Valuing and Judging Investments in Electric Vehicle Chargepoints "in the Wild"

By

Elizabeth Dolmor
ID: 36382182

In collaboration with:

Charge My Street

Department for Entrepreneurship, Strategy, and Innovation,
Lancaster University

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Abstract

The impact of Climate Change has accelerated technological advancements in vehicles in an effort to reduce effects. One such technology, is the introduction of alternative modes of transport, namely in the shape of the Electric Vehicle. A chargepoint is a new piece of technology, needed to support the transition to EVs. There are three actors vital to chargepoint installation: service providers, service hosts, and service users. These three actors will hold different valuation and judgement systems, which will influence the success of a chargepoint. This project has investigated the valuation and evaluation of chargepoints, namely its value, as a service, as a concept, and as an opportunity to fulfil a green agenda. These perspectives are particularly influenced by context, and this project has been in partnership with a service provider, Charge My Street, a community benefit society installing chargepoints in underserved locations in Cumbria. Understanding the different valuation and judgement systems at play between the three actors is key to understanding the value produced at chargepoints, both physically and conceptually.

Defining value is difficult, as it often relates to contemporary capitalism, this research has extended the scope for value beyond the capitalistic perspective of 'worth'. The project has identified the different decision tools used by service hosts to install a chargepoint, specifically the collision of values including social, environmental, and economic. Tools such as visualisations of value, ZapMap, and community creation, could improve the success of chargepoint installation for service providers such as Charge My Street.

Using an autoethnographic perspective, interviews, and twelve months immersed in the role as a service provider, has informed on the different valuation systems produced by the actors, the impactful calculative agencies which inform on decision processes, and how those involved perceive the chargepoint and its value.

Keywords: *valuation studies, valuation and judgement theory, Electric Vehicles (EV), chargepoints, values, social values, environment values, economic values, community, markets*

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__Declaration__

This thesis is submitted to the Department for Entrepreneurship, Strategy, and Innovation in Lancaster University Management School and the Board of Examiners of Lancaster University in partial fulfilment of the requirements for the degree of Master of Science by Research by Innovation. I hereby attest that this thesis is entirely my own work (with some ideas generated through discussions with my supervisors, Professor Katy Mason, Dr Burak Boyaci, and Dr Luke Rhodes-Leader). This thesis has not been submitted in any form for the award of a higher degree elsewhere. Sources of information have been fully referenced.

1.0 Introduction

The impact of Climate Change has accelerated technological advancements in vehicles in an effort to reduce effects (McMeekin and Southerton, 2012). Technology is transforming and creating new spaces within the modern world (Nightingale et al., 2020). It is impacting the daily lives of those embracing these changes. Globally, the issue is being tackled in a myriad of ways, through national and international efforts, programmes, treaties, and agreements (Lal Pandey, 2014). However, these efforts, despite being on such a large scale, are not the singular solution to solving the insurmountable issue of Climate Change. This research aims to find the value of placing Electric Vehicle (EV) chargepoints within the smaller scale community spaces, in areas outside of conurbations.

One such technology is the introduction of alternative modes of transport, namely in the shape of the Electric Vehicle. Mobility has always been part of the human aspect, and there are constant reinventions of how it can be achieved (Doody et al., 2021). This has led to the development of sustainable alternatives to traditional Internal Combustion Engine Vehicles (ICEV), which contribute millions of tonnes of CO_2 to the atmosphere annually (GOV.UK, 2022b). EVs are part of a solution to reducing the impact vehicles have on the planet (Küfeoğlu and Khah Kok Hong, 2020). However, this transition to EVs could be hampered by the requirement of a reform of public infrastructure in order to support those driving EVs (Antoun et al., 2020; Wolbertus et al., 2018). With an ICEV, users will regularly visit a fuel station to fill their tanks with fossil fuels, in the form of either diesel or petroleum. For EVs, they require more specific technology, a chargepoint.

A chargepoint is a new piece of technology, needed to support the transition to EVs (Figure 1 & 2) (Wilson, 2014). This is an indisputable fact, however, there is the issue of where it can be located. Typically, there is the general idea that those who transition to an EV do so because they have the economic ability, the social comfort, and the environmental ethos to surmise justification in purchasing it (Axsen et al., 2013; Cecere et al., 2018; Mandys, 2021). Consequently, when addressing climate change, as discussed above, it produces a caveat when efforts are made by people outside of those with these three values, those who perhaps have the environmental ethos, but lack the economic capability or social comfort. Nominally, here the focus is placed on those without access to private driveways, therefore lack the place in which to install an EV chargepoint to enable their transition to more sustainable transportation (Budnitz, 2022).

Figure 1 - CMS chargepoint at Staveley Mill Yard, Cumbria. Taken by E., Dolmor

Figure 2 - A CMS chargepoint in Carlisle City Centre. Taken by E., Dolmor

Here is the space in which this research eclipses with the market. If efforts are being made to reduce the impact of vehicles on the climate, and achieve the targets produced by governmental bodies (GOV.UK, 2021), there needs to be the opportunity for all to be involved in the agenda, circumspective of their location, economic status, or ability. EVs and their needed chargepoints are not the only solution to climate change, but their employment can improve the present circumstances (Bortone et al., 2022).

Consequently, as by design with a market, as the number of EVs on United Kingdom's roads increases, chargepoint demand increases (Morton et al., 2018). There is perhaps a tendency to place these chargepoints where there is guaranteed profit, developing a model that places chargepoints within densely populated urban areas, those at the core of the economy (Aljaidi

et al., 2020). This negates the consideration of those outside, on the periphery, those that when comparing to spaces such as London or Manchester, could be considered 'wild'. Such places like Cumbria or the Peat District, areas of natural beauty, and highly rural are perhaps not placed at the forefront of climate change, their role being to reduce carbon in the air with their wilderness (McKinney et al., 2023). But those living in these spaces do have the environmental ethos to partake in transitioning to EVs. A bias could suggest they may even have a greater environmental ethos compared to those living in highly urban areas (Liu et al., 2020).

Henceforth, public chargepoints are needed within these areas, and this is where this research is focusing, Electric Vehicle Chargepoint infrastructure 'in the wild'.

Notably however, the approach to this research is increasingly unique in two-folds in comparison to previous chargepoint research. First, it is worth observing, that rather than assessing specifically where to place and install chargepoints from a geographic perspective, this research is instead assessing the process through which those having a chargepoint installed come to their decisions. Namely, it is investigating the valuation and judgement systems of those involved. Highlighting the intrinsic human interaction needed for this environmental transition. Second, this research has been carried out within the scope of a specific chargepoint provider, Charge My Street (CMS).

CMS are a community benefit society who are dedicated to installing chargepoints within a five-minute walk of areas that lack off-street parking (CMS, 2023a). They began in 2018 and focused their efforts within Cumbria and Lancashire. Their aim is to reduce barriers to residents considering converting to an electric vehicle and installing chargepoints outside of the typical areas of commercial return, such as supermarkets and already existing petrol stations (CMS, 2023a).

