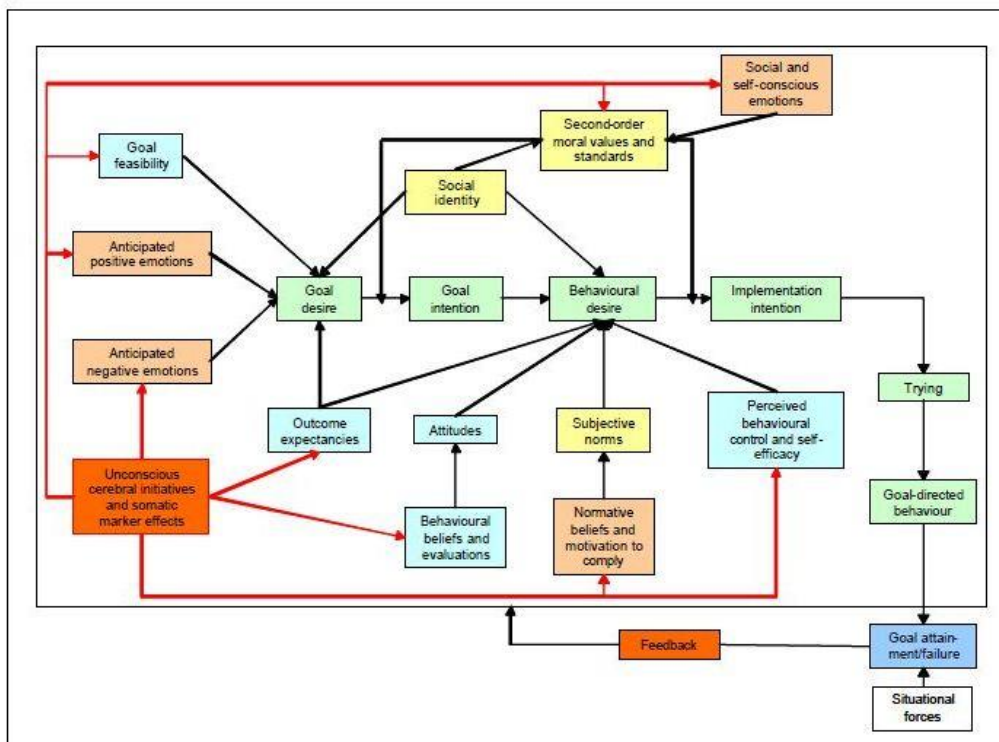
Figure 1: Bagozzi's Comprehensive Model of Consumer Action (taken from Jackson, 2005, p99)

b) Behaviour Change theories

From these ever more sophisticated but increasingly unwieldy theories of behaviour arise a range of approaches to behaviour *change*, which vary from those which assume that individuals have the ability to voluntarily control

their actions to those which take a more behaviourist stance and assume that external stimuli will exert more influence over choices and decisions. But despite the complexity of factors that influence behaviour Jackson (2005, p106) argues that '*there are only a relatively limited number of quite specific avenues for behaviour change. Specifically, the literature suggests that humans learn new behaviours through trial and error, through persuasion, or through various forms of modelling (social learning).*' The literature about behaviour change becomes much more practical and, like the that on behaviour discussed above, is often influenced by policy-making and political trends. It moves away from the purely psychological and as time goes by it increasingly incorporates behavioural economics and social psychology. This perhaps comes to a climax in the discussion of 'nudge' below.

i.   Trial and Error

Of the three processes referred to by Jackson above, trial and error is an effective but inefficient way of learning and humans have become a very successful species by individuals passing on learning through language and other forms of communication rather than having to try everything out themselves, so for behaviour change policymakers, relying on trial and error is probably the least good choice.

ii.   Persuasion

The rational choice theories favoured by the dominant trends in thinking of the late twentieth century see behaviour as based on a rational process and so inevitably point to persuasion leading to behaviour change. Much past behaviour change policy has therefore been based on persuasion by governments or others. Petty et al (2009) provide a good review of the history of this approach and the failings of it. They argue that early models based behaviour change on a change in attitude which was influenced by the credibility of the source of the message, the persuasiveness of the message itself and the responsiveness to the message of the recipient, and these fail because the models mistakenly assume that new knowledge leads to attitude change leads to behaviour change. In fact we can learn more but not change

our attitudes and behave the same even though our attitudes change: the difficulties of using information and persuasion to change people's smoking, exercise and eating habits provide ample examples. Petty's Elaboration Likelihood Model suggests that two different routes to persuasion are important. If the message is personally relevant and frequently communicated (the 'elaboration' increases), the perceived quality of the personally relevant information presented is important; '[people] *carefully appraise the extent to which the communication provides information that is fundamental or central to the perceived merits of the position being advocated'* (Petty et al., 2009, p132). In this instance the 'central' processing route dominates. However when the 'elaboration likelihood' decreases, a 'peripheral' processing route comes into play, where cues such as the importance or attractiveness of the messenger become salient. The recipient of the message associates other potential benefits with the behaviour rather than the benefits of the behaviour itself (ibid p135). Any behaviour change reliant on the peripheral processing is unlikely to last long if other issues like cost or convenience come into play (Bator and Cialdini, 2000, p531). They argue (*ibid* p539) that successful persuasion is most likely if the message is specific; the desired behaviour change is well explained, vivid and precise; the message comes with an 'encoding cue', so that it is remembered at the point when the behaviour should take place; and the cue comes with a descriptive or injunctive norm.

iii. Social Learning

Bandura's Social Learning Theory (Bandura, 1977) argues that we learn not only by trial and error but by observing other people's different behaviours and not simply imitating but also by observing the rewards or punishments those behaviours bring. Jackson (2005, pp109-112) provides several examples where social learning based policies seem to have been successful, such as people copying their neighbours' kerbside recycling behaviours and product placement in the media. It is not of course mutually exclusive to persuasion, and the use of positive role models recycling or going green may provide a better example of persuasive messages being

used to promote behaviour change through social learning, but the point is it is not simply association with the messenger, but with reasonably expected benefits or disbenefits that may accrue from the behaviour.

However this emphasis on behaviour change being spurred by conscious decisions again ignores the powerful role that habit and heuristics play in causing behaviour. Jackson (2005) points out that many theories share similar elements that involve the 'unfreezing' of undesired habits and the reformulating of new ones, first set out in Lewin's Change Theory in the early 1950s (Lewin, 1952) yet still influencing much more recent work (see Figure 2).
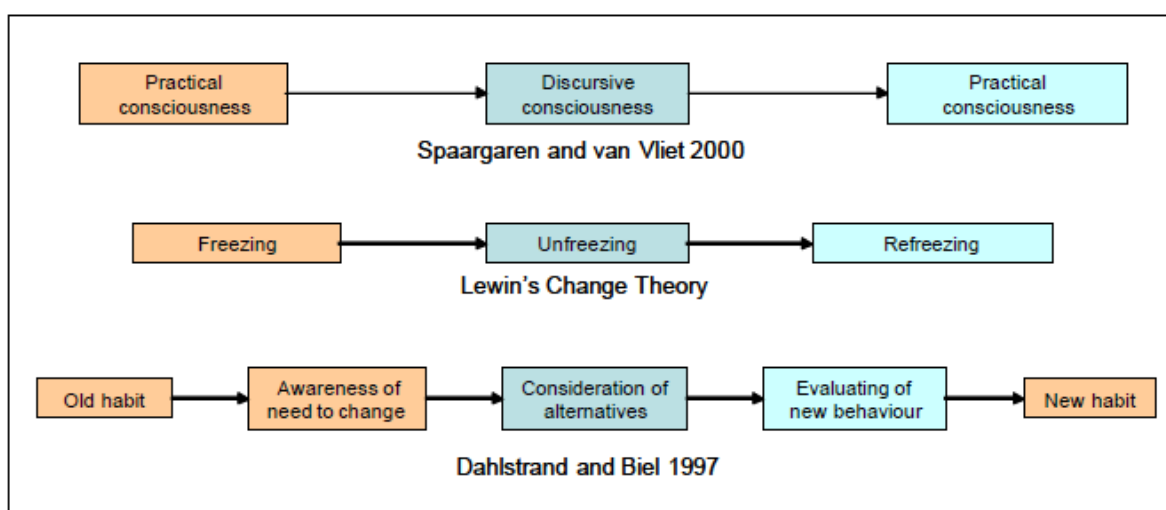
Figure 2: Theories of Behaviour Change (taken from Jackson (2005) p115)

He also notes that much of this work builds on Lewin's Field Theory (Lewin, 1946), which recommends that since habits are often formed or influenced by social norms, the most effective place to do this unfreezing is in a group environment. This is supported by Kaplan (Kaplan, 2000) and is relevant to the proposed study as is discussed in more detail below. It also once more raises the agency-structure question and points towards more sociological rather than psychological approaches.

iv.   Summary: theories of behaviour and behaviour change

This brief discussion of the semi-overlapping theories of behaviour and behaviour change demonstrates the complexity of the issue. Moreover, the evidence is that theory is only of so much use when it comes to policymaking

and practice: simple models do not capture the richness or complexity of real life – hence the over-complicatedness of, and difficulty of applying, theories of behaviour such as Bagozzi's above. When the theories are applied to attempt to change real people's behaviour in their day to day lives, they tend to hit a brick wall formed by the sheer muddle of everyday life. The Scottish Government's *10 Key Messages about Behaviour Change* sums it up nicely: '*Government policy-making needs to do more to embrace the complexity of what drives action and inaction*' (SG, 2011). Policymakers and those who are seeking to implement or encourage behaviour change rather than explain it may find it necessary to work very practically, knowing their particular population and environment and trying out approaches that seem likely to work rather than applying theoretical models and assuming that they will gain traction amongst the complexities of the real world. This has certainly been my personal experience in the work I am doing to reduce organisational carbon emissions in the cultural sector alongside the research. I am working with many organisations and whilst I have discovered that similar ones share similar problems, the details of leadership, staff traditions, organisational culture, the nature of the artform, the state of their buildings and their business models mean that a very tailored approach works best. Similarly, Southerton et al recommend that the simple replication of successful approaches in other locations will not work and '*Attempts to transfer initiatives need to be sensitive to local factors: natural endowments, social norms, existing material infrastructure, and institutional arrangements.*' (Southerton et al., 2011). In some respects this is what lies behind a recent development in behaviour change policy, 'Nudge'.

c) Nudge

Thomas Kuhn argued in *The Structure of Scientific Revolutions* (Kuhn, 2012) that for a paradigm shift to take place it is necessary not only for there to be sufficient discomfort and discontent with the existing paradigm but also a new paradigm ready to replace it. Without the replacement, various patches and fixes will be applied to try to deal with the problems. As the theories of behaviour and behaviour change based on rational choice theory began to seem less satisfactory, for the reasons I have discussed above, patches had to be found. An important development in behaviour change thinking, because it has been widely supported in UK and US government circles, has been 'nudge' – the term coined by Thaler and Sunstein in their book *Nudge: Improving Decisions About Health, Wealth and Happiness* (Thaler, 2009).

Their approach is focused on American examples and situations but it is to some extent mirrored in the UK by MINDSPACE (Dolan, 2010b, Dolan, 2010a), a collaboration between the (Westminster) Cabinet Office and the Institute of Government, and both are related to government thinking (Sunstein worked for the Obama administration). Both works use the fact that behaviour change can be achieved by taking into account the common influencing factors, habits and so on that have been noted above and using the learning to shape environments, re-arrange the 'choice architecture' (Thaler and Sunstein's phrase) and trigger behaviours in a (politically acceptable in an era of 'small government') non-coercive way. Nudge theory, and particularly MINDSPACE, acknowledges how complex the shaping of behaviour is – MINDSPACE is an acronym for all the ways in which behaviour can be influenced:

Messenger	we are heavily influenced by who communicates information
Incentives	our responses to incentives are shaped by predictable mental shortcuts such as strongly avoiding losses
Norms	we are strongly influenced by what others do
Defaults	we 'go with the flow' of pre-set options
Salience	our attention is drawn to what is novel and seems relevant to us
Priming	our acts are often influenced by sub-conscious cues
Affect	our emotional associations can powerfully shape our actions
Commitments	we seek to be consistent with our public promises, and reciprocate acts
Ego	we act in ways that make us feel better about ourselves

Figure 3: Mindspace (taken from (Dolan 2010), p8)

As Marteau et al point out, nudge is neither new nor a theory but incorporates a whole set of practical approaches and actions that are broadly based on the theories and experience discussed above: '*nudging is at best a fuzzy set intended to draw attention to the role of social and physical environments in shaping our behaviour and not to inform a scientific taxonomy of behaviour change interventions*' (Marteau et al., 2011, p263). Nudge therefore in some ways manages to deal with the muddle of ordinary life by providing heuristics for policymakers and governments to help them achieve their ends.

Nudge answers many of the criticisms of rational choice theory by accepting that most people are not rational choosers. Thaler and Sunstein divide the world into 'Econs', who make the right choices each time, avoiding the mistakes, disregarding the influences, unfreezing the habits and so on that afflict the rest of us, and fallible 'Humans' who fall prey to the mistakes, habits etc. Therefore, they say, policymakers need to use all the tools in their box (ie, messengers, incentives etc) to help people make the right choices.

And there is agreement in much of the literature that as far as it goes, nudge works, if only because it is simply a useful summary of all the techniques and tricks that overcome practical problems of getting people to change their behaviour (Schlag, 2010, p913, Marteau et al., 2011, although they also point out that there hasn't been much real testing of the approach), MINDSPACE is in a way more overt about its practicality and its normative aims: there is a 23 page 'Practical Guide' for those who want the techniques as well as a 95-page report that includes the theory, and the foreword to both notes that' *Influencing people's behaviour is nothing new to Government, which has often used tools such as legislation, regulation or taxation to achieve desired policy outcomes.'* (Dolan, 2010b, Dolan, 2010a). It also acknowledges rather more clearly its borrowing from marketing.

Where nudge and perhaps particularly MINDSPACE do score is that they recognise that behaviour change is not just going to happen because governments and other policymakers want it to. In fact of course much of the past behaviour change research has been used or driven by the advertising and marketing industries and an enormous behaviour change experiment has been underway for many decades led by private companies seeking to encourage consumers to eat, drink, drive, holiday and spend their free time differently.[2] Nudge and MINDSPACE in effect propose that policymakers should make use of the marketeers' techniques and use them for their own aims. However, 'paternalist libertarians' like Nudgers and MINDSPACERs are reluctant to take bolder action that ventures into coercion or regulation, seeing limits to how much governments should intervene in people's freedom to direct their own lives (Kate McGeevor in Pykett et al., 2011, p306). There is some debate in the literature about the political/philosophical implications of paternalist libertarianism, with Hausman & Welch for example arguing that *'Systematically exploiting non-rational factors that influence human decision-*

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[2] Phil Mackie of the NHS Scottish Public Health Network referred to this at a Scottish Government Climate Change Behaviour Change Research Programme conference, *Value and Climate Change Behaviours* in December 2011, when he contrasted the tiny budgets of public health agencies with the billions spent by advertisers. See also GOODWIN, T. 2012. Why We Should Reject 'Nudge'. *Politics, 32***,** 85-92. p90.

making, whether on the part of the government or other agents, threatens liberty, broadly conceived, notwithstanding the fact that some nudges are justified' (Hausman and Welch, 2010, p136). Goodwin (2012, p88) argues that the 'freedom' espoused by the governments that favour nudging is a narrow version which '*resides solely in the extent to which we are not physically prevented from acting by external obstacles (Berlin, 2002).'* Using a Rawlsian view of fairness, which argues against the idea that fairness is simply being physically unobstructed from being able to take advantage of opportunities, Goodwin writes that '*without serious social interventions designed to ensure that the positive freedom to take advantage of nudge opportunities is distributed more widely, nudging is inherently unfair.'* (ibid p89).

Moreover, nudge theory in one way still fails to address the greater challenge faced by all the theories of behaviour and behaviour change outlined above, which is that the focus on the individual and his/her behaviour is not enough, and this also forms part of the brick wall of what I called above 'the sheer muddle of everyday life'. A personal example of this might help show why consistent behaviour change is so difficult to achieve. My decision to walk, cycle, take the bus or drive to a performance at the theatre is influenced by many different factors. Who I am going with (my wife doesn't cycle), who I am going to meet there (cycling gear won't impress some people); the state of the roads/cycle lanes/traffic conditions (cycling feels dangerous in Edinburgh!); the cost, timing and convenience of the bus (does it go there, does it come back after the show, how long will I have to wait?); the cost of parking and fuel, the likelihood of having a drink after the show; the weather; the time the show starts (am I going to be rushed to get home from a meeting, eat and get there by bus?). All these factors vary from occasion to occasion and they are not all in my control: indeed, they are in the control of numerous different people and agencies. Whilst the various theories of behaviour can explain or predict my behaviour in certain circumstances and nudging might influence my behaviour to some degree, they can't actually address the issues that stop me cycling to the theatre. What is required

rather than a focus on the individual is system-level analysis of the factors that lead me to behave in a particular way and, if we agree that intervention is necessary and acceptable, system-level intervention so that my individual desire to travel to the theatre in a sustainable way is not discouraged by frightening cycling conditions, discouraging social norms, expensive, inconvenient buses and cheap, convenient car parking. The policymaker following MINDSPACE may make the provision of cycle lanes more apparent to me, but if she doesn't get the city council to make the roundabout at the top of Leith Walk less of a death-trap, her work on Salience will not encourage me to cycle.

Overall, therefore, rational actor approaches to behaviour change face many practical and theoretical problems which are not fully addressed by adding to the number of factors to be taken into account or patching up the holes. In the end the focus on the individual is too problematic. A more system-level focus is required. Practice theory, which works on the system-level, has strongly influenced the Scottish Government's thinking about behaviour change, and so I turn to that next.

Chapter 3: Practice theory and the Scottish dimension

Elizabeth Shove is a central figure in the UK's practice theory world and has particular relevance to this thesis. Shove argues for more sociological rather than psychological approaches to thinking about how to achieve the transition to a lower carbon future, and specifically for use of practice theory, which marks a distinct shift from the theories of behaviour discussed above. She points to the need for more systemic thinking when she runs through the titles of government climate change policy papers of the previous decade, which focus very closely on changing individual behaviours as the chosen way to proceed (Shove, 2010a). She argues (ibid, p1274) that policy needs to move 'beyond the ABC' of attitude-behaviour-choice which assumes, based on the majority of the theories of behaviour discussed in Chapter 2, that values and attitudes (the A) drive the behaviours (the B) that individuals choose (the C). Whitmarsh et al. (2011) respond that ignoring the individual, whose behaviours undoubtedly do lead to carbon being emitted, would be foolish. They are right but Shove's point is correct in that the danger is in focusing *exclusively* on the individual and not also dealing with the factors that lead the individual to behave in the way they do. In her answer to Whitmarsh et al, Shove asks for *'the active and energetic involvement of many disciplines and theoretical positions so as to generate a much greater diversity of policy problems, not to `solve' the limited set that currently attract attention.'* (Shove, 2011, p264).

In this chapter I will therefore provide an outline of practice theory but also draw out some problems associated with it: the difficulty of applying the theory to practical development and implementation of policy; and some ethical questions about who has the right to change practices.

a) A short introduction to practice theory

For practice theorists, such as the Sustainable Practices Research Group (SPRG), of which Shove is a member, the world is full not of individuals behaving nor of social actors conforming with social structures but with individuals participating in practices. In terms of reducing carbon emissions,

'This shift of perspective places practices, not individuals or infrastructures, at the centre stage of analysis. Taking practices as the unit of analysis moves policy beyond false alternatives—beyond individual or social, behaviour or infrastructure. A practice perspective re-frames the question from "How do we change individuals' behaviours to be more sustainable?" to "How do we shift everyday practices to be more sustainable?"' (Spurling et al., 2013, p4).

Practice theory in this context is largely based on the current of thinking identified, and arguably set in train, by Theodore Schatzki in *The Practice Turn in Contemporary Theory* (Schatzki et al., 2001). In his introduction Schatzki notes the groundwork done by various thinkers in many disciplines trying to do away with dualisms, including Giddens and his theory of structuration (Giddens, 1984), Bourdieu and his concept of habitus (Bourdieu, 1977), right back to the philosophers Wittgenstein and Heidegger (Schatzki et al., 2001, pp1 & 8). Schatzki, a philosopher looking at practices in an ontological sense, builds on these foundations in a more contemporary context and his work was taken up more practically by the social theorist Andreas Reckwitz in an important paper, *Toward a Theory of Social Practices* in which he '*works out the main characteristics of practice theory*' (Reckwitz, 2002, abstract). Contemporary practice theorists often take their understanding of practices from this paper (see for example Halkier et al., 2011, pp4-5, Strengers and Maller, 2015, p3, Warde, 2005, p133; and many others).

Reckwitz differentiates between practice in the singular ('*Praxis*'), which is simply a way of describing human action as a whole (as opposed to human thinking), and practices as they are understood by a theory of social practices: '*A 'practice' (Praktik) is a routinized type of behaviour which consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge*' (Reckwitz, 2002, p249). Practices in this sense can be understood both as entities and as performances. As an entity, a practice is a bundle or collection of linked know-how, feelings, understandings,

competencies and so on; as a performance it is the *doing* of that know-how, those feelings, understandings etc in a routinized way which sustains, potentially alters and passes on the practice. Both entity and performance are necessary: without performers there is no practice; equally '*a performance presupposes a practice*' (Warde, 2005, p134). Moreover, practices may require certain conditions and/or equipment: the practice of driving involves access to a car, roads and fuel and probably things like road signs and traffic lights as well as competencies including driving skills, the knowledge of local laws and conditions and even capacities such as vision and certain physical abilities. Individuals are of course carriers or performers of many different practices, some of which are themselves linked but which may be wholly independent. The practice of shopping at a supermarket *may* be closely tied up with the practice of driving to an out of town retail park, but equally some shoppers arrive by bus, and some may drive but never to the supermarket. Clearly practices will differ slightly in their performance by different individuals and will evolve and change over time. Some may get lost as carriers die out or technologies change: Shove (2012, p34) notes how the UK driving test dropped the use of hand signals in 1975. As Warde points out (2005, p137), and importantly for the consideration of reducing carbon emissions, '*consumption is not itself a practice but is, rather, a moment in almost every practice'*. That is, practices tend to lead to consumption: during the practice of driving, fuel and tyre rubber are used up. In order to reduce consumption, practices may be a good place to start.

Practice theory provides an explanation of what practices are and to some extent how they come about, but in order to achieve the desired carbon reduction targets it is necessary to consider how they might *change*. There has therefore been some discussion of how practices come about, change and die out. The SPRG, and more recently Spurling and McMeekin (2015), identify three different ways in which this might occur. This accords with a similar set of strategies for achieving change described by Walnum et al in their discussion of the challenges experienced in moving towards sustainable mobility, as shown in the table below. The similarities are striking, although

their paper is more technical, focusing not on practice theory but on the rebound effect, indicating that this approach is not exclusive to the practice theorists, and both point to the need for more system-level thinking: they '*draw upon insights on rebound effects derived from ecological economics, socio-psychological perspectives, socio-technological interaction, and urban planning as well as insights from theories about complex adaptive systems*' (Walnum et al., 2014, p9511). The important thing about this table is that it lays bare how, in the first level, Re-crafting Practices, for each group change comes about not by changing the practices as such but by addressing the components and things that make the practices work. At the second level, Substituting Practices, there is a fairly standard approach suggested by Walnum et al to achieve what both groups want. It is only at the third level, Changing how Practices Interlock, that the radical and system-level change that Shove argues for is really required, and this is the area I want to discuss next.

Sustainable Practices Research Group (Spurling et al., 2013)		(Walnum et al., 2014)
Re-crafting Practices	Reduce the resource-intensity of existing practices through changing the components, or elements, which make up those practices.	The efficiency strategy: reducing the energy intensity of vehicles through more fuel-efficient engines etc, alternative fuels; lighter vehicle materials. This could presumably also include changing driving styles through eco-driving courses etc.
Substituting Practices	Replace less sustainable practices with more sustainable alternatives. How can new or alternative practices fulfil similar purposes?	The substitution strategy: replacing current transport methods with more sustainable ones (eg from cars to bicycles, walking etc)
Changing how Practices Interlock	Social practices interlock with each other—for example: mobility, shopping and eating. How	The volume reduction strategy: reduce the overall volume of transport – this could include urban planning

	can we harness the complex interactions between practices, so that change ripples through interconnected practices?	but also issues such as the acceptability and normality of the daily commute, where people take holidays etc.

Table 1: Three approaches to increasing the sustainability of practices (adapted from SPRG 2013 Table 1, p5, with my interpretation of Walnum et al added)

b) System-level thinking

The first and second sets of approaches in the above table are fairly straightforward and represent what is generally happening at present. They require no great change in society and assume that people's lives remain much as they are, but things are achieved by more sustainable means. The third set is more systemic – it proposes 'complex interactions', in the SPRG's words, and quite significant and far-reaching changes: '*Intervening in sets of interlocking practices therefore requires intervening in the institutions and infrastructures that hold such arrangements in place.*' (Spurling et al., 2013, p14). Similarly Walnum et al stress the radical nature of their third set of strategies: *Fundamental changes in patterns of behavior and consumption must take place in order to achieve a goal of less mobility'* (Walnum et al., 2014, p9513). To achieve this will require interventions in such diverse, systemic areas such as urban planning, freight logistics systems and the development and use of sophisticated communications technologies. These areas involve many parties with competing priorities (local and national government as well as households; manufacturers, hauliers and distributers as well as consumers), making intervention much more complex than when focusing on individuals.

Practice theory implies that to change a practice will require changes in all these spheres and at all levels. Shove (2003) identifies this need for system-level analysis by pointing out that many areas of consumption reflect what are largely invisible routines and patterns (ie practices) in our lives which seem to be inexorably evolving or stabilising in increasingly resource intensive ways. In order to reduce the resource intensity, it may therefore be necessary to focus not on diffusing green beliefs throughout society in order

to promote different individual choices but on 're-specifying' normality. To do this requires an understanding of how the normality is specified and her argument, applying practice theory, is that this requires acting upon many influencing forces.

What are the tools of laundering? What devices, appliances, and chemicals are involved?

How is laundry done? What steps and stages? What skills and expertise? Who does it?

When to launder? What are the cycles and flows of washing, wearing, and appearance?

Understandings of service – of what it means to do the laundry – emerge as consequence of constituent practices, technologies, and conventions

Why launder? For sensation, display, disinfection, deodorisation, or routine.

What is there to launder? What stocks, fabrics, and types of clothing are involved?

Figure 4: The Whirlpools of Laundering (taken from Shove, 2003a)

To take one of Shove's examples, Figure 4 shows the range of influences which specify the normality of clothes laundering. What is clear is that different influences are controlled by different parties. Some do indeed depend on individual choices (Why launder? When to launder?) but Shove argues that that these are themselves founded on deeper social movements rather than just my personal decision: in sixteenth century France clothes were seen much like a sponge, used to mop up bodily dirt, and so needed to be laundered as an alternative to bathing, while today clothes are supposed to be clean and so need to be looked after and decontaminated even after

contact with the regularly washed body. What there is to launder has also changed – clothes made of fabrics that are recommended to be dry cleaned have become more common in the last twenty years. Cheap fashion-conscious shops sell short-lived clothes at low prices so that most people have large wardrobes and can change their clothes frequently, whereas in the past dresses and suits were scarce assets that had to last for years. But these changes are as much to do with global trade and economics (the availability of cheap cotton, silk and cashmere, just-in-time supply chains to high-street stores and the symbiotic relationship between high street fashion chains and the press) as individual choice. The tools of laundering are produced by multinationals and laundry practices shaped by them: washing machine manufacturer Whirlpool realised that 93% of the carbon emissions related to its products came from their usage rather than their production and collaborated with detergent producer Unilever to enable users to wash clothes at 30°C, delivering the desired results with lower emissions (Hoffman, 2006).

The implication of practice theory is that to change the normality of laundering it is not sufficient to promote green behaviours amongst the general public. Not only would individuals need to change their opinions about the need for fresh clothing but social norms would need to change in order to make frequent wearing of the same suit acceptable, which requires societal level changes; manufacturing practices would need to change so that clothes were designed and made to last longer both in terms of fashion and durability; supply chains would need to be dismantled and rebuilt, maybe reprioritising longer lasting fabrics over delicate ones; and washing machines and detergents would need to change in order to reduce their resource intensity. The fact that the last *has* occurred but the normality hasn't changed doesn't diminish the power of the argument, for the difficulty is not that these changes couldn't occur, but that in order for the normality to be 're-specified', all the changes need to happen in a coordinated manner.

In considering the issue of bathing in her article, Shove uses the metaphor of the pinwheel where several pins stop the wheel turning (see fig 5). Whilst it is

possible for all the pins to be removed a difficulty is achieving that simultaneously. This doesn't seem to be mentioned by Shove but is implicit in the pinwheel diagram: any one pin could theoretically stop the pinwheel from turning. Achieving this would be particularly hard where the pins are controlled by different elements of society, some of which may have aims quite different if not antithetical to that of reducing consumption of resources.
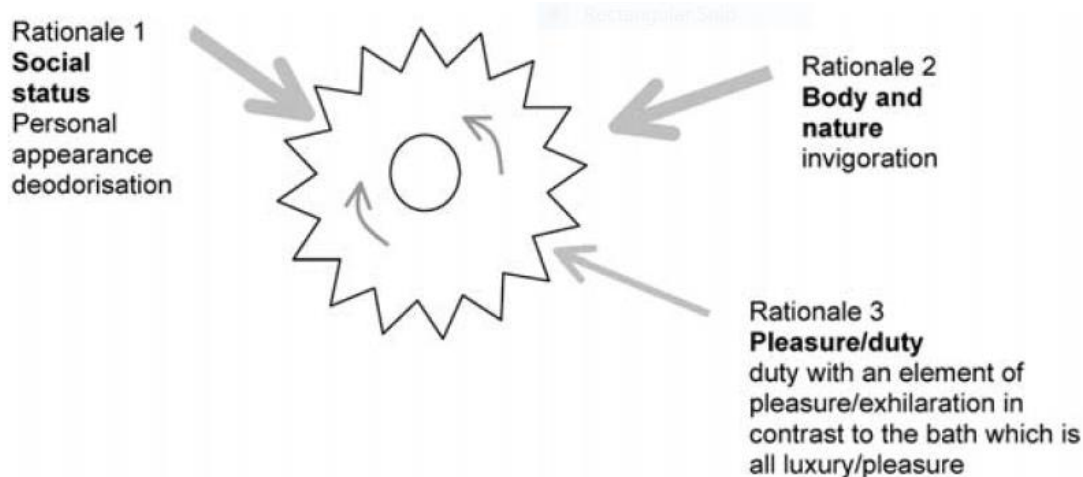
Figure 5: Shove's 'Pinning Power Showering in Place' (taken from Shove, 2003a, p408)

How radical this change would be is reflected by Shove where she argues that '*transitions toward sustainability do not depend on policy makers persuading individuals to make sacrifices, specified with reference to taken-for-granted benchmarks of normal non-sacrifice; or on increasing the efficiency with which current standards are met. Instead, relevant societal innovation is that in which contemporary rules of the game are eroded; in which the status quo is called into question; and in which more sustainable regimes of technologies, routines, forms of know how, conventions, markets, and expectations take hold across all domains of daily life'* (Shove, 2010a, p1278). No wonder Walnum et al also note that their third, systemic set of strategies is more controversial: '*the European Commission has clearly stated that curbing mobility is not an option*' (Walnum et al., 2014, p9511). Mobility, and indeed increasing mobility, is considered a given in modern

western societies.[3] It won't be easy to bring in policies that are seen as being against this trend.

Shove's contribution to this challenging debate reflects the 'practice turn' (Schatzki et al., 2001) to a sociological analysis – from a simple, one-way conception of human behaviour as being the result of the individual choosing certain behaviours in response to various social and other stimuli, to a more complex conception of a dynamic relationship between individual and society. And as the SPRG's titling of the third level as 'Changing how Practices Interlock' implies, these wider societal changes are not simply essential but some sort of coordination needs to take place in order for the changes to be effectual. This organised radicalism is difficult under the libertarian-paternalism paradigm represented by Nudge and MINDSPACE and indeed difficult in general. But its necessity seems to have been acknowledged at least by researchers working for the Scottish Government. Southerton et al. (2011) offer three main lessons from their *International Review of Behaviour Change Initiatives*, the first two of which are *'Targeting multiple contexts, moments of lifestyle transition and institutional or infrastructural pressure points'* and *'Developing frameworks for coordinated initiatives across systems'* (p2); and the fourth of their more general conclusions is that radical rather than incremental change is required: '*It is useful to consider the potential for wider-reaching system-level changes, which radically transform what and the way we consume, to achieve much more significant GHG savings.*' (p4). The Scottish Government's *10 Key Messages About Behaviour Change* (SG, 2011) stresses the importance of working on the 'Individual', the 'Social' and the 'Material' levels, with the last particularly indicating the role of other agencies in facilitating change by individuals. It has since developed the 'ISM tool' based on this approach, the thinking behind which is described most fully in Darnton & Horne's '*User*

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[3] See the European Commission's web page on mobility and transport: '*Transport directly affects everyone in Europe. Whatever age we are, and whatever activities we undertake, transport and mobility play a fundamental role in today's world. The aim of the Commission is to promote a mobility that is efficient, safe, secure and environmentally friendly and to create the conditions for a competitive industry generating growth and jobs.*' (http://ec.europa.eu/transport/about-us_en accessed 21/10/16).

Guide to the ISM Tool: '*ISM can generate a wide range of ideas for interventions because it draws on insights from all three of the main disciplines which study behaviours and practices – social psychology, behavioural economics and sociology, mostly theories of practice'* (2013, p3)*.* The ISM model also seems to take account of Whitmarsh et al's point that a use of practice theory doesn't need to exclude all other approaches: '*Acknowledging the similarities as well as the differences between different disciplinary contributions and embedding these into effective modes of policy making may present some of the options and challenges to overcome the status quo'* (Whitmarsh et al., 2011, p260).

The challenging aspect of this 'moving beyond the individual' approach is working out how to actually do so. At a conference run by Keep Scotland Beautiful at Glasgow City Halls in May 2015 the majority of talks about implementation of the tool described its use with communities, which have less control over the 'material' and possibly the 'social' elements, which backed up my experience of other events that Greener Scotland, the relevant Scottish Government department, has held. Encouragingly, at a workshop held in June 2016 (Darnton, 1 June 2016) the Greener Scotland team reported that the model had recently been used with departments within the Scottish Government, which presumably have more opportunity to influence policy and so some of the material elements. Even at this workshop however it was made clear, and a subsequent role-play exercise demonstrated, that effective use of the tool required both identifying the very specific 'behaviour' that needed to change *and* (even more difficult) ensuring that the key parties involved in the social and material influencers of the behaviour were present at the discussion about how to change it. Moreover the role-play showed that it is very easy for the process to default back to the individual, asking what is the minimum that the policy-makers, manufacturers, local authorities etc need to do in order to enable, encourage or persuade the individual to change her behaviour. Koziel notes that the ISM process needs a very good facilitator, and it has proved difficult to move beyond the mapping of the problem to work out what actually to do to solve it (Koziel, 2016).

In addition, the question of scale arises here. In order to achieve the transformational changes in society that the Scottish Government's climate change plans imply, it would surely be impossible to identify the sheer range and number of behaviour changes required, persuade the necessary parties to attend the appropriate discussions and then achieve sufficient consensus amongst them to deliver the social and material changes necessary to enable, encourage and persuade the individuals to change. Furthermore, the ways in which these changes would impact on each other (or 'interlock' in the SPRG's terms) don't seem to be considered by the ISM approach. Some of them would surely enhance the effect of other changes but others might diminish them. For example the rebound effect, both direct and indirect, could mean that benefits gained by a change in one behaviour could be reduced or even outweighed by changes in another area as individuals decide to spend money saved by a changed behaviour on something equally or more carbon intensive, or because their environmental guilt has been assuaged they reduce their efforts in another direction. This point is argued by Chitnis et al (Chitnis et al., 2013) although others claim that the rebound effect has been overestimated (Gillingham et al., 2013). The very fact that two sets of respected researchers writing at around the same time reach such different conclusions indicates the complexity of this one issue. The important point is that focusing on the individual and her behaviour is not going to get the scale and range of the changes that are required in order to achieve the necessary carbon reductions, even using the ISM tool.

The challenge of scale is also touched upon by Kurz et al who note that 'Downstream interventions may be costly and cumbersome, and may be rendered ineffective where larger structures are not conducive to the new behaviors. In such instances, 'upstream' interventions that address these structures should be considered, such as legislation, large-scale infrastructural changes, or technological innovations' (Kurz et al., 2015, p121). Kurz et al compare social psychological approaches to influencing habits with social practice approaches and conclude that maybe the best place for innovation is at the intersection of the two fields. 'Interventions that

incorporate elements of both theoretical perspectives may perhaps be most effective for breaking the mundane habitual actions that threaten the global climate' (ibid p125). However in the course of their paper they note that the translation of practice theory into practical approaches for implementation '*remains somewhat a work in progress…'* (ibid p123).

A commentary article by Shove and Walker (2007) may help explain why the practice theorists haven't focused on how to achieve this translation of theory into practice. They highlight political and ethical issues, practical problems and the dangers of focusing on technological solutions to make us wary of 'transition management'. They also hint at the risk that such transitions are predicated on an assumption that what is wanted is a society and a lifestyle that are basically the same but achieved in a different, more sustainable way. I share their concerns but also feel that a democratic and political decision *has* been made to reduce carbon emissions (the 2009 Scottish Climate Change Act was passed unanimously by the Scottish parliament after Shove and Walker's article was written), and the challenge now is to work out how to achieve that end. Moreover the current science provides ample reasons to work hard to overcome the practical problems (see for example UNFCCC, 2018). I agree however that it is a mistake to think that we can solve the problem of carbon emissions without fundamentally transforming the nature of our society rather than by managing a transition from one technology to another.

This combination of the scale of the issue, the need for system-level change and to transform society, the 'muddle of everyday life' and the difficulty of translating practice theory in to practical ways to reduce carbon emissions points to the need for a way of thinking that can begin to accommodate all these challenges. An approach which is often hinted at by the language used by the practice theorists, but which oddly is not referred to explicitly, is complexity theory. For example, in *The Dynamics of Energy Demand,* Walker writes of the '***dynamic interaction** between the various **elements** that come together to configure practices'* (Walker, 2014, p49), of the '***complex, ongoing flow of the social world*** and how '*we see the production of rhythmic*

*'load profiles' in electricity or gas grids as **emergent properties'** (both ibid p50, all bolding mine to highlight terms often used in complexity theory). Although she does not actually refer to complexity theory as such, Shove uses the language of complexity: *'the locking in of technologies and practices as they move along a **path-dependent** trajectory of sociotechnical change'* (Shove, 2003, p400); '[Laundry is a 'composite service] '*formed, shaped, and given meaning by a **complex** of "ingredients"'* (ibid p401)*; 'It locates laundering as an **'emergent service'** formed through the **co-evolution** of the **mutually interdependent elements**…'* (ibid p404). And in fact she does actually reference complexity science in a later paper (Shove, 2010b, p280).

Shove and Walker's commentary article (Shove and Walker, 2007) critiques some approaches to 'transition management' that apply complexity theory (such as Rotmans et al's (2001) discussion of the energy transition in the Netherlands), and so perhaps makes clear the reasons for the practice theorists' reluctance to engage with complexity. Shove and Walker are rightly concerned about *who* decides on the transition to *what* and within *what system*. They also worry about the ability of 'transition managers' to operate sufficiently reflexively, particularly when a systemic transition may take years to happen: how will they know what the signs of success are and what should they be monitoring or evaluating? And they are concerned that much transition management focuses on technical changes, ignoring the humans that use the technologies and so create or change the practices that they facilitate.

However, around the same time as Shove was writing about 'respecifying normality' and the complex dynamic of the relationships between the individual and society, complexity thinking was beginning to enter into social research. Urry (2003) argued that sociology needed to engage with the changes that complexity thinking had been provoking in the natural sciences since the 1970s and in 2005 *Theory, Culture and Society* dedicated a special issue to 'The Complexity Turn', as Urry as editor termed it (Urry, 2005). And at the Sustainable Scotland Network conference in November 2016 one of the main developers of the ISM model stated that '*the ISM process is ideal*

for intervening in complex systems' and that it '*responds to sustainability challenges which are urgent, complex, messy, societal and values driven'* in his description of how he had been using the model in practice (Darnton, 2016).

The Shove and Walker (2007) article rightly asks contestable and highly political questions, but in the absence of other ways of applying practice theory to an increasingly urgent problem that has already been politically defined it is worth looking at complexity theory to see whether it could provide a practical approach to achieve the desired carbon reductions. Intriguingly the Director of Energy and Climate Change at the Scottish Government has hinted at a more comprehensive re-imagining of society than earlier statements by his political masters would suggest (Stark, 2017), and explicitly used the language of complexity to describe the systems he was working within and the work to be done. I would suggest this is both a necessary and a more radical programme than those that Shove and Walker are criticising.

c) Summary

I began this review of the literature around practice theory with its convincing shifting of the locus of analysis from the individual to the social. I discussed the need to move to system-level thinking and how this seems to be in line with the thinking of some people in the Scottish Government. But I highlighted the challenge to practice theorists that it seems difficult to translate the theory into practice. I suggested that the language used by practice theorists often seems to hint at connections to complexity theory and in the next chapter I explore complexity theory to consider whether there is a need to make another shift, from the practices themselves to the complex systems that shape them.

Chapter 4: Complexity

Although the similarities between the language of practice theory and that of complexity may point to a connection, it is perhaps not obvious how a theory from the social sciences links with one very firmly situated in mathematics and the natural sciences. In this chapter I will therefore outline the background to and basics of complexity theory, the possibility of it applying to complex *social* systems and how some social scientists are beginning to both apply it and consider the theoretical and methodological implications of it.

a) Background

Complexity theory grew out of innovative mathematical and practical scientific studies of complex systems such as the global climate and animal populations, systems that were too big for analysis using classical mathematical methods. Increasing computer power in the 1970s and 80s brought the ability to study large datasets and new techniques revealed the possibility of non-linear patterns of behaviour within these apparently chaotic systems (Gleick, 1998 (although the route to complexity is not only through chaos and Sanderson points out important differences between the two), Capra, 2005, Sanderson, 2006). The combination of this work with the increasing understanding of the uncertainty inherent in quantum mechanics, first postulated earlier in the 20th century, is perhaps important: between them these two developments posed a challenge to the standard deterministic scientific method. Acceptance of complexity leads to a rejection of the idea that X + Y always = Z, as the result may depend on small changes in the initial conditions which cannot be known. Thus if the initial conditions in which X and Y are added together are A^1 rather than A, the outcome *may or may not* be Z, this uncertainty mirroring at the macro-scale the uncertainty inherent in quantum physics. The subsequent revolution in the natural sciences has led slightly belatedly to a rather smaller one in the social sciences: approaches incorporating complexity have been more widely applied to economics (another area where large datasets are available, and where a largely unacknowledged understanding of complexity has been

present since Adam Smith) and other disciplines. This is what Urry (2005) describes as 'the complexity turn', a key aspect of which is that it breaks down the previous separation of the physical and the natural sciences by seeing them both defined by complexity (he cites Wallerstein (1996)). In this respect Capra (2005) also notes that nature is more like *human* nature than was previously thought – susceptible to history, influenced by the external environment and unpredictable and so unique in each case. This is important because, as Byrne (2005) argues, complexity points to the value of comparative studies when social scientists are seeking to provide evidence for policy makers. These acknowledge the importance of the individual case and try to derive more general understandings, rather than proofs or certainties, from individual cases. Complexity theory also considers dynamic systems and change, suggesting it may well be applicable to situations where social change is the aim.

A related point to note is that complexity thinking is applied to *descriptive* rather than *analytical* processes. The essence of complexity is that it makes analysis impossible, and not just because the systems involved are too interlinked and interdependent to be analysed easily. Cilliers argues that '*the study of complex dynamic systems has uncovered a fundamental flaw in the analytical method. A complex system is not constituted merely by the sum of its components, but also by the intricate* relationships *between these components. In 'cutting up' a system, the analytical method destroys what it seeks to understand*' (Cilliers, 1998, p2). The Global Circulation Models (GCMs) that geoscientists use to forecast climate change and are prime examples of studies of complex systems are just that: descriptive models that are as accurate as possible. These are based on and improved by, and their errors and successes lead to, greater understanding, but the models themselves seek not to analyse or explain but to simulate the flows of fluids and energy around the world. Similar to Byrne's view, this focus on description rather than analysis will become important later in this discussion of how complexity thinking might be applied to projects seeking to bring

about change in the smaller complex systems of which individuals and cultural organisations are parts.

Complexity science is a family of interlocking and interacting ideas, concepts and approaches. Very good accounts of complexity theory for the sociological reader include particularly useful ones by Cilliers (1998) and Ramalingam et al. (2008). Here I will outline the basics of complexity theory and review some of the more sociological literature in terms of how it has considered complexity theoretically and practically, providing more details about relevant elements of complexity thinking where it may be useful.

b) An outline of complexity theory

In very brief terms[4], complexity theory holds that complex systems – as distinct from merely complicated ones – are open systems (ie without closed borders) consisting of a large number of elements or agents which interact dynamically between themselves and indeed with influences outside the system (this interaction may be exchange of information rather than physical). These interactions are rich, in that one agent may influence and be influenced by many others. Different agents will have different degrees of influence – some may be quite sparsely connected. These interactions are non-linear, in that small changes can have large effects or vice versa. This means that the system cannot be collapsed into a smaller equivalent system, and this non-linearity is an essential condition of complexity. For the most part, interactions are likely to be at fairly short range, although the ramifications of an interaction can be felt at greater distances as subsequent interactions are triggered in other agents. However, this means that the influence of one agent may be altered, increased or diminished by further interactions along the chain. There are feedback loops, both positive and negative, as interactions lead to changes that bring about further interactions to multiply or cancel out the effect of the first.

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[4] This outline owes a great debt to Paul Cilliers' book *Complexity and postmodernism : understanding complex systems*, pub. Routledge, London 1998

As a result of the feedbacks, the interactions and their non-linearity, complex systems are not in equilibrium – a particularly important change from a view of science, economics and other disciplines that have traditionally assumed a tendency towards stability and equilibrium. As Cilliers (1998, p4) writes, '*There has to be a constant flow of energy to maintain the organisation of the system and to ensure its survival. Equilibrium = death.*'

Complex systems have a history: not only do they develop and change over time, but their present and future are determined by their past. No agent or element has knowledge of the whole system, as this would mean that the complexity of the whole would be incorporated within the individual agent, indicating that the system was no more complex than the agent. '*Complexity is the result of rich interaction of simple elements that only respond to the limited information each of them are presented with. When we look at the behaviour of a complex system as a whole, our focus shifts from the individual element in the system to the complex* structure *of the system. The complexity emerges as a result of the patterns of interaction between elements.*' (Cilliers, 1998 p1). Although complex systems do contain redundancy, they cannot be compressed down into smaller systems and so they cannot easily be described in full. Importantly for this discussion, as Cilliers points out, emergent properties of complex systems are properties of the whole system, not individual elements therein.

Can complexity be applied to *social* systems?

The outline of complexity theory above covers complex systems as they are generally understood in the natural sciences and mathematics. But my purpose here is to think about a social issue using complexity theory and this poses the question whether complexity theory is genuinely applicable to social systems. (By a social system I mean a more or less definable collection of individuals, organisations, arrangements etc which are interconnected and interrelated, and so which affect both each other and the

system as a whole.[5]) In addition, the outline above views complexity theory as a way of understanding existing complex systems in the natural world. But if the aim is to apply complexity theory to a social system in order to put practice theory into practice, this implies first that complex social systems exist ontologically, rather than complexity theory simply being a way of understanding them; and second that it is possible to change a complex social system.

i.   Do complex social systems exist?

Starting first with the general ontological point, a number of both natural and social science writers seem to suggest that complex social systems do exist and in this section I will summarise their reasons.

Capra (2005) is a physicist who finds complexity in the real world, in the time-based and change-based processes of life. He writes of self-generating networks of chemical processes and a continuous flow of energy and matter (ie not in equilibrium). This is what living beings *are* – what Prigogine (1997) calls 'dissipative structures'.

Capra also notes that attractors, an essential feature of complex systems, are found experimentally in a surprisingly limited number of forms, and these may be seen as similar to aspects of society that social scientists study. Attractors are a feature of phase spaces. A phase space is a graphical way of showing all the possible states that a complex system might be in. The value of the phase space is that it does not try to establish relationships between different variables but rather provides a way of understanding the whole of the system by looking at patterns that are revealed when all the dimensions are taken into account. The phase spaces of complex systems often form patterns revealing unexpected order within what seemed to be a chaotic system. Areas in the phase space where the system tends to appear

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[5] *'A social system consists in a plurality of individual actors interacting with each other in a situation which has at least a physical or environmental aspect, actors who are motivated in terms of a tendency to the "optimization of gratification" and whose relation to their situations, including each other, is defined and mediated in terms of a system of culturally structured and shared symbol* PARSONS, T. 1951. *The social system,* London, London : Routledge and Kegan Paul.

are called attractors. Particular shapes of attractor are repeatedly found in complex systems, allowing them to be classified topologically and the characteristics of the complex system deduced from the attractor's shape.

As a comprehensible example of an attractor consider the difference between the climate and the weather (Allen, 2003). The weather is the result of a complex system of many different variables constantly acting and reacting to one another. It is not possible to say with any certainty what the result of those interactions will be like a year from today, but it will almost certainly fall within certain parameters. Hence we can say with some certainty what the *climate* is, and discuss that in relation to other climates. The specifics of the weather on day x in the future are simply a point in the attractor which could be drawn representing the climate. My point here is that arguably attractors also exist in relation to complex social systems: sociologists and anthropologists seek out and describe aspects of society that are found experimentally in a variety of settings.

Backing up this view that complex social systems do indeed exist, Elder-Vass contrasts Luhmann's social system theory with that based on the theory of emergence. He argues that *'emergentism is already well integrated into complexity thinking and thus provides a route for social systems theory that is both stronger ontologically and more in tune with wider developments in systems thinking'* (Elder-Vass, 2007, p410). He later writes that '*For emergentists, systems are entities. Typically, entities may be identified with things'* (ibid p414), indicating that complex social systems exist ontologically. For Elder-Vass system properties need to be understood by understanding not only the system but also the system's environment. Meanwhile emergent properties are properties of the whole, not the constituent parts, which again suggests an ontological position for the system. This seems to point away from the ISM-type approach of dealing with specific influences on (emergent) behaviour and towards taking a wider, systemic view.

For Smith and Jenks (an artist/social theorist and a sociologist, so writing from a social rather than a natural sciences perspective) not only are

complex social systems real but complexity has a real influence on the agents within the system. They argue that information is material to living beings: that learning from the outside world is essential and intrinsic to behaviour. '*Instinctual processes are necessary and therefore **not** transformative; the opposite is true of learned and modifiable behaviours*' (Smith and Jenks, 2005, p160, their emphasis). Instinctive knowledge is essential to the agent-in-the-system but learned knowledge – the response to the environment – is what *shapes* the agent-in-the-system anew, so the agent co-evolves with the system. This sounds like humans learning and responding to the complex social systems in which they operate. What is less clear from Smith and Jenks, but is implied by the co-evolution which is an essential feature of complex systems, is whether this is a reversible process – whether the system is also influenced by the agent. This is of course important if the aim in using complexity theory is to influence a complex social system in order that it changes in such a way as to change its properties – for example, to lead to lower carbon emissions.

Byrne (2001, unpaginated) writes about such 'transformations in social policy', clearly connecting complexity science with social systems and implies that this has ontological implications. He argues '*for the general value of the complexity frame of reference in understanding social policy issues*' and that '*Complexity science involves a rejection of the programme of simplification which has dominated scientific understanding since Newton, especially scientific understanding represented in mathematical form. It is essentially an ontological programme with epistemological consequences. That is to say it has a view about what the world is like - the ontological programme - and from that view it derives a programme of ways of understanding the world - the epistemological consequences.*'

ii.   Understanding complex social systems

Byrne's 'epistemological consequences' are the reason why the existence of complex social systems is important: if we want to change the systems we need to understand them. Various writers suggest that not only can we

understand social systems as complex ones, but also that doing so provides different knowledge that can be practically applied, as I describe in this section.

Byrne has regularly made use of complexity in social policy areas and focuses on the epistemological point that standard quantitative analysis cannot deal with complex and non-linear causality (Byrne, 2012a). He argues strongly (Byrne, 2012a, Byrne, 2012) for approaches making use of simulation (see my comments about GCMs above) and (Byrne, 2001) for the value of a complexity frame of reference in understanding real issues. Interestingly Byrne works regularly in areas of social policy making where an understanding of the practicalities and muddle of everyday life is particularly important, and several researchers have applied complexity thinking to practical problems.

For example, Sofoulis touches upon epistemological points while dealing with very practical issues – in her case ways of reducing water usage amongst communities in Australia. She argues that, *'The break from early modern science's linear models of causal determinism represented a decisive step towards the complexity approaches now prevailing in sciences like climatology, where probabilistic models supersede facts or theories as ways to frame knowledge'* (Sofoulis, 2011 p798). Understanding water provision and use as a complex system requires and leads to the production of different knowledge to that required by a reductively simplified conception based on 'average users'. This new knowledge can lead to different approaches to water use and management which can influence the system in a feedback loop.

Radford meanwhile considers how educational research, and so policy, could be changed by the use of complexity theory. He uses a list of characteristics of complex systems from Cilliers (1998) to conclude that '*It is not difficult to make a case for the relevance of all these characteristics in the school system in general and to individual schools.'* (Radford, 2006, p183). While he argues that the mathematical models that have been used in the natural

sciences cannot necessarily be applied to social situations, there is enough to go beyond metaphor or analogy. Schools are indeed open systems, interacting with parents, children and other parts of society. They also show signs of interdependence – learning in one class will have impacts in another, possibly on a different scale (for example when a literacy breakthrough occurs). He makes a distinction between the natural sciences and technology – research in the former seeks to understand and explain; in the latter to gain some control over processes etc – and suggests that educational research, because of the complexity, is more about explaining and understanding rather than gaining control. The systems are complex enough to suggest that control is not going to be gained, as analytical, reductionist, causal explanations will suggest. Applying policies that influence individual practices or behaviours is less likely to work than influencing the system as a whole.

Instead of seeing educational systems as 'economies of performance', in which the teacher seeks to manage the structure by manipulating particular inputs, Radford argues that a complexity approach sees them as 'ecologies of practice': dynamic environments in which different elements interact in a way which is difficult to predict. *'Notions of continuously improving practice based on specific interventions are replaced by notions of temporary equilibrium within given momentary contexts. If this is the case, rather than the proactive stance that is expected of reductionist analytical approaches, research has a more reactive role.'* Rather than providing the replicable practices that policy makers want, '*research describes and explains and in doing so supports the network of communication between institutions and outside agencies. In this context research can promote the inherent self-organisational capacities of schools as adaptive and flexible institutions working within a complex society that makes multiple demands amidst continuously changing priorities.'* (Radford, 2006, both p178). Hargreaves and Fink (2006, p164) note that schools operate with the *'fluidity and adaptability of living systems rather than with the mechanical precision of well-oiled machines.'* Improvement in schools is complex, based on many outcomes and inputs, and improvement may not be the right terminology: it

would perhaps be better described as evolving, fit and surviving. Schools can be considered as complex social systems and so complexity theory can help in the understanding of them. In discussing research models of pedagogies, Fong (2006) makes a similar point in relation to control and order in kindergartens, arguing that classrooms are examples of complex systems where teachers should be encouraged to allow order to emerge rather than seek to impose control.

A range of writers therefore both recognise the existence of complex social systems and are using the concept to understand systems they are studying.

Complexity and social change

Moving on to the question of whether complex systems can be deliberately changed, natural and social scientists and those working practically as well as theoretically seem to agree that they can. In the following discussion I'll move from the science of complexity theory through the different ways in which social scientists have used complexity to make clear that the practical application is built on firm theoretical grounds.