This research partnership brought focus onto Cumbria, or as this research has dubbed it 'the wild'. The following map shows where they have current sites in Cumbria (Figure 3)
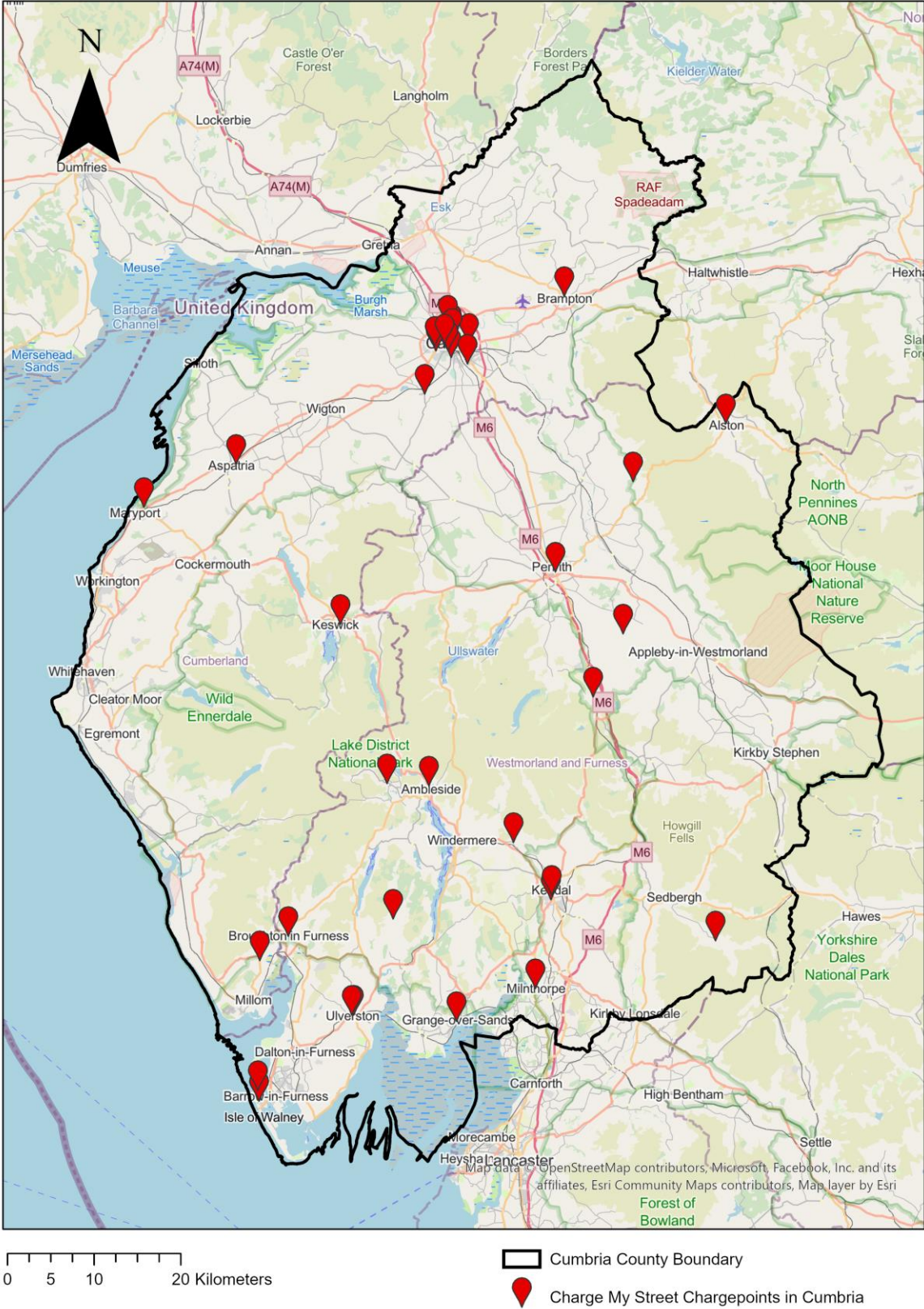
Figure 3 - A map generated to show the different locations of CMS chargepoints in Cumbria.

1.1 Project Aims

This project has focused the valuation and evaluation of chargepoints, namely its value, as a service, as a concept, and as an opportunity to fulfil a green agenda. Consequently, the aims produced follow these notions of value with relation to the service users, service hosts and service providers:

- Understand the decision process behind service hosts having a chargepoint installed.
- Investigate what 'value' is generated at EV chargepoints – i.e. how do the service providers, hosts, and users value chargepoints?
- Investigate how chargepoint service provider, hosts, and users perceive chargepoint value in contrast to traditional Internal Combustion Engine Vehicles.

These aims were generated within the context of this research, alongside the partner CMS. Uniquely, this research is generated from a coalition of three parties, the Lancaster University Management School (LUMS), Charge My Street (CMS) and the Centre for Global Eco-Innovation (CGE). Thus, it has three different research agendas. For LUMS, it is producing a piece of academic literature informing on the influence of values and valuative practices in scenarios, commenting on the theoretic vein explaining the different influences. For CMS, this project aims to provide insight into their intermediary's decision processes and inform on possible suggestions to increase chargepoint installations. For CGE, their purpose is to generate research which has real-world implications and inform on strategies to reduce the global carbon footprint. Consequently, this research is a collision of values, from the academic, to the informative, to the innovative. Hence, it must be noted and considered whilst interpreting the subsequent content.

Additionally, it might also be worth noting, the researcher background, whose previous research has revolved around sustainability and people, and how they make decisions and engage with sustainable efforts. This will have influenced the approach to this research, as at the centre of it, the resounding aim is to reduce environmental impact through understanding.

1.2 Overview

Chapter one introduces the research, setting the scene of the project, the objectives, and gives the research contextualisation.

Chapter two will address the relevant literature and place the research into context within such literature. It will discuss how values are created, and how valuation and judgement decisions are influenced by those involved in the chargepoint installation. The chapter will assess

valuation and judgement theory, and its significance and relevance to this research. Similarly, it will identify the relevant actors within the chargepoint market, the service provider, the service host, and the service users. The review discusses their roles within the chargepoint installation process, the tensions between the different actors, and how this can influence the valuation and judgment process, with specific reference to the social, environmental, and economic values, and how each of these will influence the various tensions. The research matrix will also be shown and examine how values could be identified in relation to the actors. The context provided in this chapter will be used to support the data analysis and interpretation in chapter four.