Capra cites physical scientists whose work may provide some useful clues about how complex systems actually work and how those systems might be influenced. These include Kauffman (1993) arguing that the most successful organisms live on the 'edge of chaos', somewhere between ordered and chaotic. These are best able to coordinate complex and flexible behaviour. The genes of these successful, flexible organisms do not shape their physical form, but do provide the initial conditions which will determine which forms are likely to appear in a given species. Capra (2005, p40) writes that the early 20th century embryologist Driesch showed that embryos that had cells removed still formed the same animal. What is selected by natural selection is not the individual components (cells or even genes) but the robustness of the whole system, in which multiple pathways to achieve the success are important. In complexity terms this means that attractors will still obtain and marginally or even significantly differing systems will find different ways to them. In complex social systems, transport practices might provide a good

example: policymakers in many countries have created many different systems of transport but people still tend to use their cars if they can.

This leads to Capra's (2005) reference to 'basins of attraction', where initial starting conditions for a system or sub-system may differ but nonetheless within a certain area tend towards a particular attractor, whilst a very slightly different starting point might lead to quite a different attractor, rather like being just on the other side of a watershed. If it is possible to apply these understandings to complex social systems rather than physical ones it may be that there are factors or influences which do not directly shape the final form of the system, but make it tend towards a certain range of forms which lie within one 'basin'. In order to change the social system's form to achieve a desired end, rather than changing the environment or the genes which directly shape the detail of the system (effectively the ISM approach described above), it may be that a more effective approach for bringing about change in many different instances will be to change the initial conditions just enough and in the right way to move the whole system from one basin of attraction to another – although this may also be very hard. Again, in complex social system terms, large scale congestion charging schemes such as those in London and Milan might be an example of where this has happened, but also of the difficulty in achieving it.

Rotmans et al. (2001, p19) use a similar metaphor in their discussion of transition management:

> '*Changes in worldviews (belief systems) and macropolicies (such as agreements in WTO rounds or CFC control policy) may rain down upon the macro landscape, but its contours still dictate their convergence into rivers.*
>
> '*However, this does not mean that individual actors (individuals, companies, local government) cannot be a catalyst to the transition process. Certain innovations in technology, behaviour, policy and institutions do break out of the micro level, if they stabilize into a dominant design around which learning processes take place.*

The very intuitive descriptions of schools as complex systems referred to above do seem then to align with what seems to be agreement more widely to support Byrne's view that complexity theory has value in considering social

issues, both ontologically and therefore epistemologically. It may therefore be helpful in the attempt to reduce carbon emissions related to what the Scottish Government reduces to behaviours but as viewed by the practice theorists are actually practices, and which seem to be the products of complex social systems. Some people are beginning to put this into practice. In a rare example of social research actually framed using complexity thinking, Eppel (2009) deals with both ontological and epistemological questions. She first argues that policy making processes *are* complex systems, basing this view on the analysis of interviews with 65 individuals involved in developing and implementing tertiary education policy in New Zealand in the 1990s and 2000s, comparing their description of the system against a framework of features of complex systems. She then explores how these features of the complex system of policy making influenced the formation and implementation of the policies. She argues therefore that the practical outcomes of the policy making process can only be understood through acknowledgement of its complex nature and that '*A complexity lens view of policy processes requires approaches that are consistent with the complexity of the systems they need to manage… The use of a vocabulary which includes complexity concepts, and tools designed to work with those concepts, could assist people involved in public management to describe and understand better the systems they want to intervene in and the processes they might use to do so.*' (ibid p280). This suggests that the application of complexity thinking to policy processes related to complex social systems is both necessary to and may help bring about system change.

In a related paper Eppel, Matheson and Walton outline two other studies using complexity to design practical interventions in social policy. One sought to apply complexity thinking to the design of interventions aimed at improving children's nutrition. The authors argue that actors' agency is important within a complex system in achieving system change; that while the impacts of interventions in non-linear systems are difficult to predict, research evidence can be used to guide the interventions; and that '*policy options to support the role of primary schools in promoting healthy nutrition need to consider the*

interaction between the nested systems involved.' (Eppel et al., 2011, p51). They add that that '*Complexity theory is best used when the phenomenon or problem being studied is multidimensional and its causes are difficult to identify'* (ibid p50), highlighting the practical nature of the epistemology of complexity thinking. Analysis using complexity theory may not provide generalizable theory, but provides a valuable way to address particular practical problems.

In the similarly multidimensional setting of UK and foreign development (working with Oxfam GB), Eyben et al. (2008) found the non-linearity of complexity theory useful in thinking about *why* social change happens and therefore helpful in implicitly or explicitly creating the conditions where it *may* happen. Whilst much practice in their area assumes a linear change – that if you apply a certain input you will get a change of a comparable size in a comparable area – they take the difficulty of predicting the changes that will occur when an intervention is made in the field as an argument for longer-term and flexible engagement with communities. Matheson et al. (2009, abstract) also applied complexity thinking in analysis of case-studies of community-based interventions in health care and found that it provided '*a systematic way in which to explore 'local' issues by taking a 'whole system' perspective*'. In a rather different field, Haynes (2003, p24) had earlier used complexity in his handbook for managing change in public organisations: '*Accounts of public organisations based on complexity theory stress the indeterminacy of organisational systems and the difficulty with isolating cause and effect. Organisations systems should be thought of as complex adaptive systems where the feedback between elements and individuals is the key defining aspect of the organisation in any one time and space.*' In his conclusion Haynes quotes Streatfield (2001, p140) who says that '*managers find that they have to live with the paradox of being 'in control' and 'not in control' simultaneously.*' This sounds a bit like the 'muddle of everyday life', and this and the other examples seem to indicate that it is found in many very different situations.

Others however use complexity more as a way of thinking rather than arguing that the systems under consideration are actually complex systems. For example Ramalingam et al used it to consider interventions by aid agencies in the developing world. They conclude that complexity offers a useful set of 'fictions' that allow us to understand a complex world; a holistic understanding of 'messy realities': '*This might allow comparisons between cases and systems previously not related, potentially strengthening insight and helping to highlight possible effective actions.*' (Ramalingam et al., 2008, pix). They clearly consider that complexity can be usefully applied to systems such as the delivery of international development, but also point out that complexity itself stresses the context dependence of any course of action. This provides a valuable reminder that any conclusions drawn from a study or experiment will themselves be limited by their context: '*For this reason, we realise that many of the implications here are at a meta-level, in that they suggest new ways to think about problems and new questions that should be posed and answered, rather than concrete steps that should be taken as a result.*' (ibid p.ix). This is similar to a comment made by Eyben et al. (2008, p210): '*Complexity theory suggests an approach which seeks to make a difference by working through relationships, rather than focusing on pre-set outcomes.*' Policy might aim to influence the system in the right way to bring about more generalised change, rather than focus on achieving specific outcomes such as changing this behaviour or that one, since a complex system will anyway change over time, and may itself adapt unhelpfully to an attempt to influence a single emergent property.

Urry makes much more general use of complexity in *Climate Change and Society* (Urry, 2011) where he makes explicit links between the complex global financial system, complex climatic systems and the complex mobilities of modern society (which perhaps led him to complexity thinking in his book *Mobilities* (Urry, 2007)). In effect he argues that society is a complex system and so to ignore complexity theory is to apply the wrong tools to try to understand, explain or indeed influence it. McLennan (2003), whilst taking issue with his interpretation of Urry's argument in *Mobilities* that sociology

cannot deal with the modern, fluid, mobile, post-nation-state world without taking on complexity, does seem to acknowledge that complexity (although not chaos) theory does offer some value to the social scientist. In brief he argues that:

- much apparently scientific complexity is actually quite like sociology anyway – not inexplicable, but complex and dynamic (ibid p556);
- the 'uncoupling of prediction and explanation and the perils of reductionism' (ibid p556) aren't so far from sociology or social sciences (Byrne references Durkheim to explain the concept of whole system properties, John Holland invokes Spencer regarding emergence and Urry himself references Marx);
- emergence theorists accept that emergent properties depend upon and are constrained by lower level properties, but higher level properties also emerge – this has long been understood in social science, but a degree of uncertainty is more acceptable (ibid p558).

He also points out that there are many kinds of complexity, suggesting that the issue may be to work out how to apply the right sort of complexity to social issues (ibid p562).

Summary

My review of the complexity theory literature aimed to demonstrate that there is agreement that complex systems exist as real entities in the world and that understanding the world in these terms provides new and different knowledge about it. This was important if I was to make the connection between practice theory and complexity with the aim of finding a way to reduce Scotland's carbon emissions. The review also showed there are at least some social scientists (such as Eppel, Eyben, Haynes, and Radford) making use of complexity theory when thinking about social systems and also considering that complex social systems exist ontologically. Where there is less agreement is in whether it is possible to bring about a desired change in a complex social system, and this points towards the research questions for this project.

Chapter 5: Summary and research questions

This literature review began by outlining the prevailing approaches to 'behaviour change' and the difficulties of achieving large-scale and systemic change through interventions based on social-psychological theories of behaviour. The sheer 'muddle of everyday life' added to the problem, as the practicalities of life get in the way of neat plans for intervening. Whilst 'nudge' offered a potential way to address this by providing heuristics and rather messier approaches it still failed to solve the problem that behaviour change focuses on individuals who often don't have the agency to change the factors that strongly affect their behaviour. I therefore examined practice theory, which shifts the focus away from the individual to practices, which are 'performed' by individuals but exist outwith them and are shaped by many agents, technologies etc. A challenge for practice theory, however, is how to turn theory into practice, and complexity theory is therefore postulated as a way to do so. There seems to be sufficient support in the literature for the idea that viewing a social system as a complex system is a valid and useful way not only to understand it but also to attempt to influence it.

If a social system is a *complex* social system then individual agents-in-the-system will be humans as well as other things that humans interact with, from organisations to cars, streets etc. The practices those humans perform (ie what the Scottish Government would term their behaviours) can then be understood as emergent properties of the system, shaped by the complex interrelationships between all those elements. Applying a system-focused approach to move a whole system from one 'basin of attraction' to another, where the emergent properties of the system are more sustainable, may be more effective than focusing on individual practices or behaviours in the manner of current 'behaviour change' interventions. When applied to the problem that I identified in my introduction, this led to the first of my research questions:

First research question: How can complexity theory be used to inform interventions in social systems, in order to help achieve system-level change and reductions in Scotland's carbon emissions?

Answering this first research question in any practical way poses significant challenges. But this study, with its origins in the need to find practical answers to the very real and urgent problem of how the Scottish Government can bring about the 'behaviour change' which it argues is necessary to meet its carbon reduction targets, surely needs to propose some real-life solutions. To know whether it is possible to intervene usefully in complex social systems it would be necessary to try to intervene in one: theory would only get us so far. But by their nature, complex social systems, and the results of any interventions in them, will be difficult to study: their complexity means that it may be hard to know what effect any interventions had. Evaluation will therefore be difficult and the study would need to be designed and implemented so as to provide useful data and insights, but this might challenge conventional approaches to generating knowledge.

i.   Designing my project

I therefore needed to undertake a practical project to intervene in a complex social system with a view to understanding whether this was possible and useful. To design a useful intervention, however, I had to know how I was going to evaluate the results. This led me to a small and separate literature which looked at the use of complexity theory in relation to evaluation. Using 46 papers from a review by Walton (2014) it became clear that I should use a case study approach which used a variety of methods, that I should be aware that any results might only become apparent over time, and that I should choose my system very carefully. And a crucial paper by Byrne (2013) provided some questions which would allow me to structure both the project and its evaluation to provide useful information. As the following sections make clear, this would allow me to frame a more specific second research question to effectively provide the information I needed to answer my main

one. In these sections, I therefore set out the key criteria that helped to shape my research design.

a. The value of the case study

There was a strong case for using a case study approach and designing it to deal with the above themes and challenges. As Walton (2014) notes, case studies provide opportunities for developing an understanding of the systems being investigated. Case studies enable researchers to look at both the horizontal complexity (the range of local actors) and the range of different levels of influencing factors affecting them, from national down to local (ibid, p124). Byrne and Ragin (2009) also argued for the use of case studies particularly when considering complex systems, when *useful* generalisations are needed more than everlasting laws, as more deterministic approaches can't cope with the difficulty of assigning causality in complex systems noted above (Byrne, 2013).

Blaikie (2009, p189) cites Yin (2003) as saying that case studies often investigate a contemporary phenomenon within its real life context, especially when boundaries between phenomenon and context aren't clear, often rely on multiple sources of evidence, and benefit from the prior development of theoretical propositions to guide data collection and analysis. This description both suits study of a complex system and can help guide the design to permit evaluation.

b. Theory of change approaches

One issue with working with complexity is that it has implications for the timing of evaluation. Non-linear change means that it is not possible to know when any effects of an intervention will be apparent, and so evaluation may need to take place over long timescales (Shiell et al., 2008 p1282, Barnes et al., 2003, p270). But this complicates the attribution of effects to interventions, as other changes take place over the timescales involved.

However, theory of change approaches to evaluation assume that purposeful activity implies that there is a set of assumptions about the context of an action, the aims of undertaking it and the way in which the action will lead to

the aims. Evaluation involves 'a systematic and cumulative study of the links between activities, outcomes and context of the initiative' (Connell and Kubisch 1998, p16, quoted by Dyson and Todd, 2010, p124). Evaluators can collect data on the changes wrought by the action and then assess whether these are those predicted by the theory, and collect data on any longer term outcomes. Rog (2012, p29) similarly suggests that interim measures that track short term changes related to the longer-term ones may be necessary to ensure that a project is on track. Using a theory of change approach, and being aware that indicators of future change might need to be identified, would help me address the challenge.

c. The need to choose the right system

Another important aspect of my project design would be to work on an appropriate system. Barnes et al. (2003) stress the need to understand the system, including the context it sits within. Various authors have used various means and Walton (2014, p123) notes the challenge in setting the boundaries to the system: some authors have taken into account national level policies and their interaction with local actors. Complexity theory has particular value in understanding change, which may point to a useful element of a project. Hawe et al. (2009, p94) note that complexity theory may help researchers think more about increasing actors' capability for responding to a constantly changing situation rather than about generating specific knowledge that may be applicable to this system now but not another, or not to the same system in the future. The project chosen would need to have the potential to apply the learning more widely. These considerations would influence the selection of my site, as described below.

d. Mixed methods

The challenge of finding what works in a specific situation means it is necessary to use mixed-methods of research and data types. *'Complexity suggests no one piece of data will be able to provide a complete view of the system under study.'* (Walton, 2014, p124). As Rog (2012, p129) writes: '*As a consequence of [these many] challenges, evaluations of environmental interventions need to have multiple indicators, multiple methods, and often*

need to examine multiple pathways to see if and how change occurs.' The importance of mixed methods and the skills a researcher needs to use them would become a theme of my research.

e. Byrne's seven questions for evaluating complex social interventions in a complex world

In a central paper for this thesis Byrne (2013) argues that evaluation is about understanding and so providing generalisations. Randomised controlled trials (RCTs) help deal with probabilistic causality: we can't know in any one instance that x will lead to y, but we can know that in 9 out of 10 cases it will. The emergence that characterises complexity is another step further, and where we don't know that x leads to y, the reason will be that the case isn't *quite* the same: to use my earlier description, the initial conditions are A[1] rather than A. He asks seven questions:

'*So we cannot assert that we can find out what works for changing complex systems. Instead, we have to ask:*
- *What has worked?*
- *How has it worked?*
- *Which is to ask: What causal mechanisms have operated?*
- *Where has it worked?*
- *When has it worked?*
- *Can it work elsewhere?*
- *Can it work elsewhen?*' (ibid p219)

Byrne's point is that rather than seeking to generate immutable laws that can be applied elsewhere, case studies such as the proposed one provide knowledge that can help to design future interventions in situations which will inevitably be different. As will be discussed in more depth in Chapter 10, Byrne's framework listed above informs much of the critical evaluation of this research.

f. Summary

The above points therefore provided some guidance as to how to evaluate an intervention in a complex system, which helped me design a case study aimed at answering the first research question:

- Choose a system to study which I can understand well, including the context within which it sits (acknowledging the impossibility of ever fully understanding a complex system)

- Choose a system where the boundaries are not too difficult to distinguish

- Be aware that changes may occur over a long time – and that it may be necessary to consider whether intermediate outcomes can give some indication of likely future changes

- Be prepared to use mixed methods to gather different sorts of information

Two of these factors suited my individual situation: I am an experienced theatre director and producer conducting research part-time for a PhD over six years. This provided the opportunity to study a system that I am well acquainted with and would immediately understand intimately: that of a theatre. And the length of my study could be quite extended. The combination of all these points led to my second and more specific research question:

> **Second research question: What lessons that might be applied to other social systems can be learned from a small experiment treating cultural institutions and events as complex systems?**

In deciding what the specifics of the case study should be, my personal history and circumstances and the reason for this research, the Scottish Government's need to reduce carbon emissions, pointed to the nature of a relevant and useful small project.

Although my previous career pointed towards choosing a case study within the cultural sector, the direct carbon emissions of cultural organisations are relatively low: the organisations are nearly all SMEs and involve relatively few industrial processes. In an unpublished survey of 118 cultural organisations core-funded by Creative Scotland, Scotland's arts development agency, the largest reported footprint for 2015-16 was 16,785 tonnes of CO_2-e and the average was 126 tonnes (MacLennan, 2017). There is however anecdotal

evidence that carbon emissions related to audience travel may be much higher: '*every event or venue that Julie's Bicycle has studied that included audience travel found that audience travel emissions outweigh those from energy and transport*' (Julie's Bicycle, p1). Currently there isn't much data about audience travel: cultural organisations survey their audiences and use home postcode data for marketing purposes, but most don't survey audiences about how they travel to and from events or where they come from, such as work, home or some other location.

Audience travel is also not in the control of the cultural organisations themselves and would seem likely to be influenced by a range of factors, suggesting it might be a good candidate for a system-based approach. As the decisions about travel are made by individuals, the issue might well be seen as ripe for a 'behaviour change' intervention, but as discussed above, this may not be effective.

Moreover, as I outlined in my introduction (p5 above), the Scottish Government faces a particular challenge in achieving reductions in the carbon emissions related to travel by millions of individuals. A project exploring this area would therefore be helpful.

My literature review had pointed towards a case study focused on a system which I could understand easily due to my background, and where the boundaries were relatively definable. I should use mixed methods to capture the breadth of influences on the system and I should be aware that any results might only become apparent after some time. My experience and background knowledge suggested that a project which looked at whether influencing a complex social system that gave rise to audience travel could affect that travel would make a useful case study, and so this became the practical project for my research, as described in the following section.

Section 2 – Methods: Planning the route

Chapter 6: Research Methods

a) Introduction

The previous chapter identified the two main research questions for this study, leading to the conclusion that a 'small experiment' should be undertaken looking at a case study of a complex social system relating to a cultural institution. This would help understand whether and how complexity theory might be used to inform interventions in social systems aimed at achieving system-level change. This chapter describes how I decided on the site of the project and outlines the research methods, whilst Chapter 7 provides more detail, for reasons which I explain below.

This is perhaps not a standard PhD project and my approach to this description is therefore also not quite standard. My own background needs to be described as it was central to the detailed design of the project, including the selection of the site, and it influenced the project as it went on. All research is influenced by the researcher, but in a project where the researcher intervenes in a complex social system the researcher inescapably becomes part of the system on which they are working, and so their knowledge, skills and history are particularly important to both the shape and the success of the project and hence the research. I shall return to this topic throughout the thesis. The fact that I was undertaking the research part-time over six years whilst running a new organisation with a parallel focus is also important. The charity that I run, Creative Carbon Scotland, co-developed alongside the project, providing me with the opportunity to apply knowledge and experience from each side of my work to the other. A six-year period permits slower and longer-term research to take place and changes to be made to the project where required, and to respond to relevant developments in the wider environment of climate change work and research in Scotland. And the very process of developing a project to intervene in a complex social system required a flexibility and an open-ness to change that makes a

retrospective description of the methodology seem deceptively simple and linear. There were many twists and turns in the journey of the project and I set off quite deliberately with a general idea of where it would lead but no certainty as to how I would get there. The early stages of research, including the selection of the site, would dictate the project's specifics as I learned about the complex social system I was working with and the emergent properties that might be changed through intervening at the system-level.

In this section I will therefore describe how my own history and some methodological issues shaped the project and the selection of the site. I will provide a rather bare description of the methodology, sticking to the facts rather than including the reasons why I chose the methods that I did. More detail about the methodology will be provided in Chapter 7 where I describe the results of the early stages of research, which then led to decisions about the next stages.

The researcher

I have spent most of my life since 1985 working as a theatre director. From the 1990s my work broadened out into arts management and organisational change as I ran a medium scale theatre in Manchester and took it through a large capital project which necessitated a significant 're-visioning' and restructuring. This led on my return to Scotland to membership and later the Chairing of the Lottery Committee of the Scottish Arts Council, which distributed lottery funding to mostly capital projects in the arts. Through this as much as my directing work I got to know many arts organisations, their leaders and buildings throughout the country.

Producing and directing plays requires both project management skills and dealing with the unknown. Productions are advertised with dates and tickets sold up to a year in advance, long before sets are built, rehearsals begin or even leading actors contracted. Rehearsal time is expensive, as there are lots of people involved, from writers to electricians, so good planning and preparation is essential for that valuable time to be used well. But the world when rehearsals start is always different to the way it was when the show

was planned, and the best actors, designers, technicians and other collaborators form an imaginative, complex and often contradictory group of people with their own aims, histories, viewpoints on the world and the project, strengths and weaknesses. The job of both producer and director is therefore to bring this complex network of different elements together successfully. A bit like this research project, the overall aim of a production is clear and elements of the route to it are certain but the best shows combine that knowledge with the ability to use the unknowns and the chance happenings, the unexpected turnings and even the setbacks and problems, to make a richer production than one which might have been fully planned in advance. This ability and experience, and my willingness to go with the convolutions of a complex project, have made the project possible.

Whilst conducting this research I have also been running a charity supporting cultural organisations in addressing climate change, both through their operations and the work they make and present, distribute or publish, and exploring how cultural work and practices can help build a more sustainable society. The research therefore brings together my previous experience with my current work. This is relevant since, as I will discuss below, my understanding of the world of theatre was important to selecting and gaining access to the chosen site and to the organisation's and staff's trust in me and the project, while my knowledge of environmental sustainability and climate change helped me identify an interesting and largely un-studied topic to research. I was also able to apply my increasing knowledge of behaviour change and practice theory and my understanding of how complexity theory applies to these fields to the development of both Creative Carbon Scotland and the work it does. Both this and the project sat within the same context of the Scottish Government's research into and developing thinking about behaviour change in relation to climate change.

Methodological issues

i.   The use of mixed methods

As discussed above, both Walton (2014) and Rog (2012) argue for the value of using multiple methods to evaluate interventions in complex systems. This applies equally to understanding complex social systems in the first place and to evaluating any changes that have been made to them. But it is important to be clear about *why* mixed methods will be useful. The idea of triangulation (Denzin, 1970) is often used as a way of justifying the use of mixed methods and is generally taken to mean the confirmation of the validity of data by using more than one method, investigator, theory or bundle of data. In a later paper Denzin draws on Flick (2007) to write: '*The use of multiple methods, or triangulation, reflects an attempt to secure an in-depth understanding of the phenomenon in question. Objective reality can never be captured. We only know a thing through its representations. Triangulation is not a tool or a strategy of validation but an alternative to validation.*' (Denzin, 2012 p82). Triangulation thus provides more confidence, particularly where less positivist approaches are being used.

When dealing with complex systems, however, a variety of methods may be necessary not to confirm validity but to gather sufficiently varied data to understand the system fully. Rather than nervously seeking to gather additional perspectives of a complex area to overcome problems of validity, the use of mixed methods in this instance freely acknowledges the complexity of the system or situation under investigation and therefore applies a commensurately complex range of techniques to gather appropriate data, quantitative and qualitative. Simply using one method would not comprehend the complexity of the system being studied. Perhaps taking account of the development of the understanding of complexity between 1970 and 2012, Denzin goes on to write, '*The combination of multiple methodological practices, empirical materials, perspectives, and observers in a single study is best understood as a strategy that adds rigor, breadth complexity, richness, and depth to any inquiry.*' (Denzin, 2012, p82).

My project therefore would need to use a variety of methods, not to increase the validity of the data but to gather data that adequately reflects the complexity of the system being studied. This aligns with a point made by Mertens (2012) in the Journal of Mixed Methods Research, who alludes to the wider *range* rather than amount of knowledge required when dealing with complex social systems when she outlines three 'paradigmatic stances' towards mixed methods: a dialectical pluralism which allows quantitative and qualitative approaches to be used in a useful dialogue with each other; a pragmatic paradigm which uses 'what works' in a particular instance; and a transformative paradigm which has ethical roots, emphasising social justice She goes on to say, '*Typically, mixed methods designs will be associated with the transformative paradigm because of the need to capture experiences in both qualitative and quantitative ways in order to represent the complexity of the social issues and solutions to ongoing problems.*' (ibid , p2).

ii. Validity

Validity is a contested question anyway in this very practical project which is looking at complex social systems. Seale (2004, Ch 7) identifies three kinds of validity: Measurement Validity, which ensures that the question being asked genuinely measures the question being studied; Internal Validity, which ensures that any causal statements are supported by the study in question; and External Validity, which states whether the findings can be generalised to other instances. Regarding the last of these, the nature of complex systems means that no findings from a study of one can be directly applied to another system, which by definition will be different to the first. Even the same system in future will be different to how it is today by virtue of the accumulation of history: it will be changed by the very 'experience' of today. External validity will therefore be difficult to guarantee. But as Byrne (2013, p218) points out, evaluation of a project is generally undertaken '*as a basis for transferring effective knowledge beyond that specific instance*'. I needed to understand how the knowledge I would generate could be transferred elsewhere and so what its validity would mean.

Byrne acknowledges that seeking to establish causality in a project like that proposed is not possible in the usual way, but causality is not actually the end point required. In this case the project would be a practical project whose aim was to transfer knowledge about how to reduce carbon emissions. It is therefore worth remembering that the situations to which the knowledge would be transferred would be non-research projects where change is being sought for other purposes. Rather than seeking to establish a strong causal relationship, I needed to set the limits of the study to provide enough evidence to develop knowledge of what works and why, with sufficient validity that others could confidently use it in future, but to keep the project manageable so that it didn't get bogged down in unnecessary detail. This would influence the selection of the site for the project.

Byrne argues that in a complex system there is unlikely to be a single cause of a change: rather change will occur because of how any intervention impacts upon other components of the system, and indeed upon other systems and sub-systems that intersect with the system being acted upon. And any change might occur for other reasons that we may or may not know about: '*When we intervene in multiple complex systems, we have to recognize that the same outcome may be generated in more than one way. So we have to find methods of identifying causal mechanisms, methods that can cope not only with complex causation, but also with multiple causation.*' (ibid p219).

I needed to find a way in which to identify these causal mechanisms. In the area with which Byrne is dealing – social policy where there are often many similar instances of a programme or policy to be compared – he proposes the use of qualitative comparative analysis. This would not apply to the single case study in this research. However Byrne does provide the useful set of questions to ask of an attempt to change complex systems, which I would therefore later use to structure my evaluation of the intervention:

'*…we cannot assert that we can find out what works for changing complex systems. Instead, we have to ask:*
  • *What has worked?*

• How has it worked?
• Which is to ask: What causal mechanisms have operated?
• Where has it worked?
• When has it worked?
• Can it work elsewhere?
• Can it work elsewhen?
'What' is about specification of the nature of intervention; 'where' and 'when' are about context; 'elsewhere' and 'elsewhen' are about transferability. Answers to all those questions depend on answering the 'how' question, which considers the establishment of causal mechanism.' (ibid p219).

As I will discuss in Chapter 10, the nature of the answers to the 'Where' and 'When' questions were particularly important when considering how the knowledge generated could be applied to other, non-research interventions.

As the previous paragraphs suggest, answering these questions was not going to be an easy task and would require individual judgement, using experience and knowledge of the detailed context, to ascribe what causal processes had any effect. This judgement might come from the researcher or other parties involved in the project, elicited through interviews etc. This is precisely why different methods would be required for the project: qualitative methods to elicit opinions as well as quantitative ones for the numbers.

To summarise, therefore, my project should generate knowledge that would be useful for others to learn from it in order to design successful future interventions aimed at changing complex social systems so that more sustainable practices would emerge. Its validity would depend on my providing sufficiently strong answers to Byrne's seven questions. Such answers would require mixed methods to elicit knowledge not only of what happened but how, where and when.

iii.   Researcher effect

As I suggested above (p69) the nature of complex social systems means that, even more than with other research, it is not possible to ignore the impact of the researcher on the system itself, particularly if it is research involving intervening in the system to bring about change. This brings up yet more questions relating to validity. In social research these questions are

often related to a belief that the researcher's subjectivity makes an uninflected viewpoint impossible (see for example Creamer, 2015 Section 4.2): characteristics of the researcher will inevitably colour their view of the situation and perceptions of them may influence the responses that participants in the project give them. The solution to this is to clearly acknowledge the subjectivity of the researcher and try to allow for it: as Creamer writes: '*It is imperative when conducting ethnographic research that the identity, as well as the fundamental values, beliefs, attitudes, and knowledge-base of the researcher are thoroughly acknowledged and analysed in order to be as transparent as possible about the way in which these factors will alter the relationship with the social actors being investigated, and how this may in turn affect the results gathered and the conclusions drawn.*' (ibid, p66). In the case of intervening in a complex social system the position is more extreme. As the actions of the researcher are deliberately aimed at changing the very system that is being studied, rather than seek to simply acknowledge the effects it is necessary to build into the project design, and into the evaluation of the intervention, an understanding of the researcher's role in changing the system. Without their presence the system's trajectory would be to some degree different. The evaluation should therefore assess the nature and effectiveness of their role in bringing about the system change.

In addition, Byrne's questions *'How has it worked?'* and '*What causal mechanisms have operated?'* are likely to require not only qualitative research with participants but interpretation by the researcher. This relates to Barnes et al's point (2003 p278) that it is necessary to understand the *context* within which the system being studied is situated. Questions about the causal mechanisms and the interpretation of any data provided by qualitative methods will involve a great awareness of the context to be answered realistically. And that knowledge and interpretation will necessarily include the tacit knowledge and experience of the researcher.

Possibly to this end, Denzin (2012, p85) introduces the idea of the researcher as a 'methodological bricoleur' who '*is adept at performing a large number of*

diverse tasks, ranging from interviewing to intensive self-reflection and introspection.'. The OED defines a bricoleur as *'A person (esp. an artist, writer, etc.) who constructs or creates something from a diverse range of materials or sources*' (OED) and this chimes very well with the nature and needs of this project and, I will argue below, quite possibly most instances of interventions in complex systems. As I will describe, the project required a wide range of not only different research methods but also different tasks and indeed 'voices', as it involved both engaging in a project and gathering data from a very wide range of individuals and organisations, each of which had different interests, knowledge and contexts within which they were operating. This seems likely to be typical of a complex system, with its many agents each with individual objectives, trajectories and histories.

iv.   Ethical issues

A case study of a complex social system poses interesting questions about research ethics. In most studies the site and the participants would be anonymised but in this instance such an approach would be either damaging to the research or fruitless.

For the reasons explored above in relation to validity, a study focused on a complex social system needs to explicitly acknowledge the particular circumstances of that system: any other system will have different characteristics which will make the complex system different. Therefore to try to exclude from the site description or other parts of the study characteristics which would identify the location or parties covered in the research would reduce its validity. An alternative would be to use pseudonyms but include the characteristics that make the system what it is. However this would be fruitless as it would be easy to tell from the characteristics where and what was being discussed.

Having described the system, it is likely that it will be easy to identify some of the organisations and people involved (see Williamson and Prosser, 2002, p589 for an example of similar issures in action research in nursing care). This is not only about not imparting confidential information to others: Murphy

and Dingwall (2001, p341) note that research participants may themselves be upset not only by what is included in any writing up, but also what is left out. Moreover the researcher may uncover or articulate previously unspoken or unrecognised thoughts or attitudes, which might discombobulate the participants: '*If the purpose of ethnographic research is more than the mere reproduction of participant perspectives, it is possible that the researcher's analysis will disrupt the assumptions that participants make about their world (Borland, 1991; Messenger, 1989; Scheper-Hughes, 1982).*' (ibid pp341-2).

The solution I eventually chose was therefore to be explicit to the identifiable parties involved that their participation would not be able to be hidden and to be very open during our discussions about what I was hearing and thinking. I made clear that I wouldn't include any sensitive information or comments that might be detrimental to their standing and I discussed openly as a fellow professional my own thoughts about things they said. As this was a piece of practical research, we were working together to deliver a project. The participants were not vulnerable and were themselves expert professionals in their fields, using their skills and knowledge to achieve our jointly agreed aims, so debate and questioning of assumptions would be expected as part of the process. Finally, if there were any areas where I was uncertain I would gain their approval before including them in any writing up. I would have some future relationship with many of the people involved so it was in my interest to maintain their support (for some vivid examples of this situation, see Whyte, 1984, pp200-202).

Both the willingness and ability to negotiate these tricky areas of any relationship are part of what makes a successful project work and part of being a good researcher: two of the tools that a methodological bricoleur needs if they are to be successful.

More simply I *was* able to use pseudonyms for and to anonymise any information that could have identified focus group participants and individuals that I spoke to as part of my research who didn't hold identifiable posts. When holding focus groups I made clear the nature of the research and

asked participants to sign informed consent forms. The issue about articulating previously unspoken thoughts or attitudes still applies. However my style in the focus groups was again open and transparent, encouraging participants to think about what they had said.

The Site

i.   Deciding on the focus and the site for the project

Building on the discussion in Chapter 5 above, I needed to find a site that I could understand well and one where the system was relatively definable. And from the discussion of the methodological issues above, I needed to find one where my 'methodological bricoleur' skills could be put to good use generating not general truths but practical knowledge that could be applied effectively to enhance other sufficiently similar interventions.

My background knowledge of the cultural sector and the main issues it faces in contributing to the reduction of Scotland's carbon emissions pointed very clearly to the challenge of reducing the emissions related to audience travel to cultural venues. As I noted above, cultural organisations mostly have low direct carbon emissions (MacLennan, 2017). Cultural organisations do however have two particular quirks. First, they trigger a lot of travel by audiences. Consider Edinburgh, which has around 10,350 seats for sale each night in its seven main theatres and concert halls[6]: say 2,000,000 per year allowing for 'dark' nights, bank holidays etc. If two thirds of these are occupied, that is 1,333,333 people, and if half of these drove 10 miles to and from the venue in a small car, to allow for some walking or taking public transport and some getting a lift, 6,666,665 car-miles would be travelled per year, leading to over 1,500 tonnes of carbon emissions using DEFRA approved conversion factors. This is around 10% of the total direct carbon emissions reported by *all* the 117 arts organisations in MacLennan's report. Even allowing for the approximations in these calculations it seems reasonable to suggest that carbon emissions due to audience travel are at

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[6] Edinburgh Playhouse (3,000 seats); King's Theatre (1,400); Festival Theatre (1,900); Royal Lyceum (650), Traverse (300); Usher Hall (2,200), Queen's Hall (900)

least broadly similar to the direct carbon emissions of the organisations producing the culture the audiences travel to consume.

Second, cultural organisations are organisations which command a degree of loyalty amongst their audiences, offering some potential for influencing their practices. Many Scottish classical music and theatre venues and companies have subscriber schemes, whereby audience members are encouraged to buy tickets for a series of performances at a reduced rate, whilst galleries and other visual arts organisations, which tend not to charge for entrance, will nonetheless have a 'Friends' scheme which offers benefits such as artist talks or private viewings. For many the motivation for purchasing a subscription or buying a Friends membership lies in particular benefits, such as advance booking or reduced ticket prices (Slater and Armstrong, 2014). However Slater and Armstrong also report that members of the Friends scheme at the South Bank Centre in London '*[revealed] latent motives such as aesthetics, cultural enrichment and attachment to SBC as an institution prior to joining the membership scheme, without which, the pragmatic motives would not be acted upon.*' (2014, abstract). This matches my own attachment to particular institutions and theatres (certain buildings, the aesthetic qualities of certain companies); that of my friends and colleagues, who will attend poor shows at the Glasgow Citizens, which they admire as high quality and international in style, but wouldn't go to a well-reviewed one at Pitlochry Festival Theatre, which they perceive to be low-brow and parochial; and that of audiences of the theatres and music groups in which I have worked. In addition, since subscribers and members will have confided their contact details and other information to the organisation, facilitating easy communications and providing useful information about themselves, and since they return regularly and enact or perform certain practices in relation to their attendance, this may provide the opportunity to influence those practices.

I therefore needed to find a site where I could understand and influence the social system within which the audience travelled to a cultural venue. Using my knowledge and background described above, two options became

available through my personal contacts. First, following a conversation with a colleague who runs the Brunton Theatre in Musselburgh, on the outskirts of

> - The Brunton Theatre (www.bruntontheatre.co.uk) is a mixed-programme venue of around 250 seats in a theatre and a larger auditorium holding up to 600 people in Musselburgh, East Lothian. It has strong relationships with its local audience in East Lothian and East Edinburgh. It presents everything from its own pantomime to film, popular and art-house theatre and dance and popular and serious music and opera. It can also accommodate weddings, conferences and other events.
> - His Majesty's Theatre (www.aberdeenperformingarts.com/venues/his-majestys-theatre) is a large-scale receiving theatre presenting popular and serious theatre, comedy, opera, dance and ballet in Aberdeen. It too has strong relationships with its audience that comes from the wider Aberdeenshire and Grampian area as well as Aberdeen itself. It is part of Aberdeen Performing Arts, which also runs the Music Hall (concert hall) and the Lemon Tree (studio venue for theatre and music) in Aberdeen.

Box 1: The Brunton Theatre and His Majesty's Theatre compared

Edinburgh, it seemed as though I had the ideal site (see Box 1). The theatre was going through a refurbishment, so was open to change; it was small enough to work with quite closely; the Chief Executive was interested in the project; it was close at hand and I knew both the theatre and the area well. I began to set the project up. But as we progressed, various difficulties arose. In frustration I mentioned the idea to another colleague at the much larger His Majesty's Theatre in Aberdeen, who said she was keen to be involved, and her theatre too was going through a change process. I used a simple options appraisal to decide between them.

- The Aberdeen option offered good access and support, as the Chief Executive was very enthusiastic about the project and offered to allocate some staff time to the project. Conversely, although the Chief Executive of the Brunton had seemed enthusiastic other matters were preoccupying her and she could offer less support to the project.
- Both offered a clear and busy mixed programme with a correspondingly broad audience. However the scale of His Majesty's

- offered the chance of a large group with whom to work, making sample sizes larger for quantitative and qualitative study.

- His Majesty's operates within a clearly defined catchment area (Aberdeen and Aberdeenshire) which is relatively self-contained and a social system in its own right, unlike Musselburgh where there could be confusion with the proximity to Edinburgh. The Brunton has clear competitor theatres within reach, whereas His Majesty's is the only theatre for a large area.

- Both have multiple but identifiable relationships with other agents, but as a large organisation with connections to the City and Aberdeenshire Councils, many suppliers, social and community organisations, more touring companies and other cultural organisations, His Majesty's offered a richer complex system.

- His Majesty's provided the opportunity to work with a relatively large agent in the system. The Brunton is a much smaller player locally and wouldn't have as much 'heft'.

- Whilst I am fond of the Brunton, which has a comfortable, community welcome, His Majesty's has a place in my heart as the first large scale theatre to which I ever toured a show, when I directed *Arsenic and Old Lace* in 1991. Happily, the show was so popular that they had to take the then unusual step of opening the balcony.

- The main advantage of the Brunton was its proximity: it would be easier to work there, half an hour away, than Aberdeen, which involves a 2½ hour train journey.

Although the distance to Aberdeen posed some problems with visiting the site, the other advantages made it a clear choice. I provide this detail as an early example of how my own history as researcher, and some external and apparently unconnected circumstances, changed the direction of the project from the very beginning.

The Site

i. Site Description: Aberdeen

As will become clear, a complex social system is shaped by its circumstances and context, so a short description of the unusual city of Aberdeen is necessary. It lies in the north east of Scotland on the coast at the edge of a large and productive agricultural area (Figure 6 below). It is geographically quite isolated, its nearest neighbours being Dundee about 90 minutes' drive or 75 minutes on the train away; Inverness or Edinburgh 2½ hours away by car or train (up to 17 trains a day from Edinburgh); Glasgow further still. There are no large towns nearby: Aberdeenshire, the region that surrounds the city, had a population of 261,690 in 2015 with no town larger than 19,000 people (Aberdeenshire, 2017).

Despite being out of the centre of things, with a population of 229,840 in 2016 Aberdeen is the third biggest city in Scotland, although significantly smaller than Edinburgh (roughly 507,000) or Greater Glasgow (615,000) (ACC, 2017c). It is – or at least has been until very recently – a thriving city, with higher rates of employment and higher wages in 2014-15 than Edinburgh or Glasgow. It has low rates of children receiving free school meals. In 2015 it was home to 22 of the largest 100 Scottish companies (ACC, 2016b) and had the tenth highest Gross Value Added amongst the regions of the UK (ONS, 2016). However there is still significant poverty in the city, leading to gross inequality. Despite these large companies and wealth, Aberdeen has 9 Scottish Index of Multiple Deprivation data zones in the overall ranking of the most deprived 15% in Scotland and 13 in the most deprived 15-20%. '*The 22 Aberdeen City data zones in the most deprived 20% have a population of 18,055, this accounts for 7.9% of the City's total population.*' (ACC, 2016, p2).

Much of Aberdeen's working population live in Aberdeenshire: there is a lot of commuting from Aberdeenshire, often by car, and congestion is a surprisingly big problem for a small city. The airport is reputed to be the world's busiest

heliport and operates 24 hours a day. In 2013 it was used by 3.5m passengers (Airport, 2017).

Figure 6: Map of Scotland showing location of Aberdeen. Source: Google maps

The reason for all of this is that Aberdeen is the world centre for expertise in offshore and deep-water oil and gas exploration and drilling. Even though the oil and gas in the North Sea is becoming exhausted, the expertise for getting it out continues to be important – in fact Reed (2013) argues that as the challenge of extracting it grows greater, so does the need for the expertise. Aberdeen-based companies don't only operate in the North Sea: their knowledge and skills are in demand around the world in areas like the Gulf of Mexico and off Brazil. But the economy and employment in Aberdeen have suffered with the fall in the oil price: unemployment rose by 138.4% between August 2014 and December 2015. (ACC, 2016c).

All this oil and gas focused industry has an effect on Aberdeen as a place. The city used to be a fishing port, but the harbour is now dominated by oil and gas rig supply vessels and similar: the fishing fleet has moved almost totally to Peterhead and Fraserburgh (which landed nearly 160,000 tonnes of fish in 2015, compared to 1,208 tonnes for Aberdeen (SG, 2016)). The harbour is large and right in the city centre, with large and industrial-looking supply vessels moored close to the upmarket Union Square shopping centre (see figures 7 and 8 below). The city feels prosperous, with more expensive shops and restaurants than perhaps you'd expect for a relatively small city. It is notoriously expensive to stay in Aberdeen, as the hotels and bed and breakfasts have traditionally been very busy with contractors, although this is an area where the economy has suffered: the recent layoffs have been of the temporary contractors more than the permanent staff.

Aberdeen has a – justified – reputation for being a windy and cold place: it is on the coast in the relatively far north of the UK (although possibly less cold than might be imagined because of its coastal location). Its northerly location means that it has long days in the summer but early nights in the winter.

Figure 7: Map of central Aberdeen showing the Harbour, His Majesty's Theatre, the Bon Accord Shopping Centre and Union Square. Source: Google Maps.

Figure 8: Ships in Aberdeen Harbour. Photo by Richard Slessor, 2006

Aberdeen and Aberdeenshire form a high car use region. The NESTRANS Regional Travel Strategy states that, '*Car use is high in the region; half of motorists in the north east of Scotland use their car every day. Within the population aged 17 and over:*

- *42% of residents in Aberdeen City use a car every day, compared to 33% in urban Scotland as a whole*
- *57% of Aberdeenshire residents use a car every day, compared to 48% in rural areas averaged across Scotland although often this is a necessity which causes economic hardship requiring other sacrifices.'* (Pfleger, 2008, p22):

NESTRANS goes on to say that car use for travelling to work was increasing and bus use was declining. The busy port presumably generates a lot of HGV traffic, making some roads unpleasant to walk along: NESTRANS states that an average of almost 30m tonnes of freight was moved to/from or within Grampian each year between 2000 and 2005, of which 80% was

moved by road (Pfleger, 2008, p24). Whilst these figures may have changed since the strategy was published in 2008, it doesn't seem likely: a more recent 'refresh' of the strategy focuses on NESTRANS' actions, not the changed traffic situation (NESTRANS, 2013).

This high car use exacerbates the inequalities touched upon above. Newman (2016) argues that car use is essential to modern life, in that many services are easily accessible only to those who have access to a car (see also RAC Foundation (RAC, 2012) and the Joseph Roundtree Foundation (Shucksmith, 2000)). Whilst car ownership is higher in Aberdeen and Aberdeenshire than the national average of 66%, '*the 2001 Census showed that in Aberdeen over 30% of households (and in some Aberdeenshire towns over 20% of households) do not have access to a car.*' (Pfleger, 2008, p22). The necessity for a car must contribute to the high car ownership and, as NESTRANS indicates, this presumably comes at some cost so that poorer households are unable to spend money on other essentials or discretionary goods. These discretionary goods might for some include attendance at cultural events and venues such as His Majesty's Theatre, so the high car use nature of Aberdeen and Aberdeenshire could have an influence on theatre attendance. This demonstrates the complexity of the system that HMT operates within: whilst the general economic wealth of the region may often be considered by those who run theatres, the population's mobility may be less so. Attendance may be influenced both by the reduction in people's discretionary spending power *and* by the availability and convenience etc of public transport options.

ii. Site Description: His Majesty's Theatre (HMT)

His Majesty's is a large theatre with 1,491 seats, designed by the famous and perhaps the greatest ever British theatre architect, Frank Matcham. It opened in 1906 and is a glorious building, built in granite like much of Aberdeen (figure 9 below), and a lovely theatre in which to watch or perform a show: the audience/stage relationship is close owing to the clever architecture and the auditorium has a relatively small volume despite the large number of

seats, which makes for a more intimate and exciting atmosphere. The acoustic is good. It is a classic Edwardian theatre with a narrow proscenium arch between the audience and the much wider stage area, a fly-tower to permit the 'flying' up and down of scenery and a horseshoe-shaped auditorium on four levels, The décor is opulent (figure 10) and the theatre is A-listed. It was refurbished in 2005 to improve the front of house and backstage facilities, so there is now a modern box office area and café and more space to move around in. It has a nice original horseshoe bar at Dress Circle level. (HES, 1973).

Figure 9: His Majesty's Theatre. (Image from the Press and Journal)

Figure 10: Interior of His Majesty's Theatre. Image from STV

His Majesty's was bought in 1933 by the local businessman James Donald whose family ran it until 1975, when the local council purchased it. They refurbished it and ran the theatre until 2004 when Aberdeen Performing Arts (APA), a slightly more independent trust, was formed as an arm's length body to run both His Majesty's and the Music Hall, a concert hall on nearby Union Street. Its Board of trustees includes five councillors and seven independent members. The Chief Executive leads a team of over 260 full- and part-time staff. It has a turnover of over £10m. More recently APA also took over running The Lemon Tree, a studio theatre and music venue.

His Majesty's stands on 'steeply falling ground' (HES, 1973) on the Rosemount Viaduct, a few hundred metres to the north of Union Street, Aberdeen's main street (see Figure 8 above). Along the viaduct over the valley is the very fine City Art Gallery, and next door but one in the other direction is the city's main library, although this doesn't quite feel like a 'cultural quarter'. The large 1980s/90s Bon Accord shopping centre, complete with car park, lies beyond the Art Gallery about 500 metres away, but around the theatre itself there is surprisingly little else.

The Donalds ran the theatre as very much a family concern and built up with the Aberdeen population a close relationship which suffered during the years of City Council ownership. More recently it has become a more standard 'Number One' theatre[7] that takes large scale touring theatre for short runs of a week or two (although some big musicals may play for a few weeks). The programme is therefore much like that of other Number One theatres around the country, although there are some Aberdeen- and Scotland-specific shows. The programme includes many musicals, some straight and comic drama, comedy, classical and contemporary dance, opera and some amateur and youth theatre productions. Most shows play for eight performances a week between Tuesday and Saturday, although opera and ballet may do fewer. HMT produces its own lavish and very popular pantomime each year, in collaboration with the commercial producers Qdos, with regular star Alan McHugh as the Dame (who will do up to 12 shows a week).

Audiences across the year total some 400,000 and come from all over the city and Aberdeenshire, with some coming from much further afield, including Orkney and Shetland (as became clear in a survey of audiences that I ran).

Methods: The difficulty of planning

Despite the apparent linearity that comes from telling the story of the project in retrospect, the journey was full of twists and turns, dead-ends and speed-bumps: in short, more complex and non-linear. Planning a clear methodology for a study of an intervention in a complex social system is probably a pointless task. Complex systems are inherently messy and full of 'the sheer muddle of everyday life', requiring changes to be made as the project progresses. To misquote the military strategist Helmuth von Motke, no methodology survives contact with reality, and this is surely even more the case when dealing with complex systems. As I described above, this became

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[7] A Number One theatre is a term commonly used, although not actually a technical one, for a large-scale theatre (roughly 1,000 seats or more), commercially, charity or local authority owned, outside London and presenting touring shows produced by other companies and possibly its home-produced panto.

clear in the one of the first stages of the project, the decision on where to undertake the research.

Later on I arrived in Aberdeen with an idea of what I would study but no clear idea of the methods I would use. Until I had completed the first stages of research and had some idea of the problem that I was looking into and some understanding of the complex social system in which I was aiming to intervene, it was impossible to know what I should do. During the project the results of some stages dictated the shape of the next, so that the methods chosen and the shape of the project changed. Interestingly Morgan (2008) describes this sort of process as 'emergent design' in an entry in the SAGE Encyclopaedia of Qualitative Research Methods, using a term which sounds as though it comes from a discussion of complexity, although he doesn't mention complexity in the article.

The following section therefore provides information about the methods actually used, but this was not known in advance. The structure of the research developed as it progressed, as will be made clear in the following sections and later chapters.

Description of the methods used

My project divided into three phases, which I describe in more detail below: understanding the system, which enabled me to develop an appropriate project; managing the project; and evaluating the project.

i. Understanding the system: Aberdeen and Aberdeen Performing Arts

Although the overall aim of the project was clear – to understand the complex social system in which audience travel to His Majesty's Theatre takes place, and to try to influence that system so as to increase the sustainability of that travel – the detail was not. I didn't know what shape the project would take. Instead the first stage of research would provide the information about the complex social system, which would then shape the influencing part of the project in more detail. The first thing was therefore to learn more about the site, to decide whether there was indeed a complex social system and to

understand it, and, assuming the system did exist, to learn more about audience travel to HMT.

i. *Understanding Aberdeen: Personal Observation*

I had a broad knowledge of both Aberdeen and Aberdeen Performing Arts but needed to both update and deepen this. In autumn 2013 I therefore spent time doing desk research about Aberdeen and I travelled to Aberdeen and spent time in the city centre, exploring the likely transport routes to and from the theatre, where the parking is etc.

ii. *Complex system chart and process map*

Theatres are complex organisations in their own right, involved in many interactions with suppliers from touring theatre companies to ice cream providers, funders and sponsors including the local authority and local businesses, and of course the public and staff members. APA had been going through a change process when I became involved, a situation which had benefits and disadvantages. The possibility of holding many meetings with staff was diminished, as they had spent plenty of time in such meetings recently and needed to get on with their work, but on the other hand there was a good Five Year Plan in place that I could use to understand the organisation. Internal processes within larger theatres are also complex, involving a lot of people, many departments from technical ones via administration and finance to sales and customer service. Decisions and actions often involve consultation or input from many of these departments and impact across the system. Using desk research, the Five Year Plan and my own knowledge I developed two documents that I could use in my discussions with staff members. In a complex system chart (Figure 12 in Chapter 7 below) I tried to show the various agents in the complex system that the theatre operated within, and what I thought was the likely relationship between the agent and APA in terms of their co-adapting to each other's activities. In a process map (Figure 13 in Chapter 7), so named as it sought to show the whole process or 'activity chain' that leads to an audience member travelling to the theatre to attend a show, I wanted to confirm that my understanding of how the theatre operates was correct and to identify

where useful interventions might be made. These could be as ambitious but unlikely as programming material that was relevant to the issue; through the more feasible ideas about providing facilities such as cycle parking, lockers and hairdryers for cyclists; down to simple things like promoting different sorts of travel in marketing materials and through box office staff.

I used these diagrams in my discussions with the APA staff and external parties listed in the next section and refined them as I checked their accuracy with the respondents. The diagrams below are the refined versions and therefore, although these are *my* perceptions and understanding of the complex system and the processes the theatre goes through, they were broadly confirmed by the respondents. They agreed that I had collated a good list of the major agents in the system within which the theatre worked, and that the relationships were much as I described them. And my understanding of the process of programming and selling a show which the audience then attended was good.

iii.   Individual and group meetings

I then held meetings with various members of the Aberdeen Performing Arts staff and others:

- A joint meeting with the Chief Executive, a Consultant working long-term with APA on organisational development and the Director of Marketing (25 October 2013)
- An individual meeting with the Consultant (19 November 2013)
- A telephone meeting with the Director of Marketing (soon after 19 November 2013)
- A joint meeting with the Chief Executive, Consultant, Director of Marketing, Marketing Manager, Director of Programming and the theatre's Assistant Electrician and Green Champion (17 December 2013)

During the course of the two meetings on 19 November and 17 December I discussed the Complex System chart and asked the Consultant and the

group to respond, add or remove elements and comment on the relationships between the elements. I also checked that the process map was correct.

These meetings led to further meetings with individuals representing other elements in the complex social system, such as the North East Scotland Transport Partnership (NESTRANS: I met their representative on 20 January 2014) and Aberdeen City Council (much later – 11 December 2014) in which I also consulted on the complex system chart.

ii. Understanding the system: audience travel to His Majesty's Theatre

a. Learning about audience travel: Travel survey

By updating my knowledge both of Aberdeen and of His Majesty's with my walks, desk research and discussions with the APA staff I had begun to learn about the system within which audiences were travelling to and from the theatre and within which APA itself was working. This largely qualitative and subjective knowledge now needed to be backed up with some data about how the audience actually travelled. Working with the APA Marketing Manager I conducted a survey of audience members to learn about the pattern of travel to the theatre in Spring 2014. While the main aim of this was to determine how the audience travelled to and from the theatre in that particular period it would also create a baseline against which any changes in audience travel could be measured, and it was an opportunity to ask some more qualitative questions about why people travelled the way they did, what their individual circumstances were which could affect their travel choices and so on. I would use these to shape the questions for the next stage of research, the workshop groups which would help provide a deeper understanding of the complex system that the theatre and its audiences are operating within.

i. Purpose of the questions

The questions in the survey (reproduced in Appendix 1) therefore aimed to capture the following information:

1. The main mode of transport to the theatre (and home, if different); and any other modes of transport.
2. Production attended, date and performance time and point of departure (home, work or other) to assess whether these had affected travel choices.
3. Some reasons for travel choices:
    a. what consideration weighed most heavily in choosing how to travel; whether environmental considerations played a part in the choice of travel mode; and following on from these,
    b. what incentives might encourage more sustainable travel in future
    As well as indicating fruitful areas for discussion in the workshop stage of the research, these questions would also permit tracking of any changes in attitudes in later surveys to determine whether any changes in travel behaviours may have been influenced by interventions introduced in the project, or whether changes were incidental to the project.
4. General demographic information to enable deeper analysis of the results if necessary.
5. Whether respondents were interested in joining focus groups later in the study.

What I have termed above 'environmental considerations' was left unspecified in order not to make the survey too obviously focused on environmental sustainability whilst still gaining some useful data (Lee, 1993). However, two questions mentioned 'environment', one asking whether 'environmental reasons' had been a main consideration in deciding on the mode of transport and one asking on a scale of 1-5 how much the respondent considered 'environmental impacts' when choosing their mode of transport. This means that the respondents may well have had different ideas about what environmental considerations might be to my concern about carbon emissions.

It was possible that respondents completed the survey more than once, but this was not a problem as the survey asked how attenders travelled to the theatre on each occasion, not their usual mode of transport.

ii. Methodological details and issues

The Marketing Manager and I decided to survey audiences from 15 January to 8 March 2014, because during this period all the main areas of repertoire that HMT presents in a year were covered in a concentrated period. The Marketing Manager proposed using an email survey that would capture a good range of the audience. An email would be sent each Monday to all those who had attended in the previous week whose email address was known to APA. With a rough estimate of 40,000 attendances for the period of the survey he was confident of achieving around 2,000 responses. Using a standard calculation[8] which uses the same formula as Leedy (2005), this would provide a confidence interval of 2.14 with 95% confidence level that our sample represented the whole population. In other words if 42% of the sample said they drove to the theatre, we would be 95% certain that between 39.5% and 44% of the whole population drove to the theatre (or there is a 5% chance that the true figure lies outside these limits).

This approach led to some methodological questions. First, whether an email survey would reach a sufficiently representative population, as it would only capture those who were known to the theatre, had provided email addresses and were time-rich and web-literate enough to complete a survey. We could however check whether the results were representative by using a control and asking a random sample on a particular occasion the same questions with a paper survey and comparing the results. I proposed to do this for one of the performances of the musical *Ghost* in January and February 2014, which was likely to attract a large audience and so provide a reasonable return rate.

Second, the question arose whether it was necessary to stratify the sample to ensure that sufficient responses from the smaller audiences for particular events, for example contemporary dance on a Wednesday or drama on a Tuesday, to be sure the overall sample was representative of the whole audience. This would be much harder. For example, if only 500 people

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[8] http://www.surveysystem.com/sample-size-formula.htm,

attended the show *Moontiger* on the first performance, we would need to get an unlikely 217 responses to achieve even a confidence interval of 5 and 95% certainty that the sample's travel was representative of the travel of that performance's audience. This problem was difficult to overcome.

Third, we were surveying at a particular time of year with poor weather, which was likely to skew the results. We considered re-running the survey at intervals to check the results: an email survey is very easy to conduct.

In the end, however, as I will discuss below, the results for the survey were so clear and conclusive that these issues became irrelevant.

iii.   Ethics: Confidentiality

The survey (and later ones) asked respondents to provide their postcodes, email addresses or names and certain demographic information as well as recording their travel methods and responses to qualitative questions. Such surveys are commonplace in theatre marketing work, which is perhaps why the response rate was quite high: audience members are used to being asked questions and trust the theatre to use the information appropriately. The email invitation to respond and specific questions asking for contact details specified that the information was to be used for research purposes only, working with an independent academic researcher, and not for marketing purposes. APA has a data protection policy which follows the Data Protection Act (1998) and the eight principles which guide that Act. The policy was followed in all instances not only by the APA Marketing Manager but by me in my dealings with the data he supplied to me. The data were received by the APA Marketing Manager and supplied to me in full for analysis. I maintained the data in a password protected area of my computer and did not supply it to anyone else. It will be deleted once the project is complete.

g. Learning about audience travel: Focus groups

The results of the travel survey provided both the structure of the content for a series of focus groups and a list of potential attendees, as the survey included a question asking whether respondents were willing to participate in

the groups. The aim was to develop a shared knowledge of the HMT system built up through social interaction, rather than the individual responses gained from the survey, which would be rich and complex enough for me to be able to understand and describe the complexity of the system sufficiently for this practical project.

Cilliers (2002) argues coherently that it is never possible to have complete knowledge of a complex system, which by definition is open and has interactions across its boundaries. Complete knowledge of all the interactions would be infinite, so limits must be set. Recognising that this is a practical project, what the focus groups needed to do was to help me sufficiently understand the system so that we could introduce appropriate changes. A focus group-type approach would provide the nuanced and rich understanding that was necessary, while acknowledging the inevitably limited nature of that knowledge. Travel choices are strongly influenced by limited knowledge of the influences on the traveller and the possibilities available to them. The meetings therefore needed to look at the system from the point of view of those who were both affected by it and would be choosing to travel. Waterton and Wynne (1999, p129) describe well the benefits of focus groups in getting not only nuanced information/views from participants but also the complex understanding of complex matters that is formed when themselves complex individuals interact and spur each other and the group to 'joint thinking'. They also note how perceptions of risk (in this case about nuclear plants) were moved from 'out there', independent of humans, to something more sociological (taking into account institutional context, historical context, dependency, self-esteem and dependency). This bears some resemblance to what I was seeking to do to move the HMT system and the way it influences travel from something that exists immovably to something that may be susceptible to change. Additionally the project was about change. Barbour (1999, p119) argues that *[focus groups] are better at capturing the dynamic nature of change than are approaches which rely on repeat measures or snapshot pictures*'.

I held two meetings on 1 May 2014 at the Music Hall (HMT's partner venue), one in the afternoon and one in the early evening to accommodate participants with different lifestyles and travel requirements. Invitations were sent to 125 people who had indicated in the survey that they would be interested in attending a focus group. Five participants attended the afternoon meeting and two attended the early evening one. The relatively small number of participants, owing to no-shows and late cancellations, was in the event not too problematic as the discussions were rich and flowed well and the conclusions were clear and consistent between both the participants and the two meetings.

The participants for these groups had been recruited using the Travel Survey which included a question about whether environmental considerations had influenced their travel choices and so there was a possibility that this could have influenced the participants' attendance at the meetings or their responses during them. To address this, I organised a later focus group in April 2015 for which I recruited audience members without making the connection with the audience travel survey or the rest of the project. This enabled me to assess whether the responses to the questions and topics were similar. Again, attendance was low with only two participants but the results confirmed those of the earlier meetings. I have therefore brought the findings of the three meetings together in the results section below. Table 2 shows the make-up of the three meetings.

Name (changed for anonymity)	Sex	Car owner	Estimated age & working status
May 1st 2014 Group 1			
Andrew	Male	No	60+ retired
Shirley	Female	No	60+ retired
Dave	Male	Yes	60+ retired
Julie	Female	Yes	50s working
Catriona	Female	Yes	40s working
May 1st 2014 Group 2			
Anna	Female	Yes	50s working
Joanna	Female	No	40s working
April 16th 2015 Group 1			
Cathy	Female	Yes	40s working
Alison	Female	Yes	40s working

Table 2: Attendees at Focus Group meetings

The meetings followed the same loose structure covering the following areas, to gather information on issues raised by the travel survey:

1. How participants travelled to the theatre – ie the facts about recent/current travel, to ease participants into the discussion with a straightforward question and gather detail about their specific choices
2. What they thought influenced their travel choices – a more qualitative discussion covering some of the following:
    i. Cost, time constraints, time of show, mode of getting home, weather, availability of public transport services, availability of parking, habit, others' opinion
    ii. Were there things which influenced their choices on different occasions, such as the difference between a 'going out' night at the weekend compared to a more routine weekday? Or the difference between a matinee performance and an evening performance?
3. What other ways they *could* travel to the theatre and what stopped them from doing so
4. Who or what had control or influence over those factors in 2 and 3

I facilitated the meetings while recording the meetings for a transcript. The APA Marketing Manager also attended but didn't participate, and we shared our notes afterwards.

The agenda and questions, and any more informal probing questions, were designed to keep the subject open so that participants were not guided towards questions of environmental sustainability or reduction of carbon emissions.

iii. Reflexion and developing ideas for the project

This was one of the points at which my subjective, reflexive thinking as researcher unavoidably entered the methodology. Already there was quantitative data from the travel survey and details of attendance at performances and qualitative data from the focus groups and the meetings I had held with APA staff and others. I reviewed this data in the light of my own

experience of Aberdeen to develop some ideas about how to influence the complex system as I perceived it. I also met with the chief executives of both Stagecoach North of Scotland and FirstBus Aberdeen to get a better understanding both of their perceptions of the system as it currently existed and of the possibility of their cooperation in any changes.

a. Follow up focus groups

Bringing all of this together I tested my ideas on two more focus groups in July 2014, which I recruited by re-contacting those who had attended the previous ones, plus some who hadn't been able to attend. At these meetings I was able, without fully explaining the proposals, to check whether they would address the transport issues that the attendees experienced. I was also able to seek advice as to the best way to introduce the interventions and take advice as to the details. Four participants attended the afternoon meeting and two the evening meeting.

Name	Sex	Car owner	Estimated age & working status
July 22 2014 Group 1 (3pm)			
Andrew	Male	No	60+ retired
Shirley	Female	No	60+ retired
Dave	Male	Yes	60+ retired
Julie	Female	Yes	50s working
July 22 2014 Group 2 (6.15pm)			
Katy	Female	No	30s working
Joanna	Female	No	40s working

Table 3: Attendees at Follow Up Focus Group meetings

I structured the meetings as follows

A. A quick recap
B. A brief description of my proposals and the thinking that was behind them
C. A Post-It note exercise:
    1. What are the influences that would:
        a. Encourage you to and
        b. discourage you from taking the bus or shuttle bus
    2. And what are the influences that would:
        a. Encourage you to and
        b. discourage you from using a lift-share scheme

Prompts if necessary:
- What could the theatre do?
- What could the bus companies do?
- What could the Council do?
- What would friends say?
- Anyone else

The APA Marketing Manager attended one of the meetings.

iv.   Developing the project

There followed a long-drawn out but sporadically intense period of project management, lasting in the end from October 2014 for over a year. As I was doing the research part-time I had to cram the activity into short periods and most of it was conducted remotely.

a. Meeting with project partners: Reflexive log

In October 2014 I met with the Chief Executive, Director of Marketing, Marketing Manager and Customer Service Manager of APA to discuss my proposals. I proposed three potential actions, of which one was rejected as too costly. I therefore had a clear shape for the project:

- I would run special buses from the theatre to popular destinations after the performance on busy nights at the theatre, addressing the issues that the travel survey and focus groups had identified (we later titled this service TheatreBus); and

- I would help HMT to install real-time bus departure information screens in the theatre to enable audience members to wait for their standard service bus at the theatre rather than on the street. (This second intervention took longer to implement and didn't form part of the main project.)

h. Practical project development: Reflexive log

The next stage was very practical project development, involving identifying dates for the interventions, doing detailed planning, budgeting the project and bringing in partners including funders and bus providers. This was not a simple process and several issues arose with various partners. I documented

this work in detail in a journal which combined a report of actions with personal reflection of the state of the project. More detail is provided in the results section below.

v.   Running the project

Once the intervention was up and running I used the following methods to understand how they were working and what reaction to them was:

Method	Aim
Personal experience of travel to/from the theatre	To record the experience of travelling on the TheatreBus services after the performances (and on a service bus to the theatre from the end point of the service before the performances, thereby mimicking what any actual user would be likely to do) in order to understand the service from the audience member's point of view.
Statistical reports of number of users of the project services	To record the numbers of people who had used the bus services.
Survey of audiences re use/non-use of the project services	To gather quantitative data about the users of the service and qualitative data about their experience. Copies of the surveys are provided at Appendix 2 below.
Meetings with project partners	To gather knowledge of and understanding of the various partners' experience of running the service, and also to improve the service as we gained experience

Table 4: Research methods during project implementation

vi.   Evaluating the project

a. Post-project Audience Travel Survey

At the end of the project the Marketing Manager at APA ran a similar survey of HMT audience members to the one we had run at the beginning. The survey was almost the same but left out questions relating to willingness to participate in a focus group replacing these with questions about knowledge of and any opinion of the TheatreBus project. The issues described above of a restricted and self-selecting sample apply to this iteration of the survey, but in this case the aim was to repeat as closely as possible the original one to see if any changes had occurred so no methodological changes were made.

The survey invitation was again sent to theatregoers after they had attended HMT, but it was handled slightly differently and sent out in batches rather than weekly, and so it was perhaps not clear that the questions were about

the recipient's attendance the previous week. This led to some respondents completing the survey to cover multiple visits. To deal with this, I divided these responses into their individual-visit parts, so that each response dealt with only one visit, and repeat attendees would be represented by more than one response. This was comparable to the initial survey, which repeat visitors were encouraged to complete even if they had done so before, as each visit to the theatre could result in different travel choices (for example the weather, time of day or day of the week could change things). Through this process the 1491 responses increased to 2026 responses.

i. *Post-project interviews with project partners*

To evaluate the success of the project I conducted interviews with key players in the design and implementation of the project. The Managing Director of Stagecoach North of Scotland had left his post and moved away, so I was unable to interview him. The others covered the three main partners: The Chief Executive and Marketing Manager of Aberdeen Performing Arts, the Principal Officer I had been dealing with in Aberdeenshire Council and the Commercial Officer at Stagecoach North of Scotland.

I used the same interview structure for each of the meetings, basing my questions on the Byrne 2013 questions outlined above and ensuring that each of the questions was asked and answered, but leaving sufficient flexibility to elicit other opinions and to allow the conversation to flow naturally. I recorded the meetings for transcription and took notes myself.

Research Methods: Summary

In this chapter I have described the site of my research, identified some methodological issues and, building on those, provided an outline of the methods used. As I explained, however, this was only possible with the benefit of hindsight, as owing to the nature of the project – the fact that I was seeking to intervene in a complex social system – only once I had completed one stage of research could I decide what the next stage could be. In the next chapters, which describe my activity and the 'results' of it, I give more detail about how one stage led to the next.

Section 3 – On the road: the TheatreBus project

In the next three chapters I will describe understanding the site/developing the project; managing the project; and evaluating the project. Although it was a very practical project, ultimately the aim was to answer the research questions about the value of complexity in helping us understand how to reduce Scotland's carbon emissions, so I will regularly note those points and elements that relate to complexity.

Chapter 7: Developing the Project:

a) Understanding the site: Exploring Aberdeen - Personal observation

When I started on the project I had a long relationship with but incomplete knowledge of Aberdeen. The relationship has grown out of visiting friends and experience touring small-scale theatre to the city and staying there to do so in the 1980s, touring a large-scale show to His Majesty's itself in the 1990s, via further touring as well as supporting the funding of the refurbishment of HMT in the 2000s, to my more recent informal work relationship with the Chief Executive of APA. But the 'centre' of a city moves around depending on why you are there and where you frequent. My more recent knowledge of Aberdeen has always placed HMT at the centre, but I realised I didn't know much about the wider city in the 21st century. Fittingly I had often approached HMT, or the other cultural venues not that far away, from the railway station. But I needed to know more, so one of my first tasks was to explore Aberdeen and in particular getting to and from the theatre from elsewhere in the city and from further afield.

Pierce and Lawhon (2015) provide a good account of the value of walking, especially in a city, as a method of research and this was particularly the case considering my interest in the non-car modes of transport in and from the city. In November 2013 I therefore went to Aberdeen to hold some meetings with APA staff, but also to get to know it better. I arrived at the station and walked to HMT via Union Street where the main bus stops are. I

noted cycle parking facilities in the area around the theatre and the main parking areas. I visited some of the other cultural venues in the area (the city library next door, Aberdeen's very fine Art Gallery, the slightly shabby Aberdeen Art Centre and the Belmont Cinema as well as the other APA venues, the Music Hall and the Lemon Tree). I had a useful session at the Tourist Information office getting maps and transport information for the city. They also gave me some good pointers for other transport organisations for the area including NESTRANS, the North East Scotland Transport Partnership, and a contact at Aberdeen City Council. Most important I learned how HMT is situated in central Aberdeen in terms of a user of public transport or a car. The following therefore describes the experience of walking from HMT to the transport links as a theatre goer would after a show, drawn from personal observation during these visits. This observation brought to light aspects of the experience which might well have significant effects on some people making such a journey, and that I would need to explore more deeply in later parts of the study.

i.   Walk to public transport links

His Majesty's Theatre stands on a busy road, the Rosemount Viaduct. This carries the road, across a valley with a railway and road at the bottom, to the City Art Gallery and various shops towards the Bon Accord shopping centre and the city council HQ. The obvious walking route[9] from the theatre to the railway and bus[10] stations at Union Square is via Union Terrace, at night a relatively ill-lit street with mostly large office buildings and a hotel on one side and a park, with railings to the street, on the other (see Moles, 2008, section 5.1 for recognition of how a pleasant place during the day can become less so at night). Crossing the Rosemount Viaduct is a little difficult as there is no pedestrian crossing immediately outside the theatre and the road is quite fast: pedestrians must either take their chance or turn to the left or right and

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[9] The Googlemaps map below suggests another one but it is counter-intuitive, although only marginally longer. I'm not sure it is any nicer.
[10] Union Square Bus Station is the city centre destination for longer distance buses and all of Stagecoach's services to Aberdeenshire. FirstBus operates the city's bus network, and the main boarding/disembarking point for most of their services is Union Street.

walk for 100m to some traffic lights, and then turn back to Union Terrace. After a few hundred metres the walk along Union Terrace brings you to the lively, and sometimes quite rowdy, Union Street, filled with shops, bars, restaurants etc, which is also where most city and some longer distance buses stop. There are traffic lights and a major junction to cross Union Street and the route continues downhill on Union Terrace, which is less busy than Union Street, although it now has more commercial outlets and pedestrian traffic than the earlier part of Union Terrace. As you leave Union Street behind the tone of the street drops (from a Barclays bank to fast food outlets) until you reach a junction with Wapping Street. This is slightly awkward to cross, although there are pedestrian controls. The route continuing along Bridge Street now has no shops or commercial outlets and has an urban and slightly down-market feel. (Notably you are quite close to the docks, with all their dubious associations.) After about 100m you turn left on to Guild Street which brings you to a light-controlled pedestrian crossing to the station entrance. In all, it is a walk of 700m taking around 10 minutes.
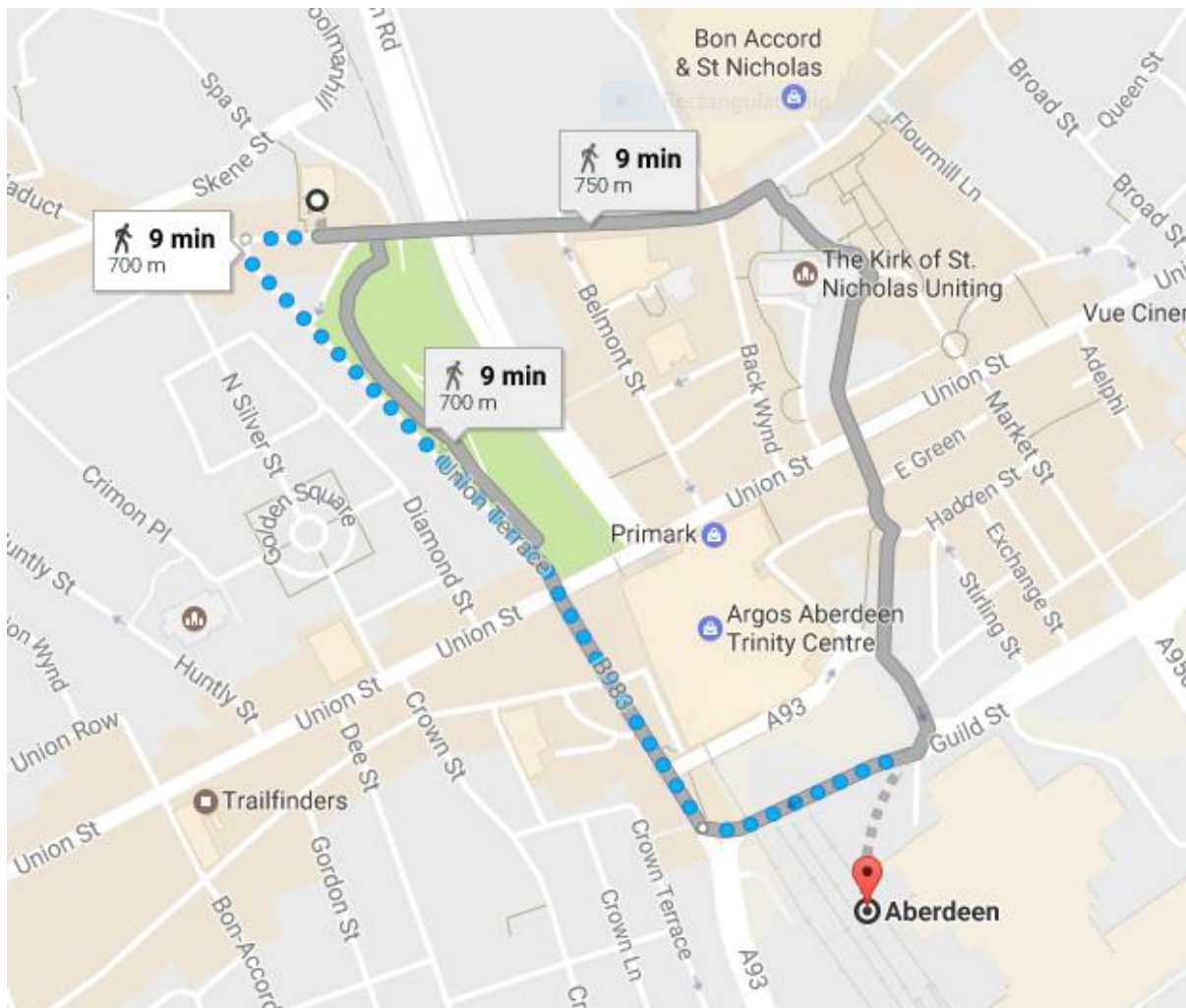
Figure 11: The walk from HMT (marked with the circle to the top left of the map) to the bus and railway stations (marked as 'Aberdeen', bottom right) (Image from Googlemaps.co.uk accessed 4/5/2017)

ii. Parking

The two nearest car parks to HMT are the Denburn Car Park on Spa Street (2 minutes' walk away, albeit via some steps and an alley) and the Harriet Street car park at the Bon Accord shopping centre, a nicer and more open walk of 4 minutes mostly along the Rosemount Viaduct. (Spa Street (top left) and the Bon Accord are shown on the map at Figure 11.) The theatre has a deal with the Harriet Street car park whereby you can buy a pass with your ticket for £2 – but the pass only lasts from 5.30-11pm, making it tricky if the show is long or you want to get there early. There is limited and quite expensive street parking on Union Terrace and rather more on North Silver St and in Golden Square; cheaper on-street parking is available to the north

of Rosemount Viaduct, some on Spa Street itself and more beyond. Unusually in Aberdeen central zone on-street parking is charged at £3/hour, 8am to 8pm, Monday to Saturday, and the maximum stay before 6pm is 2 hours – after 6pm it is two hours for £4. This means that matinee attenders and anyone wanting to arrive early for the theatre have a problem parking on the street.

Walking around Aberdeen, one of my first perceptions was that, as the NESTRANS report cited earlier describes, it feels like a city where cars, vans and lorries are heavily used. Streets are busy with cars and commercial vehicles making them unattractive to pedestrians (on one trip I saw an articulated lorry attempting a U-turn on Union Street and hitting a sign on the pavement as it went).

This process of familiarisation with the geography of Aberdeen and also how it feels to travel around it proved useful in my discussions with APA staff and others about the context within which APA and people travelling to it operate. In particular, detailed knowledge of walking to the railway and bus stations from the theatre was essential to the running of the later focus groups and eventually the development of the project.

Understanding the site: Aberdeen Performing Arts & HMT

As described above in section 2b of the Methods chapter, I used my own knowledge, the Five Year Plan, desk research and discussions with key individuals to produce two diagrams that depicted these external and internal systems. What I aimed to do with these, and at the meetings I held with staff and others when I discussed them, was to establish whether HMT and audiences travelling to it were indeed operating within a complex social system, with all the relevant characteristics identified by Cilliers (1998, p53), as described on p47 above. The system would need to have a large number of separate agents, interacting with each other dynamically and richly, in that each agent might influence and be influenced by many others; the interaction should be non-linear; the system would need to display feedback loops; the system would need to have a history; etc.

i. Complex system chart

The complex system chart (Figure 12 below and Appendix 9 for a larger version) therefore aims to identify most of the other agents with which HMT regularly engages and indicates whether there is some actual or possible *interaction* with each agent, or whether HMT is simply responding, or indeed not responding, to any changes in the other agent. For example, when dealing with Qdos, the producer of the annual jointly-produced pantomime and shown in the bottom right-hand corner, there is clearly genuine co-adaptation, as they respond to each other's budgetary pressures, decide on title, casting and performance dates and importantly respond to their own history by considering last year's panto when planning the next. Qdos may well be producing Cinderella somewhere else, so the set and costumes, expensive elements of a panto production which are re-used each year, may not be available and Aberdeen would need to adapt to that, whilst Qdos will need to take account of the rest of HMT's programme and sales. With some UK producers bringing touring productions, however, the co-adaptation may be limited (HMT takes the show or doesn't and it is effectively a hire) or it may be stronger (discussion of the best dates, ways of promoting the show etc). When it comes to transport providers (right of centre in the Aberdeen circle), Scotrail is very unlikely to respond to anything HMT does as it is a national organisation and changes it makes locally would affect its wider system across Scotland, but if HMT knew that a large proportion of its audience was coming by train it might respond to change in timetabling. However FirstBus and Stagecoach are much more local and are probably more able to change a timetable in response to a large demand from an HMT audience.

His Majesty's Theatre system chart
15 Nov 2013
Key: Green indicates where HMT and the counterparty are probably already responding and co-adapting to each other
Blue indicates where there might be the chance of such co-adaptation if initiated by HMT
Red indicates where HMT probably has to adapt/respond to the counterparty

UK

SCOTLAND

NORTH EAST SCOTLAND

ABERDEEN

Audiences and participants

Cultural
- Creative Scotland
- Federation of Scottish Theatre
- Touring consortium (Eden Court Theatre, Edinburgh Festival Theatres Trust, Glasgow King's & Theatre Royal)

Marketing
- Culture Republic
- Event Scotland
- Visit Scotland

Funders, Sponsors & Stakeholders
- SCDI
- Scottish Enterprise
- Robertson Trust
- Creative Scotland
- Shell UK
- Exxon Mobil
- Rizza's of Huntly
- Belhaven
- Grampian Police Federation
- Kudos Financial Services

Sponsors
- Milne Group
- Union Square
- Press & Journal/ Evening Express
- McLean Electrical
- ASPC
- Robertson Construction
- Aberdeen Harbour
- Anderson Anderson & Brown Capture
- Core
- Duncan & Todd
- ENI Saipem
- Lloyds Register
- MAC
- Red Spider
- SPEX
- Strategic Resources

Business
- Advertisers
- Oil & Gas
- Local shops, & restaurants
- Bon Accord Centre (parking)
- Chamber of Commerce
- Scottish Enterprise
- Visit Aberdeen

Aberdeen City Council
- Highways
- Licensing
- Education, Culture and Sport
- Planning
- Councillors

Supporters
- Local trusts
- Donors
- City Council

Funding
- Aberdeen Mobility/BT

Other cultural
- City Moves
- Peacock Vis Arts
- Aberdeen Arts Centre
- Aberdeen Art Gallery
- Lemon Tree & Music Hall (also APA)
- Aberdeen Int'l Youth Festival
- Flying Pig Productions
- Amateur companies (Lyric, Phoenix)

Cultural
- Deveron Arts
- Woodend Barn
- Scottish Sculpture Workshop
- North East Arts Touring
- Findhorn Arts
- Hospitalfields

Councils
- Aberdeenshire
- Moray
- Angus
- Highland

ABERDEEN PERFORMING ARTS

- Music Hall
- The Lemon Tree

APA Board
- Councillors
- University
- Amateur theatre
- Aberdeen business

HMT

Audiences and participants
- Audiences
- Youth Theatre
- Friends
- Matcham Members
- Volunteer tour guides

Staff
- Green Team
- Senior Management Team
- Front of House
- Others

Things
- Café/bars/restaurant
- Hairdryers in toilets
- Cloakrooms
- Theatre building
- Cycle parking
- Lockers

Transport
- First Bus
- Scotrail
- East Coast
- Stagecoach
- Airlines (FlyBe, BMI, Norwegian, Wideroe, Logan-air, Eastern Airways etc)
- Taxi firms (Comcab, Aberdeen Taxis, taxi Aberdeen etc)

Transport
- First Bus
- Scotrail
- East Coast
- Stagecoach
- Airlines (FlyBe, BMI, Norwegian, Wideroe, Logan-air, Eastern Airways etc)
- Taxi firms

Audiences and participants

Audiences and participants

Things
- Cycle parking
- Cycle routes
- Bus stops
- Car parking
- Railway station
- Bus station
- Roads

Weather
- Wind
- Rain
- Snow
- Cold

Press & Media
- Press & Journal
- Evening Express
- North Sound radio
- 106

Technical
- Lighting & sound hire
- Staging, props, costumes
- Casual staff

Suppliers
- Stationery
- Catering
- Ticketing
- Utilities
- Transport
- Financial
- Insurance
- Print
- Legal
- IT

Producers
- Scottish Dance Theatre
- National Theatre of Scotland
- Scottish Ballet
- Scottish Opera
- The Singing Kettle

Press
- Scotsman
- The Herald/Sunday Herald
- Scotland on Sunday
- Scottish Field
- Scotland Magazine
- The List
- The Skinny
- Dundee Courier
- Sunday Times Scotland

Media
- BBC Scotland
- Radio Scotland
- Grampian TV
- STV

Suppliers
- Stationery
- Catering
- Ticketing
- Utilities
- Transport
- Financial
- Insurance
- Print
- Legal
- IT

Producers
- Royal National Theatre
- Qdos
- Bill Kenwright
- Royal Shakespeare Company
- Jasmine Vardimon Company
- Rambert
- Tall Stories
- Birmingham Stage Company
- Opera & Ballet International

Networks
- Theatrical Management Association
- English Number One Theatres

Press
- Guardian
- Times
- Independent
- Telegraph
- Daily Mail
- Observer
- Sunday Times
- Sunday Telegraph
- The Stage
- What's On Stage

Figure 12: Complex system chart, November 2013 (see also Appendix 9 for a larger version)

Some of the elements in the system also interact richly, with HMT and each other. For example the transport providers and the local authorities respond to each other and are involved in joint projects and relationships, and whilst they may not particularly interact with HMT, users interact with both. The system has a history, in that there are long-term relationships between producers, audience, suppliers and theatre, as well as histories of audiences with bus companies etc.

ii. Process map

The process map (Figure 13 below and see Appendix 10 for a larger version) similarly demonstrated the internal complexity of a large theatre, although it does include some reference to outside parties such as audience members, hirers and touring companies. The process looks quite linear, as it is time-based since a show must be programmed before it can be marketed, tickets sold etc, but there are some feedback loops and iterative processes in it. As the programme is finalised different choices might be made, for example to avoid too many shows of the same sort in a row. Audience behaviour whilst the programme is being decided upon will feed into the process, as the success of a show in this season may influence the selection of shows for next season. As an example of this, in an interview with the Marketing Manager he noted that his perception was that the recent downturn in Aberdeen's fortunes had meant that fewer people were attending expensive musicals and more were coming to cheaper shows. This observation would affect the programmers' choice of material.

The programming process will involve many people and some individuals' decisions will affect others', another example of rich interaction. The technical nature of some shows may not suit the theatre, or there may be additional costs involved. A show that turns out to have very high costs – for example an ice show, which requires the stage to be covered in ice throughout the week, leading to high electricity demand – might be attractive at first, but once the technical team provide the costings the programmer might decide

that the likely sales won't cover them and will decide against taking the show[11].

The complex system chart, the process map and my discussions about them therefore demonstrated that the system did indeed have a history, did include many elements which interacted richly and dynamically and feedback loops existed within it. It was slightly less certain that interactions were non-linear. Cilliers (1998, p4) writes that '*Non-linearity also guarantees that small causes can have large results and vice versa. It is a pre-condition for complexity.*'. Many changes have linear results: a busy show means more ice cream will be sold. However as a theatre director I know points of non-linearity in the area of audience behaviour, and I discussed these in my meetings. Relatively small decisions such as casting the right actor can make a large difference to ticket sales, either because the actor is known and tickets sell well in advance or because the rehearsal process goes well and the show is successful, leading to good word of mouth. An interesting example of this arose during my meeting with the APA staff in December 2013:

> **Programming Director**: *I Dreamed a Dream with Elaine C Smith[12] – it was doing fine. Then it was announced that Susan Boyle was appearing at the end. Suddenly sales took off, a completely different show.*
> **Marketing Manager**: *That's a good example – it completely changed our marketing plan. Just that one announcement, we could then take a new strategy and approach. A big change for us.*
> **Programming Director**: *It's an interesting one about the profile and the media. If an artist that's about to perform has a high-profile encounter with the media or the press, that has an impact predominantly on attendance, but a huge increase in attendance has a massive impact on every department*
> **Customer Services Manager**: *On everybody, yeah*
> *(HMT Staff meeting 17 Dec 2013)*

I know from my own experience of running a theatre that word of mouth is particularly important in selling a show, and marketing teams employ their knowledge of non-linear behaviour to maximise its effect. First nights are

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[11] The ice show example comes from my work with Creative Carbon Scotland and another theatre in Scotland that began recording its electricity use using a meter providing data every 5 minutes, rather than simply relying on monthly totals, getting data which directly influenced its programming!

[12] The 'bio-pic' show about the Scottish Britain's Got Talent singer Susan Boyle

often priced lower to encourage attendance on a quiet weekday so that people enjoy the show and tell their friends, who then attend later in the run. A small problem in the running of a performance on the first night, or more positively a good performance, can therefore have a disproportionate effect on sales for later in the run. And word of mouth can also enhance advance sales: the mere perception that tickets are running out can lead to a run on the box office.

The diagrams and the discussions therefore indicated that HMT, its various partners and its audiences did indeed form a complex system. The next step was to look more closely at audience travel, to understand how it fitted into this system and how the system impacted on individuals' travel behaviours.

HMT 'activity chain' or Process Map –
ie, my understanding of the chain of events that leads to someone attending the theatre
Nov 15 2013
Key: Green box indicates where I think there is an obvious point of intervention to promote sustainable travel choices
Red box indicates where it is out of HMT's hands, or little point of intervention
Black box I'm not sure or think it is neutral/irrelevant
Italics are where I have added a comment – not necessarily descriptive of how things currently are

APA BUSINESS PLAN, CORPORATE STRATEGY & MARKETING STRATEGY
Drives everything - could be very influential if harnessed to the end of increasing sustainability of audience travel

APA 5 Year Plan had input from Board, local stakeholders, staff, focus groups, City Centre Partnership

HMT decides to produce its own show | HMT seeks material | APA/local/regional festival drives programme

Producer seeks dates
Hirer seeks dates

DIRECTOR/PROGRAMMING GROUP Chaired by Ben Torrie
Influenced by audience demand; policies; programming strands; funders/stakeholders; finance; history; availability of material; quality of material; scheduling ; personal taste/judgement; marketing strategy; corporate strategy

External partner seeks partnership/event

This area of work is very iterative

ANCILLARY WORK/EVENTS
Education work, Friends' Nights, Talks etc connected with programme

MARKETING/TECHNICAL/ PRODUCERS

Customer Services Review Group feedback
Audience research

SCHEDULE ON ARTEFAX Built up over time
(Ben Torrie – Head of Programming)

MARKETING PLAN
Director of Marketing & Director?

Analyse season | History of similar events | Nature of events

Identify market segments | Existing audiences | New audiences | Partners, interest groups

Set prices and sales targets | Nature of key audience segments | History of similar events | Capacity of run / Cost of event | Nature of event | Likely demand

DISCOUNTING & PROMOTIONS

'FRAME' SEASON
Title, themes, season tickets etc

AUDIENCES
REGULAR AUDIENCES | Target groups | Packages/ deals | Schools | Other groups

PRODUCE/ACQUIRE/WRITE PROMOTIONAL MATERIALS/COPY/DATA etc
Marketing team

Brochure | Direct Mail | Website | Print – HMT's | Print - external | Producers' mailouts | Producers' advertising
email | Social media | In-house displays | | | Producers' websites etc | Third party materials

Although it may not be easy to influence these elements, it would be very powerful if one could do so – it would start affecting other theatres on the tour

IMPLEMENT MARKETING PLAN
Marketing team

Box office & personal contacts | Press and PR | mail-outs | Advertising | Distribute printed materials | Producers' advertising
Special promotions | Social media campaigns | Slip programmes /exit leafleting | Brief staff esp box office and sales

SALES
Box Office

Box Office Staff | Marketing & IT

Personal callers | Telesales | Groups | Agencies | Internet

Advance | On the door | Initiated by HMT | Initiated by purchaser | Initiated by HMT | Initiated by purchaser | From HMT site | From 3rd party site

ATTENDANCE (and associated travel and issues/stages/influences)
Audience members

On foot | On bicycle | Public bus | Train | Chartered bus | Car Share | Taxi | Car
| | Awareness and proximity of stops to theatre | Walking route from station | Drop-off | Recomm-end website | Drop-off | Parking
Walking routes | Secure bike parking | Time of buses home | Time of trains home | Green bus company? | | Green taxi company? |

Lockers/secure hooks/efficient cloakroom for clothes and stuff. Hairdryers in toilets
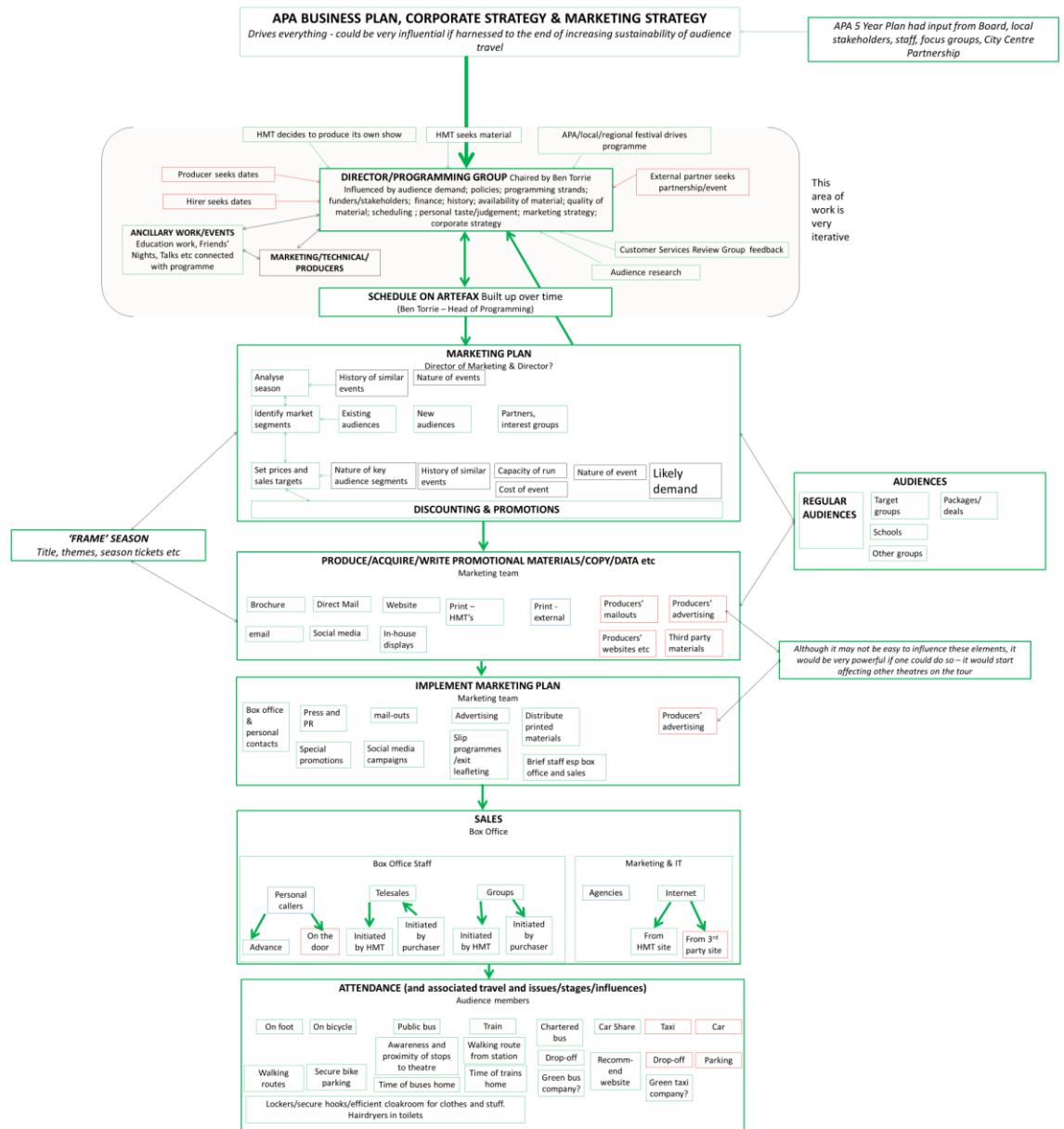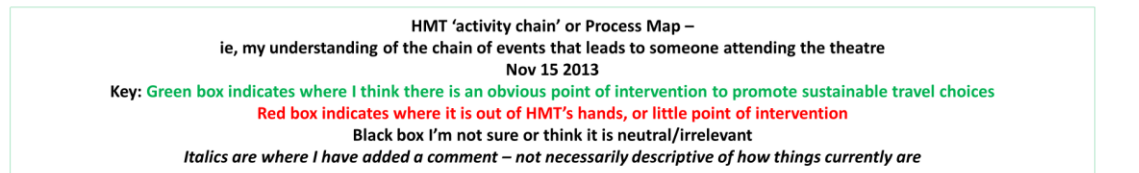
Figure 13: Process map Nov 2013 (see Appendix 9 for a larger version)

Understanding Audience Travel to the theatre

i.   Understanding audience travel: Audience Travel Survey

As described at section 3a in the Methods chapter above, I worked with the Marketing Manager of APA to survey HMT attenders in early 2014 to learn about their travel to the theatre (the survey is reproduced at Appendix 1).

a. *Responses and Confidence levels*

A total of 1,874 responses were received from 7,307 invitations to participate sent out, and from audiences totalling 43,569 for the performances covered by the survey. The majority were unsurprisingly from respondents who had attended the most popular productions, giving the highest confidence levels to *Hansel & Gretel* (ballet) and *Ghost the Musical*. However, my knowledge, gleaned as a theatre director and attender, that the audiences for different productions within certain categories of show are similar, was confirmed by the APA Marketing Manager. He said that for marketing purposes he would bracket together particular performances based upon his judgement of what the audience type would be, using his knowledge and experience of the specific APA audience. For example, for any 'high-end' work such as orchestras he would also look at crossovers with opera and ballet.[13] It was therefore possible to categorise the productions and to aggregate the total respondents for each category. Table 5 below summarises the responses according to both production and production type and assumes that dance audiences, whether for high-end contemporary dance or classical ballet, will share similar characteristics, that audiences for musicals will be similar across different productions, and that audiences for drama will be similar. This would mean that the responses were more numerous and would be counted against a larger population, making the confidence interval higher for the category rather than for individual productions. This assumption would be confirmed if the responses from attenders at the corresponding performances showed similarities, or the audiences can be shown to share characteristics through some other means.

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[13] Personal communication with The APA Marketing Manager

Production attended	Category	Surveys sent out	Valid Response percent	Response Count	Total audience	Confidence level	%age	Confid-ence Interval	%age	Confidence Interval
Hansel & Gretel	Dance	1370	32.8%	405	8532	95%	50%	4.75	70%	4.36
Wee Hansel & Gretel	Dance	Sent with above		44	735	95%	50%	14.33	70%	13.14
Ghost the Musical	Musical	4413	21.3%	940	22937	95%	50%	3.13	70%	2.87
Rambert	Dance	425	35.3%	104	1543	95%	50%	9.28	70%	8.51
Rent in Concert	Musical	Sent with above		46	1020	95%	50%	14.13	70%	12.95
Hello, Dolly!	Amateur	181	29.3%	53	3380	95%	50%	13.36	70%	12.24
Ellen Kent Opera	Opera	295	29.2%	86	1626	95%	50%	10.29	70%	9.43
Moon Tiger	Drama	623	27.4%	44	1325	95%	50%	14.53	70%	13.32
Pygmalion	Drama	Sent with above		127	2471	95%	50%	7.76	70%	8.47
TOTAL valid responses		7307	25%	1849						
Skipped question				25						
	All musical			986	23957	95%	50%	3.06	70%	2.80
	All dance			553	10810	95%	50%	4.06	70%	3.72
	All drama			171	3796	95%	50%	7.32	70%	6.71
	All sample			1849	43569	95%	50%	2.23	70%	2.24

Table 5: Survey response data and confidence intervals. Note that survey invitations for Wee Hansel & Gretel, Rent and Pygmalion were sent out with those for Hansel & Gretel, Rambert and Moontiger for operational reasons

Table 5 clearly shows that it was possible to have a reasonable degree of confidence about the results in relation to Ghost the Musical and Hansel & Gretel, with less confidence about Wee Hansel & Gretel, Rambert and Rent in Concert on their own. For instance, if 50% of the sample said that they used a car to get to the theatre to see Hansel & Gretel, I could be 95% confident that between 45.25% and 54.75% of the whole population of attenders did so; or if 70% of those sampled said they used a car to get there (see results below for why this percentage has been chosen) I could be 95% confident that between 65.64% and 74.36% did so.

j.   *Sampling errors*

There was a key issue regarding the sampling process in that the survey only contacted people who had provided their email addresses to Aberdeen Performing Arts and had agreed to be contacted by them for such purposes. It is not certain that those who provide their email addresses – generally when they purchase tickets or sign up for a mailing list – are representative of the whole audience. For example, personal ticket buyers at the box office, often buying at a busy time as the show is about to begin, are not usually asked for these details so they will be excluded whilst advance purchasers, especially internet- and phone-purchasers will be over-represented. This is perhaps borne out by Figure 14 below, which show that the vast majority of the respondents were female, although this probably does not represent the total audience: the Scottish Household Survey (2015, p178) reports that '*More women (39 per cent) compared to men (26 per cent) attended the Theatre'* suggesting the imbalance is not as strong as in the survey results. The received wisdom within the theatre world is that women buy most of the tickets (65%, according to one report (Purple Seven, 2015, p4)) and then at least some of them must attend with male friends, partners, boyfriends and husbands, judging by the Household Survey data. The majority of the respondents receiving and completing the survey – ticket buyers rather than users – would be women. The sample therefore over-represents women, although perhaps not as dramatically as might be expected on first glance at the data.
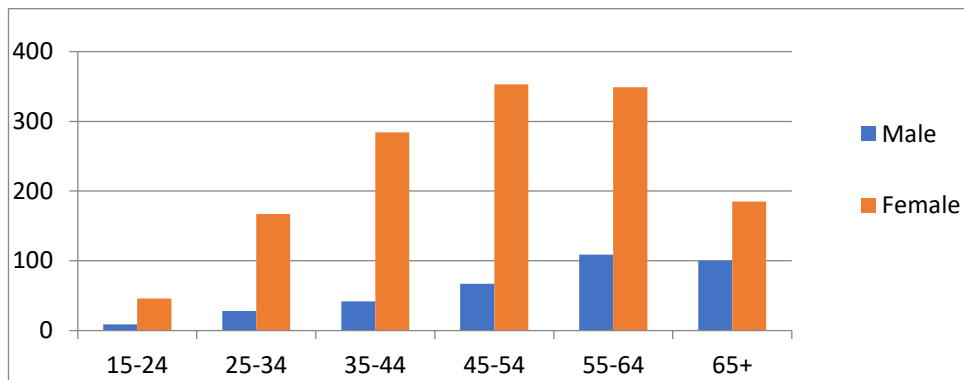
Figure 14: Survey respondents by age and sex

The sample also obviously selects people who are email and internet users, although this is not evenly distributed across the whole UK population: OFCOM reports that only 71% of adults in the social class DE are likely to use the internet, against 91% of ABC1s (OFCOM, 2014, p9). However Figure 15 shows the Mosaic segmentation of the HMT audience, and the Mosaic Scotland brochure (Experian, 2004) indicates that the bulk of the attenders who are in the groups A, B, C and D in the chart come from relatively high income groups and are internet users, suggesting that the overall HMT audience is likely to be fairly well connected to the internet and the sample is therefore reasonably representative.[14]

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[14] Mosaic is a 'consumer classification' system produced by Experian which uses various demographic, consumer and other data to categorise households and individuals into 66 groups. It is very widely used by theatre and other arts marketers. http://www.experian.co.uk/marketing-services/products/mosaic/mosaic-resources.html
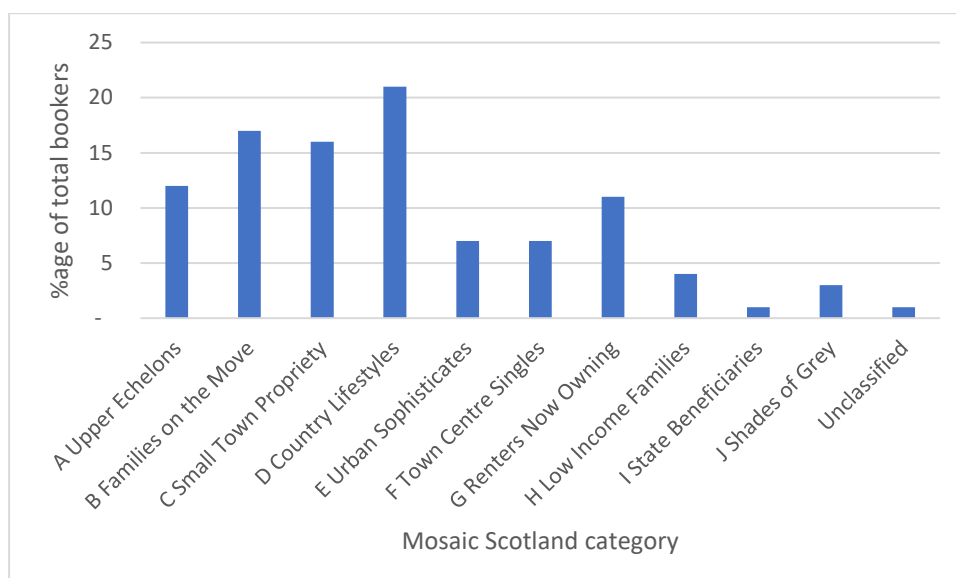
Figure 15: HMT bookers by Mosaic (Experian) segmentation. Data from HMT/Culture Republic July 2014 using survey of 46,612 bookers

However, as will be seen below the results from the survey for the key question – how people travel to the theatre – are very clear and consistent, suggesting that even if the sample is not fully representative of the whole audience, in this regard it provides confidence that the whole audience would behave in a similar way to the sample. For example, the overall share of attenders who used a car as their main mode of transport to get to the theatre, either driving themselves or getting a lift, is consistently around 70%, with a slight change at weekends and for matinees (see Figures 16, 19 & 20 below). Analysing all the respondents regardless of day or time of performance but dividing them up into male and female, gives the results shown in Figure 17. This suggests that although the sex of the attender may affect who drives, it has minimal effect on the mode of transport.
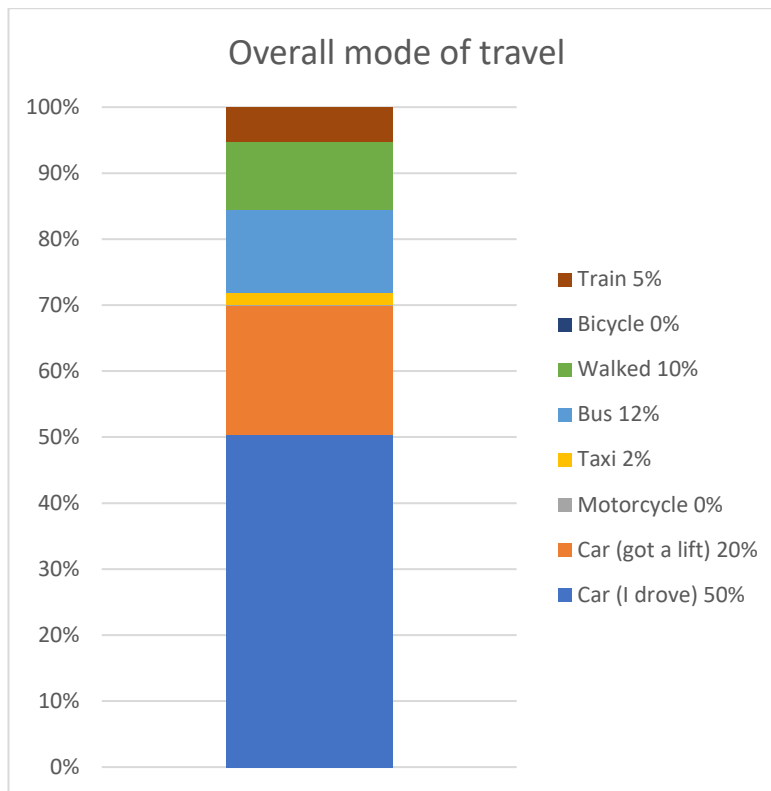
Figure 16: Main mode of transport: all respondents (%ages)
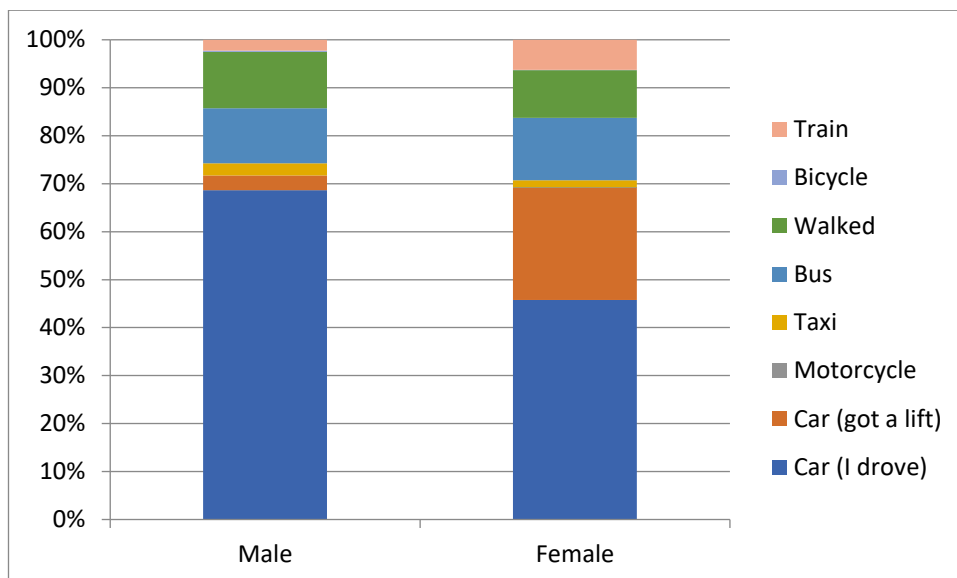
Figure 17: Main mode of transport by sex - %age, all respondents

k. Results: quantitative measures

The following charts provide some results from the survey and indicate whether the possible strata of audiences show different characteristics. These strata were: production attended (Figure 18); performance time

(matinee or evening) (Figure 19); day of the week of performance (Figure 20); age of attender (Figure 21).
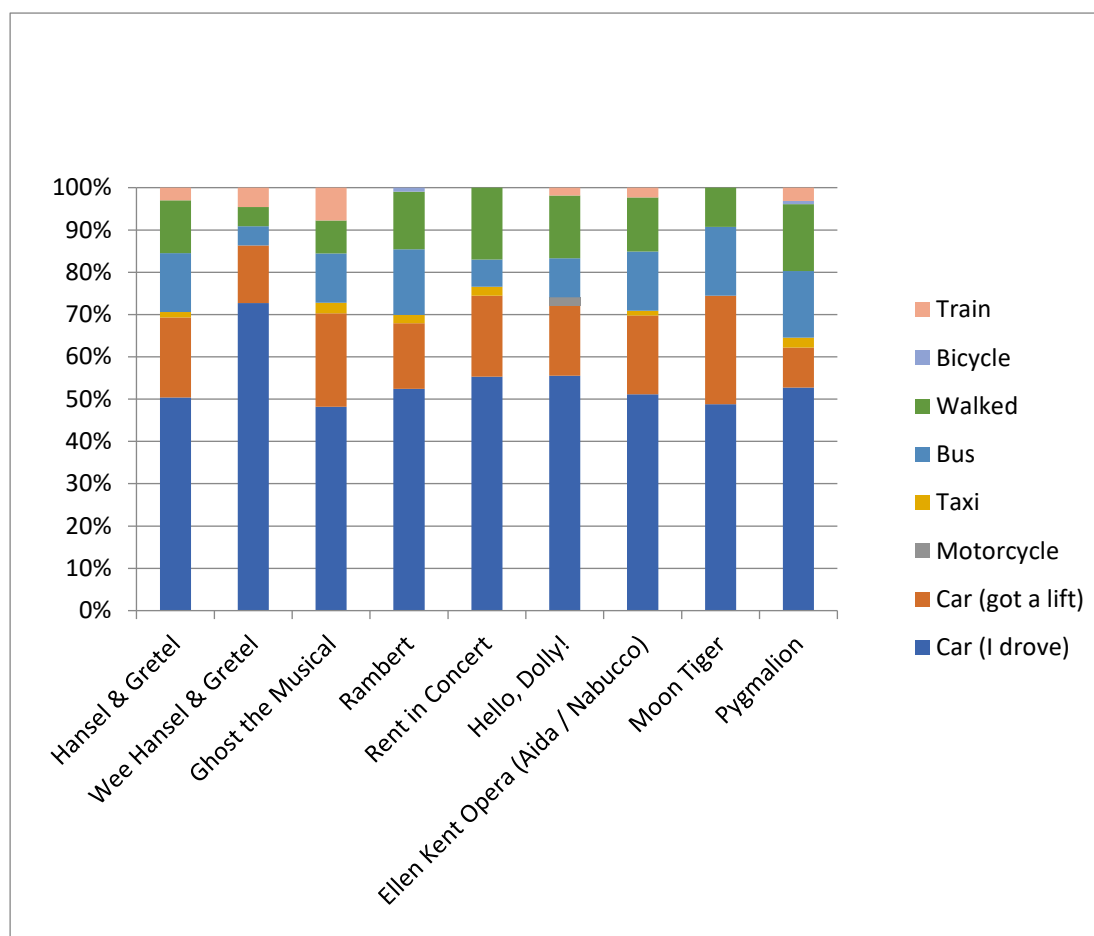
Figure 18

Figure 18: Main mode of transport by production

shows that, with the exception of Wee Hansel & Gretel, which was aimed at young children and so would have had a large audience of parents/carers with children (although this was not picked up in the survey since no question was asked about the make-up of the party), a very similar proportion of attenders travelled to the theatre by car to each production. If Car (I drove) and Car (I got a lift) are combined the percentage varies from 74% (Rent in Concert) to 63% (Pygmalion), a range very close to the overall figure shown in Chart 3. This suggests that although the audience make-up may vary from production to production, it has little effect on the mode of transport. Other modes of transport are slightly more variable and it is perhaps relevant that

Ghost the Musical, which provided a large sample as it had a long run with good audiences, hits the 70% figure almost exactly.
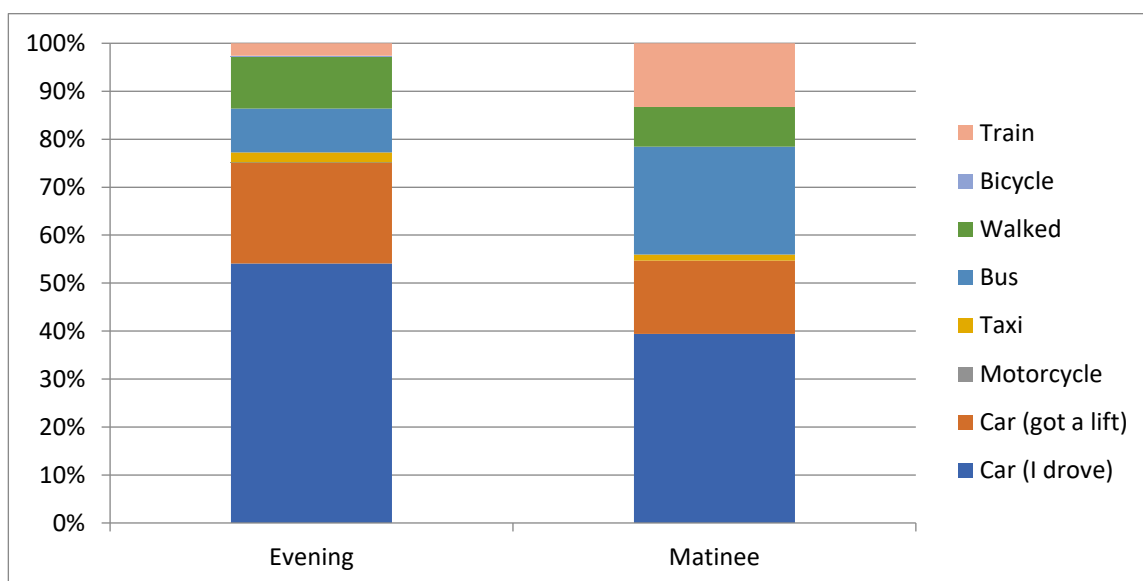
Figure 19: Main mode of transport by time of performance (%ages)

Figure 19 shows that there is a significant difference between matinee and evening performances, with much higher proportions of people travelling by train and bus to a matinee, and a smaller percentage of attenders travelling by car. This seemed to apply across different categories of attender and show. For example amongst male respondents, 65% used a car as their main mode of transport to an evening performance, 8% used a bus and 2% a train, whilst for matinees the figures were 55%, 25% and 5% respectively. For women the figures were 49%, 9% and 3% against 38%, 21% and 15% (see Table 6).