Chapter three presents the different methods used to identify the values of the various actors. It shows the data bank, and the variety of data collections which informed this research. These methods included interviews with the three identified actors: the service providers, the service hosts, and the service users. Their interviews were analysed with reference to the themes and aims identified within the literature in chapter two. Similarly, autoethnographic data has also informed the research, including, twelve months of observations and interactions with CMS, 42 chargepoints visited, over 300 photographs generated, and driving a commercially hired EV in Cumbria. Furthermore, the additional data provided by CMS also informed on the service provider perspective.

Chapter four combines the results and their analyses within one chapter. Structuring it this way was essential, as the resulting interview quotations were intrinsic and interwoven in the theory and value identification. The structure follows the data being used to answer each of the research aims, integrating the data and conceptions beyond the literature. Each answer considers the actors and their values within the breakdown of each aim, ensuring that the differing actor judgement, and valuation systems, are assess and compared. Additionally, this chapter shows the decision process of the chargepoint hosts and their roles as intermediaries before they commit to having a chargepoint installed (Chaudhury, 2020). The chapter closes discussing the relevance to CMS, and how the research can assist in their pursuit to install chargepoints and ensure their success.

The final chapter concludes this research. It aims to answer the overall question and highlight the most relevant concepts and theories to each objective posed. Consequently, it will also generate a future research agenda and how valuation theory could inform on this. Additionally, it could further improve the transition to sustainable technology such as that of EVs, and aid Cumbria in reducing carbon emissions.

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2.0 Literature Review

2.1 Introduction to Literature

This chapter is going to introduce the literature pertinent to this research, it will begin with placing the research in the relevant context, explaining the terminology and climate relevance. Following this, it will discuss, valuation and judgment theory and its significance and suitability to this research. From this, this review will disseminate the approach of valuation and judgement into three distinct actors: the service providers, the service hosts, and the service users. The chapter will close discussing how the various value and judgement systems reviewed could aid the installation of more chargepoints for Charge My Street (CMS).

2.1.1 Framing this Research

Humans have long valued *mobility*, from the invention of the wheel to the creation of a reliable internal combustion engine vehicle (ICEV) (Whitmarsh and Köhler, 2010). Such valuation has led to significant investments of human effort and resources in finding the means to transport people (Whitmarsh and Kohler, 2010). Since the original 1770s gas engine from Etienne Lenior to Nikolous Otto's first four stroke internal combustion engine (Dietsche and Kuhlgatz, 2014), there has been a constant evolution and reinvention of the automobile, and modern vehicles are at the crux of modern mobility (Attias, 2016). However, this mobility has led to the transport sector being one of the largest contributors to Greenhouse Gas (GHG) emissions (Whitmarsh and Kohler, 2010). These concerns have driven many to contest the value of vehicles; driving investments into clean and green technologies, such as Electric Vehicles (EVs) (Boulanger et al., 2011).

In 2021, the United Kingdom's (UK) domestic transport carbon emission rose by 10% to over 100 million tonnes released within the year, albeit this may be linked to a 'return-to-normal' after the coronavirus pandemic (Department for Transport, 2022). To combat rising GHG emissions and reach Net-Zero targets, the UK government introduced legislation in 2017, banning the sale of new petrol and diesel engine vehicles from 2030 (DEFRA, 2017). Net-Zero targets consist of global and national governments enforcing laws and regulations which will cut GHG emissions (UN, 2023). Only by achieving these targets by 2050 is there a chance to reduce global warming to no more than 1.5°C (UN, 2023). As global and national targets are set to reduce GHG emissions, there has been a drastic uptake in EVs, as they provide a viable pathway to aid in achieving these targets (Muratori et al., 2021). Albeit, recent government decisions have meant this 2030 target has been deferred to 2035 (BBC, 2023). In 2023, the EV market is projected to reach £15.19 billion, confirming, that as the market of EVs increases there will also be an increase in the number of chargepoints needed by users,

both publicly and domestically (Berkeley et al., 2018). There are over a quarter of a million EVs on UK roads, with a 77% increase in 2022 compared to 2020, this highlights the drastic uptake in EVs, and the need to ensure the relevant infrastructure is in place to support this transformation in vehicles on UK roads (Department for Transport, 2022).

One of the biggest challenges for EV adoption is the 'chicken or the egg' theory, as presently there is a contention between consumers being reluctant to purchase alternative vehicles, such as EVs, without the relevant infrastructure being easily attainable, and suppliers being reluctant to invest in this infrastructure until they are confident it is profitable (Greene et al., 2020; Jordan et al., 2020). Constructing a suitable charge-point network will allow consumers to complete their trip with few delays (Mastoi et al., 2022). Hence, investors in the EV industry are facing a compelling necessity to ensure these networks are suitably expanded, to reduce consumers experiencing 'range anxiety' or 'charge anxiety' (Chamberlain and Al Majeed, 2021). The three most common EV charging scenarios involve charging at home, work, and publicly. Public chargepoints are becoming more common at supermarkets, restaurants, and public car parks (Huang et al., 2016). There has been an influx of companies, and groups such as ZapMap, which have made it easier for EV users to identify where on their journey they may be able to charge (Chamberlain and Al-Majeed, 2021).

As modern mobility changes, new technologies are brought to the forefront, consequently, there is an increased need for the appropriate infrastructure to support alternative vehicles, such as EVs (Gnann et al., 2018). This marked a significant public and government re-evaluation of the needs for both public and private transport, supported by a new national-fuelling infrastructure, with zero pollution. This changing public discourse has implications for global, national, and regional policymakers and everyone, from the service user, service host, to the service provider (Falchetta and Noussan, 2021). Globally, in 2020 there were approximately 430 thousand public chargepoints, with the aim to achieve net-zero goals and adhering to the Paris Climate Agreement (PCA) (Dimanchev et al., 2022). The PCA identifies the milestones countries must reach by 2030 to reduce global warming (Erickson and Brase, 2019). Approximately 13 million public chargepoints need to be installed, this is alongside 130 million private chargepoints (Chen et al., 2020).

The EV infrastructure network currently is unable to support the rapidly increasing number of EVs on UK roads. Furthermore, despite the need for over 130 million private chargepoints, for some prospective EV users, installation of a private chargepoint may not be feasible, due to lack of accessibility or private driveways (He et al., 2022). Mortgage research suggests at least 40% of UK homes are unable to install the equipment needed to charge an EV (Lloyds Bank, 2022).

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To ensure that UK GHG targets are reached, engaging with public chargepoint issues is vital, especially as EVs are considered key to achieving such targets and reducing transport emissions (Hill et al., 2019). Therefore, those who lack access to private chargepoints need an alternative, which is where Charge My Street (CMS) has found its market.

CMS install chargepoints in car parks which are within a five-minute walk of houses without off-street parking, they are trying to tackle the issue for households within the 40% of homes who lack a private driveway or parking space (CMS, 2023a). They are distinctive as chargepoint operators, and the focus of this research is aiding the installation of their future chargepoints. They are one of the three keystone actors within this research.