	Women Evening %	Women matinee %	Men Evening %	Men matinee %
Drove	49	38	65	55
Lift	27	18	10	4
Motorbike	0	0	0	0
Taxi	1	2	4	1
Bus	9	21	8	25
Walked	10	8	12	10
Bike	0	0	0	0
Train	3	15	2	5

Table 6: Main mode of travel by sex and time of performance

This may reflect the greater availability of public transport in the afternoon and evening, and the cost and difficulty of parking during the day, an issue which was borne out when it came to the focus groups. It may also reflect the fact that half the matinee performances are on Saturdays when many people's travel patterns are different; that people may be combining the trip to the theatre with shopping and other activities; and that the matinees included performances of Wee Hansel & Gretel, when adults would be bringing children. However, it also demonstrates Aberdeen and Aberdeenshire's reliance on private transport that a significant proportion, 54.6%, of matinee attenders travelled by car at a time when public transport is at its most frequent.

Figure 20 below confirms that the time of performance makes a significant difference to travel mode with a big difference between matinee and evening performances. There is a slight decrease in car travel and an increase in taxi travel on Fridays and to a lesser extent on Saturdays, which may reflect the 'going out' nature of weekend nights and particularly Fridays, when a theatre trip might involve a meal or drinks and so the likelihood of a taxi home rather than driving. (This is backed up by my own experience of working in and attending the theatre.) However the difference is not great.

The evening performances otherwise show a remarkable consistency in the use of a car, with the major difference being between evenings and matinees. The Friday matinee pattern is explained by the fact that these performances were only of Wee Hansel & Gretel, when the audiences would have included lots of small children. Thursday matinees show a large reduction in car travel and increased bus travel, whilst the Saturday matinee shows increased bus and much increased train travel compared to evening performances.
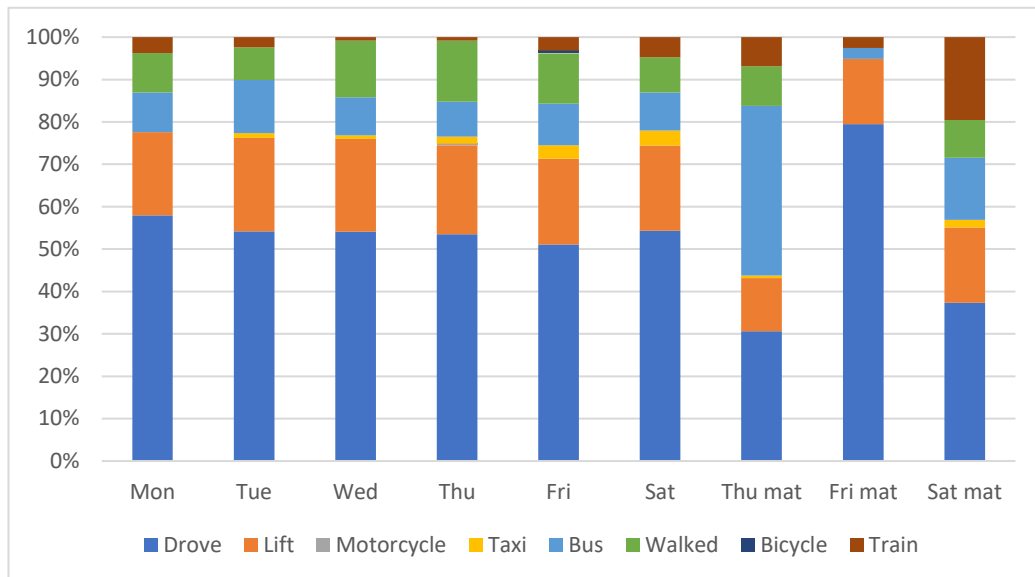
Figure 20: Main mode of transport by day of performance (%ages)

This gives strength to the conjecture that the availability of public transport influences travel, with the availability of trains after evening performances being particularly limited and so curtailing that option for attenders. It also gives rise to an opportunity for the theatre management, catering for an audience that would like to attend in the evening (and maybe can't attend a matinee) but doesn't do so because there is no convenient rail service.

The age of attender does seem to have an influence on the mode of transport. Figure 21 shows the different modes chosen by different age brackets in percentage terms and it is clear that younger audience members are more likely to travel by public transport or walk, whilst older ones are more likely to travel by car. However, it is still a majority of the total that travel by car, with many fewer younger respondents overall (only 241 or 13.75% of the 1754 that provided their age were aged between 15 and 34). This corresponds with figures from the National Travel Survey 2012 which reports that fewer younger people have driving licences (36% of 17-20 year olds and 65% of 21-29 year olds, compared with 78% up to 85% of 30 – 69 year olds) (Melbourne, 2013, p4). It also seems likely that younger people will be unable to afford to drive a car; and more may live in flats the centre of Aberdeen, within walking distance of the theatre, rather than houses further out.
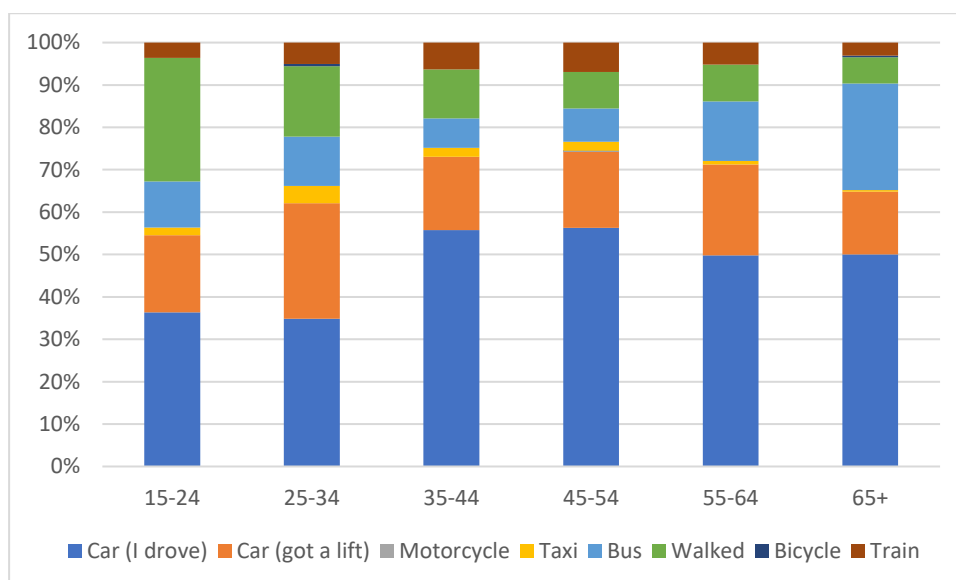
Figure 21: Main mode of transport by age of attender (%ages)
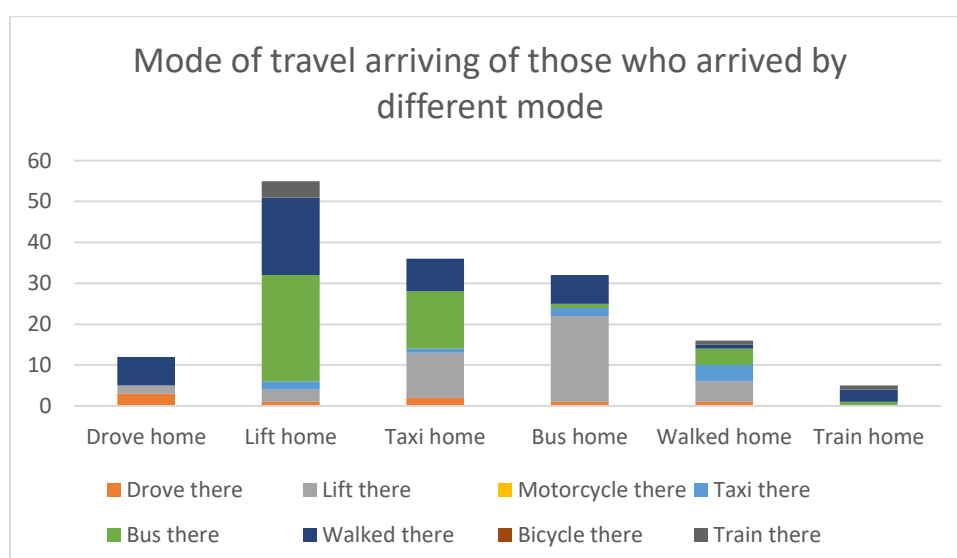
Figure 22: Main mode of transport arriving of those who travelled home by different mode (actual number of respondents). Most anomalous results (eg same mode to theatre and home) are explained by starting out from work but going home afterwards; others (eg drove there/taxi home) are unexplained, but perhaps the driver stayed for a drink and the car was driven home by a companion.

Figure 22 (which uses actual numbers of respondents, rather than percentages) shows that a relatively small number of attenders (156) travelled home by a different mode and the majority of those travelled *to* the theatre by bus (46) or walked (45). The few respondents reporting a different mode of transport on the return trip suggests that a smaller number than might have been expected came to the theatre from work but were joined there by a partner with a car, which then provided the travel home. This is

backed up by Figure 23 which shows that a very small proportion of attenders started their journey from work. Most started their journey to the theatre at home, which may contribute to the decision to travel by car as time may be short between getting home from work and leaving for the theatre.
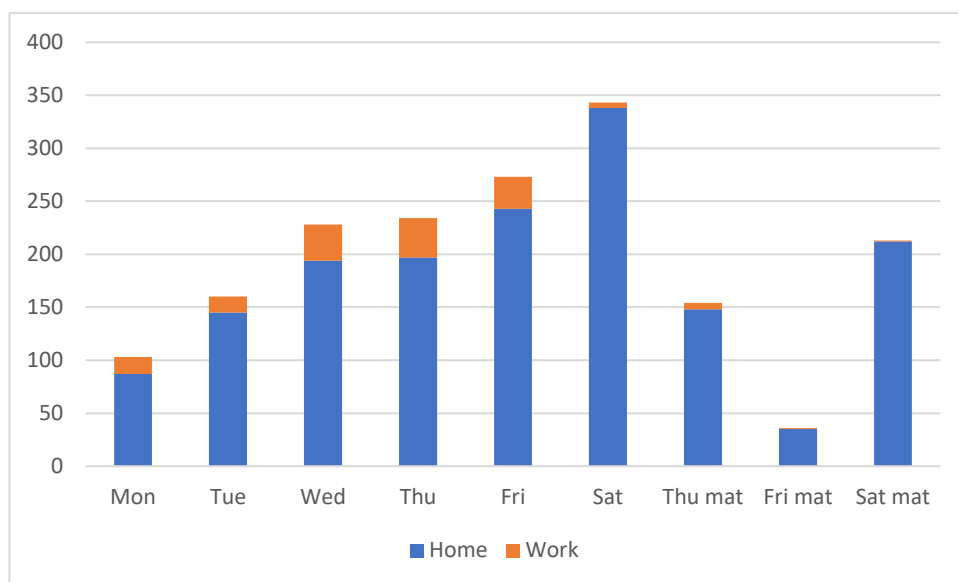
Figure 23: Departure point to theatre by day of week (actual respondent numbers)

I. Results: Qualitative measures

The three main qualitative questions concerned what considerations had influenced travel choice and what might influence future travel choices. 193 respondents – over 10% of the total – either provided information in response to the 'other – please specify' options in these questions or provided information in addition to selecting a prompted option. There were enough similarities between some of the text responses to create some new options, and where relevant the responses were coded or recoded accordingly and these tables reflect this, although there is clearly potential for misunderstanding the original response in the process.
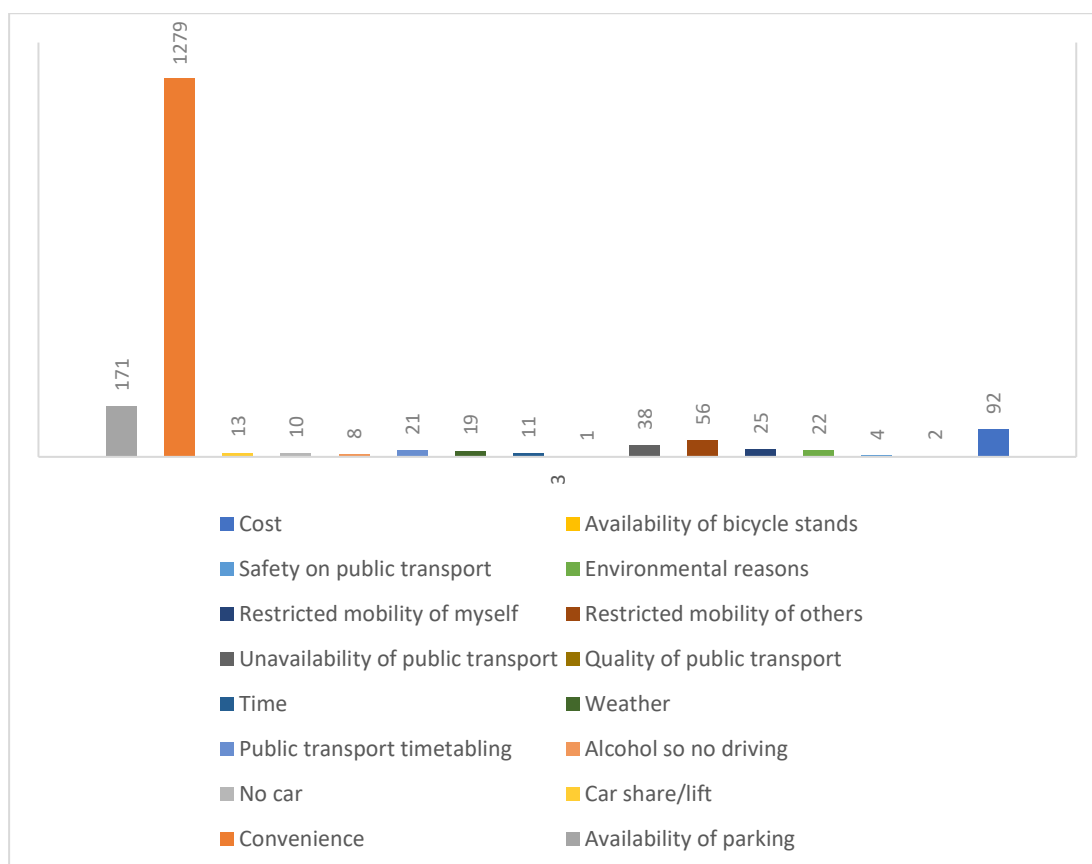
Figure 24: Main reason for mode of transport (respondent numbers)

Figure 24 shows that the vast majority of respondents chose their mode of transport for reasons of convenience, with cost and availability of parking weighing in for a relatively small minority and the other factors barely registering. This applies across different modes of transport, as is shown in Figure 25 below, which suggests that the idea of 'convenience' is applied widely by users of all travel modes to their chosen mode of transport, that is that most people are reasonably happy with their chosen mode of transport. For example, 75% of those driving a car and 69% of car passengers cited convenience as the main reasons for choosing to travel thus, just as did 76% of train travellers and a rather lower 57% of bus travellers. However, 61 respondents used the 'Other – please specify' option to comment that problems with the availability, price, quality or scheduling of public transport were at least relevant to their choice of travel mode. For example, car drivers citing 'convenience' also wrote:

- 'There is no other credible way for me. I live 40 miles south of Aberdeen and not near a railway station.'
- 'The buses are a rip off, if there are 2 people going it will [be] £8 round trip.'
- 'Personal Safety....walking to Union Street after the performance late evening and in the dark and also standing on Union Street waiting for bus'
- 'Too far to walk from bus stop in bad weather and buses are not frequently enough to get home at night'.

These comments suggest that a more nuanced sense of 'convenience' to include a negative angle may be more appropriate: maybe 'it's the only convenient means of travel because other things aren't available or acceptable to me' rather than 'I like it because it's convenient'. They are also likely to reflect a larger pool, as the majority didn't choose to provide this additional information. This was therefore clearly a topic to discuss in the focus groups and I used this question to structure the sessions.
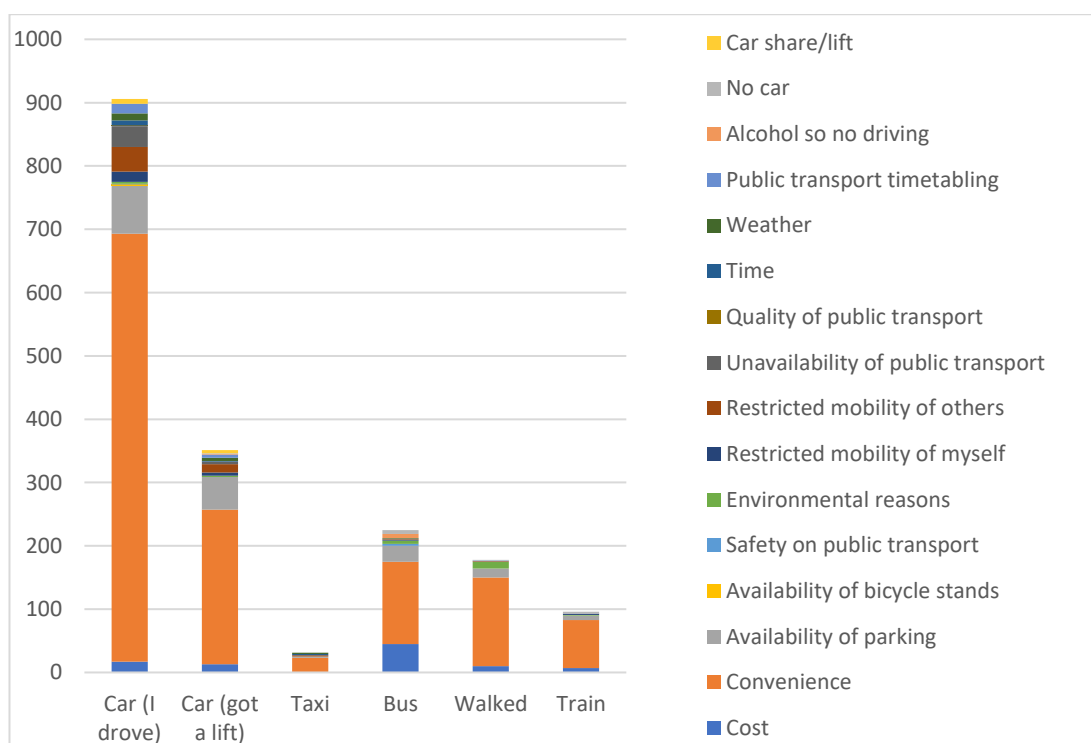
Figure 25: Main reason for choice of travel mode, by travel mode (actual respondent numbers)

In response to the question what would encourage the respondent to travel to HMT in a more environmentally sustainable manner (Figure 26) two clear points arise. First is that the respondents said that improved public transport would make a good deal of difference, and this backs up the comments
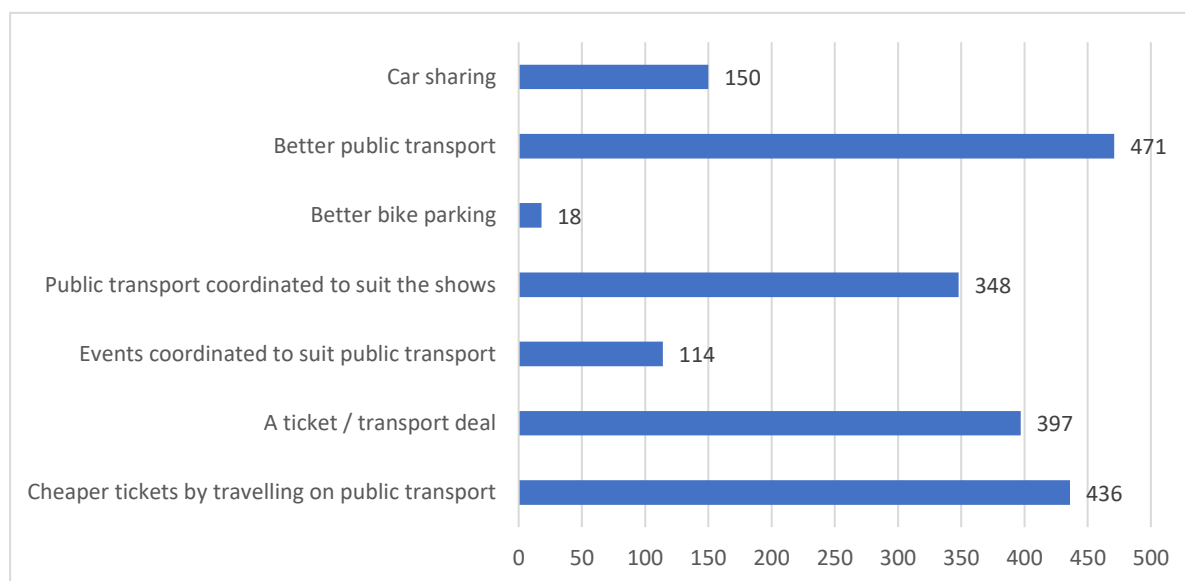
Figure 26: Factors which would encourage respondents to travel to HMT in a more environmentally sustainable way (actual response numbers)

gleaned from the 'Other – please specify' options referred to above. The number choosing one of the relevant options (Better public transport/Public transport coordinated to suit the event/Events coordinated to suit public transport) total 933 – 48% of the total responses. Second is that Cost does begin to rear its head, despite the focus on Convenience in the earlier responses: 'A ticket/transport deal' and 'Cheaper tickets by travelling on public transport' garner 833 responses between them or 43% of the total responses.

Respondents could and did choose more than one option with this question so these may not represent the views of half the respondents, but nonetheless these numbers suggest that a combination of improved and cost-effective public transport might wean some people away from their cars. This would become one of the questions I sought to draw out in the focus groups.
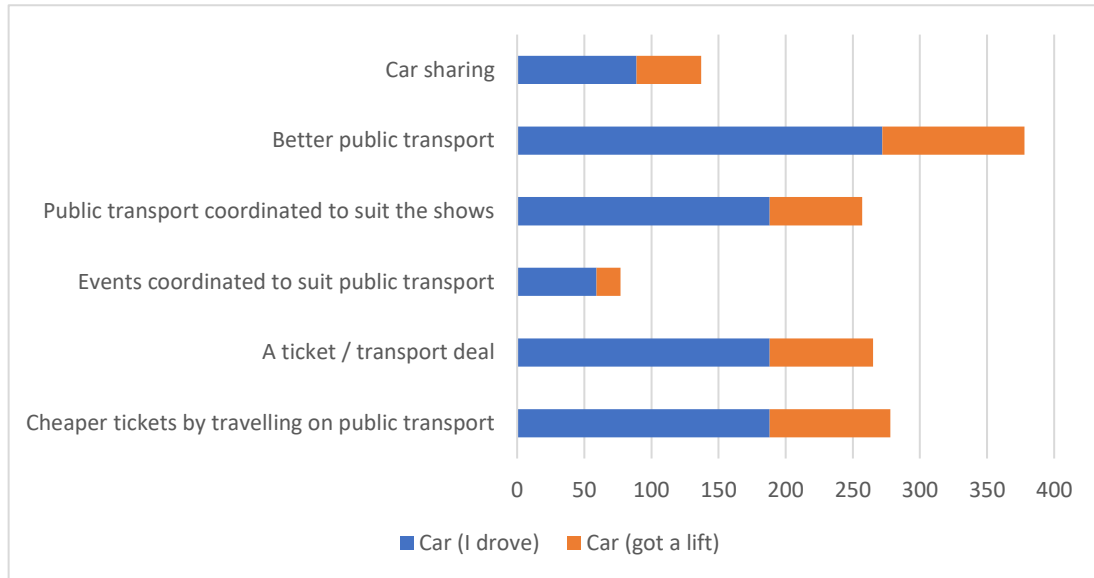
Figure 27: Factors which would encourage respondents to travel to HMT in a more environmentally sustainable way (car travellers only, actual response numbers)

Figure 27 shows the same responses but only those from attenders who arrived at the theatre by car: 712 indicated that improved public transport would encourage them to travel more sustainably; 543 indicated support for lower costs. There is another hint here that car users may not be fully wedded to their cars: it may at the moment be the least *in*convenient or the cheapest mode rather than the one they would prefer, other things being equal.

When asked how much environmental considerations had influenced their choice of travel mode, again there are some clear trends. Figure 28 shows that the majority of car travellers gave environmental considerations relatively little thought, with higher levels amongst those travelling by public transport or walking. Overall, however, environmental considerations do not seem to feature heavily, with only 7.58% of respondents saying that they considered environmental sustainability 'a lot'.
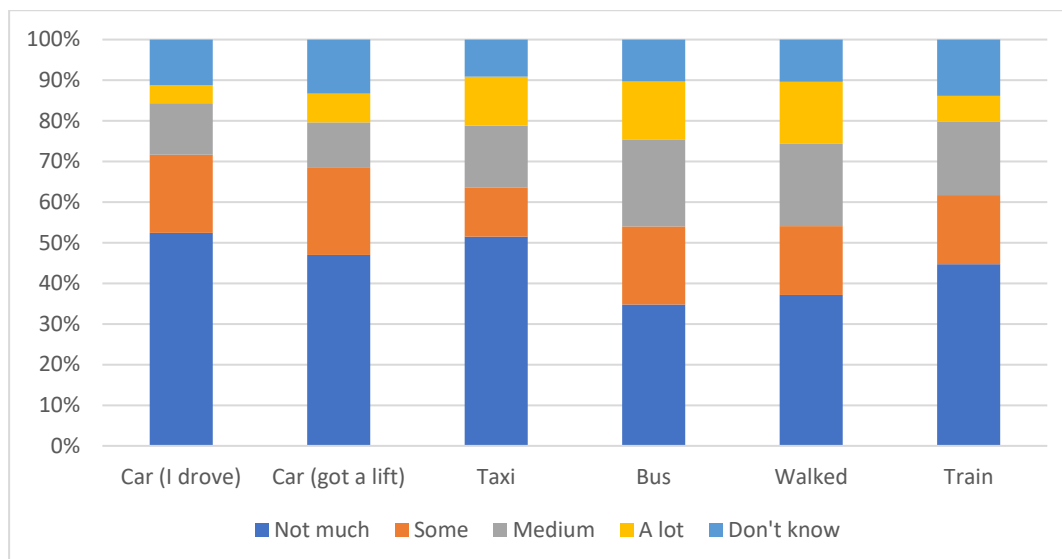
Figure 28: How much did environmental considerations influence your choice of travel mode? (%ages)

m. Conclusions

The survey provided useful data and the clear trends provided comfort that the risk was small of the sampling error undermining the validity of the survey results. It was therefore unnecessary to undertake a detailed sample of particular performances as had been considered. The data pointed towards fruitful areas for discussion for during the next phase of the research. The structure for the focus group discussions was therefore designed to bring out more detail about the following points:

- With roughly 70% of the audience respondents travelling by car on Mondays to Thursdays but a lower number using a car on the 'going out' evenings on Friday and Saturday, it would be useful to understand more about how participants viewed the social nature of a night at the theatre and whether this affected their travel choices.

- With matinee audiences significantly more likely than evening audiences to use public transport, perhaps reflecting the increased availability of it during the day, the importance of the availability of public transport needed to be teased out.

- Similarly the availability and cost of parking featured seemed to be a significant issue for respondents, and I needed to understand what

impact this had on travel choices for those currently using public transport.

- Convenience, dissatisfaction with public transport and cost seemed to be the main reasons why people choose to travel in the way they do, although the majority cited convenience as the main reason. However, although across all modes of transport respondents seemed to be fairly satisfied with the convenience of their chosen mode, there were also enough comments to suggest that the *in*convenience or problems with other modes might be leading to the current choice of travel mode, suggesting more support for public transport than might appear from the headline figures. The focus groups needed to unpack what 'convenience' meant to participants.

- Overall, improved public transport services, or the combination of improved services and coordination with the theatre performances, seemed likely to influence some people to move from driving to public transport. Reducing the cost or the perceived cost of public transport might also prove fruitful. The focus groups needed to gather more information about changes to public transport might enable or encourage people to use it more.

ii.   Understanding audience travel: Focus groups

Going to the theatre is itself a complicated if not a complex business. You must decide what you want to see; organise, persuade or encourage others, who may vary depending on the show, to come with you; set a date; and book tickets that everyone can afford and is happy with. Then on the night itself you need to get home from work, possibly get changed, have something to eat at home or out, and then get to the theatre on time. And you need to know how you're going to get home, which may be influenced by who you're with, what sort of night it is and how much time you had between work and show. I left these focus groups slightly amazed that anyone left their sofas and grateful that anyone had ever come to see a show of mine.

The number of participants in the groups was small but the discussion in each quickly coalesced into agreement around a few themes. Whilst I had been hoping for knowledge gained by the group as they talked, in fact there was little development: rather what came out was a rich description of the variety of ways in which people travel and why. This provided a great deal more information than the snapshot offered by the travel survey (reflecting Waterton and Wynne's (1999) point referenced above). The survey could only give the facts about people's travel on a single night whilst the focus groups made very clear that people's travel choices vary according to the occasion.

The focus group participants were enthusiastic and interested in the idea of talking about their travel and about the theatre: they were all keen theatregoers, attending regularly and with a long-term relationship with HMT. The conversations were easy to get going and manage, with the exception of one voluble and rather negative participant, who I regularly had to move back on to the subjects that I and the other participants wanted to discuss.

i.   A choice of travel mode depending on circumstances
A long but useful description of the complexity of organising a trip to the theatre was provided by Anna. She was an inveterate theatregoer who also ran her company's social club, but her comments merely represent an

extreme example of something that was common to all: people have a variety of routines that they bring into play for getting to and from the theatre depending on the circumstances of their visit.

> **Anna**: *I've got my own friends that live in town that I sometimes go to the theatre with. Sometimes I go with my husband. The panto is a family affair, which is usually a matinee because of the little ones. When we go out with workmates, one stays out at Kintore, so she comes in on the free bus and takes the train or a bus home. If we're going out with work friends it's usually a sociable event, and we go for a meal and few drinks, [so you'd normally get public transport home]. We are from all over so it's always very well organised, we know when we're going, are we dressing up or not dressing up, are we going out afterwards and who's getting what transport home. (Group 2)*

The discussions backed up some of the findings of the travel survey about the difference between matinee and evening performances, and between weekday and weekend performances. For example Joanna and Cathy differentiated between weekdays and weekends because work commitments mean that time is short during the week:

> **Joanna** *– If I'm going on my own I'll be taking the bus and I'll go straight from work if it's a weekday, because I don't really have time to go home and wait for another bus. (Group 2)*
> *…*
> **Cathy**: *It depends on the day of the week. If it's midweek I tend to come here and rush home…. If it happens to be a weekend …. it becomes more of a night. (Group 3)*

Catriona also echoed Anna's comments (and my own on p28 above) about her travel choice depending on who she was travelling with: with her niece who needs a lift home she would drive, on her own she might take the bus. Most importantly all but two of the participants (the couple who didn't drive and had almost no option but to take the bus) were willing to take public transport but for various reasons didn't always do so. Indeed listening to the discussions it was often difficult to understand quite why people did drive to the theatre.

ii. Dissatisfaction with driving

People regularly returned to the high cost of parking, the difficulty of finding a space and Aberdeen City Council's policy of charging between 6pm and 8pm. Meanwhile participants had developed quite sophisticated stratagems

to deal with the parking problems that risked reducing their enjoyment of the evening:

> **Julie** – *I take my car and I park it at my friend's, who lives at where the edge of the parking is paid for in Aberdeen and walk in. [NB this may be as much as 20 minutes' walk away from the theatre] (Group 1)*
> …
> **Anna** – *…we'd arrive in plenty time but then at the end of the night it's let's get out and go because coming out of the car park the traffic is just terrible (Agreement). So you need to have a prime spot parking [near the exit]. (Laughs) it sounds awful but I'm primed, I'm reversed in (Agreement) and I hurry down to the car and out before everyone else starts to leave.*
> **Ben** – *do you leave before the end of the applause?*
> **Anna** – *no I don't. But you could sit in the car park for twenty minutes half an hour. (Group 2)*

When attending shows at HMT I have regularly seen audience members, particularly older ones, leaving the theatre a few minutes before the show ends or as the curtain falls. The comments above emphasise the *inconvenience* of driving, suggesting that other modes of transport are considered even worse. Increasing the convenience of the other modes might therefore have the effect of changing the balance.

iii.   Why people travel by a particular mode

Anna's comments quoted at the top of this section also back up the data from the survey that people go to the theatre for different reasons, and in a different way, on different occasions. Some nights are 'going out' nights, and this seemed particularly true for women (although the focus group participants were mostly women, so this may be a product of the sample). And this seemed to lead at least some of them to travel in different ways, which may explain the difference between weeknight and weekend travel:

> **Anna** – *If I'm going out for a sociable night out and having a few drinks with a meal beforehand, then I'm quite happy to stay and take the bus up the road. But then I'm up very early in the morning for work so if it's purely I'm going to the theatre to see something then I would prefer to just take the car – sometimes you just want to go and see the thing, the play or whatever*
> **Joanna** – *yes (Group 2)*

There may be two relevant points here: one is about speed, getting home quicker midweek; the other is about not being able to drink and drive. The latter also arose with other participants:

> **Ben** – *Does the fact that you can't have a drink if you're driving trouble you at all?*
>
> **Julie** – *(very certain) Yes it does. For me, it's a nice part of the event, you know, in the break, to go into the lovely bar and have a glass of wine and you just couldn't do that when you're driving in a couple of hours, or even less.*
>
> **Dave** – *It is nice, yeah, My daughter in law says 'I'll drive Dad and you can have a drink'*
>
> **Julie** – *But if part of what you're asking, would I put myself through a little bit more discomfort in terms of waiting for a bus to be able to drink, yes I would, and I think there are quite a lot of people in the same situation. (Group 1)*

The going-out-ness of going to the theatre also had some limited impact on people's willingness to travel by bus because they might feel odd being on a bus while dressed up. The non-driving couple were completely unbothered by it and said that in their village, because the bus was the only form of transport if you wanted to drink, many people would take the bus while dressed up. But the response was varied:

> **Julie** - *for me that wouldn't be an issue because when I associate, like when we're on holiday to cities I associate using their public transport with going out, so it's not really a big issue.*
>
> **Catriona** – *I think sometimes you're a bit more dressed up to go to the theatre, and you sometimes feel a bit daft getting on the bus. (Group 1)*

This variety emphasises the need for any intervention to take account of varying considerations for theatregoers, even down to the same person choosing a different travel mode on different occasions.

iv.   Problems with public transport

The availability, reliability and scheduling of buses and trains before and after the show was a big issue for all the participants

> **Catriona** – *if I was going for a meal before I was going to a show, I'd want to come in a bit sooner, so I'd tend to think I can guarantee with the car, but with the bus anything can happen, it can get held up, you know, it could break down, that sort of thing (Group 1)*

…
Dave *– I was speaking to someone at the Lemon Tree last night from Inverurie, and they come in by train but their last train is 10.50 and … they either have to leave early or get a taxi. (Group 1)*
…
Anna *– …later on in the evening the buses don't run so frequently, so there could be twenty minutes half an hour between the buses, so if you come out and you've just missed a bus you might have to wait quite a while. (Group 2)*

These comments demonstrate that transport both to and from the theatre is a consideration – and of course the two are connected since you can't just use a car in one direction.

The cost of public transport was also a regular bugbear for participants. Aberdeen is perceived to have high bus fares. City fares aren't in fact that much higher than Edinburgh or Glasgow, but once you get out into Aberdeenshire the distances are longer and the fares can be higher. However there are deals to be had and many of the participants had bus passes, either because they were aged 60+ or because they used a bus pass for work. So it seemed likely that public transport was *perceived* to be expensive compared to travelling by car although when they added parking costs to fuel and other costs the difference wasn't actually so great:

Dave *– A fortune! (Lots of outrage at prices)*
Catriona *- £5.40 return*
Julie *– mine is more than that. It's a while since I've done it but I'd say probably about £10 return from Dunecht*
Andrew *– from Newburgh its £7 something return – day ticket (Group 1)*
…
Shirley *– I think if we were paying full fare on the bus we certainly wouldn't be coming to the theatre as often (**Andrew** – agreed) because it would be quite a lot of money. (Group 1)*
…
Anna *- If you're taking someone with you in the car, the price of the parking is the same as the bus. You've got two bus fares but only one parking. (Group 2)*

These comments point to the need to address both timing and at least the perceived cost of buses in any intervention, although later in the project it became clear that cost was not people's main concern.

v.   Convenience

Interestingly, variations of the word 'convenient' were only used 10 times during all three meetings lasting well over three hours, despite the survey indicating that nearly all respondents chose their travel mode for reasons of 'convenience'. The term was used in relation to time, number of people travelling together, possibly availability of bus services (although this may also be related to time) and the more general sense of 'convenient' as it is defined by the OED: '*Personally suitable or well-adapted to one's easy action or performance of functions; favourable to one's comfort, easy condition, or the saving of trouble; commodious' (OED).* Whilst some of the uses were positive some were actually about the *in*convenience of the alternatives, which backs up the idea referred to above (p129) that maybe 'it's convenient' means 'it's the only convenient means of travel because other things aren't available or acceptable to me' rather than 'I like it because it's convenient'.

There may also be a reluctance to discuss one aspect of 'convenience' which is 'how it feels' to travel on public transport as opposed to in a car. In the next section I discuss the feelings of (lack of) safety that all the focus group participants reported, which might be included under the heading of 'convenience' in a survey as the participants often felt uncomfortable in reporting these feelings. The more positive version of this, the feeling of status that accompanies travelling in a car (or perhaps the lack of status if travelling by public transport), was not raised in the focus groups but I did hear it in casual conversations with APA staff members.

Because of the emphasis the survey results placed on 'convenience' I have quoted all the uses of the word below.

Considering the time sense, if the schedules were better, Dave might use the bus more:

> **Dave** *– During the day I can get a choice of two buses from the end of my street both go past HMT. Evening it's more convenient time wise to have my car. (Group 1)*

But another of his uses of 'convenient' seems to suggest that Dave considers buses more convenient only in certain circumstances: the car is more

convenient when the bus is less so, for reasons of parking, schedule or a lot of people (maybe including grandchildren) travelling together. His use of the term here is broadly in the sense of the OED definition.

> **Dave** – *if I was going … on my own in the evening, I would certainly use the bus if it was more convenient… If I was going with the family (slight pause) they wouldn't go by bus. No, we're going by car. For pure convenience. (Group 1)*

Dave's rather general use of 'convenience' doesn't necessarily indicate hazy reasons for him making his travel choices: rather it maybe demonstrates the many different reasons relating to the many different circumstances that obtain when people travel. His 'slight pause' could register him thinking through the different challenges of travelling to the theatre by bus with the family group, or the different opinions of different members of the family. This sets a challenge for anyone trying to influence individual travel behaviours through individual incentivisation, as the same solution won't work for the same individual on every occasion.

On some occasions, time is an important aspect of convenience. Joanna focuses on time when she seems to find the car convenient for her friends because the bus would take too long or it is awkward in some other way. For Cathy it's also about time – both how long it takes to get to the bus stop and then waiting. And for Cathy, this is about getting *to* the theatre rather than getting home.

> **Joanna** – *Oh I think it would be convenience for certainly one of my friends as they stay further away. And the other one it's probably more awkward for her to get a bus as well (Group 2)*
> *…*
> **Cathy** – *[I use the car] Because it's convenient. To get the bus I have to walk a mile to get the bus and if I'm short of time, especially coming from work and you're rushing, to get to the theatre it probably takes me half an hour or more to drive in so I'm leaving home at the latest probably quarter to seven, so if you just came in from work and had a quick change and something to eat, there's not an awful lot of time to be then waiting for fifteen, twenty minutes to go and get a bus. (Group 3)*

Cathy perhaps connects (in)convenience and expense, and there is also something more general about how the convenient and the inconvenient modes of transport *feel*:

> *Cathy – I would use public transport if it was far more convenient and far more affordable (mmm) for people to use. If you have a family in Aberdeen, it's extortionate. It's far cheaper to use the car and pay parking if you have a family than it is to use the bus. (Group 3)*
> *…*
> *Cathy – I probably would walk more if…. it was better or it was more convenient or actually I had somewhere to walk to. It's just not that attractive to do it. (Group 3)*

Anna's use of 'convenience' is less focused. This could be about time, comfort or just a more general sense of ease:

> *Anna – my friends are in town, but it is more convenient for one of us to pick the other up and both come into town together rather than both take the bus. (Group 2)*
> *…*
> *Anna – I think it's more convenience and time restraints and that's what drives me to take the car… (Group 2)*

There is some support for the idea that a special bus service that was timed with the show ending would be more convenient:

> *Cathy [Re the TheatreBus service which by this time had been advertised] – Yes and I would probably use it on a weekend. That would be to just have drink. … So depending on what time the pick up's at and things like that, it may or may not be convenient and that doesn't allow for you to then have a meal perhaps. (Group 3)*
> *…*
> *Andrew [regarding an improved bus service] – I would have thought so… if they were convenient to the shows… special buses laid on (Group 1)*

Overall therefore it is clear that 'convenience' is a useful catch-all word for all sorts of reasons to use the car, or possibly to use public transport. The '*saving of trouble*' in the OED definition is useful in this regard: what the project needs to do is save trouble for users, and this might be about time but equally about how travelling by public transport feels. And it is clear from Dave's comments but also others that the particular circumstances of the travel alter what is considered 'convenient'.

vi.   Feelings of security

Related to the 'how it feels' sense of convenience, the unexpected brake on travelling by public transport, which the survey barely picked up because there was no relevant question, was the question of security waiting for and on the bus and getting to or from the bus stops. This arose in each of the

groups and across all participants, although sometimes the nervousness was displaced on to others rather than the speaker themselves. I have again quoted many of the comments on this subject because it was striking how often it came up, and with feeling.

There are comments about Union Street, about the route to the bus station and about the atmosphere (and other travellers) on the buses. People who might otherwise have been perceived as confident confessed to nervousness – although Dave was an older man, he was also healthy and tall, not a person you would think would be easily intimidated. The perceptions of rowdiness led to quite significant changes in behaviour – the ruling out of the most popular nights to attend the theatre, in the case of Shirley and Andrew, for example, or Cathy's decision to not drink although she might quite like to – suggesting that when it comes to the decision to take the car rather than the bus, this would for many be a very simple one.

> *Catriona – The only thing is, if it's a late show coming out, especially on a Friday or Saturday, the stops are on Union St and I don't feel happy, (Dave – no) being on Union St. Especially if I'm on my own …*
> *Dave – I would agree with that, totally, and I'm male and I'm still not happy*
> *Catriona – well I mean I'm a Special with the police so I'm trained to look after myself, but it still makes me think, you know (agreement) (Group 1)*
> *….*
> *Julie – I think you're right, I think there are less adults on buses in the evenings and so I suppose if you're of a nervous temperament you might not want to get on a bus with lots of teenagers or young people …*
> *Shirley – yes, so we'd rather go Monday Tuesday Wednesday, maybe Thursday, but not Friday Saturday, definitely not…*
> *Andrew – Tickets, restaurants, rowdiness on the streets*
> *Shirley – Rowdiness on the streets, going down to the bus station, things like that (Group 1)*
> *…..*
> *Anna – It's not a long way but there's a lot of bars on Union Street, a lot of younger people can be a wee bit rowdy, they don't mean any harm but now and again there can be a little bit of trouble*
> *Joanna – it can get a bit intimidating*
> *Anna - especially on a Friday or Saturday night. I tend to avoid it myself because it can be just a little bit intimidating… especially for*

older people (yes) My mother, I'd not like of think of her having to walk up and wait for a bus on Union Street. (Group 2)

…

Cathy – *I would rather go out and stay completely sober and drive and know I was safe, and know I could leave whenever I wanted to leave and get home on my own terms than wait around for public transport which may or may not turn up.*

…

Alison *– I choose my routes, I know where I'm going. (pause) I know where (pause) I will sometimes cross the road because I think "actually, I don't want to walk past that bit". I think it's just because I live on my own, I'm very aware of my own safety. I'm very much of a… If I feel as if somebody is still walking behind me. I will (pause) go and take a slight (pause) detour but sticking to a route that I know. Because I (pause) The problem I think for me is, because you're right in the centre, you get all the drunks on their way home and (pause) because of where I live, you quite often get people who are trying their luck because they can't be bothered walking home. And you would just… Please go away… (Group 3)*

The pauses in Alison's comments perhaps reflect her unhappiness about discussing this topic.

The APA Marketing Manager was present during the first two groups and was as struck by the focus on security as I was:

> *Security/safety - not something that really came out in the survey but this is clearly a concern in how people travel to the theatre. Union Street and the walk to it were considered to be intimidating to all in the groups, particularly at the weekend and by those who will be walking by themselves. The most interesting comments in my opinion came from Shirley and Andrew who now only attend at the start of the week as they feel safer travelling home and Anna who will get a bus from the Music Hall as she can wait at the doors out of the way from the street but doesn't like getting the bus from HMT due to having to walk down Union Terrace. I think security is a good point for considering how a bad experience can alter travel methods and booking habits. (email 07/05/2014)*

It was clear that the project needed to address these issues of feeling unsafe. However this was a wider issue that affects aspects of life other than travelling home from the theatre, and it would be difficult to change the nature of Union Street and impossible to alter the route to the bus and rail stations.

vii.   Focus groups: Conclusions

Following the first two focus groups my overwhelming impression was that the participants were not wedded to driving to the theatre, and I was able to confirm this in the third one aimed at checking whether the discussions in the first had been influenced by the participants being aware that the project was interested in environmental sustainability (Group 3 in the quotations above). Their choice of travel mode depended a great deal on the circumstances of their trip: day of the week, time of performance and who was travelling with them. Driving had its own problems of parking, including the expense of it, and not being able to drink. The inconvenience of leaving the theatre quickly to avoid a queue to get out of the car park, or walking some distance to where they had parked more cheaply, was very clear. All the participants would use other travel modes to get to and from the theatre on occasion, and it was to some extent the *in*convenience of public transport rather than the convenience of the car that made them choose to drive. This inconvenience was mostly because public transport schedules were problematic, with fewer buses late at night. Cost was another consideration, with participants expressing quite strongly the view that public transport was more expensive than travelling by car.

The other significant point was the importance that participants placed on their own personal comfort or security, an aspect that came out very strongly in all the discussions.

These findings put the survey results in a fresh context. While around 70% of people were arriving at and leaving the theatre by car, and most said that they chose their travel mode for reasons of convenience, this in fact may not have been because they found car travel convenient, but because the alternatives were less so, and particularly because they may not have felt comfortable or secure walking to and waiting at bus stops or the rail and bus stations. The reluctance of some of the focus group participants to admit to their own feelings of insecurity, with a tendency to displace the fear on to others, may be reflected in the low number of survey respondents mentioning safety in their free text box responses (see p129 above).

Understanding the site: Interventions development

I now had a picture of the complex social system within which audience members travelling to HMT operated, as described by the complex system chart and the descriptions of their experiences from the focus group participants, which were complemented by my own experience and knowledge of Aberdeen and travelling to HMT and my discussions with APA staff. I also had data about some emergent properties of the system, the audience travel practices as reported in the travel survey.

I used the combination of these to develop some ideas about how the complex system might be changed in order that different travel practices – ie properties of the system – might emerge from the changed complex system. Any changes needed to address the three main issues picked out above:

- Scheduling and timing of public transport particularly after performances;
- Something around security and feeling safe and comfortable, probably mostly while getting to the bus stop or station and while waiting for buses on Union Street; and
- The perceived cost of travelling by public transport.

Furthermore, any changes made needed to be changes to the *system* rather than changes at the 'element within the system' level. This would mean making changes that affected the interactions between the elements. While in theory changing one single element would have an impact on the system since the whole system would co-adapt to the change, in practice this might well be relatively ineffective unless the change was quite significant: it would be necessary to do something that would lead to real change in the system rather than something that the system could accommodate without itself changing overall. In effect most 'behaviour change' initiatives work by making changes at the local level, basing their approach on the rational actor theory and attempting to influence the beliefs and/or actions of individuals but not taking into account the system within which the individuals operate. Yet the non-changing nature of the system is precisely what stymies the

individual's continued attempts to change. The aim of this project was to work at the higher level of the system.

To achieve this I decided it would be advantageous to work with as many as possible of the major players in the system. One of these was HMT, as the trigger of substantial numbers of journeys with lots of advance information from the box office data about those journeys, including where people were travelling from and back to, on which day and at roughly what times, and with the ability to communicate with those journey-makers in advance. But others included parties such as the bus companies, NESTRANS and the Aberdeen City and Aberdeenshire local authorities. Between them these parties had the power to influence the following aspects of the system:

- Co-ordination of the timing of performances with bus schedules – bus travel being the public transport mode that is most heavily used by HMT audiences and whose timetable is easiest to influence
- Elements – although not all – of the feelings of security and safety of people walking to and from and waiting at bus stops and the bus station
- The pricing of public transport for theatregoers

On the same day as the first set of focus groups I had met with the Director and General Manager and the Revenue and Marketing Manager of FirstBus Aberdeen to discuss their knowledge of audience travel in the city and to the theatre by bus and their perception of the potential for increasing bus use for travel to the theatre. However I had picked up from comments during the focus groups, and my subsequent studying of the bus timetables, that the greatest problems were probably experienced by people travelling outside the city, so it was important that I considered not just travel in Aberdeen city itself, but to the surrounding Aberdeenshire region. I therefore organised a meeting with the Managing Director of Stagecoach North of Scotland, which provides the buses for Aberdeenshire, for the date of the July follow-up focus group to discuss similar questions. The meeting with FirstBus was set up and also attended by the APA Director of Marketing, who had previously worked

with FirstBus; my solo meeting with Stagecoach was the result of a cold call. Both meetings were positive with each company being willing to consider being part of a project that looked at other ways of changing the system of travel to and from the theatre.

In the meetings I learned about the following areas, amongst others:

- The regulatory barriers to the bus companies collaborating with each other or other transport providers, since this could be construed as anti-competitive behaviour
- The difference between a service bus – where any passenger can get on and pay their fare to the driver – and a charter, where the charge is paid before the passenger boards the bus, so the bus is not available to pick random passengers up (similar to the difference between a black taxi and a private hire cab)
- The possibility of providing buses coordinated with the end of shows at HMT and the requirement by the Transport Commissioner for a service bus operator to provide 90 days' notice for a change to the timetable
- The difficulties around providing a 'theatre ticket plus transport' deal, as this might require the provider to hold an expensive ABTA bond to protect purchasers' rights in the case of a default
- How the public find bus timetables very difficult to read and understand and the need to take away as many of the barriers to bus use as possible (but how difficult this is).

In the period between the first and the follow up focus groups I began to develop clearer ideas about the next stage of the project which would involve piloting interventions that sought to address the three aspects of the system I had identified. Whilst these interventions would be 'local' changes, rather than system-wide ones, the experiment would indicate whether the issues were the right ones to consider (a successful intervention should show that the issues had been correctly identified, and surveying should support this or not) and might help lead to wider system changes. The example of a

successful intervention could encourage HMT, the bus companies or others to consider similar interventions; audience members could discover that travelling by public transport is more 'convenient' than they had previously thought and would take it up more widely; the very existence of alternative modes of travel, and the awareness that people are using them, might encourage a wider group to take them up themselves.

The proposed interventions were:

- Buses waiting outside the theatre after the show ends and scheduled to leave shortly afterwards providing a service along routes where many audience members live, thereby dealing with the problems of scheduling and safety/comfort while waiting for a bus.

- A shuttle bus to the bus and railway station and to Union Street to connect with the Stagecoach's service buses, to help people feel more secure.

- A display screen in the HMT foyer with bus departure times and the theatre foyer remaining open so that people can wait there rather than in the Aberdonian wind and rain, and avoid having to wait on the unsafe environment of Union Street. I had met someone from NESTRANS earlier in the year when I discussed with him my complex system chart, and I knew that the real-time data was available via NETSRANS – the logistics here were around the screen itself and keeping the foyer open.

The cost issue was harder to deal with and a solution for this might have been in the provision of information and clarity rather than provision of cheaper services. However, this was something to discuss further with HMT, the bus companies and possibly an organisation such as NESTRANS which I knew had funds for this sort of intervention.

Understanding the site: Follow-up focus group

I then held a further set of focus groups to which I invited those who had attended the first meetings and also anyone else from the original list

garnered from the travel survey. I used these to assess people's interest in the interventions and to gather some advice as to how best to design them.

The focus groups were again thinly attended, but the discussion was just as rich as before and also coalesced around the same themes of safety, cost and convenience. Indeed it proved quite hard to keep people off the subjects of why they travelled as they currently did and move them on to the proposals. However when I did describe my proposals the response was very positive:

> *Joanna* – *I can't think of any negative things.*
> *Katy* – *That's what I was thinking. … It feels like a natural approach, it feels like it rounds out the experience in the correct fashion.*

The three proposals all received support although the majority of the discussion was about the direct buses from outside the theatre – despite the fact that only some of the participants came from outwith Aberdeen, where this would be most relevant. Participants had experience of real-time bus information and liked the idea of it in the theatre itself – this would add greater convenience (and possibly increase feelings of safety as it would reduce the time spent waiting on the street). The shuttle bus was only relevant to some people, but there was a general view that this would be useful, presumably mostly to others. There was discussion about the costs of any special buses, with the groups dividing slightly as the afternoon group included more people with bus passes. But despite this there was a feeling that it would be feasible to charge for both the shuttle bus to Union Square and buses travelling to Aberdeenshire. For all the participants it seemed likely they were willing to pay for the increased convenience, as all of them were currently occasional or regular bus users:

> *Dave* – *I would be quite happy to pay. As long as it was under two pounds, which is my parking fee.*
> *Andrew* - *I mean it would be more convenient to/*
> *Shirley* – *I'm surprised you're agreeing with that*
> *Andrew* – *Well it says here that I could get home and relax with a drink*
> *Shirley* – *Well that's it, yes, so you could*
> *Andrew* – *instead of waiting to, instead of that last bit rushing down to get the bus.*
> *…*

> *Katy* – I'd pay a fiver.
> *Joanna* – I'm not sure I'd pay a fiver to take me to…
> *Katy* – But then it's essentially a taxi. You'd cost more in a taxi to get from the theatre to Union Square.
> *(Long pause)*
> *Ben* – What is it, ten minutes' walk? A quid? Would that be reasonable?
> *Joanna* – I would certainly be prepared to pay that.
> *Katy* – Yeah.

There was consensus that the direct buses from outside the theatre would need to be a bookable service as people would be worried about not getting on the bus and being stranded without their car. They would need to be able to guarantee their seat in the case of a very busy bus and in the instance where no-one else had booked, they wanted to be sure the bus would still run. We discussed how it might be booked and the need for a degree of flexibility, as people's plans might change shortly before the night out. This seems like a combination of safety and cost – a slight nervousness of being caught out late in Aberdeen plus the knowledge that a taxi home in those circumstances would be expensive – with an added element of wanting to be able to change one's mind.

> *Julie* – if there was any uncertainty about how many people could get on the bus, what would happen… because if my car's out at Kingswells Park and Ride, I have to get on that bus… you might end up getting caught in the middle of town and you really will know about the £35 taxi fare to get home.
> …
> *Katy* – I suppose certainty that the bus will still run even if you're the only person that's booked onto it.
>
> *Ben* – Would you want to do it when you book the ticket or would you want to do it later?
>
> *Katy* – I think it would depend. (*Joanna* agrees) Yeah. So I think that flexibility as well, because sometimes I go to the theatre by myself as well because I quite enjoy that experience. But then everybody at work wants to come as well. So then you have to change it, so I think there has to be a lot of flexibility. So I suppose in the way you go on just now you could choose your seat, it's got to be akin to that to have that consistent feeling.

This demanding combination, the ability to book in advance *and* to cancel or add more passengers, was probably self-contradictory.

The groups, especially the afternoon group, were full of useful hints about how best to organise the project. Booking could be done on-line when you bought a ticket in much the same way as discount parking could be booked. They were very clear about the need to advertise it well and Katy spoke interestingly about the need for endorsement by the right agencies. She clearly recognised the value of the relationship that a theatre has with its audience, but she also argued that endorsement by the police would be valuable – again perhaps reflecting the slight nervousness about being on the streets in late night Aberdeen:

> ***Katy*** *– Obviously there's the endorsement [by the theatre], but Aberdeen police are really active on Twitter and since they've done that it's changed the security level on Belmont Street, because it was the worst area in Britain. One year of having active communications has actually decreased that.*

We agreed that the theatre would need to be kept open until any buses left and there was some discussion of the timing after the end of the show. For a shuttle bus to Union Square it could leave quickly, as the aim would be to get people to their longer distance bus sooner; for a direct bus to Aberdeenshire from outside the theatre, there should be a wait of up to 15 minutes to allow people to collect coats, go to the toilet and say goodbye to friends.

Understanding the site: conclusions

The travel survey and the two sets of focus groups were very useful in providing the basis for my proposals and refining them. The survey had provided very clear data showing that the majority of audience members travelled to the theatre by car, with some variation depending on the time and day of the week. It pointed to 'convenience' as the main reason why any particular travel mode was chosen, but suggested that 'convenience' meant different things to different people, and may actually have been a proxy for the 'lack of convenience' of other modes. Problematic public transport schedules may have been a reason why people chose the car. The focus groups backed up the survey results whilst providing much more nuanced data about why people made the transport choices that were revealed by the survey. They showed that, like me, people have different travel routines for

similar journeys on different occasions, depending on all sorts of factors such as who they are attending with and what day of the week it is. And perhaps most importantly they raised the issue of feelings of safety on the street while walking to or waiting at public transport nodes.

I used the results from both the survey and the first set of discussions to develop some ideas. The follow-up focus groups didn't provide much new information, but they confirmed that my ideas had traction with some theatregoers and would help to address some of the issues that they and others had brought up which seemed likely to influence people's willingness to shift from car travel to public transport. This provided me with more material to take with me to the next stage in the project development, a discussion with Aberdeen Performing Arts, whose support would be key to making the project work. They would be integral to advertising the service and probably to selling the tickets, since they had the contact details for the audience on any given night and the possibility of direct selling on-line or via the box-office. Their staff would likely be involved in the marshalling of theatregoers to any buses after the show. And if there were to be real-time bus information screens in the foyer, they would need to arrange this. The next chapter therefore describes this detailed planning of the intervention and the management of the TheatreBus project.

Chapter 8: Managing the Project

In this chapter I describe the development and management of the TheatreBus project. I have included a fair amount of detail about the work as I consider the amount and nature of the project management work to be part of the 'results' of the research: this narrative is in effect the data, similar to the quotations from the focus groups above. The amount and nature of the work reflects what influencing a system involves and in my discussion below I will consider the learning from this project that can be applied elsewhere, using Byrne's questions '*Can it work elsewhere?*' and '*Can it work elsewhen?*' (Byrne, 2013, p219) as noted above (p65).

a) Developing the project: Meeting with APA

In October 2014 I met with the APA Chief Executive, Director of Marketing, Marketing Manager and Customer Service Manager to discuss the project. There was general support for the overall project but there was nervousness about the cost implications. We agreed that we now had a good deal of information and we needed to move to the implementation stage. We discussed the three ideas that I had proposed.

- There was a lot of support for the direct buses from outside the theatre. There had been interest in such a scheme before from groups working with people with disabilities. The Director of Marketing had worked with FirstBus Aberdeen previously and had attended the meeting I had held with them and felt that there was a good opportunity to collaborate with them.
- The shuttle bus was considered more problematic. The APA team felt that it would be difficult to cover the costs from fares for what is quite a short trip; it would be logistically difficult as APA felt they would have to provide the minibus, rather than work with a provider.
- The real-time bus information screens in the foyer were supported in principle but there was concern about where they could be placed in the listed building. The costs should be manageable because there

was equipment already in the organisation that could probably be re-used.

The Chief Executive was enthusiastic but also emphasised the risks to APA, which would be the public face of the project. If an audience member got stranded in Aberdeen with no way home, it would be very damaging. She identified the complex customer journey from learning about the project right through to getting home. She raised the need to keep the foyer open after the show for longer with the costs involved. She gave an example of some local groups already bringing their parties in minibuses: would we end up just doing the work for them, and other people disappointed because they found themselves unable to book a seat? The messaging and logistics would need to be very firmly in place.

With the same focus on customer satisfaction there was a great deal of interest from the APA team in the findings from the focus groups about comfort and safety and the need to address these issues in relation to their aim to offer a great overall experience to audience members, from ticket booking to the end of their trip to the theatre.

Similar to the focus groups' emphasis on advertising we discussed the importance of PR and communications. A new idea, possibly because all the focus group attendees were at least occasional bus travellers, was the need to break down barriers of nervousness about using a new travel mode: how it works, what might go wrong. I used the parallel of my own discomfort when attending swimming pools because I so seldom go to them: what is the etiquette in the changing room? where do I put my clothes?

We decided to move ahead with the direct buses from outside the theatre and exploring the possibilities of the real time bus information screens, but the shuttle bus to Union Square was considered too expensive.

i.   Direct Buses from outside the theatre

We agreed that we should start with a limited period, starting with performances of *Shrek* in January 2015 which would be a very popular show.

We already had good postcode data from those who had already booked: the Marketing Manager would provide that to me and I would do some analysis of the main areas where attenders were coming from so that we could identify routes that might be popular. I would then contact both FirstBus and Stagecoach to propose a collaboration, with them sponsoring the project by providing the bus with APA doing the logistics and promotion. In the meantime the Customer Services Manager would work on the logistics and plan the sales mechanisms through the box office system (Audience View) and the Marketing Manager would develop an outline marketing campaign.

ii.   Real time bus information screens in the foyer

I agreed that I would contact NESTRANS to find out about the logistics and any support that might be available. The APA team would bring up the question of finding the hardware and working out where it might be located at a wider management team meeting.

iii.   Summary

I now had the basis of a project involving at least two of the major players that I wanted, a transport provider and the theatre, with the possibility of involving NESTRANS, which is a partnership between the two local authorities and so another major player. The focus was on influencing the system within which the audience members travelled, specifically the interactions between a transport provider and the theatre, rather than influencing the audience members directly, although some of the work would of course go into informing them about the improved transport possibilities, both the direct buses and also through the use of the real time bus information screens, which would cover service buses. The aim was to see if making these changes would lead to different travel behaviours emerging from the changed system. In order to ascertain whether the system had indeed changed I would be able to interview people from the major players during and at the end of the project. And to measure whether any different behaviours emerged I could undertake surveys of users and non-users of the

services provided and also run a second major travel survey of the wider audience to see if there were any changes after the project took place.

The next stage was to implement the project.

Implementing the Project: Project Management is a Complex Business

In this quite long section I describe in detail the implementation of the TheatreBus project. Importantly for my overall research, what began as standard project management turned into a more reflexive process as I re-understood techniques, practices and skills that I had long used as means by which I was understanding, responding to and seeking to influence a complex social system. It was during this process that I became fully embedded in the system and an element in it rather than someone outside it who was simply observing it.

- I began to recognise characteristics of the system, including how seemingly unconnected or distant elements could have bearing on the system as experienced by the theatregoer
- I realised that things that I was used to dealing with in other projects, such as considering people's other commitments, time-frames and unconnected aspects of their work or life, were my way of responding to influences on the system
- I began to recognise how much energy is used in trying to influence the system, partly because one property of the system was that it was to some degree resilient, in that the other conscious elements had their own aims and trajectories.

i.   Implementing the Project: Project Development

The first thing to do was establish the details of the project. The APA Marketing Manager drew from the box office computer the advance booking data for the shows during the proposed period (13 January – 18 April 2015) and he and I used our experience to identify the performances when there was the likelihood of enough attenders to warrant running buses from the

theatre. Friday and Saturday evenings were likely to be busiest, providing the maximum market for the service, and the survey and focus groups had indicated that during the week people were more likely to be short of time travelling to the theatre as many would be nipping home from work and then out again, and so perhaps less likely to give up the car for the bus home. Using the postcodes of all those who had booked tickets for the busy Friday and Saturday evenings, I used mapping software (www.mapsdata.co.uk)[15] to locate them so as to identify likely routes for buses. I selected three routes, two into Aberdeenshire (Stonehaven and Banchory) and one within the city, by counting the postcodes along routes where there was a cluster. The Aberdeenshire routes seemed to warrant most attention, as there were more standard services within the city.

I then had a telephone call with the Managing Director of Stagecoach North of Scotland in which he indicated that he was interested in the project but that he would charge £130 per bus per run. He did however offer free travel to the theatre on any of his buses for anyone who was booked to return on the special bus that he would run for us along two of the routes. He also noted that there were already buses and trains running on those routes and felt there might be no need to provide extra ones.

I therefore checked the running times of all the shows through the producers' websites, websites of other theatres presenting the same work and details of the plays/musicals where the current production was not yet up and running. Using this data I checked the timetables of buses and trains along the potential routes against the end-time of each show to calculate the potential for attenders to reasonably catch a service bus or train. This confirmed that for most of the productions a special bus would be desirable as the waiting times for service buses or trains were very long and/or the risk of missing an earlier service would be too great[16].

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[15] See Appendix 3 below
[16] See Appendix 4 below

ii.   Implementing the Project: Survey of Bookers

The Marketing Manager sent an email survey to patrons that had already booked for the relevant shows asking how they planned to travel to the theatre, whether they would be interested in a special bus, what considerations would encourage them to use it and what their postcode was. 667 bookers responded, approximately 20% of the whole group surveyed, with the following results:
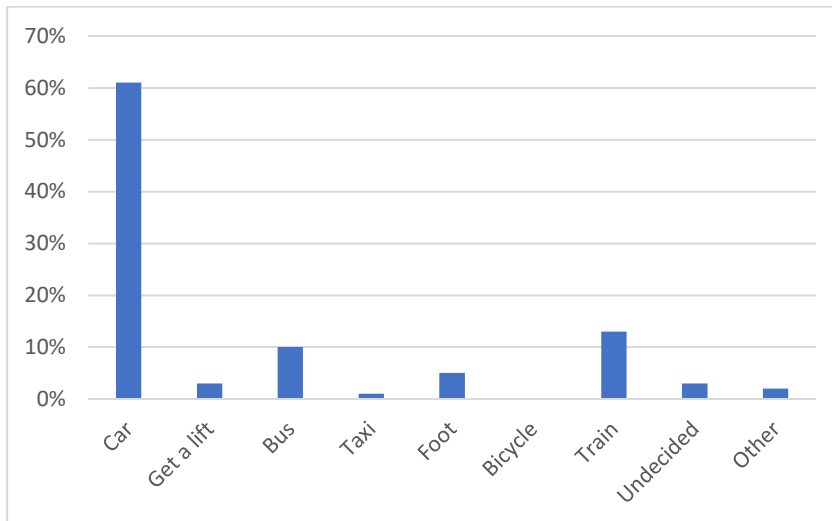
Figure 29: Spring 2015 bookers planned mode of transport
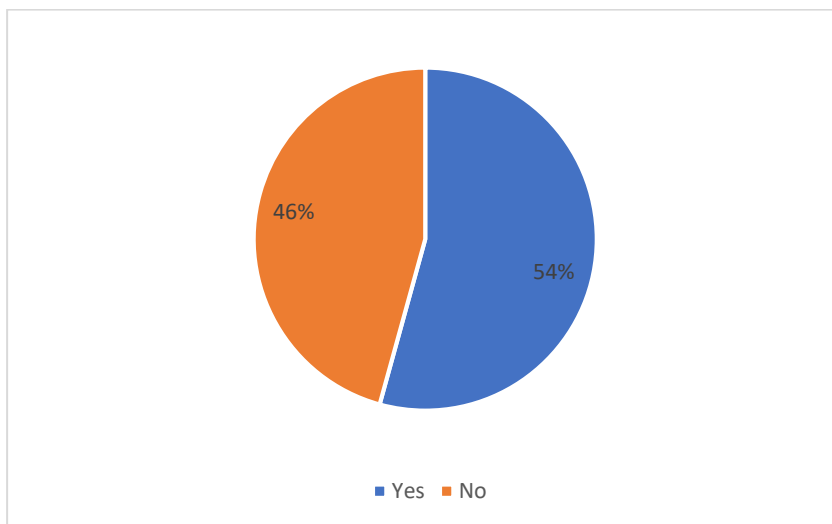
Figure 30: Spring 2015 bookers : interest in using a dedicated bus service?
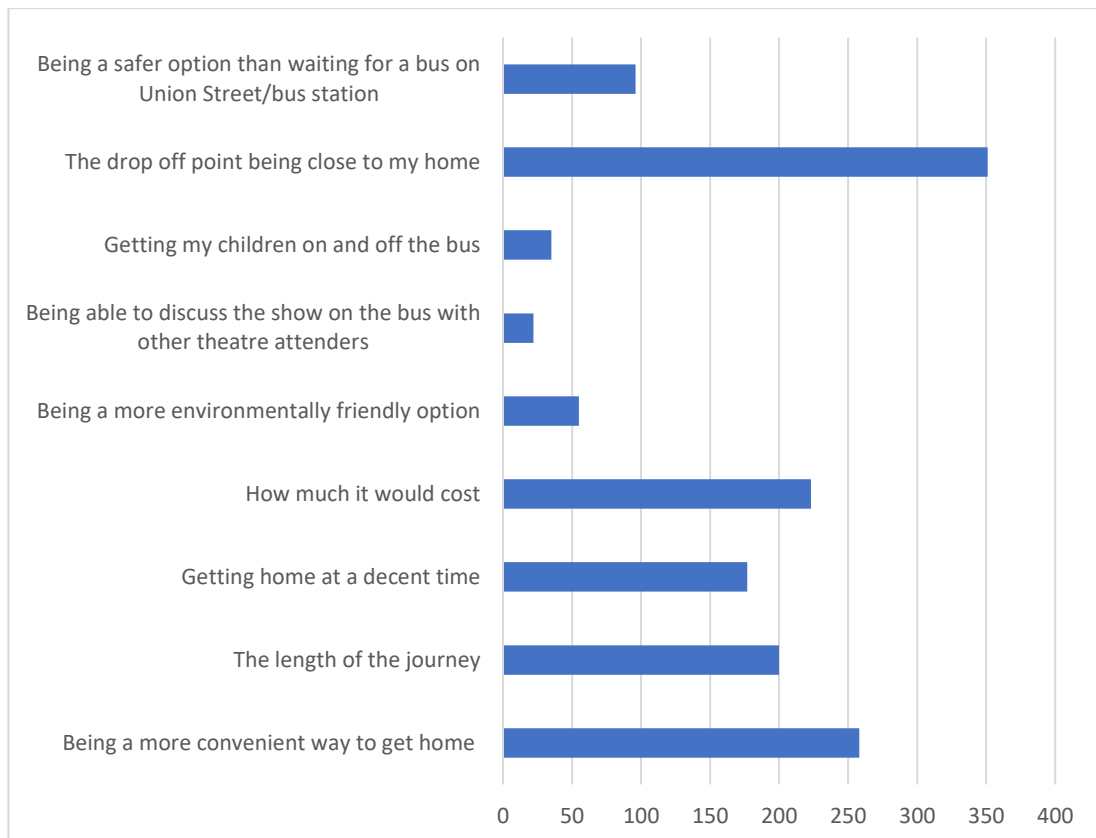
Figure 31: Spring 2015 bookers: Which of the following factors would be a consideration when using this service?

The survey confirmed that the majority of the attenders intended to travel by car (Figure 29). At 64% this was slightly below the *actual* numbers travelling by car in our earlier travel survey, which possibly reflects the poor weather during the earlier survey period discouraging people who would otherwise travel by other means: the value/action gap, where individuals' well-meaning intentions are not acted upon in their actions, comes into play (Jackson, 2005, p53) (and see Chapter 2 above). The number who would consider using a dedicated bus service was lower than we had hoped at 54% (Figure 30), but after discussion we decided it was high enough to continue with the project. During the period we were considering there would be 10 weekends and so 20 performances that were likely to be busy – an audience of maybe 20,000. Allowing for some who wouldn't live on a relevant route, if 20% rather than 54% of them were prepared to consider using the bus service, that was a potential market of 4,000, or 142 per performance, which would make it

difficult to break even at £130/bus and an acceptable fare, but if the project was reasonably successful any losses would be relatively small.

Convenience again seemed to be the main reason for considering using the bus service (Figure 31), whether this was understood simply as a general 'more convenient' or in the more nuanced senses brought up at the focus groups including timings. 15% of the respondents cited safety concerns directly. The TheatreBus project seemed to respond to most of these desires.

iii.   Implementing the Project: Project Management

Meanwhile I had contacted NESTRANS and learned that there might be up to 50% funding available from NESTRANS if we made an application quickly, so I drew up an application and sent it to the APA Chief Executive and Director of Marketing so that they could submit it in APA's name. This prompted a slightly panicked Chief Executive to seek a meeting to discuss the potential financial risk to APA. On 24 November 2014 she, the Director of Marketing and I had a long phone meeting. The Chief Executive was particularly unhappy that APA as a charity was taking a significant risk whilst the commercial company Stagecoach would not be taking any. The upshot of the meeting was that she was happy to press ahead but that the Director of Marketing and I were to arrange meetings with the Managing Director of Stagecoach North of Scotland and also with the Managing Director of FirstBus, who we thought, after our earlier meeting and the Director of Marketing's experience of working with him earlier in her career, would be more amenable to the project. Meanwhile the application went in to NESTRANS.

The Director of Marketing and I therefore met with the Managing Director, Stagecoach North of Scotland with the aim of bringing him into the project more fully, getting him to share the risk (to encourage the APA Chief Executive) and lowering the cost of the buses. This meeting was not wholly successful. He expressed his scepticism about the project, although he did agree to reduce the cost of the buses to the cost price of £90/bus, and confirmed he would include the free inward travel offer. However his manner

and scepticism should perhaps be taken in the context of his having had to deal with personnel issues in his marketing department that morning, and this was of course a marketing-led project. This is an example of the impacts on the project of apparently unrelated events and agents in the system.

iv.   Project delays – and a window of opportunity

By this time we were getting late in the year to start the project in January and on 22 December I wrote to the team at APA to say that it seemed beyond doubt that we were too late to start the bus project in mid-January and so I was proposing to delay until the autumn of 2015, giving us more time to plan.

More or less on the same day I was given a lead by a contact about some Scottish Government funds available to local authorities for promotion of sustainable travel during the following financial year. On Thursday 8 January I made contact with the Public Transport Unit of Aberdeenshire Council and got back in touch with the Transport Planner at Aberdeen City Council. Time was tight – the application for funding had to be in by the end of January. On the Friday I received a reply from Aberdeenshire Council and on Monday 12 January I made a short-notice trip to Aberdeen to meet the Principal Officer (Information & Infrastructure) of the Transport Planning Unit of Aberdeenshire Council.

The Aberdeenshire Principal Officer liked the project and thought he could include it in the Council's proposal to the Scottish Government's 'Smarter Choices Smarter Places' scheme. He also thought that he could find a way to match the possible 50% grant with funds from the Council's resources. The next day he emailed to say that he would propose the project to his colleague who was dealing with the SCSP application. He later submitted a full proposal, largely using copy that I had provided. The proposal was for buses along three routes into Aberdeenshire and 'mentioned' (his word) the other partners but was effectively underwritten by Aberdeenshire Council so that if no other funds were available they would match the Government funding.

This pleased the APA Chief Executive as it meant that APA would have lower costs and minimal risk.

I had also discussed with the Aberdeenshire team the real time bus departure information idea and they told me that Aberdeenshire was procuring its own Bustracker system which would cover all providers in the region and would operate within Aberdeen as well as the 'shire. Unlike Aberdeen City, which is unusual in contracting the service to a commercial provider, they would run it themselves and they thought it quite possible that Aberdeen Performing Arts could join in the project at a greatly reduced cost compared to the other service, which only covered First Aberdeen buses.

This episode provides another example of the non-linearity of time, but on this occasion I had got to the window before it closed. And it demonstrates another aspect of *managing* an intervention in a complex system. I had to be willing and able to make a rather speculative cold call, based on information provided by a personal contact, and then take an early morning train to Aberdeen at short notice in order to get the project to work. Similarly my new friend at Aberdeenshire needed to be willing and able to act quickly and meet somebody he had never met based on an unsolicited email. These individual characteristics were what was making the project work. The reasons why the Aberdeenshire Principal Officer did pick up on my proposal came out in our post-project interview, discussed below, and were as much about Aberdeenshire Council's own situation and aims as about the project, providing another example of the interactions of very individual elements each with their own trajectories. The Aberdeenshire Principal Officer had also mentioned at our meeting that our contacts at FirstBus had both left, which explained why they hadn't responded to our requests for a meeting. Here was another example of changes in the initial or later conditions leading to significant changes in the system: the Director of Marketing had a good relationship with FirstBus having worked for their PR company in the past, and particularly with those two individuals, but now we were back to square one, having to build a relationship from scratch.

I now had in place three major elements of the system in the form of Aberdeenshire Council, APA and Stagecoach and I understood from Aberdeenshire that it would complicate matters to have NESTRANS involved, so I withdrew our funding application. We were on track to run the project in the autumn of 2015, the next main season at the theatre, with buses running on most Fridays and Saturdays from 11 September to 21 November. I developed a project plan (Appendix 6). However, the next sections demonstrate how much detailed work is required to manage an intervention in a complex social system in response to changing circumstances which may be only obliquely related to the project. I will touch upon this in my discussion when I distinguish between 'implementing' and 'managing' projects, and discuss the skills necessary for doing so.

v.   Detailed Project Development

In late February I had a meeting with the new contact at FirstBus. It was friendly: he was interested in the idea and had a few interesting points. However, after some delay he came back to me with a much higher price than Stagecoach of a minimum of £195 per bus, so I didn't follow that up. Since our discussions with his predecessor had effectively been about their providing buses free of charge, this again demonstrates how a change in an element of the system (the person who is in place) can make a significant difference to it.

In March the project funding was approved by Paths for All, the government agency that was managing it, and there followed a period of more standard project management for the autumn season buses. We went through the process again of identifying the likely shows, checking the show time/bus time relationships and deciding on the routes (see Appendix 5). We decided to start the service with performances of *Dirty Dancing*, which would have large audiences and was likely to attract groups who would want a night out and to drink. I produced a budget which demonstrated that Aberdeenshire Council's contribution, plus APA's in-kind support through their staff time and promotional activity, plus Stagecoach's contribution through reducing the cost

per bus was sufficient to match the government funds. Logos and credits for APA, Aberdeenshire Council, Stagecoach, Paths for All and Transport Scotland (demonstrating the number of parties involved) had to be approved and publicity materials produced. The online box office system needed to be updated to allow people to buy tickets (figure 32). The autumn programme included an advert, we sent an e-flyer to anyone who had already booked for the relevant performances and produced physical flyers for the box office (Figure 33) and. I convened a meeting with APA's Marketing Manager, the Aberdeenshire Principal Officer Hall and people from Stagecoach to sort out the practical details of routes, stops, logistics, marketing, press & PR, ticketing etc. I held a pre-meeting with the APA the Director of Marketing and Marketing Manager in advance to sort out the details we were interested in. (The agendas for these meetings are provided at Appendix 7.)
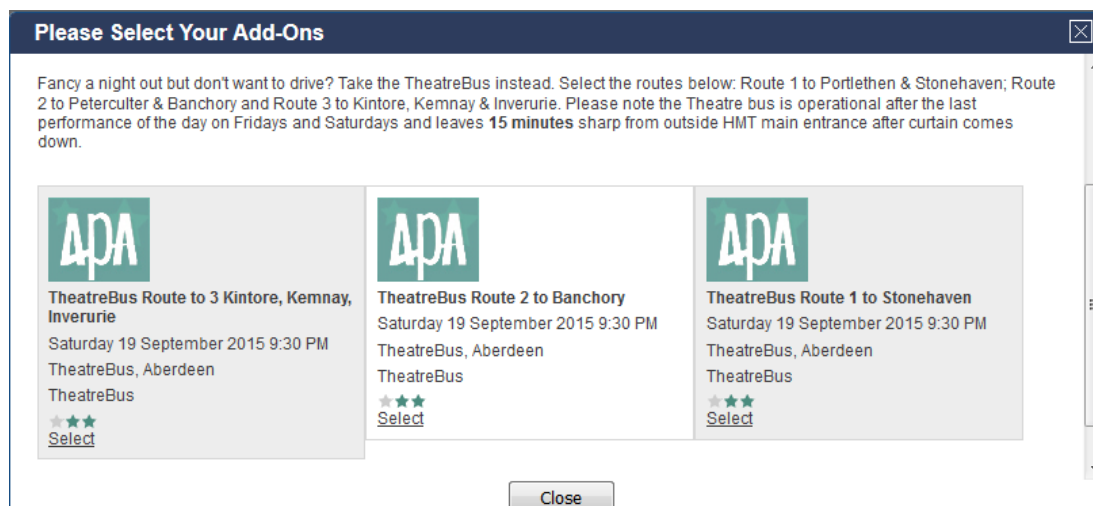
Figure 32: Screen grab of the on-line box-office pop-up

Fancy a night out but don't want to drive?
Take the *TheatreBus* instead!

From September, buses will run from outside HMT on Friday and Saturday evening performances along three routes into Aberdeenshire. The buses will be waiting outside His Majesty's Theatre and will leave exactly 15 minutes after the curtain comes down.

- Book in advance to guarantee your seat
- Your *TheatreBus* ticket will be vaild on your inbound journey on any Stagecoach bus
- Travel with people who like you have just seen the show
- No walk to the bus stop or waiting in the rain!
- Enjoy a drink in the bar without worrying about the new rules

Enjoy these benefits for the following performances:

- **Dirty Dancing**
  (Exc. 5pm performance on Friday)
- **Scottish Ballet's Elsa Canasta and Motion of Displacement**
- **Shawshank Redemption**

- **Rebecca**
- **And Then There Were None**
- **Jesus Christ Superstar**
- **White Christmas**

PRICES:
- Stops within the city: £2.50
- Aberdeenshire stops: £3.50

Smarter Choices, Smarter Places   paths for all   Aberdeenshire COUNCIL   Stagecoach NORTH SCOTLAND

BOX OFFICE 01224 **641122** aberdeenperformingarts.com

TheatreBus Routes and stops:

Route 1

Portlethen & Stonehaven
(via normal 7 routing)
- HMT depart
- Marywell*
  (First Aberdeenshire stop)
- Schoolhill Portlethen
- Portlethen ASDA
- Portlethen Academy
- Portlethen Berrymuir Road
- Newtonhill Skateraw Road
- Stonehaven Barclay Street
- Stonehaven Spurryhillock

Route 2

North Deeside Road to Peterculter & Banchory
- HMT depart
- Mannofield Church
- Cults Hotel
- Culter
- Drumoak*
  (First Aberdeenshire stop)
- Crathes Castle Gates
- Banchory Silverbank/Morrisons
- Banchory Academy
- Banchory High Street
- Banchory Burnett Road

Route 3

Kintore, Kemnay & Inverurie
- HMT depart
- Berryden Road
- Northern Hotel
- Woodside Fountain
- Bucksburn Police Station
- Blackburn Leys Hotel*
  (First Aberdeenshire stop)
- Kintore Hallforest Avenue
- Kintore PO
- Port Elphinstone
- Inverurie Market Place
- Inverurie Bainzie Road
- Inverurie Old Chapel Road
- Kemnay High Street
- Kemnay Bremner Way

HOW IT WORKS:
Pre-book your seat on the bus at the box office or on the night before the performance starts. You will receive a ticket that you show when boarding the bus.

HOW TO BOOK:
Book online when purchasing your ticket for the show, in person at the box office or over the phone at **01224 641122**. If you have already bought your theatre tickets, please contact our box office to get your TheatreBus tickets.

PRICES • Stops within the city: **£2.50** • Aberdeenshire stops: **£3.50**

BOX OFFICE 01224 **641122** aberdeenperformingarts.com

Figure 33: Front and back of TheatreBus flyer with logos

Over the summer months my work on the project quietened down as most things were being handled by APA and Stagecoach. I drafted an agreement between the three organisations. I provided information for the Paths for All

project reporting (see Appendix 8). There was much to-ing and fro-ing about marketing materials. I developed a survey of bus users and non-users for when the service began. The Box Office Manager became more involved as his team put the service on sale and began speaking to phone and personal customers about it. The Customer Services Manager also started to work out the details of how they would run the actual operation of getting people on to the right buses.

In June I became concerned that the APA Marketing Manager was under pressure, having to deputise for his manager, who was now off on maternity leave, as well as continue with his own work and of course the additional work of the TheatreBus project. I received several emails with comments like this:

> *Sorry I've not been in touch recently, been completely flat out of late. We've actually got the TheatreBus set up on the system now although it took a bit longer as there were a few hitches in getting it set up. We'll be working on the promo material next week but hope to get this arranged asap but apologies again for the delay. (email 19/06/15)*

The specific circumstance of the APA Director of Marketing suddenly discovering (I use the word advisedly) that she was pregnant and going on leave shortly thereafter is of course a relatively unusual one and demonstrates the particularity of any case study. However one thing that is fairly certain in any project is that *something* unexpected will happen: the business of project management is dealing with these situations, ensuring that you have enough leeway or time, etc. In this instance it is again an example of the complex system in action: one element interacting with others, and those interactions reverberating to some extent through the system. It had an impact on me, as I had to chase things up, and on the project, because things fell a little behind and there was less marketing work done on the project than anticipated. Similarly I was busy with my other work and this too will have impacted on the project and on other people working on it.

There began to be more interaction with the Stagecoach Operations Manager – answering questions about bus stops and timings, discussion of

marketing and PR between APA and Stagecoach. I had to ensure that marketing materials were checked with both Stagecoach and Aberdeenshire – a reminder of the impact of multiple partners in a project.

Running the project

i. Running the project: reflexive log

With the first buses running on 11 September sales were not going well. I received a breakdown of sales to date on 26 August and the total sold for the whole project was 20, with 8 for one performance and 2 for 6 others. This disappointing news spurred conversations with the Box Office Manager. These led to some questions arising and details of the logistics being worked out, which echoed some of the discussion in the focus group about when passengers could book (see p151 above). We agreed with Stagecoach that we could cancel a bus if there were no passengers booked and we needed to do this by the Wednesday before the Friday/Saturday run, so that they could roster the drivers. The Marketing Manager organised with the Customer Services Manager that they would have some tickets available to sell in the foyer after the box office had closed for any buses that were running, for customers who decided there and then to take the bus.

The Box Office Manager asked his team what the response of personal and telephone customers was when they were told about the TheatreBus offer, if they had bought a ticket for a relevant performance:

Most common responses based on box officer feedback:
- *Bus doesn't go to my area – when are you going to extend service to my area*
- *No thanks - have already arranged transport*
- *Getting a lift from a friend for free*
- *Group of us going by car – we don't all live in same place & it's more convenient as we can drop off people at their doors*
- *Not sure, will think about it, speak to my friends and get back to you (in this case box officer should highlight bus ticket needs to be purchased in advance)*

(email 04/09/15)

By Monday 7 September bookings were still very low: 2 for that Friday on one route, 1 for Saturday. We hadn't considered what we would do if there

were no or very low bookings at all for buses on one or more routes: would we cancel, and what would this mean if we then got further people trying to book after we had cancelled the bus? And how would it feel to those who had booked if they were the only one or two people on the bus? Also, this would be a very expensive way of transporting a small number of people.

On the Tuesday afternoon at 2.30pm[17] I received a slightly annoyed email from the Stagecoach Operations Director saying he needed to know immediately the arrangements for the weekend, as he had to roster the buses. This was despite him saying previously that Wednesday would be fine. It turned out that Stagecoach was that week running buses for a major conference at Aberdeen Conference Centre, and he was under pressure – yet another example of quite separate elements impacting on the system. I spoke to the APA Marketing Manager and we agreed that we needed to honour the offer despite the low number of tickets sold just in case we got walk up customers and late bookers. So:

1. I was to contact the Stagecoach Operations Manager to confirm numbers and ask if he could run a smaller bus
2. I was to cancel the other two buses for each night, but ask if it would be possible to add back in the other buses and if so when
3. I was to check with Aberdeenshire Council whether it would be acceptable to run taxis if we got late bookings that couldn't be accommodated on buses – so as to maintain the offer in the first few weeks of the project. If so, I was to check what the recharging approach and schedule would be
4. We agreed that the feedback at the box office had been interesting – we agreed that maybe the Box Office Manager should ask the team to note where the interest comes from if people are not on the right routes.

I then spoke to my contact at Aberdeenshire Council and he approved the above points. He said that running taxis was against the aim of the project

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[17] I am specific about the timings in this description to show how necessary it was to work quickly

but agreed that in the first few weeks it was an appropriate approach to achieve the aims we have.

By 3pm I had replied to the Stagecoach Operations Manager apprising him of the bookings and covering the above points. I also said we wanted at least one bus in front of the theatre to use as advertising. I confirmed the buses actually required and the timings. At 4.20pm he replied apologising a bit for and explaining the stress behind the tone of his earlier email and saying he was consulting with his Managing Director; then again at 5.45pm confirming the change and saying he would ask their Marketing Manager to use the presence of a bus for publicity photos. We cancelled the unnecessary buses and agreed we would use taxis if there were any late bookings.

I had planned to go to Aberdeen for the weekend both to help with the first nights of the project and also to experience at first-hand how it all worked. I took with me some paper surveys to give to any passengers. As I travelled up I received an email saying that the only 2 people booked for that evening had cancelled.

In Aberdeen I met with the APA Box Office Manager, Marketing Manager and Customer Services Manager. We agreed:

1. For that weekend we would hold up to two taxis worth of tickets (ie, 8) where there was no booking
2. At the start of the show the Box Office Duty Manager would hand any remaining tickets to the Duty FoH (Front of House) Manager in case there was a late buyer
3. We would inform Stagecoach about the situation
4. They noted that Dirty Dancing is attracting an unusually city-centre audience.
5. We would try to get a picture of the group of 8 booked for following Saturday getting on the bus, for promotional purposes

In a more private discussion with the Marketing Manager he agreed that his pressure of work had hindered some of the marketing effort. However he also said that Dirty Dancing was struggling with worse sales than anticipated,

possibly owing to it having been before for a long run only two years previously, which was also adding to his workload, and which may have affected the take-up of the TheatreBus offer.

Chatting with the box office staff, one of them was very reassuring – '*It's a good idea, people will pick it up, these things take time*', she said. This response was echoed in a reply from my Aberdeenshire Council contact who I emailed to keep him informed about our plans:

> '*Converting customers to Public Transport is always going to be a hard sell. It is a new service and may take time to take off.' (email 11/09/2015)*

And an email from the Customer Services Manager the following day had a similar message:

> '*Unfortunately we did not sell any tickets last night however we had staff outside next to the bus handing out leaflets and got a lot of interest and questions about it with many people saying they would use it in the future' (email 12/09/2015)*

The following week there was a mix up in communication between APA and Stagecoach about the bookings for the buses which I had to sort out as the system at APA wasn't quite working and the APA Marketing Manager was out of the office. During the course of this I also discovered that the APA web-box office pop-up was providing incorrect information about the routes and specifying that the time of the bus leaving would be 21:30, ie before the show finished. I contacted the Box Office to get this changed and it became clear that the time was difficult to change, but the routings descriptions would be changed and they would write to any bookers to confirm that they had booked for the right bus. These two examples again demonstrate the 'friction' and muddle of any project, and the time and work required to get things working, especially when more than one party is involved. As I will describe below, the interesting thing is how the system gradually adapted to work smoothly. As an example of how this comes about by small steps, in this instance we agreed that in future we'd refer to the routes by destination, not by number, which left too much room for error when so many parties, including the public, were involved.

The Box Office Manager said that of the TheatreBus sales, only 10% were direct from the web and 90% seemed to be from upselling by the box office staff. He said he had noticed this before with new initiatives – people want to try it first with some help by talking to someone or are enticed in a conversation. It's only when they are confident that they will book on-line.

I was then away for a few weeks and was pleased to see when I returned that the system of communication between the APA Box Office, Marketing Manager, Customer Services Manager and Stagecoach worked smoothly. Sales were still not high but patrons were happy. As I will discuss below (p186), the way in which the initial problems were sorted out is an important part of the learning from the project.

ii. Running the Project: Personal observation of the TheatreBus operation

Early in November I travelled to Aberdeen to experience the TheatreBus service myself and talk to the staff who were facilitating it and the users. On a Friday night my wife and I travelled from Banchory into Aberdeen on the Stagecoach service bus and back on the TheatreBus, emulating an audience member's experience; on the Saturday we did the same from Stonehaven. The following section therefore applies techniques of participant and personal observation. I took quick notes during each evening and complemented them later with a richer description from memory. I have grouped the notes here under some familiar headings.

a. *Personal observation of the TheatreBus operation: Convenience*

The system scored very highly here in relation to the '*saving of trouble*' sense of the word. Each time we were on the bus within minutes of the show having finished, along with the other passengers. The buses were waiting right outside the theatre: no walking to the station or to waiting twenty minutes to get out of the car park. You gave your name to an easily located usher in the foyer with a clipboard; they ticked your name off and on you got. In the sense of *'time saving'* it was good too. We were back in Banchory an hour and five minutes after the show came down, which if you were parked close to the theatre and drove quite fast, would be longer than driving but not by much (Google estimates the drive at 35 minutes; the service bus into Aberdeen earlier in the evening had taken 55 minutes to the bus station). The bus trip to Stonehaven was much faster at about 35 minutes.

However in terms of '*how it feels'* there was an interesting difference between the two trips. On the first evening the bus waited a long time before it left. The Duty Manager waited until the 15 minutes were up before leaving although all the booked passengers were on board, presumably because someone might want to buy a ticket. Most of the audience had already left, however. It felt frustrating: that problem you have with buses when they don't

leave, but there's no obvious reason why. Then once she did give the go ahead, the bus still waited – the driver seemed to be waiting for his colleague on the bus in front to leave. I had the sense that others were feeling the frustration too. Eventually we set off 20 minutes after the show came down, 10 minutes later than necessary.

Furthermore the driver didn't ask who was getting off where. He just drove as if it was a service bus, which on the Banchory route meant leaving the main road a few times to pass through villages, and then to go to several stops around Banchory, although we all eventually got off in the town centre. Combined with the failure to leave early when he could have, this was disappointing. If there had been lots of people getting on and off, it would have felt fine, but with just a few it wasn't.

The next morning I contacted the APA Customer Services Manager and described this situation. That evening it was much better. The bus left 9 minutes after the show came down, immediately we were all on board. It made a big difference to how it felt – as though the bus was your taxi rather than a service bus. Moreover the driver checked who was going where: we and one other group to Stonehaven and two couples to Portlethen. Again, this made it feel more like your own service. I had the sense that this bus driver was more imaginative and had grasped the aim of the project than his colleague – or maybe just had more seniority and was able to ignore the standard approach.

In addition, the Stonehaven bus followed a more direct route through Aberdeen rather than a longer route the previous day. Like the sleaziness of the walking route to the station, this is a function of the geography of Aberdeen and Aberdeenshire. To get to Banchory involves going along smaller streets through quite a lot of Aberdeen and then a sinuous and at times narrow road along Deeside, whilst the route to Stonehaven is shorter to get out of Aberdeen and then a fast dual-carriageway with few potential stops. These are the elements to the system that would be very difficult to change.

n. Personal observation of the TheatreBus operation: Comfort/safety

On our first night in Aberdeen we walked along Union Street at about 9.30pm. It wasn't particularly rowdy although there were signs it was getting noisier. The restaurant we had eaten in had been quiet, unusually so the waiter said, although as time went on more people arrived – several groups of men in their thirties having a curry, so classic drinkers/eaters who might be a bit intimidating to older bus-passengers.

Then walking along Union Terrace to go to the theatre half the street lights (almost precisely) were out so it was very dark and uninviting – my wife said she'd think twice about walking along there. Later talking to an usher at the theatre he said that a cafe staff member (male) had twice been propositioned by prostitutes when he was walking home along Union Terrace at about 8pm (although I question whether this wasn't the section of Union Terrace nearer the station).

The Banchory bus was a bit chilly when we got on, although it warmed up, and quite rattly when we were travelling – it was a local bus rather than the coach sort we had got into Aberdeen. It didn't feel as though you were finishing off your evening in style – not like travelling home in your own BMW, for example. Once it got going it was warmer. Again, the Stonehaven bus was a bit nicer.

o. Personal observation of the TheatreBus operation: Cost

The TheatreBus rate of £3.50 return compared favourably with what most people were paying, which varied depending on where they got on. Of the people on the bus from Banchory into Aberdeen, perhaps two thirds paid in cash (and so could benefit if they used the Stagecoach offer of free inward travel) whilst the remainder used concession cards or bus passes, meaning that any use of the TheatreBus later would have involved an additional cost. On the way in from Stonehaven the proportions were similar, and I saw two people having to educate the driver about their being able to use the TheatreBus tickets to claim their free inward travel: he accepted their

argument although he clearly didn't know about it. I discovered later that it is a policy of Stagecoach to always give passengers the benefit of the doubt in such cases.

iii.   Running the project: sales figures

By the end of November I had figures for the total tickets sold for the TheatreBus service. The following table and charts provide some details.

Route	Friday sales	Saturday sales	Total sales	Average passengers per bus
Stonehaven	28	27	55	5
Banchory	21	8	29	2.8
Inverurie	4	17	21	2
TOTALS	**53**	**52**	**105**	**3.4**

Table 7: TheatreBus bookings by destination

Table 7 shows that overall the sales were very disappointing. The most successful route was Stonehaven, which may reflect my own experience on the buses: Stonehaven was an easier, quicker journey, whereas the Banchory road winds more, making the bus journey less comfortable and longer, with more stops and probably a greater difference in time between the car and the bus. There are also fewer service buses to Stonehaven than to Banchory, which is relatively well served. Inverurie was less successful still, perhaps because there is a train service, perhaps because there is a smaller audience base on that route.

Figure 34 below shows that ticket sales did increase over the course of the project, showing increased frequency of bookings, even if the numbers per performance didn't increase consistently. And Figure 35 shows that there was a gentle but consistent upwards trend in sales for the Stonehaven route with a more or less flat trend for Banchory and a gradually diminishing popularity in the Inverurie route. The numbers are however small, making the reliability of these trends weak.
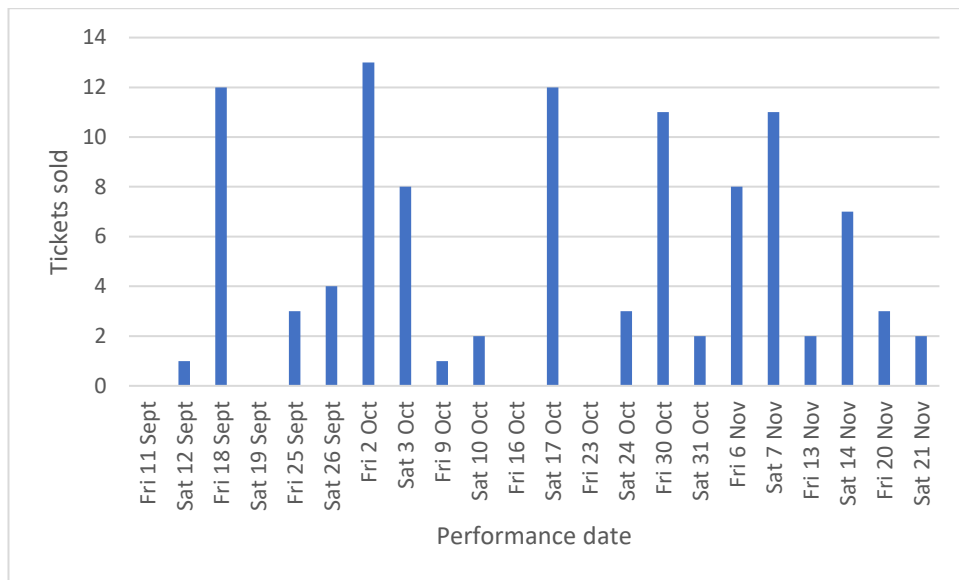
Figure 34: Number of bookings by performance date
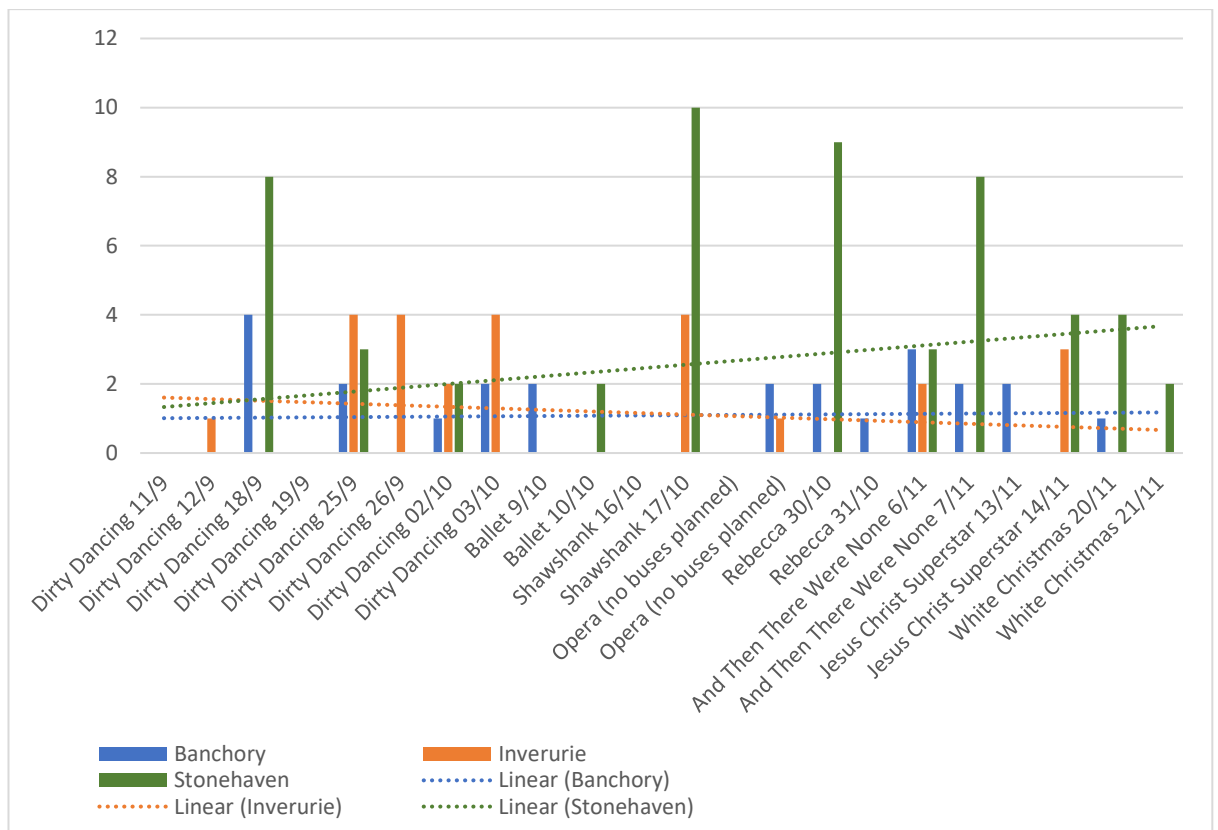
Figure 35: Total sales per performance showing destinations and trends

Although the Marketing Manager and I had thought the musical Dirty Dancing would prove a good starting point for the project, the charts show that in fact TheatreBus sales were low for that production and in general they were lower for musicals than for 'straight' theatre, ie drama: the average for a

performance of a musical when there were any sales was 4.4, whilst for drama it was 7.3.