Due to their unique approach to chargepoint installation, CMS have an intermediary body when operating their chargepoints, in the form of a chargepoint host, or service host as they have been dubbed for this research. This service host is another keystone actor, as CMS needs to market themselves to entice future hosts into working with them to bring a chargepoint to communities with little or no off-street parking (Bessy and Chauvin, 2013).

The final keystone actor is the service user, or those who are charging their vehicles at CMS chargepoints.

There is a symbiotic relationship between these three keystone actors, they all engage with each other within different markets, and furthermore, have different value and judgement systems (Skålén et al., 2023). Therefore, when investigating investments into EV chargepoint infrastructure in the wild, or more specifically Cumbria, these three-keystone actor's valuation and judgement processes need to be investigated, and framed, in order to ensure the success of future chargepoint installations for CMS. Hence, the following sections discusses how value is relevant to this research, as well as how the different systems of valuation can be perceived depending on context and the relationship between these three keystone actors.

2.1.2 Defining Value

Defining value is difficult, as it often relates to contemporary capitalism, and is determined as the 'worth' of a product or good, primarily to financial investors, a product is of 'value' if it is profitable (Stark, 2009). Value, and by extension, valuation, is determined by the constituents of desires and interests in their occurrence (Irving, 2011). Value is interrelated to different forms and dimensions of social life, as this social perspective can present different forms of value such as moral, aesthetic, and economic values (Beckert and Aspers, 2011). Assessing the social recognition and pluralistic definitions can aid in understanding how to define social worth (Lamont, 2012).

Value domains are not separate or exclusive, they co-generate and integrate with their definitions (Karababa and Kjeldgaard, 2014). They determine that the value of a commodity

is dynamic, subjective, and context-dependent, and within its complex nature it is constantly created and co-created with a network of actors.

Valuation theory theorises *how* things are made valuable for whom, and why (Lamont, 2012). The three 'V's', valuation, valorisation, and evaluation are linked social problems faced by contemporary societies, consequently, there is a distinct difference between the three V's, which must be distinguished to enable further understanding of valuation theory.

Valuation theory has been used to describe the introduction of innovation, for example, in the pharmaceutical industry by Mason *et al.,* (2019), or through the progression of a start-up company, as discussed by Stark (2009). The focal point of this research is not to geographically determine where to put chargepoints, but to understand what *value* chargepoints have to service users, and service hosts, thus enabling service providers, such as CMS, the choice of future site development.

Valuation practice study is investigating how things are commensurate, compared, categorised, and clarified, specifically how things are judged to count more than others (Mason *et al.,* 2019). Kornberger (2017) disseminates that the market is ordered, hierarchised, and ultimately valued through valuation practices which are determined through the available market devices. Valuation can assess the invisible or hidden realities and values within routines and existing norms, critiquing existing models of value which are dominantly economic in nature (Krenz et al., 2014).

Frequently, there is a focus on niche markets within value research, rather than assessing situations with social groups and individuals who have been stigmatised. This is taken into consideration with this research, as the target users of CMS chargepoints, are marginalised groups in regard to their accessibility to EV chargepoints.

Basic social processes have been investigated by social scientists for years, and within these, are valuation and evaluation, along with commensuration, differentiation, closure, and exploitation (Rijcke et al., 2015). Valuation can be approached from different perspectives, from cultural valuation focusing on symbolic goods to social practices (Lamont, 2012). In the EV market, valuation is a particularly important concept because it determines not only how the reduced pollution of vehicles is framed, but also if it is worth the investment. This needs to be considered from the three keystone actor's perspectives, as each play a role within the installation of future chargepoint infrastructure.

Valuation moments occur when different social worlds collide, it is generated when diverse social values and market devices interact to generate economic value (Mason *et al.,* 2019). The collision of social worlds creates the space in which markets can be generated, for example, the creation of non-profit organisations, when missions, markets and politics meet,

but all concentrate on the same social values (Frumkin and Andre-Clark, 2000). In other words, what Stark (2009) refers to as 'worth', namely, what is worth investing in; worth doing, emerges at a juncture where social and economic value meet, and at this juncture, there are different actors engaging with the same concept or problem. Hence, particular attention must be paid to where values intersect for the service user, the service host, and the service provider. Therefore, investigating socio-economic value and valuation is pertinent, if we are to enrol enough market actors into providing, and maintaining, an EV and chargepoint infrastructure, to support the use of greener mobility technologies.

2.1.3 Where Value is Occurring

Identifying a 'site' in which valuation is occurring is key to this research, nominally there has been an overemphasis on the economic value of a site, and there is less establishment of values such as ecological, moral, and political (Choi et al., 2010). At such sites however, there is often a conflict as to how value and valuation systems are defined, especially amongst the actors. Different actors will interpret value as what is relevant to them, and most important to them, hence the three keystone actors' valuation systems need to be realised in order to engage with their varying perspectives, and perhaps, understand what values are common amongst them all, as well as unique to the individual (Antal et al., 2015). It is this crux in which CMS can uncover the tools they could deploy to further develop their chargepoint portfolio. When investigating how users, or consumers, service hosts, and service providers make value judgements, it is vital to understand how the markets, in which they are intertwined, are created, as it illustrates where they engage with products (Antal et al., 2015).

2.1.4 Framing Markets

Markets are created by identifying and framing the relevant processes of distinct agents and actors when they come together to agree a price for an exchange of goods and money (Araujo and Mason, 2021). As previously stated, the three agents or actors within this research are service users, service hosts, and service providers. Consequently, there are three spaces in which markets exist (Figure 4).
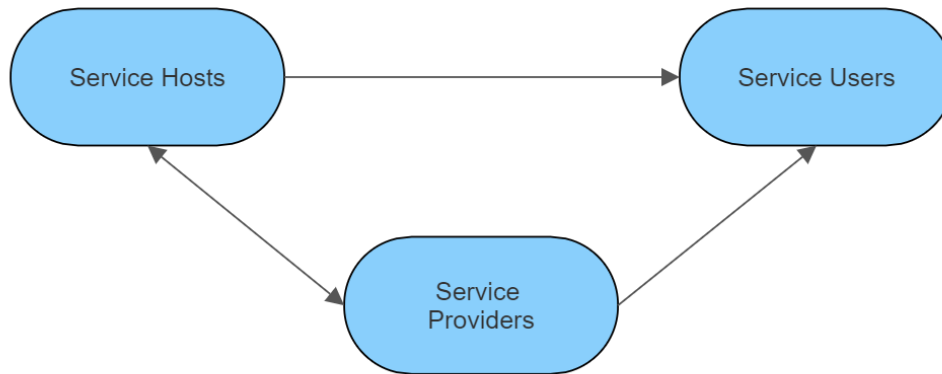
Figure 4 - Diagram to show the market framework occurring between the three actors and their relationships

Both for the consumer and the market, transactions are complex in nature, they are dependent on how those involved place value on the object, practice, or agent (Araujo, 2007). Miller (2002) uses the example of selling a car, and how it can only be understood by untangling a complex web, as it is specifically related to the purchaser's lifestyle, finance, and projected use. This is followed by the web of the salesperson's quota, and commission, which further relays to the manufacturer, and so forth (Miller, 2002). Markets become organised through algorithmic configurations, examples of this include spaces such as a supermarket, a shopping centre, or virtual spaces such as electronic markets. With such algorithmic configurations, calculative agencies are assembled, as markets emerge as collective calculative devices (Araujo, 2007). Here is where this research aims to focus, as it proposes to identify where calculative tools and devices are used by those engaging with CMS to have a chargepoint installed at their sites. But it also aims to take this one step further, to understand how users also identify value at a site, and the tools they use to judge whether they will use a particular site.

Callon and Muniesa (2005) explored calculative agencies involved in areas such as design, production, marketing, purchasing, and consumption. Each of these agencies will have a different set of tools and capabilities with which they compete, co-operate, or become disconnected from each other. Araujo (2007) uses Barrey et al. (2000) example of when individual customers enter a scene which has been choreographed by agencies involved in every detail of the buying process. Barrey et al., (2000) suggest that such agencies on the supply side are unequally distributed, as both retailers and manufacturers have different agencies acting on different datasets representing demand.

Mason *et al.,* (2019) concur that moments of valuation occur when different social worlds collide, their focus is on pharmaceutical and medical discoveries and their collision with markets. Social worlds are different groups of practices, values, and ideas (Hackett, 2008). They explore how valuation practices, and market devices enact but also contest what is worth doing and not worth doing, specifically related to diverse social values and how they generate economic value, focusing on the nexus between science, marketing, and entrepreneurship.

In contrast to Araujo (2007), who suggest markets are generated as they shift and rely on existing agencies, Mason *et al.,* (2019) explore how markets shape socially and economically valuable discoveries occurring in a non-commercial setting. Markets are socio-economic collectives with contestations, calculations, and co-ordinated actions, they can organise multiple social values to generate economic value (Mason *et al.,* 2019, Geiger *et al.,* 2014; Stark, 2009). Mason *et al.,* (2019) focus specifically on the moments in which the market meets science and how value is generated through choreographed contestations.

Mason *et al.,* (2019) concur that no predetermined marketing pathway exists, instead contestations bring together valuation practices, and market devices from multiple social worlds, which generates new valuation practices, shaping what is next. This moves attention from the institutional arrangements of the market and towards socially diverse practices and devices. This collision of social worlds allows the creation of unique sites for practice, patterns, and technologies to be organised as well as different values to be generated (Mason *et al.,* 2019). Markets are conceptualised as a categorisation of goods, which can be contradictory, and dynamic, making it difficult to identify a clear-cut transformation of the market (Flaig et al., 2021). Despite this, when actors conceptualise markets, they can be reconciled through co-ordinated, collective actions, and devices. But overall, markets are mobilisations of varying bodies of experts, calculative agencies, devices, and practices. Mason *et al.* 's (2019) conceptualisation focuses on fixing and framing valuation and generative dialogue at the nexus of valuation practices and market devices. Within each market an actor may have ideas of how services or objects should be valued, in a monetary term, due to its beauty, purity, might, or high/low standing (Stark, 2009). Consequently, these values are placed onto a single monetary scale, according to the money consumers are willing to pay (Stark, 2009).

Hence, the need to clearly identify the relevant actors within the research. Within the EV and chargepoint markets in Cumbria, there are more actors, such as Electricity North West, or the various council bodies for each sector of Cumbria. But currently, despite offering their own unique tools, calculative agencies, and expertise, they are secondary bodies and actors within this research. Therefore, choosing to specifically focus on those providing, hosting, and using the chargepoints will allow greater insight, and clarity, for CMS installing future chargepoints.

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Furthermore, investigating more than three bodies may distract from the overarching aim of this research. Understanding how users, hosts, and providers reach a decision is important to identify as the chargepoints are objects which allow the provision of a service to users (Antal et al., 2015).

2.1.5 Framing Valuation

Valuation framing and fixing is dependent on what is of concern and what is to be taken into account, it needs to consider stable objects, and ideas in a collective, so they can be assessed (Lamont, 2012). Arjalies, in Kjellberg et al., (2013), comments that the meaning of valuation is not found in the object, but it refers to how the object is *being referred.* Valuation as a verb has a different perspective, as Kjellberg et al. (2013) argues, there is a distinct difference between valuation, which focuses on the *process* of giving worth, and evaluation, which focuses on *assessing* worth.

The framing and fixing, within this context, are dependent on who is engaging with whom, and the market position that occurs, which is why the three intersecting markets have been defined. These markets are intertwined and therefore influence the framing of valuation, as different perspectives influence what is of value (Antal et al., 2015). This framing and fixing enables actors to collate value practices from different social worlds which aids in identifying what is being valued and generates a search for information as to what is valued (Skålén et al., 2023).

Investigating valuation is deemed a difficult process by the valuation board in Kjellberg *et al.,* (2013) review. They suggest there is need to distance from a perspective with which processes are logical, and make value appear from an interaction between unconnected actors (Kjellberg *et al.,* 2013). It needs to concentrate on the rules, instruments, routines, and devices concerning the socio-technical agencies between different actors where valuation occurs.

Material things and markets, as Pollock and D'Adderio (2012) and Mason *et al.,* (2019) argue, constitute one another, and consequently, market devices are representations of market, scientific, or technical knowledge. These devices allow actors to understand, calculate or uncover states in the world (Mason *et al.,* 2019). Such examples are re-presented to different social worlds to work out different forms of value (Fisher et al., 2016). Within this specific chargepoint market, there is a collision between mobility, environmentalism, and technology (Sovacool, 2017), and a new value system is created.

Consequently, further discussion needs to distinguish the differing value and judgement systems of the three keystone actors. Hence, the following sections will discuss how the

service provider, service host, and service user, could identify value, and the valuation tools they engage with, when making a judgement. But it will also consider the context of the market in which they are framed, as this could impact their valuation systems. Namely, the tensions between the three actors and their markets will be considered.

2.2 Service Providers

The service providers in the context are Charge My Street. They install and operate community chargepoints within Cumbria, hence they have a unique value and judgement system.

Stark (2009) suggests that value occurs when there is a deviation from routines and devices, suggesting value is linked to the Schumpeterian notion that the entrepreneur is the actor who breaks routines and encourages new combinations. When interpreting this in regard to the EV and chargepoint industry, it is debatable whether there has been a full deviation from a routine. As compared to ICEV, EVs still require 'refuelling' but with a different fuel source (Sierpiński and Staniek, 2019; Sierpiński et al., 2020). The deviation in routine may come from using a chargepoint instead of a fuel station, however, this deviation can occur in the same space and place as several chargepoints can be placed within these stations (Fernández et al., 2018). When transferring a practice to another space, such as from a fuel station to a chargepoint, it can inform on what is specifically important to the actors engaging with such a practice. Cultural history, image, and institutional environments are critical to the success of the transference of innovative practices (Choi et al., 2010).