The poor sales for Dirty Dancing may have influenced the trend, as after its run ended the sales did increase overall. The trend may therefore be a function of the production as much as increased awareness of the service, for example.

iv.   Running the project: User and non-User Survey

Surveys were sent by email in the week following the relevant performances to those TheatreBus users for whom the Box Office had email addresses and to those (roughly 2000) attenders at the relevant performances for whom the Box Office had email addresses and whose postcodes indicated that they lived on or near one of the three TheatreBus routes. From the survey of both TheatreBus Users and also theatregoers at the same performances who hadn't booked for the TheatreBus I gathered the following results. 22 Users and 213 non-Users responded in total: a roughly 20% sample of the total 105 who used the TheatreBus service and around a 10% response rate from those non-TheatreBus Users who were surveyed.

a. Running the Project: Non-Users survey

Although 115 of the 213 of those non-Users hadn't heard of the service before coming to the theatre that day, there were 121 responses to the next question, about why they hadn't taken the service although they knew about it. This may be because some who had not heard of the service answered in error, or because the survey allowed respondents to give more than one reason: it is not possible to tell from the data the survey method produced. 56% of these said they hadn't booked because the routing didn't go close enough to them (Figure 36). A few said it was too expensive or too slow, reasons that could be included in the 'convenience' bracket.
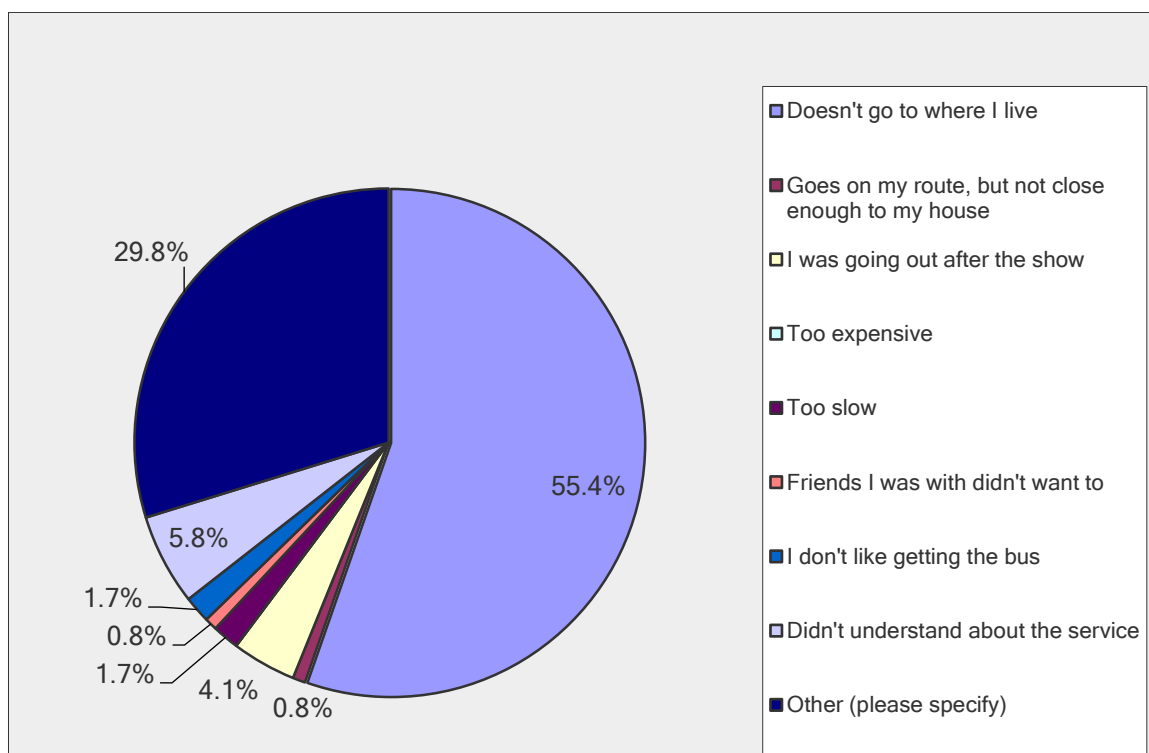
Figure 36: Non-Users' reasons for not using the service (121 responses, but this may represent fewer individual respondents as more than one reason could be given)

Of the 39 who responded 'Other' and gave a more specific answer, a further 11 could be categorised as 'route not suitable', making a total of 78 (64%) responses giving this reason, and 8 gave a reason why they had to or were already using the car – heavy shopping, they were coming from somewhere else etc. Two had a bus pass and so used the service bus and two wished they had used the TheatreBus because they missed their service buses and had to wait! Three quarters of the responses to this question therefore provided a specific reason not to use the service, and only a quarter of respondents seemed to know about it but chose not to use it for some other reason of 'convenience', dislike of public transport etc. What might therefore be called a 'non-dislike' of the concept of the TheatreBus, even if it didn't perhaps suit individual respondents, was backed up by over one third of those who *hadn't* been aware of the service before thinking that they might use it in future, with another third uncertain and a third thinking they wouldn't (Figure 37).
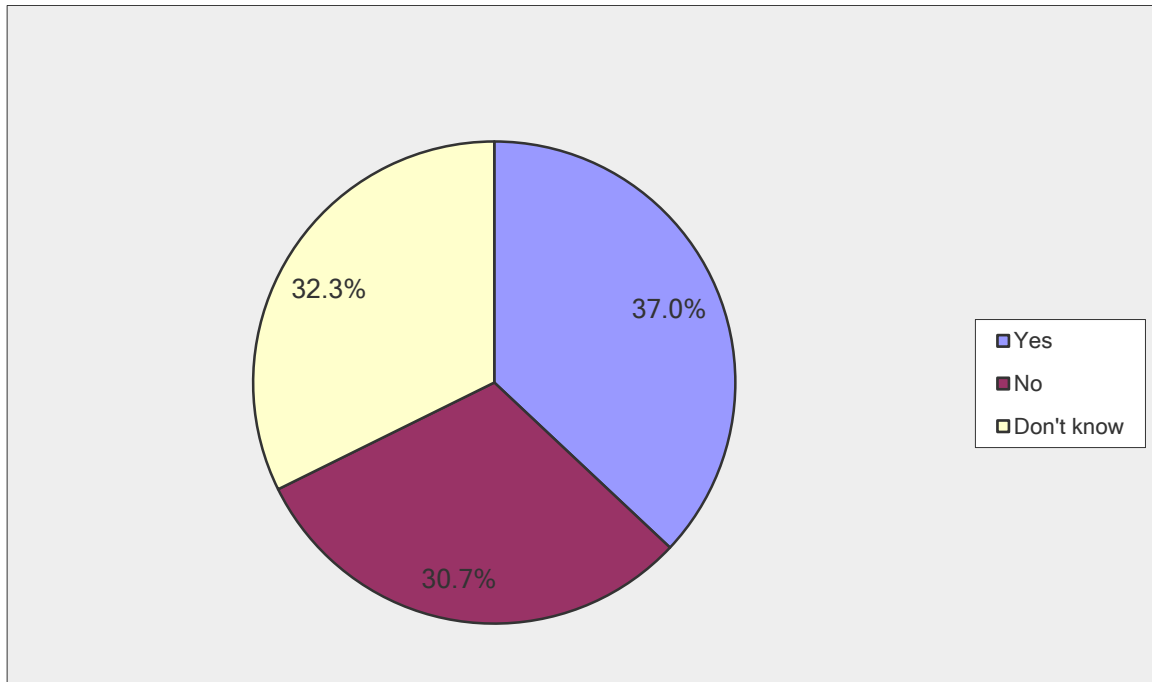
Figure 37: Non-Users' interest in TheatreBus in future (164 respondents)

When asked what they found appealing about the TheatreBus service, and so perhaps which factors would encourage them to use the TheatreBus in future, over 36% of the 164 respondents said that the fact that they wouldn't have to walk to or wait at a bus stop or station was appealing, whereas 3% and 2.4% respectively said the service would be Safer than and Nicer than normal public transport (Figure 38). This backs up the importance that the focus groups placed on safety and 'comfort' or security. Of the 41 responses which said 'Other' and provided more information, 10 favoured not having to deal with parking issues and 7 valued the fact that they would be able to have a drink, again backing up the focus group discussions.
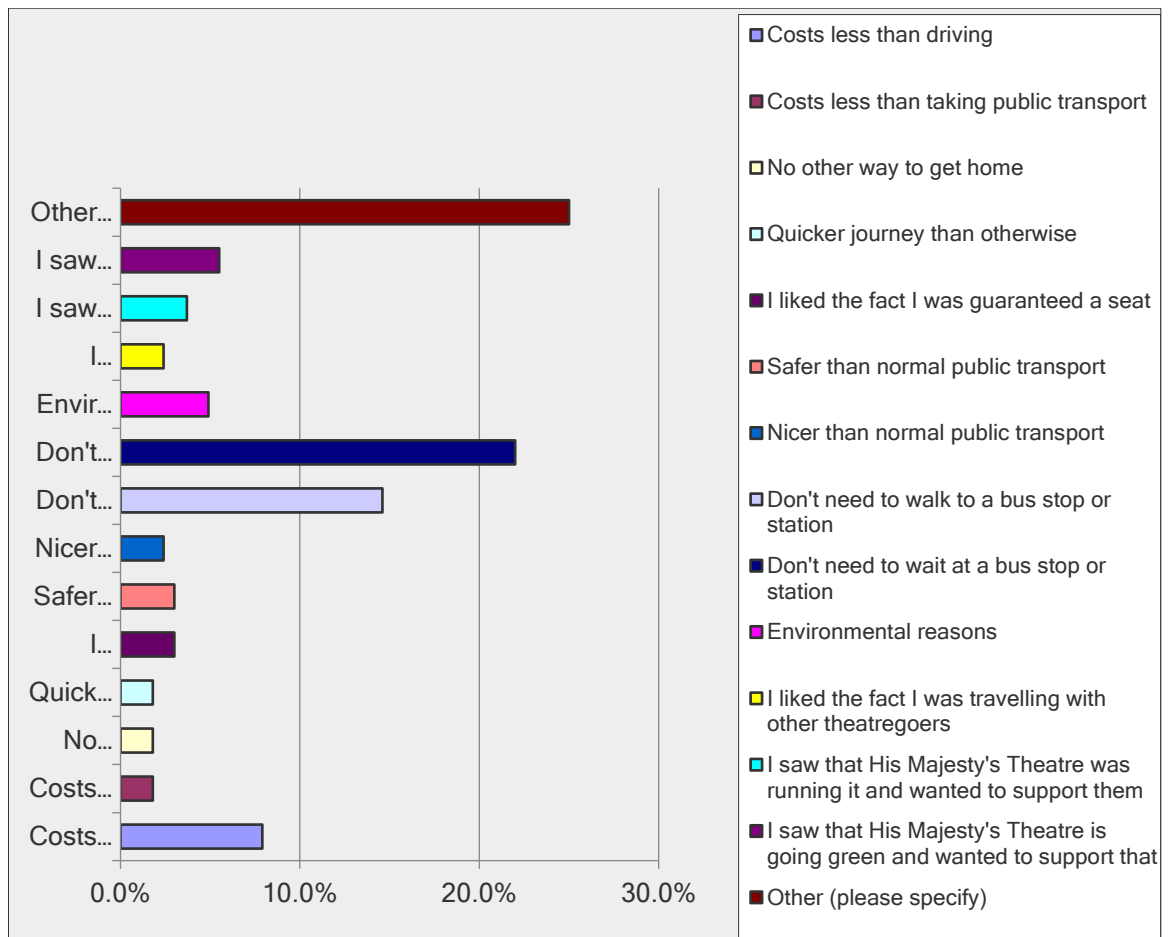
Figure 38: Non-Users' interest in different benefits of the TheatreBus service (149 respondents)

Of 149 respondents who answered the question 'What would encourage you to use the TheatreBus, 70 (roughly 1/3 of all the respondents) gave an answer related to the service going near their home, suggesting the service was appealing, but may not be feasible (although a large proportion of these respondents wanted the bus to go towards or to Ellon). Only seven mentioned the price as a barrier.

p. Running the project: TheatreBus Users survey

The 22 respondents who completed the survey for those who had travelled on the TheatreBus probably represent more than 21% of the total users, since most people go to the theatre with others, and the survey will only have been sent to one member of the party. Nearly all the users travelled to one of the main destinations and only one alighted within Aberdeen itself, confirming that the service was mostly of use for Aberdeenshire residents.

76% of the respondents walked home from where they got off the bus and 24% drove or got a taxi (Figure 39). Combined with the fact that most of the respondents alighted at one of the main destinations the high proportion walking points to the main benefit of the service, that it allows you to avoid the car altogether. However the fact that 24% of respondents drove home after getting off the bus perhaps highlights the problems of parking and the concerns about walking back to their car in the city: people were prepared to undertake a slightly longer and more 'inconvenient' total *journey* in order to avoid a greater inconvenience overall. They didn't want to have to find and walk to a parking place, or to leave the theatre early and wait a long time to get out of the car park.
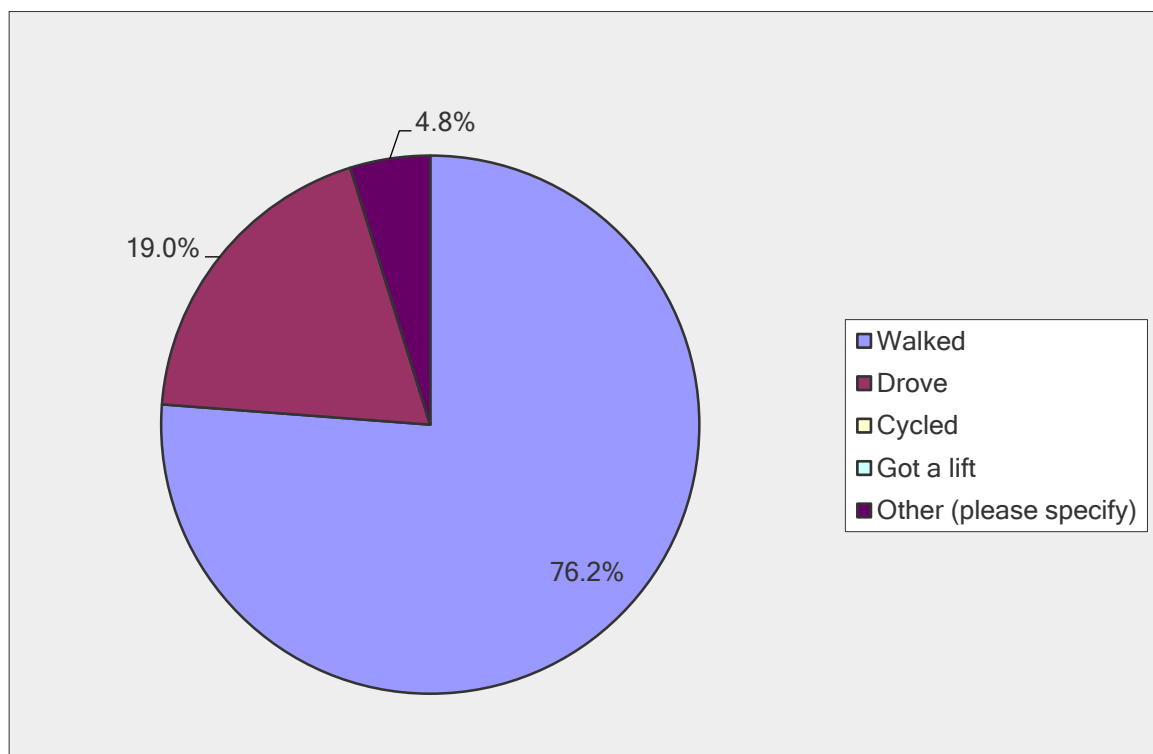
Figure 39: How TheatreBus passengers travelled from the bus stop to their final destination

A few respondents indicated that the availability of the TheatreBus service encouraged them to go to the theatre, and nearly half responded to suggest that it might have had an effect: convenience in whatever form would seem to make a difference (figure 40).
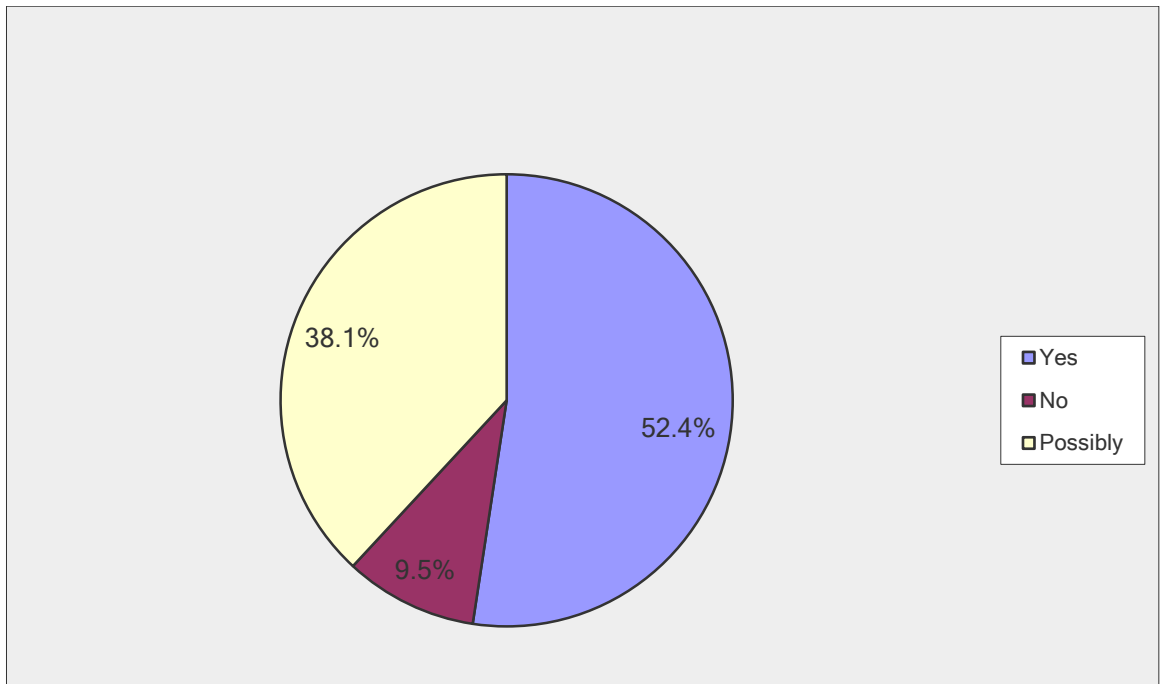
Figure 40: If the TheatreBus wasn't available, would you still have gone to the theatre?
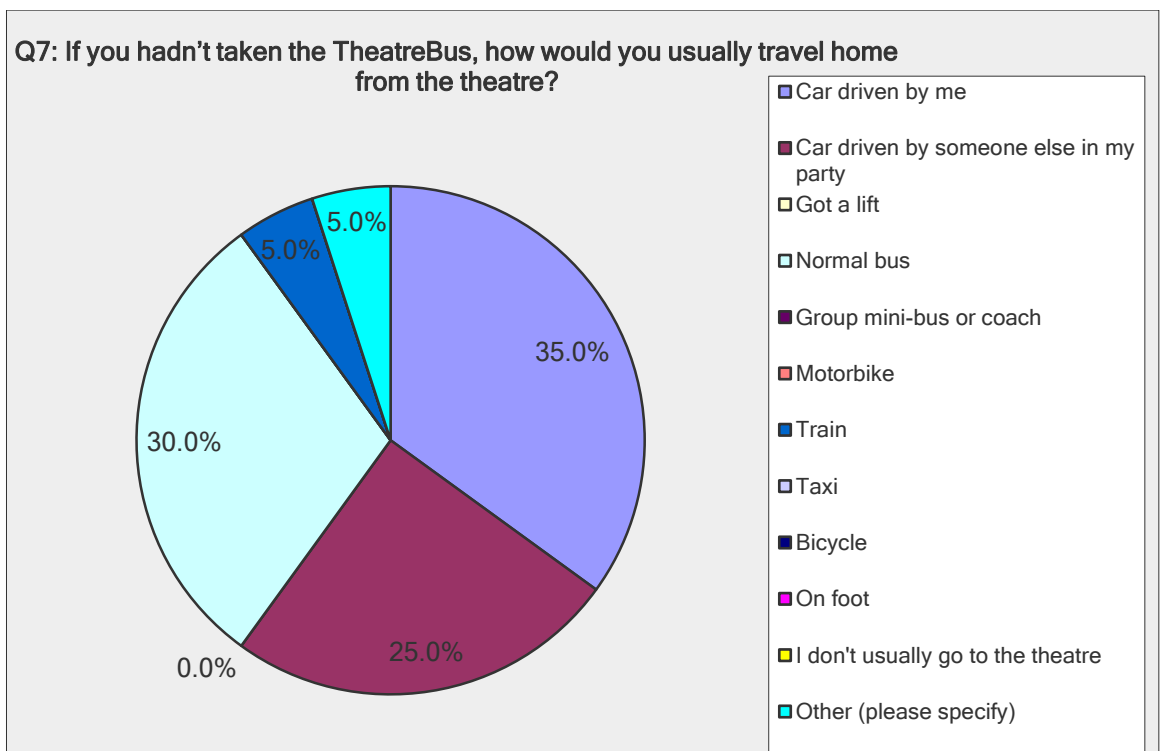
Figure 41: How TheatreBus users would normally travel home

60% of TheatreBus users would normally have travelled home by car (figure 41), with the one person who responded 'Other' specifying that they would have travelled by '*Bus Taxi or Car depending on event*'. This is therefore a

proportion slightly below the overall car-users amongst the wider travel survey and the same as those in the 'intended travel mode' survey earlier in the project.

When turned into actual numbers, these figures are obviously small and whilst the sample represents a good proportion of the TheatreBus users, it is too small to draw wider conclusions from the survey to apply to the larger number of people who didn't use the service. Overall however it seems that the service did encourage people to change their travel mode rather than simply take a more convenient bus service, and that convenience in some form contributed to that decision.

v. Running the Project: Phase 2

An encouraging indication that the TheatreBus project was making a difference to the system came when, despite the low sales, the partners encouraged me to run a second phase of the project, which hadn't been in the original plan. This section describes the implementation of Phase 2 in rather less detail, partly because the practicalities were similar but partly because, as I will describe, the system now didn't need as much input from me.

a. Developing Phase 2

In December I travelled to Aberdeen to meet with the APA Marketing Manager and Box Office Manager. I took notes and recorded the meeting.

We discussed the running of the project, the results of the surveys, anecdotal evidence from the box office staff and the effects on APA as an organisation, if any, of running the project. Both the APA staff felt that the project had been very positive for them and for APA as a whole. This was borne out at another meeting I held the same day with many of the APA staff as part of a separate project related to their capital project to refurbish the Music Hall. The subject of the TheatreBus project was mentioned positively a number of times by staff members as an example of how the organisation could change as it went through and came out of the refurbishment process.

We discussed the low up-take but their view was that we needed to promote it better, there would be slow growth, and we needed to 'activate the don't knows'.

The Box Office Manager passed on his anecdotal evidence from his staff:

a. Informal car sharing seemed quite common already amongst the audience
b. Lots of people had already made travel plans when they bought their tickets
c. Many people had bought their tickets before the bus was on the system
d. But there had been nothing but positive feedback from customers, whether or not they planned to use the service

We discussed the fact that we had all been busy (the Box Office Manager had been off on Paternity Leave and as a new father was currently stretched), which might have affected the amount of time we had given to the project and accordingly the degree and quality of the promotion. They understood intuitively the characteristic of the complex system that this represented – that there are always other, seemingly unrelated, considerations that affect a project. We also hadn't had as much help as we would have hoped for from Stagecoach, but this might well have been because they were equally busy and we hadn't had time to press for more help.

We discussed the effect a project like this had on the overall APA organisation. The Box Office Manager thought that it had a ripple effect in that people learned what worked and also how to interact with other members of the organisation. This was particularly useful for newer members of staff, who learned about the organisation. He thought that the same was true of another new project APA had been working on, True North, where similar issues had arisen from doing something for the first time (in that instance, commissioning singer/songwriters to create new work).

Both commented on the fact that there had been glitches in the system early on, working with Stagecoach, but that these had been ironed out and the relationship and the system had developed well so that it all worked smoothly

after a few weeks. They thought that these early and quite minor glitches might actually be helpful: they allow you to learn things without the issues being large enough to cause serious problems. This helps avoid those more serious problems later on. This bears some resemblance to a point of Ostrom's in Governing The Commons (Ostrom, 1990) where she discusses how systems for collective action evolve. Minor problems are overcome in a measured way, alerting the group to the potential for that problem to occur but without causing too much strife or leading to a collapse in trust.

Shortly after this I wrote to and then had a conversation with the officer at Aberdeenshire Council. Although he was disappointed in the number of audience members who hadn't heard about the TheatreBus service, he was not worried about the low number of TheatreBus users as he recognised that it was a new public transport project and that these always take a long time to build a customer base. He was sufficiently pleased with the project to continue it, using what remained of the funds he had allocated to it to support a second season. Surprised, I convened a meeting at HMT in January 2016 of staff from APA, Stagecoach and Aberdeenshire, alerting everyone in advance that we were considering running the service again.

b. Running Phase 2: Meeting with Project Partners

The meeting was lively and positive and felt very different to the planning meeting we had had with the same partners before the first phase (see p164 above). Although that meeting had been friendly enough it had been driven by the APA Marketing Manager and me, providing and seeking information, ensuring that everyone understood the project. We felt more like purchasers of a service from Stagecoach and, to a lesser extent, recipients of a grant from Aberdeenshire rather than equal partners in a joint enterprise. At this meeting, which interestingly saw the Stagecoach and Aberdeenshire Council representatives coming to HMT for the first time, everyone was chipping in ideas, commenting on how to make things work, disagreeing where relevant and offering their own resources to make the project better. For example, additional publicity materials and effort were offered by both Stagecoach and

Aberdeenshire in recognition that the main issue was raising awareness of the service. The tacit knowledge of Stagecoach and Aberdeenshire Council was also very clearly being applied to the project in relation to the choice of routes and Stagecoach's experience of running special buses for football matches and other events. Aberdeenshire Council's use of Twitter to publicise bus services in a recent flooding event had been very successful and they offered to use the same approach for the TheatreBus. The APA staff contingent was also larger, with the Box Office and Customer Services Managers taking part and meeting the Stagecoach and Aberdeenshire Council representatives for the first time.

We agreed that we would continue the TheatreBus service for a second season of Fridays and Saturdays between March and July 2016. The routes would be to Stonehaven and Banchory and we would swap the service to Inverurie for one to Ellon on the northern route out of Aberdeen up the coast, as Ellon had a poorer public transport service and the Stagecoach and Aberdeenshire representatives advised that it would be more likely to succeed. We would improve the images used in the publicity and APA and I would decide when to start the service, taking into account that Stagecoach could mobilise quickly and it was marketing and public awareness which would take more time. We identified where there had been glitches in communication early on and we agreed to some changes to the system to improve it, including getting clear about the point on a Wednesday when buses needed to be cancelled if there were no bookings and that we would from that point on only sell tickets for buses which were guaranteed to run. Importantly the APA team agreed to pass the project on from Marketing, which is where the work had previously been focused, to the Box Office and Customer Services team once the initial planning had been done. Fewer people being involved would mean there was less chance of mis-communication. The project and the system were beginning to be normalised.

Following the meeting the APA Marketing Manager and I went through the process again of identifying the right performances with which to work.

However there was a big difference between the first time and this time in the amount of work I had to do as project manager, and with whom I was in touch. I received 10 project emails from the APA Marketing Manager between the meeting and the end of the season, compared to over 70 during the first season. The relationships between the partners were different: many more emails went direct between the Box Office and Stagecoach, with the Marketing Manager and me copied in but not required to take any action. Overall it was a much smoother affair which had its own momentum. During the first season I had had to keep putting energy in to keep things going: checking that bus timings had been communicated, ensuring that flyers were available at the box office. This time that wasn't necessary.

Despite the smoother organisation, sales were not particularly strong or better than the previous season, as shown in Table 8.

Route	Friday sales 2015	Friday sales 2016	Saturday sales 2015	Saturday sales 2016	Total sales 2015	Total sales 2016
Stonehaven	29	23	26	23	55	46
Banchory	17	16	5	21	22	37
Inverurie	8		16		24	
Ellon		7		18		25
TOTALS	54	46	47	62	101	108

Table 8: TheatreBus bookings by day and destination, 2015 vs 2016

c. Running Phase 2: User survey

The APA Marketing Manager ran a survey of those who used the 2016 TheatreBus service for whom the Box Office had email addresses. The number of respondents at 20 and the results were broadly similar to the 2015 survey as shown in Table 9 below. Again they demonstrate that the service was successful in moving people from car to public transport.

Question	2015 results (21 respondents)	2016 results (20 respondents)
How did you get from the bus stop to your final destination?		
Walked	76.2%	80%
Drove	19%	20%
Other	4.8%	0%
If the TheatreBus wasn't available, would you still have gone to the theatre?		
Yes	52.5%	65%
No	9.4%	5%
Possibly	38.1%	30%
If you hadn't taken the TheatreBus, how would you usually travel home from the theatre? (*NB in the 2016 survey respondents were able to tick more than one travel mode*)		
Drove myself/got a lift	60%	90%
Bus	30%	35%
Train	5%	10%
Taxi	0%	5%
Other	5%	5%

Table 9: Comparison of 2015 & 2016 TheatreBus User survey results

I included some additional questions in the 2016 survey to probe more deeply into respondents' reasons for taking the TheatreBus and what would make it more successful in future. The results confirm the views expressed in the focus groups with half of the respondents saying that the main reason they used the TheatreBus was to avoid walking to or waiting at a bus stop or station or because the TheatreBus was safer than normal public transport (Figure 42 below). Interestingly 20% wanted to support the theatre's running of the project, demonstrating the loyalty which patrons feel for 'their' theatre, which could be useful in advertising such a project in future, and a further 5% wanted to support HMT's attempts at going green. The two 'Other' responses both mentioned the fact that the TheatreBus meant they could have a drink because they were not driving.
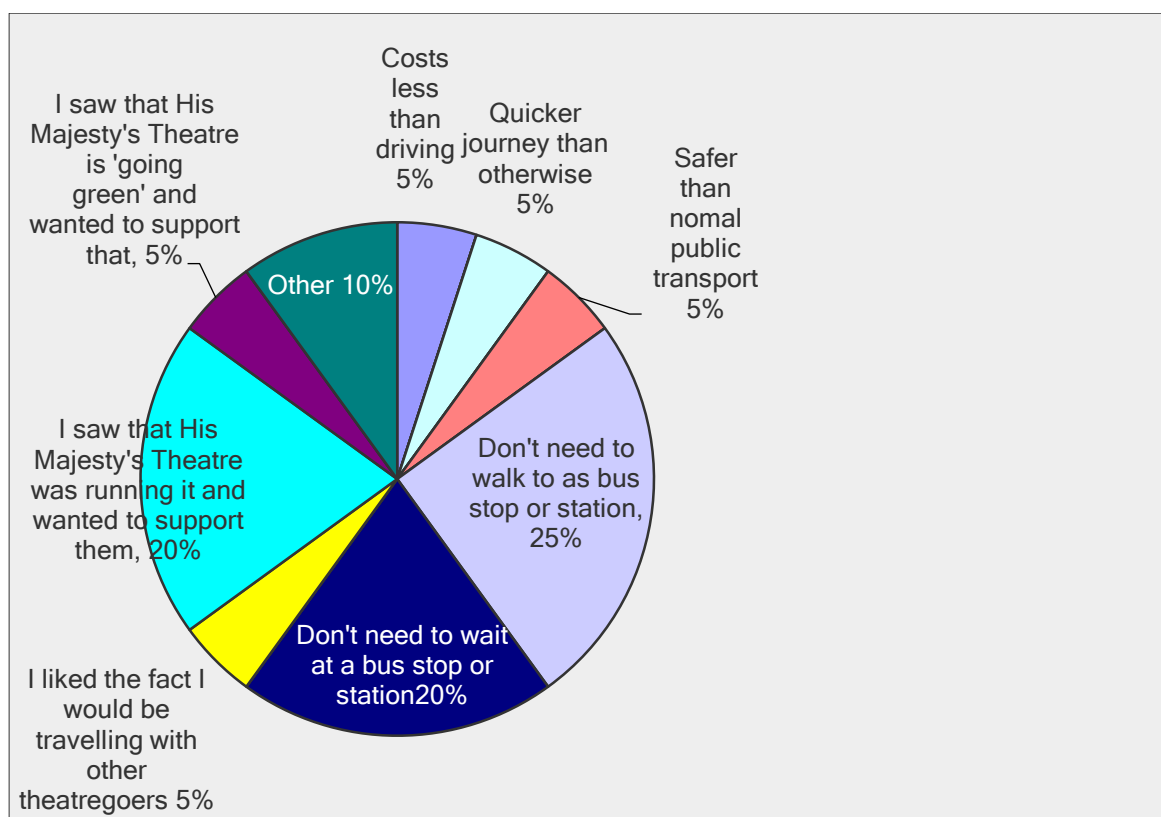
Figure 42: Main reason for deciding to take the TheatreBus

These findings were backed up in a further question which asked respondents to list *all* the reasons why they decided to take the TheatreBus (see Table 10 below). There was much support for His Majesty's, with 80% of respondents ticking this answer, and most respondents keen to avoid the walk to or wait at a bus stop or station. Safety and 'niceness' also registered well. Cost was not a particular issue, although in a later question about what users didn't like about the service two respondents said it was too expensive. In later questions 90% of the users said they would take the TheatreBus again and, in response to being asked what they liked about the service (Table 11 below) ticked the box for 'convenience' and 78% said they liked to be able to have a drink at the theatre.

Answer Options	Response Percent	Response Count
Costs less than driving	20.0%	4
Costs less than taking public transport	10.0%	2
No other way to get home	0.0%	0
Quicker journey than otherwise	35.0%	7
I liked the fact that I was guaranteed a seat	35.0%	7
Safer than normal public transport	20.0%	4
Nicer than normal public transport	45.0%	9
Don't need to walk to as bus stop or station	65.0%	13
Don't need to wait at a bus stop or station	65.0%	13
Environmental reasons - "greener" than going in a car	45.0%	9
I like the fact I would be travelling with other theatregoers	20.0%	4
I saw that His Majesty's Theatre was running it and wanted to support them	80.0%	16
I saw that His Majesty's Theatre is 'going green' and wanted to support that	30.0%	6
Others in my party were taking it	10.0%	2
Other (please specify)	25.0%	5

Table 10: All reasons for deciding to take the TheatreBus

Convenient	83.3%	15
Friendly	72.2%	13
Cheaper	22.2%	4
Makes the evening last longer	5.6%	1
Nicer/safer than public transport	50.0%	9
I can have a drink at the theatre	77.8%	14
Greener	38.9%	7
I get home sooner	61.1%	11
I like the fact I am guaranteed a seat	61.1%	11
Other (please specify)	16.7%	3

Table 11: What users liked about TheatreBus

Managing the Project: conclusions

This second season of the TheatreBus therefore broadly replicated the findings of the first one. The project could not be described as a great success: the number of users was too low and we didn't succeed in moving many people from their cars to the bus service.

However the continuation of the project from the Phase 1 to Phase 2 was an unexpected bonus and demonstrates support for the project not only from APA, which had helped initiate the project, but also from Aberdeenshire Council, which was funding it and so showing real support, and from

Stagecoach, which although not profiting significantly from it, still felt it worthwhile to participate. Moreover, relationships had improved between the partners, genuine participation had increased and logistics and communications had become much smoother. The project became demonstrably replicable.

The feedback from users did indicate that the service was popular and most of those who had used it would otherwise have been car users. The surveys, although with relatively few respondents, give confidence about the design of the intervention being popular with actual and potential users and addressing many of the issues raised by the focus groups. The project had attempted to increase 'convenience' and to avoid the concerns that theatregoers have about walking to or waiting at bus stops and stations, and the feedback indicated that in these respects it had been successful. The surveys suggest that if the TheatreBus service could be continued with improved marketing, and so increased awareness, and serving areas with sufficient numbers of potential theatregoers, it could move people out of their cars and on to a TheatreBus. There was limited evidence to suggest that the availability of the TheatreBus service might attract people to attend the theatre who otherwise wouldn't, which is good for both the theatre and for the bus provider as well as for the project overall.

Whether the experiment had succeeded in changing the system within which theatregoers operate when they travel to and from the theatre is not however something the surveys tested. Whether or not a survey could test it is uncertain: how would you ask a user whether the complex system of which they are part has changed? The evidence from the meeting with the APA staff in December 2013 demonstrated that even with some time to explain the concept of the complex social system, members of staff found it confusing and difficult to think about.

By the end of the 2016 summer season Aberdeenshire Council's money for the project had run out and without sufficient numbers of users it was not possible to discuss continuing the TheatreBus service any further. The final

stage therefore was to evaluate the success of the project itself, rather than the TheatreBus service in particular, as described in the next chapter.

Chapter 9: Evaluating the TheatreBus Project

With the conclusion of the TheatreBus project the final part of the research was to evaluate the effects of my intervention in the complex system. I needed to find out whether the system had changed, or, taking a theory of change approach, whether there were indications of likely future changes. I should stress that it was not the success of the TheatreBus project that I was evaluating but whether the complex system within which theatregoers travelled to HMT had changed.

I evaluated the project in two ways: with a post-project travel survey aiming to compare the results with the original one in 2014; and with post-project interviews with key individuals from the project partners. The latter provided the more interesting and useful data because it elicited more accurate information about whether the system had changed, as the partners were important agents within it.

a) Evaluating the Project: End of project travel survey

In Spring 2017 the APA Marketing Manager ran another survey of audience members about their travel to and from the theatre, to compare with the original survey conducted in 2014. The response to the survey was good, with 1491 responses being received. As noted above (p103-4) some responses covered more than one visit and so the data was used to create 2026 responses relating to individual visits. The survey was run during a period when the TheatreBus service was not being offered.
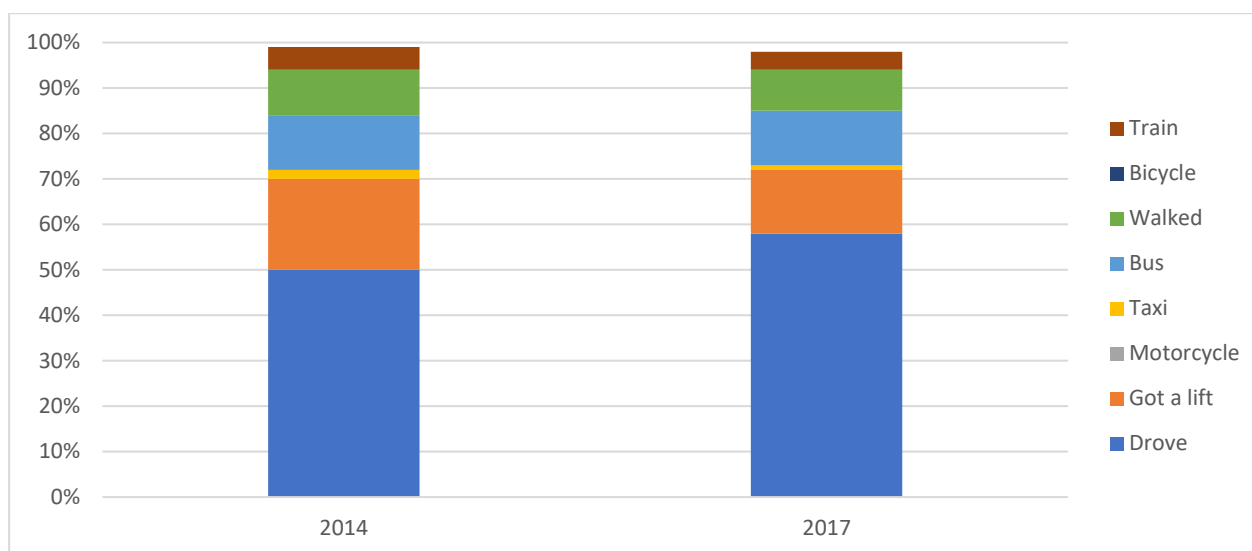
Figure 43: What was your main form of transport to get to the theatre? (2014 vs 2017)

The results (Figure 43) show that little had changed since the original survey in that 72% of the audience arrived at the theatre by car (70% in 2014); 9% had walked (10%); 12% took the bus (12%); and 4% by train (5%). Since the survey was conducted at a time when the TheatreBus wasn't running, this is not surprising: the factors influencing their decisions would not have changed greatly since the original survey. Similarly Figure 44 shows that the overriding consideration when choosing how to travel was again the 'convenience' of the travel mode chosen (79% of the total responses in 2017 and 78% in 2014), but as discussed above this could mean that the mode was the least *in*convenient of those available, and 'convenience' has a range of nuanced meanings.
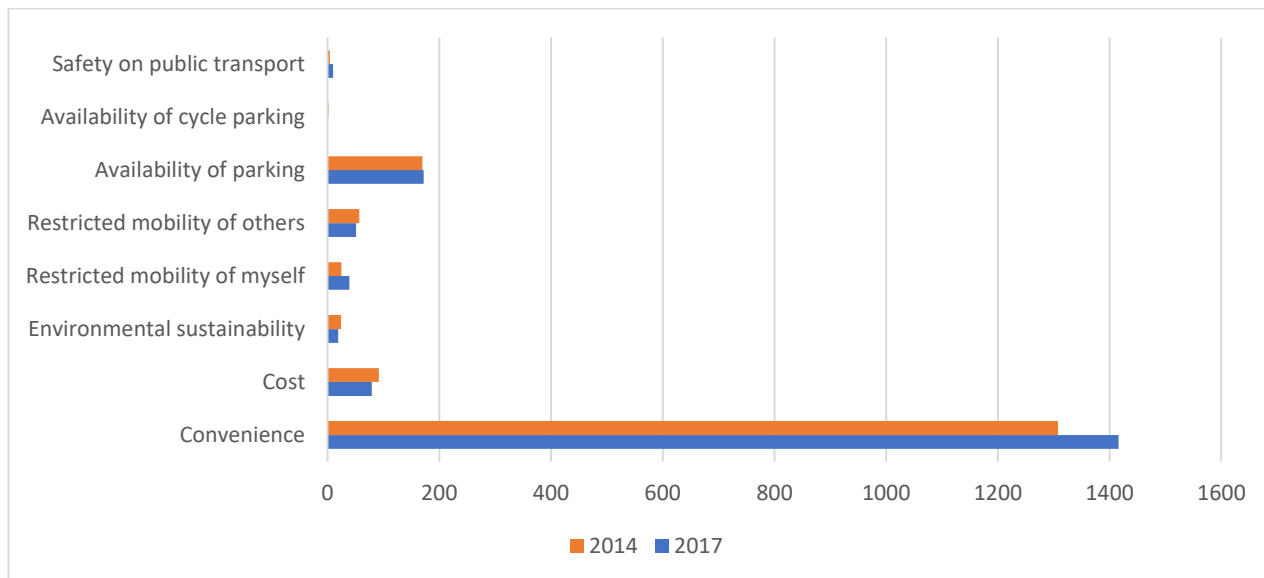
Figure 44: Main consideration when choosing travel mode – 2014 (total 1682 responses) vs 2017 (total 1787 responses)

This is borne out by a closer analysis of which category of traveller gave which response. Table 12 shows that whilst most of those who travelled by car cited 'Convenience', presumably because they found that mode most convenient, so did many others, some of whom will also have had access to a car but clearly didn't find it so convenient. And the availability of parking is presumably a positive factor for those who travelled by car, but a negative feature for those who chose to travel by other means.

	Drove	Lift	Bus	Train	Taxi	Walked
Convenience	861	196	129	67	22	147
Cost	31	6	31	4	1	6
Restricted mobility of self	24	8	7	1	1	0
Restricted mobility of others	37	11	3		2	0
Availability of parking	112	28	24	4	3	8
Safety on public transport	5	2	4	0	0	1
Environmental	0	0	11	0	0	8

Table 12: Main consideration when choosing travel mode by actual travel mode (2017)

Figure 45 shows that the majority of respondents were not actually aware of TheatreBus. And out of 224 comments made about TheatreBus in a free text box option, 67 said that it didn't operate in their area (or they assumed it

would not) and 39 said they had used it or would like to use it in future, suggesting again that a better-known service which did go to the right areas would attract users.
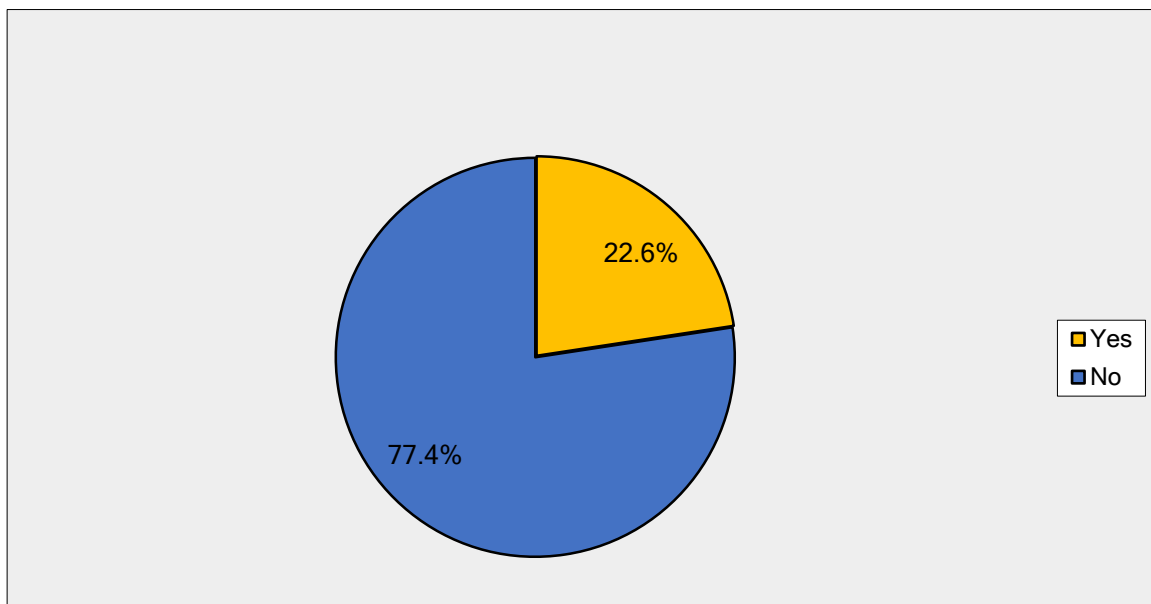
Figure 45: Are you aware of the TheatreBus scheme which was piloted during 2015 and 2016?

Figures 46 and 47 provide some idea of what would encourage theatregoers to travel more sustainably. The percentage responses are very similar to those in the 2014 survey.
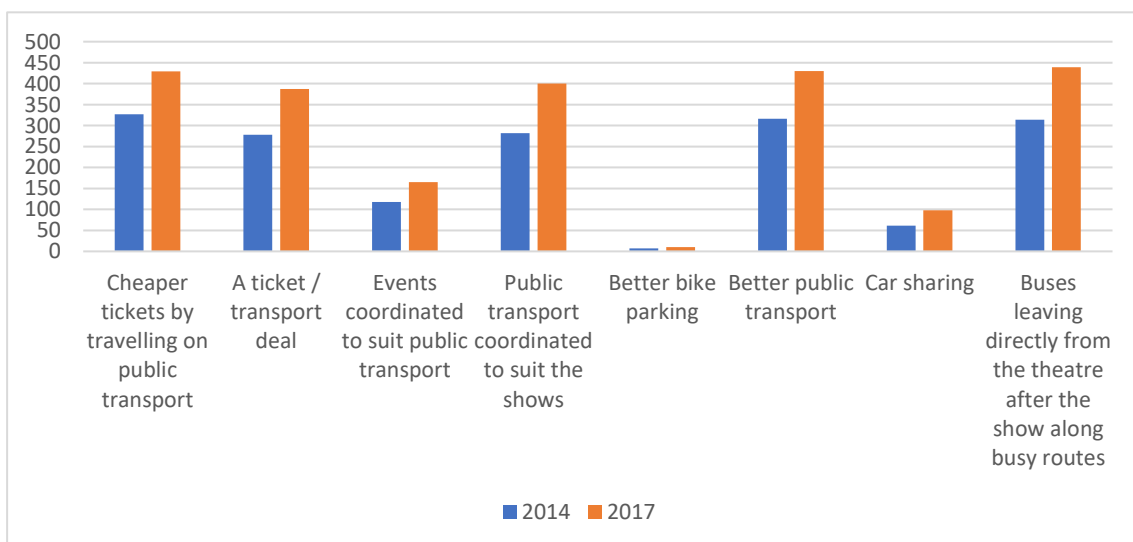
Figure 46: What would make you consider travelling to His Majesty's Theatre in a more environmentally friendly manner? (Actual numbers of responses: respondents could choose more than one response)
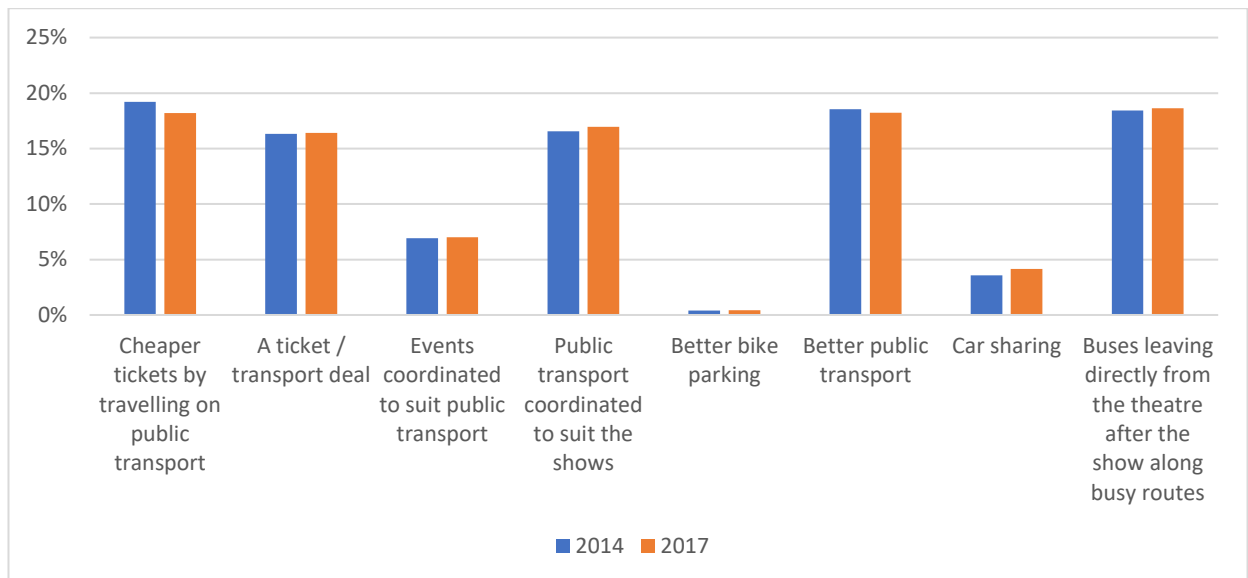
Figure 47: What would make you consider travelling to HMT in a more environmentally friendly manner? %ages of total options chosen

i.   Evaluating the Project: End of Project Travel Survey conclusions

Although the survey doesn't seem to indicate that the attitudes of those attending HMT to how they travelled had changed after the TheatreBus project, this was not quite what the project aimed to do (although such a result would have been a great success). A project aimed at changing theatregoers' attitudes – a more standard 'behaviour change' approach – would have focused more closely on the individual attenders, providing information, incentives etc to motivate a change in behaviour. The TheatreBus project however focused on changing the system within which the individuals were operating when they made their travel choices. This survey could not assess whether the travel choices were different because the system had changed. A survey of HMT attenders during the TheatreBus season who were widely aware of the service might have done so, and the closest I have to that is the combination of the Users and Non-users surveys discussed above (p178). In retrospect, the final survey was undertaken at the wrong time, and indeed if we had run it when the TheatreBus service was running it might have helped promote the service to potential users.

However, in many ways a more important question, particularly after the positive responses we had had from the partners to the project, was whether the system had indeed changed. This was explored in the second part of the evaluation.

Evaluating the Project: Interviews with Project Partners

In January and February 2017 I met with four representatives of the partner organisations to ask them about their perceptions of the project (the Chief Executive and the Marketing Manager from APA, the Aberdeenshire Council Transport Officer and the Deputy Operations Manager for Stagecoach North of Scotland). Each of the meetings took place in one of their offices and I recorded the conversation to complement my notes. Each of the partners was very happy to meet and the conversations were all very relaxed and positive. I made clear at the beginning of each meeting that my questions and the conversation were not about my involvement but about the project overall, and that the partners should feel confident about speaking freely about problems that had arisen. I was confident that they all felt able to do so, and their responses were genuine. As noted above (p78) we were professionals working together to evaluate a joint project, and so questions of competence or confidentiality did not arise.

The interviews followed the same broad structure, although the conversations flowed differently in each case. After some preliminary chat – which was often quite illuminating – I asked the following questions, aimed at eliciting data related to Byrne's questions (Byrne, 2013):

> i. **When we first started on the project, what did you think about it?**

The interviewees were all very positive about the project and in each case it fitted their own objectives. Aberdeenshire Council had received *'regular request[s] for more post-theatre buses: it often came up in surveys and at feedback sessions'* and it tied in with their priorities, to get more people to use the bus, not just for the theatre but more widely. Additionally '*it was a*

'shovel ready' project, all ready to go: we didn't have to do the planning.' For the APA Marketing Manager the project aligned with the wider aims of APA to improve its environmental sustainability (APA has an active 'Green Team') but also the customer experience. Additionally the APA Chief Executive said she was always keen for the company to try new things '*if someone has a project and it's innovative…. It's about your project but it's also about our company.'* Indeed, her interest in change was one of the reasons I went to her in the first place. In this she has some similarities to the Operations Manager at Stagecoach: '*It was a great idea, and you've got to try things. Stagecoach has always been interested in things like that…. I'm a great one for testing new markets. 9 times out of 10 it will fall flat on its face but the 10th time it will work.'*

This aligning with the partners' own slightly differing but complementary objectives may seem obvious but is worth considering in terms of working within a complex social system. Where the agents have their own trajectories and objectives the way in which they co-adapt to the presence of a new agent with countervailing objectives might be to ignore it or make it difficult for the new agent to co-exist with them: perhaps Aberdeen City Council's or FirstBus' responses to the project could be interpreted thus. In order to achieve change it may therefore be necessary to work with the objectives of the agents in the system.

ii. And now what's your view of it – has anything changed?

There was a little more divergence in responses to this question. Despite the low take-up of the service, Aberdeenshire Council and APA were generally pleased as both found the data and feedback from users and non-users very valuable. Data from non-bus users is rare for both bus providers and the Council. And both they and the bus companies they support may know where their actual passengers get on and off, but not what the remainder of their journey is or why they travelled in the first place.

For Aberdeenshire Council the project '*allowed us to address myths*' when people who normally drive took a bus. The project addressed the main perceptions about bus use: '*reliability, punctuality, frequency and clean buses: TheatreBus delivered on these: reliable (booked in advance with HMT backing it); convenient, appropriately timed and punctual (outside the theatre at the right time); clean (buses had already been cleaned that evening).*' He would run the project again – the only problem would be the finance. And, using the standard language of behaviour change, he acknowledged that '*it's difficult to nudge people out of these perceptions if they don't use buses already.*' The APA Marketing Manager broadly agreed, again speaking in behaviour change terms. The project had '*given us a lot of insight*' but '*it goes back to breaking habits and breaking… people out of a comfort zone*'. He and the Aberdeenshire Council Transport Officer thought that user numbers would increase if it were possible to continue the project: '*Feedback was always great, I don't think there was anybody who didn't think it was a good idea, through the surveys or otherwise, and I think as a whole it would grow in reputation and build.*' (APA Marketing Manager).

The APA Chief Executive was more interested in the change the project had wrought in her organisation: '*one of the things that's really pleasing for me is how it's been embraced by our team. A lot of the business of effecting major change is about people and how you can transform the culture… it's been a good stepping off point for us to discuss what kind of organisation we are.*' This suggests that one of the agents in the system has been changed by the project, which may help lead to a change in the system, as the rest of the system adapts in response. This potential for further change is illustrated by her later comment: '*I would quite like to have a conversation with the team about it, because I've heard the staff saying "Oh, I wonder if we should do this for Mamma Mia."*'

The APA Chief Executive also raised the question of timing: '*You have to have some stability and space to focus on a project like this, and in the first year [of her tenure, a period of significant change] it wouldn't have happened. And if it had happened now [four years later] it would still have been great but*

it wouldn't have been so much part of the learning curve for the staff.' Again this demonstrates that the complex system has other pressures and characteristics which may seem to be separate from the project but actually have bearing on it, and it points to the need to consider these issues when seeking to intervene in a system. I was aware when selecting the site of the research that both the Brunton Theatre and APA were going through periods of change, which made them good potential sites for an intervention, and this seems to have paid off.

In contrast, and in keeping with his own and his company's objectives, ie to gain more bus users, the Operations Manager of Stagecoach was more '*disappointed that it wasn't as successful as we wanted it to be. We did everything we could.'*

iii. What do you think worked?

The two interviewees working at a strategic level mentioned similar areas that worked well, whilst the two working on implementation had different comments. The APA Chief Executive emphasised the value of the new partnerships the project had brought (with Stagecoach and Aberdeenshire Council) and was pleased with the enthusiastic engagement of her staff with the project:

> *'The new ways of working and the partnerships that it brought to the table were really important. Being able to talk about it to different people opens doors for us and makes us a richer organisation, gives us a foothold to discuss other things, gets us known, respected, part of bigger discussions that are going on around the city. […And] the staff motivation around it: seeing a cross-departmental team of people who can be working under high pressure discussing how it would work and who would be doing what and coming up with ideas of what was the best way to promote it or manage it. And then the feedback, talking about it.'*

Perhaps reflecting this engagement, the Aberdeenshire Council Transport Officer was struck by the smoothness of the operations by APA staff and

compared their engagement with another organisation he had tried to work with: '*If we had the same level of engagement or enthusiasm as we do from APA, or even just the attitude, we could achieve more.*' The other organisation '*definitely don't see [travel by users to their site] as their issue – it's discharged to other people to sort out. They do the minimum.*'

The APA Marketing Manager focused on how he and his colleagues had learned through the project: '*What worked is how we all learned as it went on. As it was new we needed to test the water: we didn't know certain parts of it until we tried, and then once we did we were able to learn and start to work together quite quickly, both internally and then as we started working with Stagecoach and Aberdeenshire Council, we were able to figure a system out that sort of ran itself in the end'.* This demonstrates the adjustment needed to take into account other agents' needs (eg Stagecoach's need to roster the drivers for the weekend on a Wednesday). For him one of the project's biggest successes was understanding that a theatregoer's experience doesn't start and end with their time at the theatre. Framing this in complex system terms, his understanding of other elements of the system was increased: '*There's a sort of fragility with how people travel. It was the safety side of it that really struck me, and learning that we could lose a customer because of something that has absolutely nothing to do with us. That learning what really affects our audiences, not just being in here, but what happens when they're standing at a bus stop could affect their attendance with us.*'

Reflecting his much more practical role in the project, the Stagecoach Operations Manager focused on implementation: '*The way we tweaked the routes to better suit the needs.*' This was as a result of the second planning meeting when all the parties contributed more fully than at the first one: had there been more engagement by all the agents the first time round, the problem with the Inverurie route might have been spotted: '*It was the Inverurie one we dropped, wasn't it?... And that was because the 37 went past the front door of HMT and the vast majority of passengers could use their free bus pass.*' A crucial point here is that Stagecoach's knowledge was

in the system during the first phase of the project, but needed the various agents to develop a working relationship in order to be applied.

iv.   And why do you think these things worked?