This, however, depends on how they are framed, for example, if emphasis is placed on framing markets as organised encounters of distributed calculative agencies, this highlights the stabilising role of investments in rules and conventions, such as with property rights (Araujo, 2007). But Callon et al., (2002) suggest a different frame which focuses on the qualification of goods and making them calculable through objectification, singularisation of actions, and sets of practices, which perhaps have the potential to destabilise encounters of distributed calculative agencies.

There are two notions of markets that need to be framed when considering the valuation system of CMS as the service provider, as they are engaged with two versions of a consumer or customer. CMS market themselves to prospective site hosts, but also to users. There are two spaces in which CMS need to determine what is of value to them and construct their practices appropriately to each of these market types.

Araujo (2007) concludes that market types will differ in their configuration of calculative agencies, and their mobilisation and distribution will also influence the agency power.

However, such agencies need calibration. Power (2004) suggests that each agency is a technical instrument which can be standardised and measurable, but to ensure this, a specific framework must be established which involves decontextualizing groups and objects, allowing them to be compared within the same frame. But context and setting give understanding as to where value is generated. Hence, despite technical instruments removing context, when users, hosts, and providers interact to install a chargepoint, this context is needed.

This framing and fixing enables actors to collate valuing practices from different social worlds, which aids in identifying what is being valued, and generates a search for information as to what is valued by other actors (Bessy and Chauvin, 2013). Furthermore, through such framing for valuation, it highlights the next steps, the correct market actors, and new knowledge. Mason et al., (2019) suggest, as a mechanism of marketisation, using fixing and framing of valuations, has implications for research on the commercialisation of science. They claim that business models do more than 'capture value' as they represent revenue, and using these models as valuation devices shifts focus to emergent and future market connections (Mason et al., 2019). They conclude that future research should be encouraged to use a comparative approach, examining multiple discoveries, and consider the context-dependent patterns of choreographed contestations.

These contestations occur between these two markets key to CMS as a service provider and as a venture. As Fisher et al., (2016) suggests, new ventures secure resources from different audiences, and this could argue that social judgements, and valuations occur within socially constructed systems of norms, values, and beliefs. For example, Cochoy (2009) describes the introduction of the shopping trolley, as a technical market device, which allowed the transportation of larger volumes of goods, and equipped shoppers to make different valuations about what to buy, and subsequently, changing market behaviour (Estes and Streicher, 2022). Consequently, the tools, such as those given to shoppers in a supermarket, or categories within online shops are useful when determining what is valuable (Williamson, 2021). If these are identified, it can improve the process through which chargepoints are installed and ensure that CMS are practicing appropriate marketing techniques to have success when investing in chargepoint installations.

Aspers and Sjorgen, in Kjellberg et al. (2013), suggest valuation is bringing order to different people, things, and ideas, and understanding the relationship between them all. Ultimately, valuation is related to classification, and furthermore, when assessing valuation, there needs to be consideration of spatial, temporal, and spatio-temporal implications. This is particularly relevant when assessing where to put chargepoints in the wild, as the spatio-temporal implications will impact chargepoint installations in Cumbria. As well as this, uptake of EVs in

Cumbria will impact the rate in which chargepoints are deemed as valuable. Social and geographical characteristics are relevant to such innovations, as they may occur in niches or protected spaces, they can inform on the new technology developed, learning processes and institutions (Kemp et al., 1998).

Stark (2009) discusses two problems for businesses when they initially come into existence, how they are perceived and generate value, and carving their niche within the existing market. Therefore, highlighting the existing tools, and products available in the EV chargepoint market can inform this research, as there has been little done to understand how actors, such as CMS, make value judgements on their investments into EVs, more importantly, the infrastructure of chargepoints required to make EVs valuable and viable.

2.2.1 Tensions between Providers and Hosts

The framing of where valuation occurs for each of the keystone actors is inherently linked to which specific tension the theory is placed upon. As previously identified, CMS has a bilateral approach when engaging with their market, as they are investing in both chargepoint hosts, and users.

Value as both a noun and as a verb is further explored by Kjellberg *et al.,* (2013), as they disseminate how value is often thrown into the economic sphere. Stark's (2009) Parson's pact distinguishes between the singular value, the outcome of an individual valuation effort, and the plural values, the standards, rules, norms, and ideals which can be used to perform such valuations. They suggest a gap in the conceptual framework of valuation, as there is prioritisation of the economic and financial methods and metric, with specific reference to prices. However, there was objection to approaches of valuation conception which assume that different values are reducible to a single measure. They suggested that there are different notions of value, such as exchange, use, and semantic value.

Araujo (2007) argues that approaches such as Callon and Munisea's (2002) to the concept of markets as institutions is reliant on defining it through tensions of a market being a locus for different expertise and focuses, for example, the law playing a key role in establishing and policing trading. Or in this instance, rather than a trading policy, climate legislation is placing an emphasis on EVs becoming the new mobility norm, and consequently infrastructure needs to be integrated into businesses, communities, and social spaces (Hill et al., 2019).

Due to this, there is a new market created through which chargepoints are installed, but these require expertise of specific groups of people, such as engineers, and those installing the chargepoints, as well as those selling, and using the chargepoints (Antal et al., 2015). Here

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lies the crux of a tension between the service provider and the service host, as both have a specific set of skills and expertise. Where CMS are providing the equipment for a chargepoint site as well as supporting and monitoring them, the hosts act as a gatekeeper. The hosts have the local expertise and understand their customer base. Legislation, such as that introduced to increase the number of EVs on UK roads, also generates a social issue as to where the infrastructure is installed. Hence, there is a collision between these two spheres in which valuation can be applied, but these two keystone actors will have different judgement and valuation systems at play within their decision-making process (Bessy and Chauvin, 2013).

Identifying systems might be relevant when distinguishing where different social worlds come together to generate value, this could be considered when assessing value in chargepoint infrastructure. However, they are part of a bigger system and institution. There are many variables involved, such as accessibility, internet, cost and more (Zhang et al., 2019). Institutional perspective will influence where value is generated, which highlights the need to consider CMS's ethos. Furthermore, as to whether the service host's ethos is parallel with CMS's will influence their engagement, and the market space in which they interact. CMS need to market themselves in adherence with the values which hosts hold, but equally need to ensure they are achieving their own goals delineated by their valuation and judgment systems. Specifically, there is an exchange of values and services occurring, as hosts provide a site to install a chargepoint for users, as well as internet and electric connectivity. But, in return, they gain a new tool with which they can market themselves to their customer base and provide their customers with another service on their site (Bramwell et al., 2019). There is a practice at play between these two, as their engagement generates an intermediary market. Technically, the service hosts have little to do with the transaction of services between the provider, in CMS, and the users, charging their vehicles, other than a site for a judgement to occur.

Such practices addressed by Shove and Pantzar (2005) are recognisable entities through the reproduction of a routine, but in previous research they suggest there has been a lack of consideration of the artefacts, infrastructures, and products involved within these routines. These practices involve the active integration of materials, meanings, and competencies. However, there is the suggestion that routinely there is a failure to capture the extent of what is actually involved (Maller, 2023).

This tension between the service provider and hosts, generates a new set of valuation and evaluative tools for the consumers who engage with both. Lamont (2012) discusses the evaluation and valuation practice relevant to the instruments and tools involved, and how they are also constitutive for the evaluative culture. They elaborate on Karpik (2010) discussion of

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devices, as they are crucial for understanding the creation and construction of value, especially in relation to unique object such as chargepoints. Tools allow information to be gathered from multiple parties, and further can allow valuation to occur where there may be a lack of comparable objects, which may not have been easily or previously valued. Karpik (2010) suggests there are detail devices, including networks, appellations, rankings, and confluences. This research is particularly focusing on the role of tools when looking into chargepoint installation as well as use. Therefore, identifying such bodies, tools, and ideas is key to the success of installing future chargepoints.

Consequently, recognising this dynamic relationship between these two keystone actors shows that both gain a tool for valuation and judgement systems, and that perhaps, their overall values need to be cohesive, to ensure a successful symbiotic relationship. The hosts are a site at which valuation can occur, but are also a consumer of CMS, hence, value such as environmental activism, sustainability, and community needs, need to be important to service hosts, and providers, as well as the financial values, as they provide a service to their customers.

2.2.2 Tensions between Providers and Users

Another tension that needs to be addressed is the transaction between the service providers and users, to further investigate where valuation and judgments occur, when installing, and investing in chargepoints in Cumbria.

Transactions are a point along a sequential process of production and consumption, where there is little interaction between market participants (Vargo, 2009). Callon *et al.,*'s (2002) approach suggests that there is a tension between the formal aspects of market institutions, and the notion of the market as a setting where suppliers and customers develop mutual understanding of capabilities through their interactions. Setting and context can influence where markets occur, and how different actors approach the same situation (Antal et al., 2015).

Between CMS and users, there is a specific market generated, as they are addressing EV users who lack access to off-street parking to install chargepoints, but equally provide publicly accessible chargepoints. When considering how the market is constructed, Araujo (2007) discusses the phenomena of public opinion and how the customer is a product of techniques, tools, and bodies of knowledge. There is a consensus that overtime, people learn how to cooperate with such phenomena, from which market practitioners are keen to portray what specific products are within the customers context (Garcia et al., 2007). Customers are trapped within a dynamic and continuous process of qualification and requalification, as they

create new routines or adhere to the original routines (Callon et al., 2002). Consumers accept this and are driven by routine choices which are further supported by existing methods of qualification (Lamont, 2012). However, due to the fixation on singularisation, mass retail provides a primary site to study the collective work undertaken by marketing professionals (Lamont, 2012). This could be particularly relevant to consumers changing and adapting to the new vehicle market, specifically, the EV market. Those who switch from an ICEV to an EV, must then contend with a new field of expertise, specifically, how to operate EV chargepoints when charging their vehicles. Overall, this practice is perhaps adherent to the routine of users refuelling their ICEV, but there are new technologies involved with charging an electric vehicle.

At the heart of CMS's ethos, is the consideration that they are trying to solve a social problem, therefore, social values are inherently integrated into their marketing structure and key to their valuation and judgement systems when investing and installing chargepoints. Rokeach (2008) definition bases social values on core conceptions of the desirable, within every individual and society. Specifically, social values are either instrumental, or terminal, in relation to modes of conducts and end states of products. This notion suggests that values are universally valid, and cultural differences can be observed when ranking social values (Antal et al., 2015). Consequently, as Karababa and Kjeldgaard (2014) suggest, there is a sequential pattern when assessing object value in relation to Consumer Culture Theory (CCT), as value is attached to objects, which is then translated in semiotic value, and further translated into exchange value. This suggests the cyclical nature of value, and that it extends further than the exchange value of a product.

Within valuation studies, there must also be the consideration of evaluation, these practices are frequently conflated in literature as well as in reality (Lamont, 2012). As Lamont (2012) suggests, evaluators will valorise the item they are assessing to justify their assessment to others, using such tools is how peers are persuaded to agree with their evaluation.

There is a lack of considering consumers not as users, but as active and creative practitioners, they have the capacity to reproduce practice (Priem, 2007). Through such reproductions new practices can emerge, and it is dependent on the form of consumer-producer interactions. This relationship between material objects, associated images, and forms of competence are of importance, as their interaction and practices circulate different meaning, competencies, and products. Shove and Pantzer (2005) conclude that practice innovation is not a simple one-off enterprise, it needs to be continually reproduced by those involved, and only through this can something, such as Nordic walking, be reconstituted as a new form of 'fun'.

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Hence, this suggests that when new practices are introduced to pre-existing exercises, their integration is dependent on how they are received by those already involved in the practice, and their willingness to engage with new equipment and technology, such as those converting from ICEV to EVs. New equipment is introduced to users, and from this, new spaces for valuation to take place, occur. Shove and Pantzar (2005) conclude that practices and products are closely intertwined, they suggest that commodities, techniques, and associated concepts circulate in ways that practices do not. Practices are new configurations of elements which either already existed or are new alongside others in existence. Consequently, both consumers and producers partake in reproducing and reinforcing practice (Watson et al., 2012). Shove and Pantzar (2005) show that investigating the change of practices involves understanding the existing configurations and how those involved in the EV industry need to reproduce existing practices.

2.3 Service Hosts

Uniquely, this research has a set of intermediaries between the service provider and service user, the service hosts. Typically for CMS chargepoints, these service hosts range from community spaces like village halls, to businesses, such as hotels, wanting to expand their service range to customers. Thus, it presents a distinctive dynamic when investigating where value and judgements occur when CMS install chargepoints, as they have two market tensions to contend with (Bessy and Chauvin, 2013). This suggests such intermediaries will have their own agenda as a customer to CMS, but also as a beneficiary of the equipment installed, therefore they have a distinctive viewpoint of a chargepoint as an object (Antal et al., 2015).

Defining the object in relation to its service subjects it to a set of properties, for example, a rental car only being available for a limited time and for specific uses (Araujo, 2007). Translating this notion to chargepoints, and their installation, is key to understanding what value is generated, and therefore, uncovering the tools and devices used by service hosts to make their decisions.