All the interviewees commented that the operational side of things worked well because there was good communication, people knew their jobs and worked well together. The Aberdeenshire Council Transport Officer noted a degree of flexibility from Stagecoach that helped deal with any uncertainty about when travellers could use their TheatreBus tickets on their inward journey: *'with Stagecoach the approach from management seems to be that if you are unsure, let them on´* which was echoed by the Stagecoach Deputy Operations Manager. As quoted above, he thought the engagement of the APA management and staff with the project was important, and unusual: '*Large employers like XXXXXX, they tend to discharge their responsibilities by hiring a bus for staff and running it in the morning.'* This engagement kept the project progressing: '*The project wasn't over discussed, because there was a willingness and a drive, it kept moving at the right pace.'* He also noted that Aberdeenshire Council and Stagecoach had a pre-existing relationship that helped, another example of the complex system's history.

Like his Chief Executive, the APA Marketing Manager thought that what had made the project work, and what would have hindered it in other circumstances, was the timing: '*[It] was perfect, I think the company was just coming to the end of a transition, sort of repositioning and we were just ideally placed.'* And like the Aberdeenshire Council/Stagecoach relationship but internally to APA he cited that fact that he and his colleagues had a history that helped: 'We *work well together as a team. I know that I can rely on the Ticketing Manager, the Customer Services Manager can rely on us…. when problems arose, you could send a quick email saying 'that didn't work let's do it this way instead' and know that that would sort things out.'* These points all demonstrate that the history of the complex system, and the specific agents within it, is important.

The APA Chief Executive again brought up the timing of the project but seeing the system at its widest, saying that '*it worked because there's a bit of a zeitgeist for it too. I think the planet we live on now, we all have to take seriously all of this and have to do our bit, and I think our customers and partners know that and understand it and want to contribute.*'

These points back up my experience and emphasise the practical aspect of managing partnership projects that are successful.

v.   What didn't work?

All the interviewees agreed that the number of users had been low, and that promotion was at the heart of this, although they also agreed that most of what could be done had been done. The Aberdeenshire Council Transport Officer said he was happy with the promotion, but that it didn't work. If they were going to run the project again that is the thing they would change. He wondered about the cost of the tickets: the cost of running the bus was so low that you could almost run it for nothing, but he didn't feel that pricing was the core issue.

The APA Marketing Manager went in to more detail about the challenges of promoting the service. Although he felt he had done what he could, he wondered whether more coordinated work by the partners could have achieved more change. He referred back to a participant in one of the focus groups: '*[She] said 'I take the same parking space and reverse in each time'. She has that so set in stone as her routine, is she going to see what TheatreBus is? And I wonder if people are very set in their ways, and 'convenience' is such a big part of this, if it's something a bit different it's quite hard to break people out of that habit.*' He also described how '*You can put things in front of people but they are sort of 'snow blind'*' when they fail to notice something such as TheatreBus because it is not what they are looking for, as they always travel by car (a bit like the infamous gorilla on the basketball court (Simons and Chabris, 1999)). This was echoed by the Stagecoach Deputy Operations Manager who said, '*Once people got to that*

part of the booking process they were just ticking the box: click here and get out as quickly as possible'.

The APA Marketing Manager contrasted promoting TheatreBus with selling a musical, which people understand already. *'Advertising is about creating a response, and the response at times isn't 'I'll buy a ticket for that', it's 'I'll need to find out more about that'.'* This chimes with the comment of the APA Ticketing Manager's earlier on in the project when he said that his experience was that when a new product was introduced, most sales were made through personal contact with box office staff rather than through the web. Customers wanted information and reassurance, whereas presumably buying a ticket for one musical is like buying one for another.

vi.   Were there any particular circumstances that affected the success of the project?

Three of the four interviewees highlighted the impacts of apparently unconnected external factors on the project. The Aberdeenshire Transport Officer highlighted the challenge of changing travel patterns when other elements of the system were encouraging car travel. *'Failings of the project were outwith our control. If there were more restrictions on car use in the area, if the theatre was less easy to access, maybe it would have worked better.'* More positively he pointed out that I had contacted him with the project proposal at just the right time: *'The SCSP scheme was a bit of a rush. We had already covered our planned projects with other funding, so we didn't have anything to bring out during the very short timescale allowed by the Smarter Choices, Smarter Places (SCSP) project funding. So this project came at a good moment.'*

The APA Marketing Manager said that the Director of Marketing going on sudden maternity leave had had an impact: *'It changed the dynamic, without a doubt, how I worked changed. She would have been involved, I would as well, but she might have approached it differently. The timing as well, her going off when there was a lot picking up, with the project, the [refurbishment of the] Music Hall, our first True North which was a lot to get off the ground.'*

The Stagecoach Deputy Operations Manager said that the personnel involved changed part way through the project, and this was largely chance. I would suggest this became clear during Phase 2 of the project. '*I wasn't that involved at all in the first phase, it was only the second phase. It just happened to be because [his colleague] wasn't available the day he arranged the first meeting he sent me and I just followed it through from there. He was already in the zone for being promoted anyway, so his mind was on other things.*' In Phase 2 Stagecoach certainly made a bigger contribution to the planning, although the relationship had already grown closer during Phase 1.

However the impact on the project of apparently external circumstances arose again later on in our conversation. The Deputy Operations Manager said that my contact at Aberdeenshire Council was a happy coincidence. I had followed up the lead I had for the SCSP scheme, which happened to be being handled by my contact. The Deputy Operations Manager thought that the right contact, '*whose budget pays for subsidised services*' was off sick at that time, and that probably I was lucky because '*you would probably have more positivity out of [my contact]*'.

The APA Chief Executive meanwhile focused on a different but relevant issue for using the knowledge generated by the project to inform future interventions. She wondered whether the project would have been different in other cities, particularly considering Aberdeen's hinterland in rural Aberdeenshire and the financial inequality in the area. '*I think outside London it has the highest gap between rich and poor of any city. So there were areas that it went to that were slightly well off, but not exclusively. So when you go south, for example, it's not quite so well off as some of the north east.*' This may explain the greater uptake of the TheatreBus service on the southerly Stonehaven route.

This impact of external events and circumstances is surely a feature of all projects, but was made clearer to me throughout by the use of the 'complexity lens'. It emphasises Byrne's (2013) point about needing to understand very fully the individual circumstances of a case study, so that the

right lessons can be learned to apply to subsequent projects – which was the focus of the next question.

vii. What have you learned from the project which we could use to apply to other projects with a similar aim?

What was interesting about the answers to this question was that it wasn't the specific nature of the TheatreBus project that was important but how it was conducted as a partnership project and with which partners. This points to a topic I will discuss in Chapter 10 about the way in which complexity rears its head in partnership projects and how this needs to be managed.

The Aberdeenshire Council Transport Officer suggested that while services along similar lines have been used at the Aberdeen Exhibition and Conference Centre and AFC's football ground, of more significance is the novel way of thinking about and managing these sort of projects:

> '*The thing is how to replicate it so it works, not the operational side but more the survey, the designing the service side of it… with the likes of the NHS, the likes of business parks and major employment centres. The side of it which is easily replicated is the operational side of it. The side that is far more useful is the part that you've undertaken, the survey and the analysis side of it and what we do with the information.*'

The point here is about the management of partnership projects in complex systems. He said that at other (non-entertainment venues) the travel needs are not as time-specific: people start and finish work or visit at different times. But an equivalent project would identify particular needs for particular places. Although the Council doesn't run buses, they could discuss the data with Stagecoach to see how they could collaborate. But – and this is crucial – this would need the engagement of the parties triggering the travel, whether that be shoppers, workers, NHS patients or whatever.

The APA Chief Executive also talked about *how* the project was operated rather than where or the specifics of it. She was clear that she saw APA – and indeed the arts sector generally – as needing to collaborate with more partners from other sectors. Going further she argued that '*that's the whole*

thing the arts is all about…We developed a model, in the sense that it brought a team of people together and the way that we made it work. So that's got to be something that you can apply to other scenarios or projects, including environmental projects, in the way you do it.'

She took this further in a description which is relevant to the use of the knowledge generated by this research:

> *'And you can just start painting that picture and thinking "well, surely you can apply that to something else that we want to do even if it's not remotely similar". Sometimes a really good way to explain something to people is to give an example of how you would do that. We don't very often get the opportunity, and [your approaching us] should be motivating us to take that initiative as well, thinking of the work that we've invested to bring that model together…. Because who would think that an arts organisation and a transport partner would be natural bedfellows? They're not. And that's quite an important thing in Aberdeen in the way that we try to explain what we do. There's nothing worse than being pigeonholed as a sort of fluffy airhead arts organisation that's vacuum packed. We're not. One of my jobs is really to go out there and to explain to people, the business community, the local authorities, whoever, that we have a contribution to make to city centre regeneration, for example.'*

These comments, and particularly that about not being natural bedfellows, are perhaps the most important to come out of these conversations. Although they may not seem like natural partners, in fact any organisation that triggers approaching a million journeys a year, 70% of which are in cars with only one or two passengers, is arguably a very natural bedfellow of transport planners and public transport providers. As the surveys and focus groups showed, reconfiguring theatregoers' travel could improve their experience of the evening considerably. And as I write this, Edinburgh is struggling to deal with the influx of Festival visitors and the issues of parking and congestion that they bring. The Edinburgh residents' experience of August might improve as much as the visitors' if the Festivals, hotels and others saw themselves as

natural bedfellows of the transport providers and planners, and this might well be true too of the residents of the streets where APA's theatregoers park in the evenings.

This topic also came up in the conversation with the Stagecoach Deputy Operations Manager. He said that Stagecoach has a separate company that deals with big events like the Ryder Cup, the Commonwealth Games and big music festivals. They already work with the NHS and companies in Aberdeen with discounted travel passes and salary sacrifice schemes for season tickets. He also mentioned a project with Sunderland AFC where the club, the police and Stagecoach collaborate to run a park and ride for football matches which uses the roads on a local industrial estate for parking, as the games take place when the estate is quiet. Football clubs do of course have more of a relationship with transport providers, since they often provide transport for away games, and they will also have relationships with the police, who they pay to oversee their matches. What was interesting about this is that the project was initiated by the football club and that the police and perhaps the industrial estate were involved:

> **Deputy Operations Manager** *People park anywhere they want along the main roads in the industrial estate and the park and ride buses just run up and down the industrial estate and stop at any bus stop along that road to pick you up and take you back after the match, and it works fantastically.*
> **Ben**. *So why is that not happening everywhere?*
> **Deputy Operations Manager** *Just the logistics there. Big industrial estate, big long main road, dual carriageway that heads out that way, and very restricted parking at the Stadium of Light. So it's the perfect storm, isn't it?*
> **Ben** *But why not elsewhere… parking is always a problem near football grounds?*
> **Deputy Operations Manager** *But the police were on board. They would stop the traffic and wave the buses through so you weren't getting caught up. The Open golf in Fife worked the same [on a one-off basis. But] that Sunderland one will happen twenty five, twenty six times a year.*

The Stagecoach Deputy Operations Manager recalled other examples of partnership working where they work with two local employers, in one case diverting service buses a short distance at a minimal cost to include a new

factory on their run, and in another to run Council-subsidised services between two plants where work and staff have been transferred from one to the other. These services were also a result of collaboration and another party's initiative:

> *'In all those cases it's taken the third trigger. Aberdeenshire Council got involved for [Company 1] and offered us some money. And [Company 2], to a lesser extent, because it's a very, very short extension, it's only about half a mile on what is a thirty five mile route anyway. But again [Company 2] waved the chequebook at us, "how much will it cost?" And in the grand scale of things it was pennies. But it wasn't something we would just do off our own backs.'*

The last of these cases is simpler, involving only two parties, but these perhaps more standard examples all demonstrate an approach that moves away from focusing on the individual user and instead changes the system in which those individuals operate. Like APA, Sunderland AFC, Company 1 and Company 2 are not natural bedfellows of transport providers but trigger significant numbers of journeys and there are benefits to each of them, and other local agencies, in solving transport problems. In two of the three cases, the other agencies joined the consortium to help achieve the change. And my interviewee identified the need for somebody to want to solve a problem that wasn't solvable by any one party, least of all the individuals. In Sunderland it was a parking and transport issue that needed the football club, police, industrial estate and Stagecoach to collaborate; for Company 1 and Aberdeenshire Council it was an economic and employment issue; for Company 2 a staffing issue. Interestingly in each case the intervention was made at a time of change: a new stadium or factory, new work rotas, APA's change process. Currently APA is also embarking on another significant change process as it refurbishes the 1,281-seat Music Hall, offering an opportunity to change the system within which audiences travel to the venue.

Overall therefore each of the interviewees was thinking about changing the system within which individuals make their travel choices, and suggesting that it might not be the transport operator which needs to instigate the change. And the interviews revealed that a time of organisational change in

that instigating partner might be a good moment to run an equivalent project – something I will return to in my discussion.

viii. Has the project changed your thinking or organisation more widely?

The answers to this question brought out an interesting shared focus on partnership working, how you achieve it and who to work with. These are topics I will return to in my discussion as they relate closely to both government policy around carbon emissions reduction and the importance of considering complexity in the design and implementation of projects.

In answering this question the Aberdeenshire Council Transport Officer had most to say, and it had certainly influenced his own thinking, indicating a shift away from the focus on the individual. He had previously written a dissertation on promoting bus use by changing individuals' perceptions, and he said that in the past '*we've probably set out to change an individual's perception and changing an organisation's perception would be just as valuable.*' He added that '*We have these conversations with the NHS, we've tried to break down the doors of the business parks, and we've worked with the airport, but not to the same degree of success.*' When I asked why he thought that was, his answer was crucial to the way in which partnership projects are designed: the organisations involved all had quite specific objectives and pressures that didn't focus on transport. For example NHS clinical targets were the focus of their work, and when Aberdeenshire Council had sought to work with major companies on a business park the companies wanted to distinguish themselves from each other to attract staff by offering free bus passes, rather than collaborate on a cheaper option which would provide a better bus service for all. '*That's ridiculous from our point of view, but to them, it is providing their staff with free travel, which may be an improvement over the company next door. We see a business park as one employment centre, but they see it as six competing organisations.*'

When I asked whether the project would change his approach he was quite specific:

'I think perhaps the way we engage going forward might be different. It's easy to say but it's finding the right people, either by luck or design, finding the right people in the room at the right time. It's finding people with the same level of enthusiasm and willingness to do it. If you've got someone whose main job is to look after the estate and they've been given transport to do as well as an extra, it doesn't help.

'I think [this project], even this discussion, has given us a bit of enthusiasm to go and try again with some people. OK we didn't have the success with the numbers, but the partnership itself was a success, so maybe try to build those things again.

'Looking at the NHS and the transport they generate, we wouldn't have to pay for the buses – there are commercial operators doing it. But it would be the coordination and the promotion of it, finding someone in the NHS to break that door down.'

Three components of these comments are important and I will return to them in my discussion below: first the need to find the right people, second the need to think about partnerships and third the need to find someone within an organisation like the NHS to '*break that door down*'. I will argue below that project managers working on this kind of project need to be good at dealing with multi-partner projects, at finding and motivating the right people and knowing enough about the partners' objectives and pressures to be able to 'break the doors down'. And each of these involve complexity: project management is often about dealing with complex social systems.

The APA Marketing Manager also thought the project had changed how he would work and that APA had learned too. He focused on the question of audience members' feelings of comfort and security when they were travelling to and from the theatre, and the importance of being aware of audience members' experience during their travel. He also wondered aloud whether APA should enter into partnerships with transport operators through their Friends discount scheme:

'I would probably say Stagecoach wouldn't have been one of the obvious ones when we were looking for partner businesses. We always think about bars and restaurants, Waterstones... sort of cultural offer… Maybe we haven't been thinking laterally enough and maybe Stagecoach would get on board with this, that you show your theatre ticket on any of their buses and maybe that's what would change. Rather than putting buses on from outside the door maybe what we do

is that we strike up an agreement that if you show your Friends card you get 50p off your bus travel.'

A further comment demonstrated how he had changed his understanding of APA's role in triggering travel and so potentially transport planning:

'When we first went in for the meeting, I remember sitting out in the corridor, and it was quite like you're outside the headmaster's office and there's these people walking by looking at you and thinking 'who are these guys?' And they probably wouldn't have thought about partnering up with us. There's never been an approach made in either direction in my time here, but it's quite a logical thing. We can have upwards of 1500 people in our venue at any one time and when the performance ends, they all need to travel somewhere in some form, whether by car or bus or foot or bike. When you think about it sideways like that it's a perfect fit in a way.'

He thought his thinking about APA's role in transport to the theatre had changed.

'Yes. You realise that it plays a big part. We have quite a big catchment area so our audiences have to travel. You always knew that was a consideration, and it's just to the extent of what that is for customers. … And when we started doing TheatreBus, we were able to pick out routes, and you pick out Deeside Road, which is where a large part of our customer base is, but it's such a poor road to drive on, it brings the convenience back in, people just want to get back as soon as they can. [He contrasted the winding route to Banchory with the smoother one to Stonehaven.] So from that point of view, just considering the route they have to take can affect things.

Ben *So your understanding of travel and transport has become richer?*

'Yes. If there's a show they want to come to, they'll find a way. But it's a richer understanding of how they will get to us. When it comes to advertising shows that won't change what we do. But when it comes to the partnerships we have, such as the Friends scheme, we ought to have a travel option. Maybe we need to categorise it a bit more, think about what are our travel options, a Freephone for taxis in the foyer.'

For the APA Chief Executive the project contributed to her shifting the thinking of the whole organisation, although it was in line with her personal direction of travel anyway. She also thought it might have had an effect on APA's ability to form future partnerships.

'Change my thinking? It's certainly developed and informed my thinking. … I think it's probably changed the way some colleagues at APA think. It opens a door into another world that you might not have

opened and people, I hope, are encouraged to step in and take a look round….For me, I am more than aware of what we have to offer and part of my frustration is some of those other less expected partners don't get that. But the difference is if you have a project that you've done, an example, that really helps. Because it's hard for an arts organisation like ours, even though being quite big in the city gives us a bit of traction. We go to transport partners or business partners, the harbour, the airport, and say "we think we can work with you." And usually we go with something, "this is what it could be." But it's really great to be able to say, "we want to work with you, can we talk about what that could be, and here's a project that we did that worked for us but brought benefits to the partner as well."'

The Stagecoach Deputy Operations Manager was a bit more circumspect. His view of APA as a future collaborator in planning of transport initiatives focused first of all on the staff and the fact that APA was a relatively small operation, with only around 250 staff, so there was not much opportunity for Stagecoach. '*For a Mega Rider ticket deal it's the bigger organisations with lots of staff like the NHS, Total, BP and Shell. Staff travel scheme seems to be the successful one up here. And [APA] don't really have enough staff.'* But when I probed he became more interested, again shifting his view of which partner Stagecoach might work with and why, now beginning to understand that a theatre triggering lots of *audience* travel might be a useful partner, to the benefit of both parties:

> *'From all the data you've acquired was there anyone that went to the show that wouldn't have gone if we didn't have the bus travel? That's where we've had more success with regular bus services when we're encouraging new people to travel. We try to encourage people on to the bus that would otherwise use their car. What I'm trying to get at is if you were to try to do it again I think the focus would be in trying to encourage people that wouldn't go to the theatre anyway to use it because it's an easy way to get there.'*

Each of the interviewees therefore indicated that the project had influenced their views on who to work with or how to do so.

Evaluating the Project: Conclusions

Whilst from the survey data it seems unlikely that the TheatreBus project changed audience travel behaviours very much, there does seem to be more evidence from the post-project interviews that the *system* within which those audiences travel has changed. The two staff members of Aberdeen

Performing Arts and the Transport Policy Officer from Aberdeenshire Council were clear that they now see a cultural venue as a potential participant in transport planning in a way in which they hadn't before. The relationships between the three partners have developed and their experience in working together has been positive, pointing to the possibility at least of communication about those audiences' travel in the future if not an actual project.

What is harder to gauge is whether it is only in the individuals that change has occurred, or whether the organisations they work for have also changed, which will be more relevant to change in the system. It is clear from the responses of the APA Marketing Manager and Chief Executive that they do now see both a role for APA in getting involved in transport planning, and benefits for APA itself. With the Aberdeenshire Council Transport Officer it is less clear: if he moved to another job, the learning from the project could be lost. But the personal contacts are important – part of the complexity of the system, indeed – and when one party moves on the other party has some experience and knowledge to introduce themselves to the replacement. APA would know in future that there is someone to talk to at Aberdeenshire and Stagecoach, even if that person was new; they would know how the system works and what is important to their counterpart.

Is simply providing an example of a project that is deemed to have worked, at least partly, sufficient to say that the system has changed? And is this any different to the outcome that any other pilot project might offer, rather than evidence of real system change? I think there is useful learning from this intervention in a complex social system, and for that I will return in the next chapter to my research questions and Byrne's methodology for evaluating interventions in complex systems (Byrne, 2013).

Section 4 – Analysis: Reviewing the trip

Chapter 10: Discussion

The previous three chapters described the development and implementation and assessed the success of the specific project that I ran for this research, the TheatreBus service in Aberdeen. The reason for undertaking this project was to explore the value of using complexity theory to inform interventions in complex social systems with a view to using that approach to contribute towards a reduction in Scotland's carbon emissions. In those chapters, in order not to lose sight of the wider aim of the research, I highlighted points where the complexity of the system in which I was intervening became particularly apparent and where this complexity influenced the outcomes of the project or where it had affected my own or others' actions in the development or implementation of it. This chapter returns to the wider research questions and uses the TheatreBus project as a basis for discussion of them.

My review of the literature pointed to the value of a case study as a means of generating 'useful generalisations' (Byrne, 2013) in order to transfer knowledge to other situations, rather than seeking to develop everlasting 'laws' which will hold in all circumstances. It highlighted the relevance of Theory of Change approaches (Dyson and Todd, 2010), which acknowledge that the desired changes may come about gradually and that the process of bringing about change may therefore need to be evaluated as much as the final outcome: if the necessary steps towards the outcome can be identified as having occurred there is a good chance of the outcome being achieved; if not, then a different approach may be required. And following Byrne my review accepted the view that '*we cannot assert that we can find out what works for changing complex systems. Instead, we have to ask:*

- *What has worked?*
- *How has it worked?*
- *Which is to ask: What causal mechanisms have operated?*
- *Where has it worked?*

- *When has it worked?*
- *Can it work elsewhere?*
- *Can it work elsewhen?'* (Byrne, 2013, p219)

The second and more specific of my research questions aimed to bring these three ideas together by asking: **What lessons that might be applied to other social systems can be learned from a small experiment treating cultural institutions and events as complex systems?** My aim was to use this experiment as a case study to help answer the first and wider question: **How can complexity theory be used to inform interventions in social systems in order to help achieve system-level change and reductions in Scotland's carbon emissions?** In this chapter therefore I will not assess the success or otherwise of the specific running of the TheatreBus, but I will first address the second and narrower research question by looking at what can be learned from what I will now call the TheatreBus *experiment.* Treating the Research Project (rather than the practical TheatreBus experiment, and capitalised so as to distinguish it from other uses of the word 'project') as a case study in its own right, I will use Byrne's questions to help structure the discussion. I will consider the case study with an awareness that the desired outcome may not yet have been reached, but progress on the way may be detectable. I will then address the first and wider research question by seeking to show how the lessons about complexity theory can be applied in other situations. In the course of this I will, perhaps unconventionally, introduce some material about aspects of government policy around carbon reduction, which although new is relevant to the wider application of the findings of the research. Finally I will touch upon some methodological points about the research which lead to some recommendations for policymakers.

a) What lessons that might be applied to other social systems can be learned from a small experiment treating cultural institutions and events as complex systems?

i. What has worked, and how?

a. *Making use of complexity*

One element of the experiment that worked was simply that viewing travel to the theatre through a complexity lens successfully changed my understanding of the issue and so my design of the intervention. This also rubbed off on others with whom I had close contact, leading to a potential change in their own thinking and work practices.

First, viewing the experiment as an intervention in a complex system certainly changed my own approach to it as the intervenor. One of my first acts was to develop the complex system chart which described the system in a way that I wouldn't otherwise have done. This led me to consider different elements of the system afresh. For example, I noticed the convoluted route to HMT because of the lack of pedestrian crossing or traffic lights outside the theatre and this led me to recognise the street furniture and layout as a factor in the way people – and perhaps particularly the older people who make up much of the theatre's audience – get to and from it. Such banalities as a traffic island could easily be overlooked if it weren't for this focus on all the elements that combine to bring about different travel choices.

Similarly the drawing of the complex system chart and my discussions about it with APA staff members alerted me to the elements in the system, a group wider even than I imagined despite my long experience of working in the theatre, that were currently being overlooked. It made me realise that what were perceived as relatively distant elements in the system were actually important agents when it came to planning a night at the theatre.

The questions I asked in the focus groups also reflected my interest in the complex system. My aim was to draw out not just how people travelled but why, and whether and why they travelled differently on different occasions. I tried to convey my interest in a very wide range of factors without confusing

the issue or prompting responses by outlining the idea of complexity. The rich conversations and data that resulted delivered the surprise of the strong influence that feelings of personal safety had on participants' transport choices, and the less surprising but still strong focus on different sorts of night at the theatre: 'going out' nights, more sedate 'see the show' nights, family outings etc.

Second, and more conceptually, looking at the system through a complexity lens also broadened my understanding of 'a theatregoer'. I referred above (p52) to Sofoulis (2011) who suggested that understanding water use as a complex system led to a more complex conception of the water 'user'. A similar change took place here as the relatively simple picture of the audience's travel to and from the theatre became much more nuanced through a greater interrogation in the focus groups. Audience members' different choices of transport mode for different times or days, and indeed their decisions *not* to travel to the theatre on certain days, were related to emergent properties of the system resulting from the combination of elements such as the scheduling of public transport and the theatre, feelings of personal safety and the geography of the city centre, who they were travelling with and the type of night out they were planning. The idea of an 'average theatregoer' is perhaps even more unreal than that of an 'average water user' since each theatre trip may be different even for the same individual. Therefore to target theatregoers with specific 'behaviour change' interventions may be ineffective since the behaviour to change will be different on different occasions.

Third, my understanding and use of complexity had an effect on other people. Working closely with the APA Marketing Manager over a long period my awareness of the complex system communicated itself to him, and later in the process his comments about how an unpleasant encounter on the way home from the theatre could affect an audience member's perception of their whole night at the theatre demonstrate his grasp of the idea. His understanding that distant elements of the system can affect the part he is most interested in – selling tickets – was developed by him making use of the

idea of the system. Similarly his comments quoted above (p214-5) about the changed relationship between APA and Stagecoach and the potential role of APA in transport planning demonstrate his greater understanding and how this at least might feed into his future decisions and actions. In Theory of Change terms, this would seem to be an indicator that the project was moving in the right direction, even if it was not wholly successful.

The causal mechanism at work here would simply seem to be the application of the concept of complexity, the 'complexity lens'. This might seem to be a slightly banal statement, but it is worth making in the light of the slow uptake of the 'complexity turn' (Urry, 2005), not only in sociology and the social sciences but more widely, and in this context particularly if government policy is still being generated without taking into account the complexity of the systems it is aiming to change. At the Sustainable Scotland Network (SSN) conference on 5 October 2017, the Scottish Government's then Director of Energy and Climate Change, Chris Stark, did seem to be seeing the world as interconnected and used phrases such as 'a system view' and 'tipping points', but made no actual reference to complexity as such. Other speakers from Scotland's local authorities and health trusts seemed to be less aware of complexity and to be working in a more linear manner. (The SSN is the support network for the Public Bodies which have duties under the Climate Change (Scotland) Act 2009, of which more below.) If those who are making and implementing policy are not viewing the 'behaviours' they are seeking to change through the complexity lens they may struggle to achieve the scale of change that they want.

That complexity is not a widely understood concept, at least further down the hierarchy, is backed up by the fact that other members of the APA staff with whom I had less contact did find the concept harder to grasp. These are the kind of people on the ground who will be undertaking and participating in the projects that policymakers will need to take place. Whilst this poses the problem of how to communicate complexity easily, the increasing difference between the APA Marketing Manager's understanding of the issue and that of some of his colleagues suggests that a familiarity with the complexity lens

does bring a useful wider awareness of unexpected aspects of the system which itself could lead to changes in thinking and practices. In their discussion of 'curating' the process of engaging multiple actors in planning the use of a plot of land on the outskirts of Rome, Kampelmann et al touch upon this problem and the use of simple tools to overcome it: '*The act of actually drawing a system, even a simple system (e.g. how a carrot travels from farm to fork) was enough to create a common vocabulary to encourage actors to participate in the map-making process. The workshop confirmed that people are rarely trained to think in systems and will clutter-up and focus on their specialisation if left to their own accord.*' (Kampelmann et al., 2017, p8). The drawing of a complex system chart or process map might similarly be developed as an appropriate method for helping others develop an understanding of the complexity of any system as it provides a very concrete representation of it, although they don't fully convey ideas such as feedback loops and non-linearity.

d. The alignment of the system agents' different aims

Another element of the experiment that worked was the alignment of the system agents' different aims. One of the characteristics of a complex *social* system is that many of the agents have aims and objectives of their own, unlike the algae in a petri dish or winds in a global climate circulation system. In a system of co-adapting agents, these aims may or may not be compatible: for example FirstBus and Stagecoach might well have conflicting aims if they are competing for passengers on a given route. The experiment was successful in selecting partners which were both relevant to the experiment's objectives – ie they could help achieve them – and whose aims could feasibly be aligned. Indeed its success depended on the aligning of the aims of APA, which was interested in improving the theatre experience for its audience members and in experimenting with new ideas and collaborations, with those of Aberdeenshire Council, which wanted to reduce car use whilst ensuring its citizens had access to cultural activity, and of Stagecoach, which wanted to build its user base. There was also some weeding out of potential

partners whose aims didn't align, since Aberdeen City Council and FirstBus could both have taken part, but the Council chose not to and I chose not to include FirstBus because of the costs and their general reluctance to get involved.

Whether this success was a result of either my use of complexity or a function of the system being a complex social system is debatable. Arguably any successful collaborative project rests on the aligning of the collaborators' aims. Moreover, those aims or at least the prioritisation of them may well change during the course of the project as financial or other circumstances change (such as the problem which arose for the Stagecoach North of Scotland Managing Director with a key member of his staff: his priority at that point became the resolution of that problem, not participation in a more long-term project). However this points to an important idea: complex social systems are all around us and what humans do most of the time is manage them, respond to them and operate within them. Any collaborative project involving several partners is likely to be describable as taking place within a complex social system. In fact it is difficult to imagine what such a project outwith a complex social system would be: society is a complex social system (see Pawson (2006, p30)). Most projects, including more traditional 'behaviour change' projects, are therefore likely to be taking place within complex social systems and need to be designed and managed as such. The experiment's successful aligning of the changing aims of the different partners is therefore simply dealing successfully with a complex social system. As with the earlier comments about making use of the complexity lens, the important point is not that this is unusual, but that the complexity often goes unrecognised.

The causal mechanisms which made this element of the experiment work are however wider than in the first. There was a need to identify the potential partners, which I indicated above required a grasp of the complexity of the system and indeed perhaps the very practical exercise of drawing the complex system chart which listed the agents in the system. Picking up Barnes et al's point about needing to understand the context of the system

(Barnes et al., 2003) there was also a need to understand the different objectives of the potential partners. In this case I had a particular advantage since I knew the world of theatre well, so I came to the experiment with a good understanding of APA's corporate and the individual staff members' objectives. I also had an awareness of the local authorities' carbon reduction responsibilities through my work with Creative Carbon Scotland, and when I approached Aberdeenshire and Aberdeen City Councils with my proposal for the SCSP funding I was able to frame this in such a way that my contact at Aberdeenshire could see the benefits for his organisation, confirmed by his re-use of my language for his bid to his superiors for match-funding. My understanding of bus providers' aims was more limited and this is perhaps reflected in the greater challenges I faced in bringing one of the two operators on board. However in the end Stagecoach's objectives are fairly straightforward and comprehensible: they want more business and are prepared to experiment at relatively low cost in order to build their user base. I was therefore able to identify and align the partners' objectives effectively.

There was also perhaps a less tangible and 'softer' causal mechanism involved, which was the ability to bring the partners together and develop and adjust the experiment so that their objectives and those of the experiment itself were aligned. This is related to but not wholly encompassed by my intimate knowledge of the world of theatre and my reasonable knowledge of the carbon reduction aims of local authorities. For the experiment to be successful it was necessary that the APA and Aberdeenshire Council staff in particular trusted me to work to help them achieve their objectives. Hardin (2006) gives a very clear account of how X's trust in Y is actually a statement of Y's trustworthiness in the particular context of the trusting, and accordingly can only rationally be based on X's knowledge of Y. He argues that trustworthiness is based either on reputation or on experience. I'd suggest that my introduction to APA and endorsement by the Chief Executive, and my clear affinity with and understanding of their world, enabled me to gain the trust of the APA staff and their confidence that I would work to achieve their objectives with the experiment.

With Aberdeenshire Council I had less of a built-in advantage but my framing of the experiment in the right way may have helped. Subsequently, the quality of my project management work seems to have helped build a degree of confidence, evidenced by the Principal Officer's comments in our follow up meeting (see p198). Similarly, in an email early on in the process he wrote, '*I am very appreciative that the project is moving along. I fear we may have missed a few key deadlines if you had not progressed it.*' (personal email 23/05/15). My commitment to the project also helped and again my wider experience leads me to think that my commitment and work encouraged others to reciprocate: certainly the APA Marketing Manager and I have worked very well together and he took the time within a very busy role to contribute greatly to the experiment. I quoted above the APA Chief Executive who stressed during our follow up meeting that the project had worked because of my values, commitment and passion for the project. My experience of project management suggests that building this sort of trust through one's actions and values is crucial to running successful projects, and I will return to this below.

e. *Changing the thinking within the partners about their role in transport and carbon reduction*

The third and perhaps the greatest success of the experiment was that there was an acknowledged change in the thinking of two of the partners about the role in the planning of transport provision for those organisations that trigger travel by the public, and a smaller change in the third. These were changes that took place within the partners themselves, rather than an increased understanding of how to achieve success in projects like this; and this has important implications for the overall aim of the Research Project, ie how to achieve a reduction in Scotland's carbon emissions.

In the follow-up interview with the APA Chief Executive she clearly considered the company's involvement in transport planning to be a successful and unusual partnership which she would use as an example to encourage others. She had moved from considering an arts organisation and a transport partner to be '[*un]natural bedfellows'* to considering a bus

company, and in particular one which was unwilling to take a risk on the experiment, to be an appropriate partner with whom to work. Similarly the APA Marketing Manager said he would now think about transport providers when he was considering offers and deals for Friends of the theatre.

The Aberdeenshire Council Transport Principal Officer was already engaged in similar partnerships but his department hadn't previously worked with a cultural organisation and the experiment had rekindled his enthusiasm for trying again with other partners, as demonstrated by his comments quoted above about working with the NHS (p214). And even the Stagecoach Deputy Operations Manager's suggestion at the end of our meeting, that if we were to try the experiment again the focus should be on developing the audience for the theatre that was currently not attending rather than converting current attenders to a different travel mode, indicated a willingness to work together again and a better understanding of the opportunity offered by partnering with a large theatre.

The changes in thinking are slightly different in each case.

- Most importantly, APA recognised for the first time its role as an organisation that triggers travel and will now consider how it can contribute to the wider need to reduce travel-related carbon emissions, and also how it can make use of the opportunities that its role brings (such as partnering with a taxi company).

- My contact at Aberdeenshire Council widened his view of the potential partners the Council could work with to include cultural organisations, and regained his enthusiasm for partnership working.

- The change at Stagecoach was smallest, as it replicates what the company does elsewhere, but there was a shift in the Deputy Operations Manager's thinking away from staff to audience travel and a greater understanding of the size of the potential market available at His Majesty's.

The causal mechanisms behind these changes reiterate the reasons why the other successes occurred. At its most basic the fact that the experiment took

place with some success provided an example of something that worked for the participating organisations, and so the individuals could see that a similar or related project could work in future. Moreover, although the experiment was only partially successful, the core ideas behind it were perceived by the partners to be right: it was the financing and perhaps the promotion and marketing of it that reduced its success. This meant that the partners and others could see how a similar project could succeed in future, as exemplified by their comments in the follow-up interviews. Again, in Theory of Change terms, the project was going in the right direction.

However unpacking this points to some of the characteristics of future projects that will enable them to work, and so will help answer Byrne's questions about whether this sort of project could work elsewhere and elsewhen. As I have described above, the causal mechanisms for what did work within the experiment include a combination of a) an understanding of and application of complexity thinking; b) a good knowledge of the system that is being intervened in; and c) the softer skills and attributes which built trust amongst the partners. My description of the project management also brought out the many occasions when often distant elements of the complex system affected the experiment and my need to manage these. Putting these together I would therefore argue that what made the elements of the TheatreBus experiment that worked work was a particular approach to project management that acknowledges that such projects are set within complex social systems; and so that approach seeks to understand and manage the impacts of the relevant complex social system.

ii. Where and when has it worked?

APA's acknowledgement of its role in triggering travel and Aberdeenshire Council's increased interest in partnership working point to an answer to Byrne's questions 'Where has [what worked] worked?' and 'When has it worked?'. As Byrne (2013, p219) makes clear, the 'where' and the 'when' are about the context (presumably, although he doesn't state it, this would include social, economic, political and geographic contexts etc) within which

whatever worked took place, and he stresses that complex systems have a temporal dimension: their history limits their present and future.

a. Where has it worked?

Answers to the 'where' question range from simplistic ones such as 'a theatre in Aberdeen', to more general ones like 'in a small city in a country where funding was available for such a project, where there is a wider pressure to achieve carbon reductions etc'. However these don't provide useful answers if as described above the aim of the Research Project is to develop 'useful generalisations' which can be applied elsewhere and elsewhen.

The increased understanding of travel to the theatre produced by the Research Project made very clear the importance within the context described of the complex social system in which that travel takes place and how different agents within that system can have an impact on the travel. It also made clear that to bring about significant change will require changes to the system rather than to individual elements. This is a common situation and one which is replicated in a much wider set of circumstances than those involving cultural organisations. A great deal of car travel consists of individuals making domestic or work-related journeys which take place within a system over which they or their employers have little control. Much of this travel therefore takes place outside the areas over which the Scottish Government has regulatory control or direct levers it can pull in order to reduce the associated carbon emissions. These are the areas where application of the learning from this Research Project might be useful. A more relevant answer to the 'where question' might then be 'a situation where a number of significant organisations had some impact and influence on individuals' travel and so carbon emissions, and a self- or externally-imposed pressure to help deliver a reduction in carbon emissions generally, but none had either the responsibility or the ability to significantly change the travel.' The specific context of Aberdeen, a cultural organisation and so on will be useful as well, but in this instance a more conceptual answer seems valuable.

b. When has it worked?

Finding the *useful* answer to the 'when' question is equally important. I have noted above points when temporal aspects of the complex system were relevant: the fact that APA was going through a change process and my squeezing into an open window for funding with Aberdeenshire and the Scottish Government's SCSP scheme were beneficial, whilst meeting the Managing Director of Stagecoach North of Scotland when he was having staffing problems wasn't helpful. Widening the context to include UK-wide temporal considerations such as the period of austerity and the impact that has had on local government budgets, or the current dominance of the rational actor theory of behaviour is also relevant. Seeking to apply the useful generalisations to a similar situation at a different time in future might find even less fertile ground as budgets tighten further, or might be easier if a different understanding of behaviours, practices and complexity had become widely shared. However it is important to identify what temporal scale will be useful when seeking to apply the learning elsewhen: use too broad a brush and the learning could be applied at any time; too narrow and the potential for applicability will be limited.

One useful answer to the 'when' question is therefore that the experiment took place at a time when APA was going through a process of significant change under a relatively new Chief Executive who was seeking to locate the organisation differently within Aberdeen, and was therefore willing to commit resources to the project. To put this more generally, what worked worked at a time when one relevant partner wanted to instigate change and had some wherewithal to do so.

In addition it became very clear that my investment of time and energy in the project meant that it kept going when other people's attentions were elsewhere. The resources needed to make the project work were not just those of APA. My description above of Project Management as a Complex Business is full of times when I had to remind or encourage someone to do something or snatch an opportunity that would pass if I didn't do some work there and then. There is a perhaps slightly stretched analogy here with

Prigogine's description (Capra, 2005, p37, Prigogine, 1997, Chs 2 & 3) of the complex systems that are living organisms as 'dissipative structures'. Dissipative structures in this view are 'far from equilibrium' and require a constant source of energy (in living creatures' case, food and oxygen) to maintain their stability. But an increase in the flow of energy may push the structure into a new, equally unstable but different state. I often felt during the management of the experiment that I was putting energy into it so that it would remain alive, but also so that the system in which I was intervening might shift to a different state.

I want to argue therefore that the 'when' question can be answered not with a temporal description but rather with a conditional one. What worked worked when there was both an instigating partner with a commitment to the project, *and* sufficient time and resources injected into the project to enable it to succeed. A project in this description is an attempt to shift the system from one state into another, no matter how small that jump might be.

Other factors, such as the availability of the Smarter Choices Smarter Places funding, were more specific and whilst that funding had an impact on the project, it affected the detail of the experiment rather than its overall shape.

It is worth re-iterating my comments above about the importance in complex system project management of the ability to identify and grasp temporal opportunities. One of the reasons I chose to site the Research Project in Aberdeen was because I knew APA was going through a period of change. Complex social systems are path-dependent: their present and future are limited by their history. Knowing and understanding that history may be an important part of making an intervention in one work.

iii.   Can it work elsewhere and elsewhen?

In order to answer these last questions it is useful to sum up the answers I have given above to Byrne's earlier ones. Note that I am not arguing that the whole TheatreBus experiment should be repeated, but that the approach to the intervention might be useful to apply elsewhere and elsewhen.

1. What worked was:

a. The use of complexity in developing and implementing the intervention;

b. The alignment of the different partners' aims; and

c. Changing the thinking within the partners about their role in transport and carbon reduction.

2. The causal mechanism was:

a. A particular approach to project management that acknowledges that such projects are set within complex social systems and so seeks to understand and manage the impacts of the relevant complex social system.

3. Where and when what worked worked was:

a. In a situation where a number of significant organisations had some impact and influence on individuals' travel and so carbon emissions, and a self- or externally-imposed pressure to help deliver a reduction in carbon emissions generally, but none had either the responsibility or the ability to significantly change the travel; *and*

b. When there was an instigating partner with a commitment to the project, and sufficient time and resources injected into the project to enable it to succeed.

Could this approach work elsewhere and elsewhen? I believe it could and during the Research Project two specific examples arose in which the 'where' and 'when' questions can be answered in a similar way. In these cases a similar approach to addressing the issues might usefully be applied that recognises them as complex social systems and so seeks to understand and manage them in that light. The second of the examples relates to cultural events, but the first is far from that area, demonstrating that the same approach might be used in a range of settings.

a. Example 1: Aberdeen Royal Infirmary

Hospitals trigger significant amounts of travel: the Aberdeen Royal Infirmary (ARI) has 900 inpatient beds and serves a population of over 600,000 people (Grampian, 2013). The hospital is sited just off one of the main routes into

and out of Aberdeen from/to the west and much of Aberdeenshire. NHS Grampian is currently in the process of constructing a new multi-storey car park at the ARI with 1,000 spaces for patients and visitors (Grampian, 2017). All the patients and visitors, and the staff, for whom there is another large car park, will travel from or through Aberdeen City or Aberdeenshire Council territory to get to the hospital. NHS Grampian and both local authorities are taking action to reduce their carbon emissions, but much of the transport to the hospital will be by individuals and won't fall within the organisations' control.

In order to reduce the carbon emissions from travel to and from the hospital, the standard approach would be some sort of 'behaviour change' initiative to inform, encourage or incentivise people to move from travelling by car to more sustainable means. However the wide rural catchment area and irregular travel by many patients would make this hard for an organisation which is already hard pressed to meet its health-focused targets. Even a transition to electric cars, which is one of the means by which the Scottish Government aims to reduce road transport-related emissions (SG, 2018, p108), will mean that individuals will need to buy new cars or move towards car clubs or similar, all of which require changes to current practices. In a region where a car is an essential item for almost everyone but there are significant wealth inequalities, and where the rural context may make car clubs irrelevant for many people, the uptake may be slow. Collaboration with the local authorities and other bodies on changing the system within which people are travelling to the hospital might provide a more effective approach.

c. Example 2: The Edinburgh Festivals

My second example arises from a series of meetings I was invited to attend during the period of my research, convened by Transport Scotland. These brought together representatives of the main Edinburgh Festivals taking place in the summer months, Transport Scotland itself, representatives from the City Council and other bodies, and the transport providers that operate to and in Edinburgh, from Edinburgh airport via bus and rail companies to the taxi owners' federation. There was a concern within some festivals that

audience members attending late-night shows during August were unable to find public transport home. Although the environmental impacts of this were not the focus of the meeting, a lack of late-night public transport is likely to lead to additional car travel and so related carbon emissions.

Like the ARI, the festivals in August, with over 4m tickets sold, over 50,000 performances and thousands of performers in 2016 (CEC, 2016), trigger a great deal of travel and carbon emissions, and here there is a complicating factor. The audience travel to and around Edinburgh during a concentrated period in August takes place in addition to the normal travel of Edinburgh residents, workers and non-Festival visitors. The buses, trains and road network are already heavily used: suddenly for one month, hundreds of thousands of additional journeys are made. No one organisation is responsible for this travel or can influence it on its own: there are five festivals taking place at the same time, with audiences attending different events presented by hundreds of different companies in hundreds of venues, and each festival has little control over the travel of their audiences and less control over the means by which they travel. The transport providers don't know what performances are happening when or how many people are attending. During the course of the meetings it became very clear that there were significant gaps in communication between the transport providers and the festivals, and a lack of knowledge on each side of how the other planned their activities and what the challenges were that they faced during August. A representative from Transport Scotland, which is closely involved in transport planning for one-off events such as the Commonwealth Games, said that the festivals had '*surprised him, coming up out of the blue like this*' – although they take place every year, and in 2017 would be celebrating their 70th birthday.

Again, the standard solution to this issue would be a 'behaviour change' initiative in which audiences were informed, encouraged and incentivised to travel differently. But collaboration between the festivals, the transport providers and others such as the City of Edinburgh Council might provide a

more effective way to address both the travel problems and the related carbon emissions.

> **How can complexity theory be used to inform interventions in social systems in order to help achieve system-level change and reductions in Scotland's carbon emissions?**

Turning now to my first research question, how could an approach that uses complexity theory help in these sort of examples? To answer this it is first necessary to describe the context of Scottish Government policy which affects the parties involved.

i. The policy context: The Duty on Public Bodies

In both of the examples, individuals' carbon emissions fall between the organisations and institutions over which the Government has some control. The local authorities (City of Edinburgh, Aberdeen and Aberdeenshire Councils), NHS Grampian and Transport Scotland are all Public Bodies as defined in the Climate Change (Scotland) Act 2009, and as such they are charged with three Duties. The Guidance to Public Bodies about their duties under the Climate Change Act notes that they are required to act '*in the way best calculated to contribute to the delivery of the [overall national] targets* (SG, 2011b, p6), which is a usefully broad instruction. For the most part the guidance focuses on the Public Bodies' direct carbon emissions, as defined by the Greenhouse Gas Protocol (ibid Box 2, p22*), but* '*Public bodies are advised to approach the duties broadly and include direct and indirect emissions.*' (ibid p10). Public Bodies are also '*encouraged to work together through existing mechanisms … or through devising new partnerships, and to explore opportunities for building capacity and sharing best practice*' (ibid p13). In addition, later in the same document the guidance is that **'***Working cooperatively with other public bodies, e.g. bodies in the same geographic area, or bodies working in the same sector, will maximise efficiency and increase the impact of climate change action'* (ibid p30).

ii. Aspects of Scottish Government policy hinder collaborative working

The ARI situation provides an example of where the three Public Bodies might usefully work together and as in the Edinburgh Festivals example there will also be opportunities for Public Bodies to work with other sorts of organisations to help reduce their carbon emissions. The TheatreBus experiment would seem to be an example of a Public Body working with two *non*-Public Bodies '*in the same geographic area*' in such a way. But whilst there is a clear intention in the Scottish Government's guidance that Public Bodies such as local authorities, NHS trusts etc should work together and with other partners, it seems that progress on this has been relatively limited and fairly basic in its ambition. One reason why is that the Scottish Government's policy may actually discourage the partnership working that is necessary.

The Sustainable Scotland Network's report on Public Bodies Reporting 2015/16 (SSN, 2017) indicates that the 150 'Major Players' reported on a total of 119 projects to do with climate change. These involved only 32 Public Bodies, with five Bodies accounting for nearly half of them[18]. Four were described as 'Awareness raising projects'; one each as 'Learning/training' and 'intra-organisational communications; 13 as 'Behaviour change'; 15 as 'multi-organisation communications'; 11 as 'skills/capacity building'; and 74 as 'partnership working on climate change or sustainability' (SSN, 2017). Seventeen projects, described as 'Awareness raising' and 'behaviour change', might reasonably be expected to be projects working to address indirect carbon emissions caused by individuals' and smaller organisations' actions, whilst the learning/training and communications projects (another 17) are probably not.

The largest category, 'Partnership working on climate change or sustainability', is very general. In the case of Aberdeen City Council, which

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[18] Aberdeen City Council was involved in 15 projects; Glasgow School of Art in 8; Scottish Enterprise in 12; Scottish Natural Heritage in 13; and South Lanarkshire Council in 8.

judging by the numbers is the leading collaborator, some examples are provided in Table 13 below, copied from the data sheet provided by the Sustainable Scotland Network. I would suggest that a minority of projects, those highlighted by me in blue, are aimed at reducing those indirect carbon emissions caused by the actions or behaviours of individuals: the others are more focused on infrastructure, renewable energy and land management. In a private conversation with an officer of Aberdeen City Council I asked about what is perhaps the flagship partnership project, the North-East Scotland Climate Change Partnership Network. Their description of it was that it was '*set up to raise awareness and get people together – it has never been much more than that… there was never the funding or the resources*' (ACC, 2017b). The officer did say that Aberdeen's Sustainable Energy Action Plan (SEAP) measured the Council's direct carbon emissions, which were approximately 1% of the city region's total emissions, so they are focusing on the other 99%. Accordingly, '*most public bodies have tackled the direct emissions first, but Aberdeen has begun to work on other* areas' (ACC, 2017b). For example there is a City Centre Masterplan that aims to increase active and public travel in the city centre (ACC, 2015) and a Sustainable Urban Mobility Plan seems to have been in development since 2011, which among other objectives aims to reduce greenhouse gas emissions (ACC, 2013) (interestingly it is not available via the new ACC website). Aberdeenshire Council is leading on the North East Sustainable Energy Action Plan to reduce emissions across the region. NESTRANS, another member of the Network, is working on transport-related emissions, but the officer said that '*what is really hard is the private sector*' (ACC, 2017b). This is a reminder that transport is only one emissions source amongst many – agriculture and land-use change, energy production and waste are also important. These other sources are the result of emergent properties of different complex social systems: lessons learned from this Research Project might be applied to them too.

Outputs	Value to Organisation	Total Investment into Partnership
Powering Aberdeen		"£15,000 for creation of a business hub by SBC. £35,000 for emissions information gathering by CUSP. £30,000 for consultancy services."
North East Sustainable Energy Action Plan	Over-arching strategy for the North East of Scotland to ensure transboundary issues are considered. Compliance with legislation, alleviation of fuel poverty, fuel security, job creation, revenue savings, corporate reputation enhancement, attraction of investment, global recognition, diversification of the economy alongside many other benefits.	Time and £7K contribution to the development of the documentation.
North East Scotland Climate Change Partnership network	Opportunity to learn from others, share best practice and develop collaborative projects.	Officer time to facilitate the network.
Dee Catchment Management Plan	Protect and improve the waters of the River Dee Catchment.	0
Natural Flood Management	Aberdeen City Council is looking at Natural Food Management (NFM) to provide an extra level of protection to deal with urban creep and climate change. There is a project on the Leuchar and Gormack Burns which feed into the Culter Burn.	Officers' time
Protect and enhance local biodiversity through the delivery of a Local Biodiversity Action Plan (LBAP).	Working to help preserve and protect biodiversity and will implement projects that helps achieve this aim, taking the future threats of climate change into consideration. For example, there will be a focus on protecting and preserving habitats that help store carbon such as peatlands, raised bogs, heaths and fens.	0
Project aimed to deliver a hydrogen strategy for Europe's North Sea Region.	Working to bring about a hydrogen economy in the Aberdeen City Region developed through the HyTrEc project.	0
Aberdeen Renewable Energy Group, is working to ensure businesses in Aberdeen City and Shire capitalise on opportunities in renewable energy.	AREG works closely in partnership with the Council to identify and help facilitate the delivery of projects that could provide additional renewable energy infrastructure.	0
North East Scotland Area Advisory Group. Local River Basin management	The 2nd River Basin Management Plans … sets out a 12 year plan to get all water bodies to good ecological status. The Plan is supported by the Water Environment Hub web tool.	Officer time
North East Scotland Area Advisory Group. Local Flood Risk Management Plan (LFRMPs)	Aberdeen City Council Planning and Flooding Team have been involved in developing the Scotland Flood Risk Management Plan and the Local Flood Risk Management Plan (LFRMPs)… based on the Flood Risk Management Strategies (FRM Strategies), published in December 2015. The LFRMPs provide more detail on the actions that are to be taken forward in the first flood risk management cycle, June	Officer time

	2016 – June 2022. The LFRMPs were developed in partnership and will link to other plans, policies, strategies and legislative requirements.	
GetAbout brand	Getabout is a sustainable travel brand promoting walking, cycling, use of public transport, lift share.	0
0	Promotion of usage of shared more sustainable transport	0
0	Promotion of usage of low carbon emission vehicles: electric vehicles	0
0	Smarter choices, smarter places. Promotion awareness on sustainable and active travel	0
Green Santa	Promotion of recycle and reuse within schools across the city	Private companies donated prizes and Recycling Officers' time

Table 13: Aberdeen City Council's Partnership Working projects 2015/16

The point of all this is not to criticise Aberdeen City Council, which seems to have progressed partnership working more than most Public Bodies, but to show that addressing these indirect emissions caused by individual behaviours is hard and doesn't get the investment of time and resources that is necessary. This may reflect a point which was referred to in the literature review above, made by researchers using complexity theory to look at attempts to reduce waiting times in A&E across Scotland by addressing interdependencies with other departments. Even within the same NHS trusts, teams from acute care departments found it hard to engage colleagues from other departments with issues that affected the performance in A&E: '*there was no incentive for stakeholders from outside the hospital to risk changes, because the formulation of the target in terms of waiting time in accident and emergency meant it was perceived solely as an acute care target.*' (Dattée and Barlow, 2010, p21). Similarly, although the Public Bodies Duties may highlight partnership working, the highest priority areas to report on will be the Bodies' own direct carbon emissions, because these are relatively easily measurable and reported on. Failure to reduce these may well mean criticism from the Government, higher expenditure on fuel etc and additional taxation under the CRC Energy Efficiency Scheme. Working hard to deliver indirect carbon reductions that will be hard to measure, won't show up in your reports to the government and won't save you any money is very likely to be a lower priority.

To put this into context – and to back up the comments of the Aberdeen City Council officer referred to above – at the Sustainable Scotland Network conference on 5/10/17 the Scottish Government's Director of Energy & Climate Change stated (Stark, 2017) that he considered that the work on decarbonisation of the electricity supply, which had been the focus of his team's work thus far to reduce Scotland's carbon emissions, was more or less dealt with, in that the work was underway even if it was not yet complete. The focus would now move on to transport and domestic and non-domestic heating – responsible as noted above for around 20% and 40% of Scotland's carbon emissions respectively. Yet except for some heating and internal transport, these areas are precisely the ones that are not in the direct control of Scotland's Public Bodies, where the Scottish Government's policy levers operate.

There are therefore aspects of Scottish Government policy that, by focusing on the direct emissions of Public Bodies, hinder work on what is becoming a more important area, the indirect emissions related to transport and domestic and non-domestic heating.

iii. A Duty to Collaborate to address society's carbon emissions

To overcome this problem, there is a need to foster collaboration and to move away from a focus on individual Public Bodies' direct carbon emissions. The causal mechanisms that I identified for what worked in the TheatreBus project and the answers I proposed to the 'where' and 'when' questions provide some learning which could help achieve this.

To recap, I identified that partnership projects aimed at reducing indirect carbon emissions such as TheatreBus are set within complex social systems, and so an approach which seeks to understand and makes use of complexity may be useful. And I argued that the lessons from the TheatreBus project could be applied to situations where there were multiple organisations that had some influence on individuals' travel and so carbon emissions, and had a reason to act, but none had a specific responsibility or ability to change the

travel; and where there was an instigating partner who could commit time and resources to a joint project to enable it to succeed. It is clear from my examples above that, like in my Research Project, the Public Bodies and private organisations involved trigger significant amounts of travel. The indirect carbon emissions from this travel are influenced by several organisations, and all the Public Bodies involved at least have a reason, under their Public Bodies duties, to act, and yet no single organisation is required or has the ability to take full responsibility. But unlike in my Research Project, there is not an obvious instigating partner to commit time and resources to a joint project to enable it to succeed.

One solution to this might be to strengthen the Public Bodies duties to try to force the Public Bodies to account for the indirect carbon emissions that they trigger, but arguments would be likely to ensue about who the emissions 'belonged to'. More interesting is a comment made by Professor Jan Webb speaking at the same SSN conference referred to above, that perhaps there should be a new 'Duty to Collaborate'. Webb touches upon this topic in an earlier presentation to a UKERC Heat Networks and Governance Issues

Figure 48: Slide 9 from Professor Webb's conference presentation 'Can UK Heat Networks be Commercially Viable?' (Webb, 2016)

conference in 2016. The situation described in her slide (Figure 48 above) sounds very familiar.

The Public Bodies are being encouraged by the Public Bodies Duties to act like rational actors according to the standard theories of behaviour, the problems of which I outlined in Chapter 2: their best course of action will be to focus on their own carbon emissions, to increase their own 'welfare' (reduce taxation, avoid criticism). And a Duty to Collaborate may not fully address this, since it would to some extent conflict with that focus on their own welfare. I would therefore go one step further and say that there is a need not only to collaborate, but that the duty of Public Bodies should be to reduce not just their own but Scotland's carbon emissions. Arguably, this is already contained within the phrasing of the first Duty: to act '*in the way best calculated to contribute to the delivery of the [overall national] targets* (SG, 2011b, p6). If Chris Stark's aims that I described on p241 above (Stark, 2017) are to be achieved, the responsibility of Public Bodies to address the carbon emissions of individuals will therefore need to be strengthened in the guidance to or the wording of the forthcoming new Climate Change Act itself, so that it trumps the need to address their own direct carbon emissions.

A Duty to Collaborate in order to reduce Scotland's carbon emissions that trumped the other Public Bodies Duties would place on those organisations that had impact on individuals' travel a pressure to help reduce them, and would give those organisations the incentive to take the lead and put in some resources. This would meet the 'where' and 'when' conditions I identified and solve the ensuing problems: there would be multiple organisations that had some influence and a reason to act on individuals' travel and so carbon emissions, and the Duty would give them a specific responsibility to change the travel; and the Duty would mean time and resources would be committed to a joint project to enable it to succeed.

This shift reflects a wider need to move away from the redundant use of rational actor theories of behaviour and behaviour change for other organisations and individuals, towards taking a more societal approach –

mirroring the shift in the locus of investigation from the individual in theories of behaviour to the social in practice theory. Across the board it is not *my* carbon emissions that need to be reduced, but Scotland's.

This goes against the grain of government thinking that has up until now focused on individual welfare and choice. As I touched upon above, answering the 'when has this worked?' question in the wider sense brings up issues about what is possible within a particular societal context. However Stark's recognition that the focus needs to move to those hard-to-reach individual carbon emissions, combined with an increasing change in the tone of economic thinking as the impacts of the 2007 financial crisis really begin to bite, maybe provide some cause for optimism.

iv.   Methodological questions that could influence the development and implementation of policy

Collaborative projects aiming to address wider society's carbon emissions will be difficult to evaluate and will require different ways of working to more straightforward single-organisation projects aimed at reducing direct carbon emissions. My Research Project suggests that a different sort of evidence may need to be sought by policymakers when evaluating past and considering future projects; and that a set of different skills may be required in both policymakers and those tasked with managing the projects. Two different methodological issues point in this direction, as they question the value of positivism when intervening in complex social systems.

a. *Experimental method*

I have called the TheatreBus project an *experiment* and this has echoes of a traditional positivist scientific method, but when working on complex systems, positivism becomes difficult. This poses problems for social scientists and policymakers, as it makes it hard to provide the sort of positivist justification for a policy decision that is often required. As I wrote above (p65), Byrne's useful article (2013) discusses this, and the following builds on that.

In a positivist approach, experimenters believe that they know the causal mechanism and the situation in which it is applied. For example, when using

a balance, they know that the balance is designed such that if the weight on one side is greater than the other, the balance will tip that way. When they add weight to one side and it tips they can say it is *because* they added extra weight. David Hume's questions of causality aside, they can ascribe causality.

In less clearly defined experiments, such as those involving humans, where the details of the situation are not controllable and there is a degree of uncertainty, Randomised Controlled Trials (RCTs) are used because they make it possible to ascribe a *probability* of causality. In the social sciences, experimenters have even less certainty, and in complex social systems the added issue of history, and so path dependency, and the complex interactions of the very many parts of the system make it even harder to know what the situation is on that side of the scales. The experiment can't be repeated in the same place because the fact of repetition is itself an influence on the system; and the history and complexity of two similar systems will mean that they are unknowably different from each other in a potentially relevant way. So when an intervention 'adds weight' to the other side of the balance it can't be sure that it will have the expected effect, and if it does, it is not possible to ascribe causality or even probability, as the experimenter can't be confident that it was their intervention that led to the effect. It isn't possible to say that in a similar situation the same would occur, because it isn't clear enough what a 'similar' situation would be. Hence Byrne's approach using the case study and the need for the evaluator's judgement as to what worked when and where, and when and where it might work again.

This poses a problem for social scientists conducting experiments on complex systems, and yet as I argued above, interventions aimed at bringing about the changes required to reduce Scotland's carbon emissions are always going to take place within complex social systems. In turn this poses a problem for policymakers, as they will want evidence that a policy intervention will work before implementing it.

The important point here that brings together both methodological and policy issues is that if there is an acceptance that practices can be treated as the emergent properties of complex social systems, policy makers may need to agree that different sorts of experiments, and a wider range of evidence, can provide the justification for policy changes.

b. Researcher effect

Similarly, policymakers and those implementing their policies may need to consider a wider range of people to manage the interventions in complex social systems that bringing about changes to practices requires. Standard project management skills and techniques may not be appropriate for the uncontrolled environments that complex social systems present. This is because, in those uncontrolled environments, the particular skills and attributes of the project manager may significantly affect the success of any intervention.

In Chapter 6 above I acknowledged that my personal experience was highly relevant to the TheatreBus experiment. At a simple level this was because it influenced the decision about the site, but more fundamentally it was because the inevitable influence of a researcher in any research project is exacerbated in an intervention in a complex social system since the researcher becomes part of the system and so changes it irrevocably. I also argued earlier in this discussion that particular qualities and knowledge that I brought to the experiment were amongst the causal mechanisms that enabled the elements that worked to be successful. To recap, I brought: a) an understanding of and application of complexity thinking; b) a good knowledge of the system that was being intervened in; and c) the softer skills and attributes which built trust amongst the partners, including in this instance an intimate knowledge of theatre. But I brought as well a rich seam of experience on which to draw, from being the child of a chemical engineer and a drama-school graduate, through being educated in the 1960s and 70s in a large Inner London Education Authority comprehensive school, to working in the NHS prior to attending university: all of which I am aware have shaped my personal and professional life, from my interdisciplinarity to the

way I work with other people. These aspects of the causal mechanisms are however peculiar to my involvement: another project manager would bring different skills, knowledge and characteristics. The nature of the researcher therefore needs to be taken into account in the analysis of such a project to maintain its academic rigour, but also needs to be considered when using the experience of this project to appoint the project manager to one deemed similar. Certain attributes, including more formal skills and knowledge related to the project manager's training and experience, but also less formal (and maybe more difficult to define and more contentious) ones such as social capital and networks will affect the outcomes, as there can be many ways in which a project is successful, influenced by different forms of social capital, different life experiences and different professional knowledge. Policy-makers and intervention designers and implementers may therefore need to look for attributes particular to the individual project, a reflection of the complex nature of the systems in which the interventions are taking place.

These skills and knowledge may well be found in practitioners in fields other than those normally considered by those looking for project managers. The discipline of 'project management' is often rather positivist and linear in its conception. For example Prince2 is publicised as '*the world's most widely adopted project management method, used by people and organizations from wide-ranging industries and sectors*'[19] and is indeed widely used. Yet the odd name of the method is an acronym from the longer descriptive title *PRojects IN Controlled Environments,* when as I have suggested the projects required to reduce carbon emissions are likely to be in the highly uncontrolled and uncontrollable environments of complex social systems.

In my case, I would argue that many of the skills that I brought to the experiment, separate from the knowledge of theatre and carbon reduction, come from my experience and training as a theatre director and producer. As I described in Chapter 6 above, the business of directing involves managing a complex network of individuals from different disciplines and with different

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[19] https://www.axelos.com/best-practice-solutions/prince2/what-is-prince2

viewpoints: indeed the success of the project often depends on the conflict and tension between these viewpoints.

The 'civic artist' Frances Whitehead argues that artists bring to projects a range of skills that are often overlooked (Whitehead, 2006). During the course of an early iteration of her Embedded Artist Project, in which she was working, as an artist, within the local authority on the cleaning up of a steelworks' slag heap, she realised that '*artists have knowledge, not just creativity*' (Whitehead, 2011, p268) and analysed this in a poster, *What do Artists Know,* reproduced as Figure 49 below. At art schools, drama schools, conservatoires of music, film schools and so on, would-be artists are trained to research widely, borrow, learn from and collaborate with other disciplines, experiment, and deal with failure as well as success. Their experience in the field adds to this, providing them with the skills to manage people and delicate situations and, if they are successful, developing the energy, stamina and resolve necessary to see projects through to completion. These skills and qualities resemble those needed to intervene successfully in complex social systems for other purposes, much as I described in the project management chapters above. This is not to suggest that artists or cultural practitioners should be employed on every carbon reduction intervention, nor that cultural practitioners alone have these skills – they will be found in many fields. And in different systems and situations, such as the Aberdeen Royal Infirmary example above, a deep and intimate knowledge of the relevant institutional set-up would be required. These sorts of skills and qualities will be found in practitioners in a wide range of fields, and perhaps a wider range than is normally considered. Artists however bring two particular characteristics which are often useful.

> # What do Artists Know?
> ## Frances Whitehead © 2006
>
> ***Beyond a wide range of material practices, histories and techniques, concepts and theoretical frameworks, artists are trained to use a unique set of skills and methodologies. These include:***
>
> - **Synthesizing diverse facts, goals, and references – making connections and speaking many "languages". Artists are very "lateral" in their research and operations and have great intellectual and operational agility.**
>
> - **Production of new knowledge as evidenced by the 100+ year history of innovation and originality as a top criterion**
>
> - **Creative, in-process problem solving and ongoing processes, not all upfront creativity: responsivity.**
>
> - **Artists compose and perform, initiate and carry-thru, design and execute. This creates a relatively tight "feedback loop" in their process. (see Complex Adaptive System theory)**
>
> - **Pro-active not re-active practice: artists are trained to initiate, re-direct the brief, and consider their intentionality.**
>
> - **Acute cognizance of individual responsibility for the meanings, ramifications and consequences of their work. (The down side of this is that artists are not always team-oriented or willing to compromise due to the high premium placed on individual responsibility and sole authorship.)**
>
> - **Understanding of the language of cultural values and how they are embodied and represented – re-valuation and re-contextualization.**
>
> - **Participation and manoeuvring in non-compensation (social) economies, idea economies, and other intangible values (capital).**
>
> - **Proficiency in evaluation and analysis along multiple-criteria – qualitative lines, qualitative assessment. Many are skilled in pattern and system recognition, especially with asymmetrical data.**
>
> - **Making explicit the implicit -- making visible the invisible.**
>
> - **Artists do not think outside the box-- there is no box.**

Figure 49: What do Artists Know? (Source http://embeddedartistproject.com/whatdoartistsknow.html)

First, artists are accorded by others licence to break the rules, precisely because of the name of their job. They specialise in making things up and justifying their conclusions using alternative conventions rather than focusing on acknowledged facts. Others expect them to be iconoclastic and 'think

differently'. It is not that they don't apply knowledge and research, but it may be different knowledge: in the case of Whitehead's steelworks project it was because she ignored the accepted wisdom about the conventional approaches to cooling a slagheap that she researched alternative methods and discovered an old one that would also provide a low-carbon feedstock for a local cement works. Project managers from more conventional fields not only might not think about taking this approach, but they might well be hindered by their professional standing from doing so.

Second, art thrives on contradiction and complexity. E O Wilson writes, '*The love of complexity without reductionism makes art; the love of complexity with reductionism makes science*' (Barrow (2003, p2), citing Wilson (1999)), and to be any good, cultural practitioners need to both enjoy complexity and be good at managing it. Lilley (2013, p97) argues that '*the acknowledgement of uncertainty marks the beginning of the exposition of the problem'* and goes on to explore the poet John Keats' idea of the state of 'negative capability': '*when a man is capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason'* (Keats and Colvin, 2011, p48). She writes that '*to be capable of 'being in uncertainty' is a prerequisite for approaching the uncertain.*' (Lilley, 2013, p101). Her article, in a comparative literature and theory journal, describes very well the need to accept the uncertainty and complexity inherent in complex systems which I recognise from my own theatre directing and work with composers, writers and others. And I believe it is that taking pleasure in and inspiration from uncertainty that permits the fairly open methodology which I adopted in the Research Project.

Bringing together these ideas of complexity and an embracing of uncertainty, in a very recent paper Kampelmann et al. (2017, pp2-3) argue that, '*While much has been written about potential tools for tackling complex or 'wicked problems', considerably less is written about influential roles that can facilitate these, as individual approaches or assemblages, within a participatory setting [*They cite Head and Alford, 2015; Weber and Khademian, 2008*]. Roles like organiser, facilitator, or moderator tend to reflect the logic of tame problems that can be 'fixed' through analytical*

decomposition guided by the actions of a neutral actor.' The authors argue instead for '*a curatorial role, a position that deals with complexity and conflict using multiple approaches, methods, logics – one that identifies itself as part of the actor cohort and is deeply concerned and connected with the content.'* In cultural practice, the curator helps a viewer of an exhibition know where to look, using the curator's own expert knowledge to make sense of a wide variety of items but allowing the viewer to bring their own background, understanding and perspective. Although different viewers will bring different viewpoints, the aim is to reach sufficient shared understanding to make progress in a contested area. There are echoes in both this approach and Whitehead's of Denzin's 'methodological bricoleur' (Denzin, 2012) and the OED's definition of a bricoleur as *'A person (esp. an artist, writer, etc.) who constructs or creates something from a diverse range of materials or sources'* (OED).

I should make clear that not all artists and cultural practitioners work in this way: some have quite a different approach to control and complexity. And of course, some will be good at their work and others less so. This will also be the case with practitioners from other fields, and my experience on this Research Project suggests that an understanding of complexity would be a useful skill for many people involved in interventions aimed at reducing carbon emissions. The introduction of complexity into relevant training courses and degrees would be worthwhile.

Policymakers and implementers should therefore think very specifically about where to find the project managers for interventions in the particular complex social systems that they want to change. And they should consider whether, since intervention in complex social systems is likely to be a feature of a wide range of carbon reduction policy measures, some education in complexity theory, and how it can be applied to practical situations, would be useful. Finally, a usually overlooked group of people – cultural practitioners – may be the right ones to oversee some of these interventions, particularly if for some reason they already have an intimate knowledge of elements of the system being intervened in.

Conclusions

These methodological questions combined with the issues I raise in my discussion of the policy context and the potential Duty to Collaborate all point to the need to acknowledge the fact that any attempt to reduce Scotland's carbon emissions is going to take place within the complex system that is society. The kinds of projects and interventions required will not easily be justified by standard means of assessing success or failure, pose problems for arguments for action using rational actor approaches, whether at the individual or organisational level, and may need different sorts of people to undertake them. In my concluding chapter I bring these ideas together and offer some recommendations for policymakers.

Chapter 11: Conclusion – We missed the turn, but there's another one up ahead

Project summary

I began this thesis by outlining the challenge faced by the Scottish Government in reducing Scotland's carbon emissions by 80 or 90%, or even reaching net zero emissions, when a significant proportion of those emissions are caused by the activities of individuals over whom any Government has very limited influence.

The Scottish Government's Low Carbon Delivery Plan (SG, 2009, p5, paras 1.37-1.41) specified 'behaviour change' as the means by which Scotland would achieve the reduction in these individuals' carbon emissions, and this continues in the Climate Change Plan (SG, 2018). I identified transport-related emissions as particularly problematic, since these are the result of millions of individual journeys, the number of which shows no sign of diminishing. Standard, individual-focused 'behaviour change' approaches face theoretical and practical problems that make them likely to prove ineffective and unable to achieve the necessary scale of reductions. Practice theory moves the site of investigation away from the individual to the social, and holds that practices are the product of a complex mix of social, economic, technological and historical factors. Whilst the theory seems useful to explain how social practices come about, mutate and die, it has not been as effective at providing practical advice as to how to bring about the changes that are required to achieve results such as carbon emissions reductions. Building on my experience of Scottish Government briefings and workshops aimed at rolling out the ISM Model, a tool aimed at influencing behaviours which makes use of social practice theory, and applying my own layman's knowledge of complexity theory, I noted the similarity between elements of social practice theory and complexity theory and wondered whether bringing them together might address the challenge of putting social practice theory into practice.

Complexity theory seeks to better understand and explain the characteristics of non-linear, complex systems. I suggested that social practices can usefully be viewed as emergent properties of complex social systems. This would mean that changing the complex social system might bring about different practices (that is, behaviours), and I proposed that rather than intervening at the individual or even at the social practice level, seeking to influence the complex social system of which the practices are emergent properties would be more effective. This led to a practical project in which I applied complexity theory to practice theory by intervening in a complex social system in order that the emergent properties of the system would change, leading to more sustainable travel practices. The aim was to use the project to learn more about intervening in complex social systems and how to evaluate such interventions.

As a doctoral thesis should demonstrate how the work has produced original research contributing to the field of study, in this concluding chapter I will suggest that my novel application to a real-life situation of the combination of one theoretical approach (complexity theory) to another (social practice theory) has provided new knowledge and understanding, with both methodological implications and practical impacts, which I outline first below. As this is a very practical thesis, I will offer some recommendations, based on my project and this research, for ways in which policymakers could approach this challenge by taking 'the Complexity Turn' (Urry, 2005). Finally I will suggest some areas for further research.

a) Contribution to the field of study: Methodological implications

John Urry (2005) put forward the idea the 'Complexity Turn' over a decade ago but there has been relatively little uptake of complexity theory amongst the social sciences: a Google Scholar search for the phrase shows that 477 papers have cited Urry's original article. Why this should be is partly illustrated by the practical and methodological issues that arose during this project: the long duration, the amount of energy and time, and the combination of skills required for a meaningful and successful project that

deals with complexity; the unorthodox nature of the 'emergent design' methodology (Morgan, 2008); the cross-disciplinary nature of the work; the fact that a researcher intervening in a complex system inherently involves becoming part of, and so changing, it. Maybe it has simply been a bit too difficult and other, easier to manage 'turns' have taken precedence. The urgency and importance of climate change, and the Scottish Government's need to achieve its targets, do however strengthen the need for the Complexity Turn. Fazey et al. (2018) discuss the need for more 'action-oriented transformation research' and the professional and practical difficulties experienced by researchers combining academic and practical research, and argue that '*being intelligent about complexity involves exploring possibilities without being restricted to what is formally probable. Yet science and research are naturally conservative, with a tendency to progress incrementally rather than through more fundamental change.*' (ibid p63). But the application of complexity theory to practice theory, which *is* associated with more fundamental change yet has been gaining increasing attention in the discussion of climate change in Scotland, helpfully offers the potential for practice theory to answer the criticisms about how it can be applied to produce practical outcomes.

I pointed out in Chapter 3 above that it seems strange that this combination of theories has not been fully explored before, when the language used to describe aspects of complexity theory is so similar to that used in discussing practice theory. The reluctance to take the Complexity Turn seems very widespread. The critique by Shove and Walker (2007) of the politics of transition management makes some good points that apply to the sort of project I undertook. To recap, they argue that the transition management makes contestable assumptions about the technological nature of the transition, rather than discussing what sort of society we might want to transition to. They raise questions about reflexivity and the challenge of identifying the indicators of very long-term success. However in the very practical situation which does obtain today, where a transition has been explicitly defined through a political mechanism, the first question is less

compelling. If there is democratic agreement that carbon emissions need to be reduced, then at least part of the task is to find ways to reduce them. And the issue about the long term nature of changes is precisely one that needs to be tackled by practical research and is addressed by Byrne (2013) and the theory of change approaches highlighted by Walton (2014) and Dyson and Todd (2010). Fazey et al. (2018, p70) also argue that researchers need to be more willing to acknowledge '*the normative role of the researcher, critically questioning and reflecting on the values underlying choices early on in research'* answering at least to some degree Shove and Walker's criticisms. The bringing together of these fields is therefore a valid and I would suggest overdue exercise.

This thesis contributes to these literatures by not only applying complexity theory to this case, which clearly has particular value in Scotland, but also by widening the range of examples in which complexity has actually been used.

These methodological contributions are both about encouraging and facilitating the taking of the Complexity Turn by providing a theoretical reason for doing so. My project backs this up with a practical example that provides a foundation for others to build on, or indeed material to argue against.

Contribution to the field of study: Practical impacts

I sought to apply this use of complexity theory in the field by trying to intervene in a real-life complex social system, understanding it as such and designing the intervention to influence not the individual agents but the system as a whole. The academic literature provides some examples of case studies and projects being analysed through a complexity lens, but it is harder to find those that describe the specific application of complexity theory in the development of the projects undertaken. Rutter et al. (2017) suggest that funders may be reluctant to support novel and unorthodox approaches such as those applying complexity theory, even in the field of public health, where there does seem to be increasing interest in systems theory to address complex issues, even if complexity theory itself is not necessarily being applied. For example, the report by the Academy of Medical Sciences

(2016) references the importance of transdisciplinarity and the complexity of the challenge of improving the health of the UK population but doesn't actually use complexity theory in its discussion of how to achieve it.

More practically the project has highlighted the challenges that a practical project intervening in a complex social system poses. These include the amount of time it takes, the need to involve multiple parties and the difficulty of evaluating the results, particularly over the short term. On the positive side, these challenges have led to my being able to propose (below) some policy recommendations which relate to the skills required to manage complex interventions in complex systems, and to the nature of evidence that such pilot projects can provide to policymakers to enable them to decide whether to develop an idea or reject it. The project and my discussion uncovered some problems in existing policy design which may inadvertently encourage Public Bodies to focus on less important sources of carbon emissions. I was also able to put Byrne's approach to evaluating complex interventions in complex systems (Byrne, 2013) into practice and unpack two of the questions he uses in his approach, I hope providing a useful example to anyone who might follow my lead of how to interpret these questions (see pp229ff above).

i. Research questions and learning derived from the case study

My first research question brought together the main aim of the thesis with the new approach that I was proposing and asked: **How can complexity theory be used to inform interventions in social systems in order to help achieve system-level change and reductions in Scotland's carbon emissions?**

To provide a practically useful answer to this question it was necessary to try to intervene in a complex social system to understand whether it was feasible, how to evaluate the success of any interventions and how to actually go about it. My reading of the methods literatures showed that a case study would help provide this information and so my second research

question asked: **What lessons that might be applied to other social systems can be learned from a small experiment treating cultural institutions and events as complex systems?**

For my case study I made use of my background, experience and contacts in the world of the arts and conducted an experiment seeking to change the complex social system within which audience members travel to a large theatre in Aberdeen. Although this was not wholly successful in its aim of changing the travel behaviours of audience members, it did provide the following useful learning about deliberately intervening in a complex social system to deliver different travel practices.

1. Travel, whilst it is the result of specific choices by each individual, is influenced by a range of factors which are not within the control of that individual and indeed are within the control of no single person or organisation. Rather, major public entities (such as the Public Bodies defined in the Climate Change (Scotland) Act, 2009), smaller organisations and the individuals themselves are all agents in complex social systems, which are dynamic, unbounded, non-linear, subject to feedback loops and so demonstrate emergent properties of the systems.

2. The task of changing the travel behaviours is therefore one of intervening in these complex social systems to change them, rather than the standard approach of intervening at the level of the individual in a more linear fashion.

3. While my experiment focused on travel-related emissions, similar considerations are likely to apply to other emissions sources. It is therefore possible to widen this approach out to include all of Scotland's carbon emissions, which are produced by the complex social system that is Scottish society rather than by individuals or individual organisations. The Scottish Government's policies need to be targeted at addressing the society's overall emissions rather than focused on those 'belonging to' individuals or organisations, and so behaviour change. This means intervening in complex social systems

up to the scale of society as a whole and moving away from rational actor theory at both individual and organisational level.

4. As interventions in complex social systems are just as dynamic, not fully bounded, non-linear and involving of multiple parties as the systems being intervened in, this will require *management* rather than *implementation* of projects: the outcomes are never going to be fully knowable in advance and constant adjustment to the system will be necessary to achieve the desired results.

5. The Public Bodies over which the Government does have some control are important agents in all these systems: as my experiment and other examples showed, the Public Bodies influence much of Scottish daily life. However current Scottish Government policy leads to a focus on the Public Bodies' direct carbon emissions rather than the increasingly important prize of those emissions that fall between them. To achieve a reduction in society's overall carbon emissions rather than just reduce the Public Bodies' own direct ones, a different approach will be required.

6. The Public Bodies and other organisations are all busy doing their normal work, and the experience of the TheatreBus project indicates that both a commitment to a project and the ability to devote resources to it are necessary to its success.

7. Discussing my own TheatreBus project I showed that my understanding and use of complexity changed my thinking about the system and how to intervene in it and affected those around me who were heavily involved in the project. Building on this and following what seems to be the direction of the current thinking at the Scottish Government, an understanding of complexity theory and its application to the social sphere as well as the natural sciences would be helpful.

ii.   Policy recommendations

Overall, this is effectively a call to society and policymakers to take the Complexity Turn: to start applying complexity theory in society's thinking and

policy-making. But this will itself be no simple change. I therefore suggest that the following recommendations flow from the above points:

1. First, policy needs to overtly acknowledge the Complexity Turn: the society in which Scotland's carbon emissions are created is so clearly a complex social system that to continue down a road that fails to take account of that will only lead to interventions that fail to deliver the desired reductions. There is evidence that this is happening, from Andrew Darnton's session on the ISM model at the SSN conference in 2016 (Darnton, 2016) to Chris Stark's talk at the 2017 iteration of the same event (Stark, 2017), but judging by the questions at those conferences and conversations I have overheard, awareness of that complexity is not widely shared. If the system's complexity is not explicitly acknowledged, then it is easy for people to ignore it, as simple linear descriptions seem easier to deal with.

2. Therefore the focus of policy needs to shift from the direct carbon emissions of individuals and public and private organisations of all sorts to society's overall carbon emissions.

3. This leads to the third point, which is that an understanding of complexity needs to become much more widespread, at least in policymakers and those implementing the policy at the higher levels. Without this wider understanding, mention of complexity will not make much difference. That this should be a deeper and more theoretical knowledge which however can be practically applied, rather than a general awareness of the complexity of society, was clear from my own change in understanding which occurred when I took the time to draw the 'map' of the system that people were travelling in in Aberdeen. The benefits of it also became clear from the APA Marketing Manager's growing awareness of the implications as we worked together. Current and future policymakers and implementers need to be able to consciously rather than, or at least as well as, unconsciously apply the 'complexity lens'. This might mean that learning about complexity theory and how it might be applied in

practice should be built into continuing professional development and post-graduate or even undergraduate degrees.

4. With such knowledge becoming more widespread, a wide range of evidence should be acceptable when it comes to assessing whether interventions should be continued, rolled out more widely or abandoned (see Rutter et al. (2017)). An awareness of complexity theory would lead to a clear understanding that interventions may take time, so theory of change approaches may provide different indicators of success. The causal factors may need to be described in more nuanced and individual manners, considering elements such as the individual experience of the project manager or the conditions in which a pilot took place, with an understanding that these will never be exactly replicated but can still provide useful knowledge to point to the design of future interventions.

5. To provide this wide range of evidence, methods of evaluating complex interventions in complex systems need to be further developed and understood.

6. There should be a refocusing of the Public Bodies Duties, or the guidance about how to comply with them, to move Public Bodies away from addressing their own direct emissions to addressing Scotland's overall ones. This would need to involve some sort of Duty to Collaborate as no Public Body has sufficient influence to make a difference to the individuals' carbon emissions that are increasingly important. This would be a result of taking the Complexity Turn as it would acknowledge that these carbon emissions are the result of practices emerging from the complex social systems that individuals are operating in, and that these systems can only be influenced by collaborative interventions by many partners.

7. Any such Duty to Collaborate needs to be strong enough to encourage organisations to divert resources to relevant projects, over-riding other less important duties.

8. The introduction of this Duty to Collaborate would mean that different sorts of qualities and backgrounds should be considered when seeking project managers for interventions. They would need an understanding of and affinity for complexity, an intimate knowledge of the areas(s) they would be intervening in, to ensure the trust of the people they are therefore working with, and the ability to constantly tweak and manage a system, rather than to put in place a one-off intervention. As I have suggested above, these qualities might be found in people from a range of unexpected areas, including the arts.

Further research

'*Never let a good crisis go to waste*' (Rahm Emanuel, see Knowles).

The forthcoming new Climate Change Bill promised by the Scottish Government for 2018, the urgency of the task set by the Paris Agreement, the wider awareness of anthropogenic environmental change and acceptance that action is necessary, the continuing fall-out of the 2007/8 financial crisis and the resulting questioning of the dominance of rational actor economics are among the factors that combine to make this a propitious moment to be arguing not only for social scientists to take the Complexity Turn but also for an acceptance of a wider range of kinds of research that are able to understand, manage and make practical use of complexity theory. But if the Complexity Turn was not taken in 2005, I suggest that three areas of research are needed to make sure that the next exit is taken, and that it leads to a new destination.

Research about research – why wasn't the Complexity Turn taken?

First it would be useful to look into why the Complexity Turn failed to get the attention of social scientists, their institutions and the funders of their research. I suggested above some possible reasons. The questions posed by Shove and Walker (2007), Rutter et al. (2017) and Fazey et al. (2018) need to be answered and a more detailed exploration would help break down the institutional and professional barriers to research involving complexity. For the field to have the credibility and so attract researchers the nature of

the knowledge on which it is based and the challenges it faces need to be properly understood. If, as I argue, such research projects take longer than the norm, use unorthodox methods and produce different sorts of evidence, these aspects are pertinent to funding, project design, the expected outcomes and the application of any knowledge produced.

Taxonomy of research

Building on this, the diversity of the few examples of the application of complexity theory to bring about societal change and the challenge I faced in finding them points to the need for further research to bring together the literatures from a wide range of fields to explore this area. I have focused on the sociological literatures, but there is clearly interest in these ideas in public health, education and international development, whilst complexity theory itself of course comes from the natural sciences. The very varied nature of these fields reflects the complexity of the topic and the need for researchers to be aware of and grasp the basics of a very wide range of ideas and discussions. Authors such as Walton, Byrne and groups such as the Academy of Medical Sciences still tend to focus on their own areas: if the Complexity Turn is going to be embraced, it would be very valuable for a review to bring these together. This is no small matter: the inter-, trans- or even *a*-disciplinarity of such a review would make it a long-term project; the crossing of the boundaries which institutions, journals, research councils and individuals are comfortable within would be challenging; and the project would pose yet more methodological questions about the combination of very different methods, approaches and bodies of evidence.

Research into the challenges of implementation

Moving out of the academy, the practical purpose of this area and the urgency of the problem it is seeking to address mean that research is needed to understand what the hurdles to implementing research findings will be, in order that they can be overcome. This again may require crossing disciplinary boundaries. The political-economic question of why rational actor theory continues to dominate despite the theoretical and practical problems that it faces needs to be answered. There have been some attempts to

provide fresh approaches and in the Prologue to the 2nd edition of his *Prosperity Without Growth* (Jackson, 2017), Tim Jackson justifiably writes that what was once a fringe issue has now moved into the mainstream. But these examples are few and far between. This returns to the question about why what is at heart an economics question dominates so much of the discourse, and so policy development, about climate change and carbon reduction (Urry, 2011, pp1-2).

Yet more practical are questions about how policy implementation takes place and particularly the nature of government and its relationships with wherever the interventions are taking place, such as within local authorities. I wrote above of the problem of perverse incentives built into the Public Bodies Duties in the Climate Change Act 2009, and of course the new Climate Change Bill offers the opportunity to deal with these. My own experience tells me that, perhaps particularly during a period of 'austerity politics', the silo-ed nature of the Scottish Government leads to problems further down the pyramid: structures at the top are replicated all the way down. Some of the public health literature already touches upon these issues (see for example Dattée and Barlow (2010)), demonstrating the value of bringing together disparate literatures and learning from established practice in other fields. But if a radical – and so fear-inducing – change of direction is required, more and more focused examples of potential solutions and ways of working will be helpful.

No Public Body is an Island

I want to finish by bringing some of the ideas of this thesis together. In Chapter 2 I suggested that the concepts of 'behaviours' and 'behaviour change' really came to the fore only when the post-war consensus had broken down in the early 1970s. Prior to that, public goods such as health or issues such as the lack of access to energy were seen as national problems to be dealt with by society, but in the 1970s economic and political thinking began to focus on the individual, who was responsible for their own choices, behaviours and life. This occurred for political and economic reasons that

influenced thinking about society as a whole. With the atomisation of society into individuals, the challenge of how to 'change behaviours' became important and the number of academic papers addressing this grew exponentially (Spotswood, 2016).

My policy recommendations above are couched in the usual kind of language, but what they hint at is a much more fundamental shift. It is not possible to write a thesis in 2018 without reflecting, consciously or otherwise, the change in the economic, political and so social context that the 2007/8 financial crisis wrought. My argument that we need to take the Complexity Turn expresses that, just as since the 1970s the rational actor theory was increasingly applied not only to individuals but other entities such as the suppliers of public goods such as electricity, transport and even health, now the realisation that the theory doesn't actually work needs to be applied as much to public bodies and companies as to individuals. These all exist and participate in complex social systems and applying rational actor theory-based policies to bring about change in their behaviours will not succeed.

One thing I learned from my practical experiment in Aberdeen is that genuinely taking the Complexity Turn is not just dealing with a particular problem, it is flicking a switch in the head that changes a whole way of thinking.

Building on my suggestion that artists can sometimes bring a different way of seeing things to help solve complex problems, I want to apply here something I have learned as a theatre director. At the end of a rehearsal period you watch a dress rehearsal of the show, with all the complexity brought by the combination of the script, the different actors, characters, design, music, lighting, stage management etc – and all the people who work on those elements. After that rehearsal you have maybe thirty minutes to give 'notes' to the whole company to make improvements: a company of possibly tens of people, each with their own roles, ideas, understandings, trajectories through the production and insecurities about the first public performance. Any change that one of those people makes will affect each

and all the others. When your thinking is clear and you are working at your best there will be something you can say that, like a line of dominoes falling over when the first one is toppled, reverberates through the whole production, influencing everyone involved in their own role, changing the whole thing for the better. The challenge is identifying the small shift that can feed through the complex system leading to wholesale change. What you are trying to do is change the system to bring about different emergent properties.

Maybe the solution to the Scottish Government's problem is actually quite simple. One apparently small statement could reverberate through the whole system, affecting everything from the largest public body down to the individual. The Complexity Turn is at heart a reminder that there *is* such a thing as society. But the society that Margaret Thatcher is commonly (mis)quoted as denying exists is not the predictable, linear society that is easy to influence through policy levers and legislation that was once imagined, including by influential sociologists. Like a good show it is complex, non-linear, unpredictable, reaches no equilibrium and displays sometimes surprising emergent properties.

Appendices

a) Appendix 1: Travel survey for attendees at His Majesty's Theatre spring 2014

Survey questions

1. Which show have you just been to see? (Scottish Ballet's Hansel & Gretel/Scottish Ballet's Wee Hansel & Gretel/ Scottish Ballet's Wee Hansel & Gretel/ Ghost the Musical/ Rambert/

   Rent in Concert/Hello, Dolly!/

   Ellen Kent Opera (Aida or Nabucco)/Moon Tiger/Pygmalion)
2. What was the date of the show you attended?
3. What was the time of the performance you attended?
4. Where did you start your journey to His Majesty's Theatre? (Home/Work/Other (please specify))
5. What was the postcode of where you started your journey to get to HMT?
6. Which form of transport took you the majority of your journey to His Majesty's Theatre? Please also indicate any other mode of transport you took to get to the venue as part of the journey. (Car (drove)/Car (lift)/Motorbike/Taxi/Bus/Walked/Bicycle/Train/Other (please specify))
7. Did you travel home in the same way? (Yes/No)
8. If no, how did you get home indicating the main form of transport and any other mode you took? (Car (drove)/Car (lift)/Motorbike/Taxi/Bus/Walked/Bicycle/Train/Other (please specify))
9. Can you tell us what your main consideration was when choosing how to get to His Majesty's Theatre? (Cost/Convenience/Availability of parking/Availability of bicycle racks/Safety on public transport/Environmental reasons/Restricted mobility of myself/Restricted mobility of others/Other (please specify))
10. On a scale of 1 - 5 with 1 being not much and 5 being a lot, can you tell us how much you consider the environmental impacts when choosing transport to attend the show?

11. What would make you consider travelling to His Majesty's Theatre in a more environmentally friendly manner?
    (Cheaper tickets by travelling on public transport/A ticket-transport deal/Events coordinated to suit public transport/Public transport coordinated to Suit the shows/Better bike parking/Better public transport/Car sharing/Other (please specify))
12. Are you (Male/Female)
13. Age bracket (15-14/25-34/35-44/45-54/55-64/Over 65)
14. What is your working status?
    (Employed full time/Employed part time/Retired/Student/ Unemployed/Looking after family or home)
15. If you have worked, what is your current or last job (Open response)
16. What is the highest level of qualification you have gained? (Standard Grades, GCSE or equivalent/Highers, A Levels or equivalent/ Further or higher education below the level of a degree (diploma, HND etc)/Degree (BA, BSc etc)/Postgraduate degree (Msc, MA, PhD etc)/Prefer not to say
17. Where do you live? (Aberdeen/Aberdeenshire/Other Scotland/Other UK/International)
18. Do you have access to a car? (Yes/No)
19. What is your home postcode? (Open response)
20. We will be forming a group of people interested in improving the options for travelling sustainably to the theatre. If you would like to be kept informed about this or to join the group, please provide your name and details here. We will not pass your information on to any third parties.

Appendix 2: Surveys of TheatreBus users and non-users

i. TheatreBus User survey

The following survey was sent by email to all Users of the TheatreBus service during the week after they travelled home from the theatre.

Q1: What was the date of your journey? Please enter the date in the following format: DD/MM

Q2: Which bus route did you take?

Q3: Where did you actually get off the bus? (please give name of street and town, village or stop)

Q4: And what was the postcode of your final destination? This will NOT be used for marketing purposes. (Please give postcode in the form ABX XXX or ABXX XXX)

Q5: How did you get from the bus stop to your final destination?

Q6: If the TheatreBus wasn't available, would you still have gone to the theatre?

Q7: If you hadn't taken the TheatreBus, how would you usually travel home from the theatre?

Q8: Did you use your TheatreBus ticket to get a Stagecoach bus to His Majesty's Theatre before the show?

ii. TheatreBus Non-user survey

The following survey was sent to all attendees at His Majesty's for whom the Box Office had email addresses and postcodes, and whose postcode indicated that they may have found the TheatreBus service useful.

Q1: When you came to His Majesty's last weekend, were you aware of the TheatreBus service?

Q2: If Yes, please tell us why you didn't use the TheatreBus service (tick all that apply)

Answer Options
Doesn't go to where I live
Goes on my route, but not close enough to my house
I was going out after the show
Too expensive
Too slow
Friends I was with didn't want to
I don't like getting the bus
Didn't understand about the service
Other (please specify)

Q3: If No, do you think you may use the service in future?

Q4: Did you find out about TheatreBus on your recent visit to His Majesty's?

Q5: 5. Which benefits of TheatreBus do you find most appealing?

Answer Options
Costs less than driving
Costs less than taking public transport
No other way to get home
Quicker journey than otherwise
I liked the fact I was guaranteed a seat
Safer than normal public transport
Nicer than normal public transport
Don't need to walk to a bus stop or station
Don't need to wait at a bus stop or station
Environmental reasons
I liked the fact I was travelling with other theatregoers
I saw that His Majesty's Theatre was running it and wanted to support them
I saw that His Majesty's Theatre is going green and wanted to support that
Other (please specify)

Q6: What would encourage you to use the TheatreBus?

Q7: What is your postcode? (This will NOT be used for marketing purposes)

Appendix 3: Example of mapsdata map showing location of early bookers by postcode for Shrek in Spring 2015 season
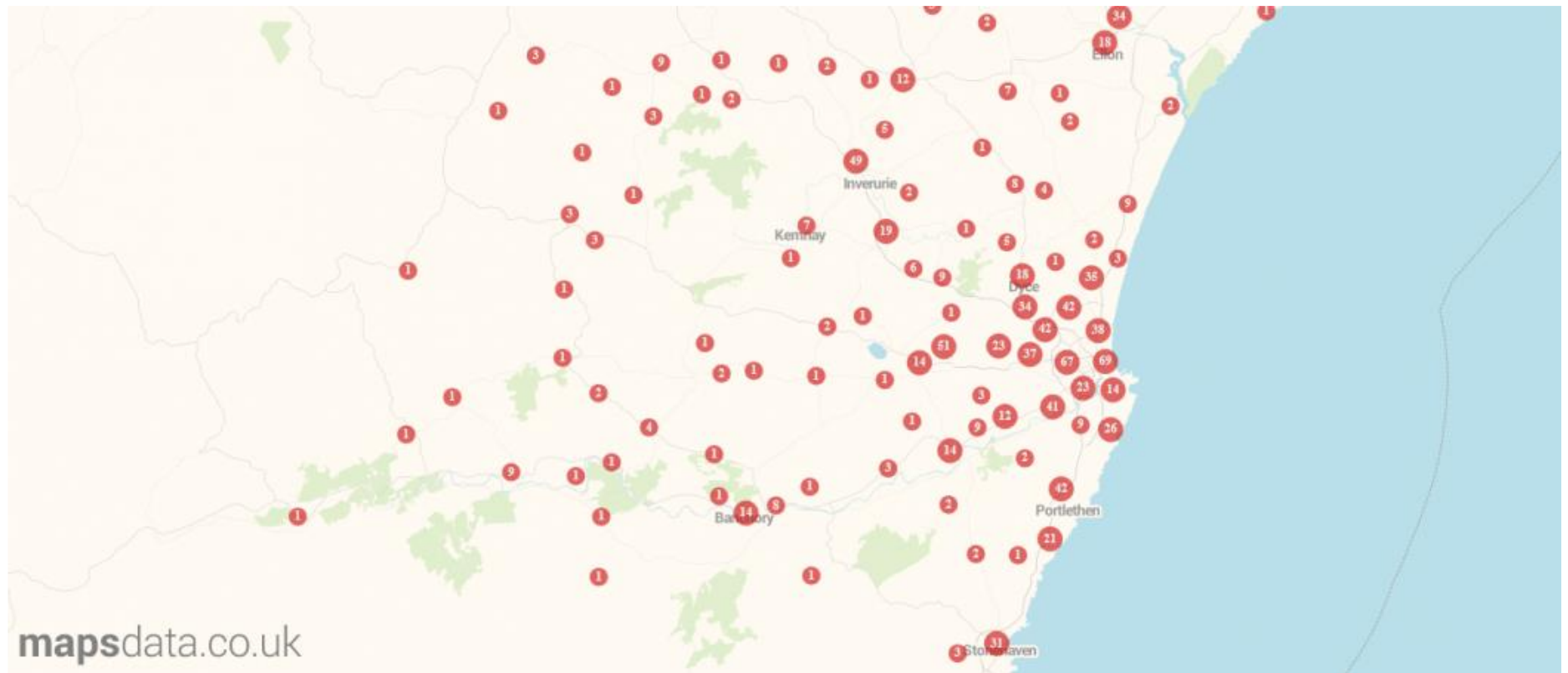
Appendix 4: Table showing bus and train times aligning with show times for the spring 2015 season

Bus times as at 20 Nov 2014. Fridays and Sats are the same

Show	Running time	Start	Finish	Bus to Stonehaven & Portlethen	Gap	Train to Stonehaven only	Bus to Inverurie	Gap	Bus to Kemnay	Gap	FirstBus along N Deeside Rd	Gap
Scottish Ballet	2 hr	19:30	21:30	22:40	1 hr 10	23:23	22:00	30 mins	22:50	1 hr 20	21:47	17 mins
Shrek	2hr 15	19:00	21:00	21:40	40 mins	21:31	22:00	1 hr	22:50	1 hr 50	21:17	17 mins
Mockingbird												
Jersey Boys	2 hr 40	19:30	22:10	22:40	30 mins	23:23	23:00	50 mins	22:50	40 mins	22:47	37 mins
The Bodyguard	2hr 25	19:30	21:55	22:40	45 mins	23:23	22:10	15 mins	22:50	55 mins	22:17	22 mins
Full Monty	2 hr 30	19:30	22:00	22:40	40 mins	23:23	23:00	1 hr	22:50	50 mins	22:17	17 mins
Sister Act	2hr 20?	19:30	21:50	22:40	50 mins	23:23	22:10	20 mins	22:50	1 hr	22:17	27 mins

Yellow highlighted times possible; red highlighted possible but tight

Timings allow for minimum 20 mins between scheduled end of show and bus

Appendix 5: Table showing bus and train times aligning with show times for the autumn 2015 season

Dates	Title	Finishing time	Bus times as at 20 March 2015. Fridays and Sats are the same unless stated									
			Bus to Stonehaven & Portlethen (Union Square)	Gap	Train to Stonehaven only	Gap	Bus to Inverurie (Union Terr Gdns)	Gap	Bus to Kemnay (Union Square)	Gap	Bus to Banchory (St Nicholas Kirk)	Gap
8 Sept - 3 Oct	Dirty Dancing	22:00	22.15 (not Sat), 22.40	15 or 40 mins	Fri 23.23, Sat 22.27	27 mins (Sat only)	22:12, 23:12	12 or 72 mins	22:50	50 mins	22:46	46 mins
9 & 10 October	Scottish Ballet	tbc										
12 - 17 october	Shawshank Redemption	tbc										
26 - 31 October	Rebecca	21:45	22.15 (not Sat), 22.40	30 or 55 mins	Fri 23.23, Sat 22.27	42 mins (Sat only)	22:12, 23:12	27 or 87 mins	22:50	65 mins	22:46	61 mins
3 - 7 November	And Then There Were None	21:42	22.15 (not Sat), 22.40	33 or 58 mins	Fri 23.23, Sat 22.27	45 mins (Sat only)	22:12, 23:12	30 or 90 mins	22:50	68 mins	22:46	64 mins
10 - 14 Novemb	Jesus Christ Superstar	21:40	22.15 (not Sat), 22.40	35 or 60 mins	Fri 23.23, Sat 22.27	47 mins (Sat only)	22:12, 23:12	32 or 92 mins	22:50	50 mins	21:46, 22:46	6 or 66 mins
18 - 21 Novemb	White Christmas	22:10	22.15 (not Sat), 22.40	5 or 30 mins	Fri 23.23, Sat 22.27	17 mins (Sat only)	22:12, 23:12	62 mins	22:50	40 mins	22:46	36 mins
	Too tight or long wait (over 40 mins)											
	Between 25 & 40 mins after show ends											
	Between 10 & 25 mins after show ends											

Appendix 6: Project plan

February	• Confirm details of proposal with Aberdeenshire Council • Meeting with Aberdeen Council • Confirm autumn programme • Confirm likely dates for buses (use current bookings, sales targets etc; maybe survey existing bookers) • Proposal to/discussion with FirstBus	• Ben Twist • Ben Twist • the Marketing Manager/Ben Torrie • the Marketing Manager/Ben Twist • Ben Twist/the Director of Marketing
March	• Agree which bus company/ies to work with • Confirm costings with bus company • Marketing plan with costings • Review staffing arrangements • Prepare budget • Agree budget internally • (SCSP funding announced 'mid-March) • Confirm match-funding with Aberdeenshire (and Aberdeen City if possible) • Confirm go-ahead • Produce advert for April brochure • Design print, web materials	• Ben Twist/the Director of Marketing • Ben Twist • the Director of Marketing/Ben Twist • Lyn Hackett/Ben Twist • Ben Twist • the APA Chief Executive/the Director of Marketing/Ben Twist • Ben Twist for the Director of Marketing • the APA Chief Executive • the Director of Marketing/ Ben Twist • ?
April	• Agree provisional plans with bus company(ies) • Put on to Box Office system ready for bookings • Implement marketing plan (PR, advertising etc)	• Ben Twist • ? • the Marketing Manager • Box office • Box office

	• Open bookings once brochure distributed • Contact patrons who have already booked to offer bus service • Focus group to get general view of transport/travel in Aberdeen (*not* sustainable travel focused) • (Install Bustracker if appropriate)	• Ben Twist • (?/contractor)
May	• Continue implementing marketing plan & sales • Monitor sales to review plan •	• the Marketing Manager/Box office • the Director of Marketing/the Marketing Manager/Ben •
June	• (Decision on funding from NESTRANS two months after application) • Continue implementing marketing plan & sales • Monitor sales to review plan • Produce advert for August brochure • Design and procure banners for foyers	• the Marketing Manager/box office • the Director of Marketing/the Marketing Manager/Ben Twist • the Director of Marketing/ Ben Twist • ?/Ben Twist
July	• Continue implementing marketing plan & sales • Monitor sales to review plan	• the Marketing Manager/box office • the Director of Marketing/the Marketing Manager/Ben Twist
August	• Brochure distributed • Review sales • Confirm final plans with bus company/ies • Arrange staffing; induction • • Plan survey of users	• Ben Twist/the Director of Marketing • Ben Twist

		• the Customer Services Manager Hackett/Ben Twist • Ben Twist/the Marketing Manager
September	• Buses start • Photocall, PR etc • Survey users using forms and/or Survey Monkey	• FoH/Ben Twist • Ben Twist/the Marketing Manager/FoH staff

Appendix 7: Agenda for project planning meetings on 16 & 17 April 2015

      i.   **Preparatory meeting on 16 April with APA Director of Marketing, APA Marketing Manager and me:**

1. *Programme*
   a. *what is now confirmed*
   b. *When it goes on sale*
   c. *Sales to date*
2. *Likely shows and dates for running buses*
   a. *?*
3. *Ticketing – Audience View: what needs to be done*
   a. *What information we need from Stagecoach*
   b. *Pricing*
   c. *Date we put on sale*
   d. *ATOL: if we offer a 'show + transport' deal do we become a tour operator, which would be problematic? Do we have to find another way to do this?*
   e. *Is there a VAT complication (ie VAT on ticket, not on transport)?*
   f. *(I wonder whether the best way of avoiding both these issues is in offering the two items separately, not jointly)*
4. *Promotion*
   a. *Press & PR*
   b. *Leaflets – for APA venues, circulation, for Aberdeenshire and for Stagecoach*
   c. *Signage within HMT*
   d. *Offers?*
   e. *Marketing plan*
   f. *I think I'm meeting Kim Masson, Marketing person at Stagecoach on Friday*
5. *Budget*
6. *Logistics (may be longer term)*
   a. *Staffing in the foyer (do we need to bring in Lyn and/or the Aberdeenshire Principal Officer for this, in due course?)*
   b. *When I need to be there*
   c. *Other staffing?*
7. *Surveying/audience feedback (longer term, although outline useful now?)*
   a. *What APA want to know*
   b. *What Ben needs to know*
   c. *What Stagecoach wants to know*

ii. Meeting on 17 April with Stagecoach, Transport Strategy Officer at Aberdeenshire Council, APA Marketing Manager and Ben Twist:

1. *Routes, stops, dates – at least in outline*
2. *Ticketing arrangements*
3. *Promotion*
4. *Surveying*
5. *Agreement with Stagecoach and Aberdeenshire Council*

Appendix 8: Project aims and objectives for Aberdeenshire Council's project in the Paths for All: Smarter Choices, Smarter Places programme: His Majesty's Theatre Sustainable Transport Project

Project Aims and Objectives

The desired overall outcomes for the SCSP programme[20] are:

1. **Changes in knowledge, attitudes and beliefs towards sustainable travel choices;**
2. Increased walking and cycling modal share for short local journeys, proportionate to a one-year programme;
3. **An increase in other sustainable travel choices for longer journeys, i.e. public transport and car share;**
4. Reduced car use for short local journeys;
5. Reduced driver only journeys;
6. **Building an evidence base for interventions.**

This project is focusing on the three outcomes shown above in **bold:** 1, 3 and 6.

1. **AIM:** To encourage a switch from car travel to bus travel for specific journeys (Outcome 3 above)
   a. **Outcome:** Amongst travellers from His Majesty's Theatre after specified performances a switch of 5% from car travel to bus travel. Use as baseline survey in 2014 showing that 70% of theatre attenders travelled by car.
   b. **Measured by:**
      i. Number of users of specially provided buses
      ii. Survey of users about how they would have travelled if the buses had not been provided.
   c. **Who will do it:** Ben Twist (Aberdeen Performing Arts researcher) and APA staff
   d. **When**: Surveys during autumn 2015; results analysed by 31 March 2016
2. **AIM:** To increase amongst His Majesty's Theatre audiences awareness and support for sustainable travel (Outcome 1 above)
   a. **Outcome:**
      i. Increased consideration by His Majesty's Theatre audiences of environmental reasons when choosing mode of transport to the theatre
   b. **Measured by:**

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[20] From Smarter Choices, Smarter Places 2015/16, Application Guidance November 2014

      i. Survey of theatre audiences in spring 2016, using as baseline a survey in 2014 with 1,874 respondents. In 2014 1.17% of respondents gave 'Environmental reasons' as their main reason for their choice of travel mode to the theatre. 6.88% responded that they considered Environmental Impacts 'a lot' when choosing transport mode.

      ii. Survey of the users of the buses provided by the project to assess changes in attitudes

  c. **Who will do it:** Ben Twist (Aberdeen Performing Arts researcher) and APA staff

  d. **When**: Bus user surveys during autumn 2015; wider audience surveys January - March 2016. Results analysed by 30 June 2016

3. **AIM:** To explore how transport providers, event producers and other stakeholders can work together to facilitate sustainable travel (Outcome 6 above)

  a. **Outcome:** a case study of a collaboration between different actors aiming to increase bus use

  b. **Measured by:**

      i. Qualitative interviews with staff from the theatre, the bus provider, the local authority and others involved in the collaboration.

      ii. A description of the project, its methodology and theoretical basis and the results

  c. **Who will do it:** Ben Twist (Aberdeen Performing Arts researcher)

  d. **When**: Interviews January – March 2016; writing up by 31 October 2016

Appendices 9 & 10 – attached after References

    i. **Appendix 9: Complex system chart, large version (see p110)**

    ii. **Appendix 10: Process map, large version (see p112)**

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