Organisations provide another site for valuations, with statistics and research agencies, they produce another tool with which valuation assessments can be made. Kjellberg *et al.,* (2013) conclude that valuation is relevant within all chapters of society, it is something that is applicable in all situations. Incorporating valuation within sites of social change allows the examination of alternative options within contrasting systems of values. Furthermore, it would introduce opportunities to investigate shifting valuations and how they become organised, as well as where and how existing technologies of valuation impede or aid social change. For example, with the social effort being made to transition to low carbon technologies, such as EVs, there has been a greater need for alternative options (Logan et al., 2022). EVs and their

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needed infrastructures are currently in a transition stage, in which there is a dilemma as to who invests first, the consumer, who then must contend with the possibility of the infrastructure taking years to be fully established (Hill et al., 2019). Or, the manufacturer, who installs chargepoints with the prospect that the site may not become well established, or unused. The intermediaries in this are those who could benefit of being both the consumer and the manager, as with a lack of infrastructure in Cumbria, it is more likely that service hosts will gain the benefit of being a site with a chargepoint. Their choice to have a chargepoint installed gives users another tool for valuation. But equally, the service host needs to contend with the concept that EVs are part of a transitioning society, and it may take time to see an investment return (Logan et al., 2022).

However, if service hosts engage with being a space for social change and having a chargepoint at their site, it can generate a new tool for users, their possible consumers, to judge where they choose to spend. It allows for categorisation and engages their site with a new symbol of social change (Aimé et al., 2022).

Categorisation can determine what group the object or person belongs to, which is carried out by the assessment and examination of the object or person's characteristics and properties. There is some conflict between sociologists, anthropologists, and economic sociologists, as where the former identifies symbolic boundaries and classification systems, the latter have focused on conventions formalised by ranking systems (Lamont, 2012). However, both suggest there is a need to understand technologies and how they imply value through stabilisation and institutionalisation to reach such criteria (Lamont, 2012).

For service hosts, their value systems need to align with CMS, but equally, social values also need to be recognised. As part of the CMS network, service hosts are providing a site of value to their local communities, and furthermore, they are engaging with a new concept and idea, and due to this they engage with a new area of symbolism.

As previously suggested, with the invention of a new product, concept, and idea, there is symbolism integrated into it. In Shove and Pantzar's (2005) example, Nordic walking symbolism includes, health and fitness, fun, and an ordinary activity for ordinary people. This example could be translated into the interaction between people and their vehicles, as vehicles are now as essential to daily life as much as walking, comparing the two examples is useful. Furthermore, similar to the equipment introduction to Nordic walking, there is perhaps a comparable introduction required during the integration of electric vehicles.

There are tensions which need to be investigated to understand where value and judgement systems are generated when discussing service hosts. The role of intermediaries is extensive

as it links the service user and service provider, but also plays an active role providing knowledge and some services (De Silva *et al.*, 2018). In literature, there is a lack of understanding as to how intermediaries generate value for themselves. More recent literature explores how intermediaries can partake in creating value, and their impact, but do not consider the value they generate for themselves, or what they specifically value which enables them to become co-creators of value, with both service providers and service users (Abbate et al., 2019; Baker et al., 2021; Barraket, 2020; Bäumle and Bizer, 2023; Bertin and Schaeffer, 2022; Bramwell et al., 2019; Caloffi et al., 2023).

2.3.1 Provider and Hosts

The tension between service providers and service hosts is key, as the hosts provide a preformatted space for users to gain access to the product of the service provider, or through the approach of a singular site in which this exchange can occur. Latour (2007) discusses the concept of a singularisation of mass retail through the example of a supermarket, it preformats a space through which the consumer is allowed to calculate and choose, even if this is as simple as choosing a specific slice of ham. To make this decision, customers are equipped with labels, trademarks, barcodes, weights, and measurement chains, and more, all which sustain the mental and cognitive competence (Latour, 2007). However, consumers must subscribe to using such equipment, it is not personal property to consumers, it is borrowed (Lamont, 2012). In the instance of the intermediaries of the site host and the service provider, there is an exchange going on. However, overall, the site hosts are borrowing the equipment from CMS to generate another value perspective for their site, whether they are a hotel aiming to attract those driving an EV, or a community space wanting to attract locals to events and the spaces they can use. There are benefits to the site hosts borrowing such equipment to allow service users of both the chargepoints, and their businesses, to have another tool provided to them allowing them to make a value judgement.

Exchange value conceptualises market behaviour as a value exchange system among parties (Bagozzi, 1975a; Bagozzi, 1975b), consequently, this defines value as economic in relation to a firm's product. Price is an individual point of value in the form of money, this is specific to the cost of production, or competitor price. Despite this, exchange value can also be considered in relation to the 'use value' for the consumer. Furthermore, product consumption has different dimensions in relation to consumer's side of value, as it links to the individual, social, psychological, and economic value of the product. Consequently, as Karababa and Kjeldgaard (2014) suggest, there is a sequential pattern when assessing object value in relation to CCT, as value is attached to objects which is then translated in semiotic value, and further translated

into exchange value. Again, this suggests the cyclical nature of value, and that it extends further than the exchange value of a product.

Overall, having a chargepoint at a service host site provides value to both the service host and the service provider. It provides a site for judgements and valuation to occur, both between the service user and the service host, but also the service host and service provider. It can provide another conceptualisation of what values the service host deems relevant and important to social change.

With identity, and linking value, Holt's (2004) notion of identity value, specifically relates to brand's value and their contribution to self-expression. Holt's (2004) conceptualisation related to identity and emerging markets developed further research, such as that of Thompson and Tian (2008), as they demonstrated how commercial myth can influence identity value in society, through specific media strategies. This further supports the cyclical nature of how value is defined, as this also explores semiotic and social value which can be further translated into economic value. Those hosting a site can benefit from the installation of a chargepoint and attract more customers due to the added advantage of a chargepoint being present, adding economic value to their site, and provide another tool for their customers to use when judging whether to visit or engage with the service host (Wolbertus et al., 2018).

The introduction of a chargepoint to the site can allow service hosts to show their different values such as environmentalism, or social change (Wilson, 2014). Specifically, they are engaging with their surrounding community and providing a service, this intermediary role, however, does give them the opportunity to engage with more than just their local community, as those traveling through the areas their located or those visiting and driving an EV may interact with their business or space.

There are numerous actors within the EV chargepoint industry, but service hosts are valuable for the service providers. In this exchange of values, service hosts may provide the opportunity for service users to stop and charge their EV, taking advantage of the onsite chargepoint. The tension between these two, highlights this symbiotic relationship, as they provide equal opportunities to each other to profit, but also impact social change and transitions to EVs. They are integral to allowing those without access to off-street parking the possibility of transitioning to low carbon technologies.

2.4 Service Users

The final keystone actor to be discussed is the Service User, or the consumer. Consumers must value products for them to be sold in markets, and their value is assessed in relation to

other products (Aspers and Beckert, 2011). Ideally, those installing chargepoints, or considering having a chargepoint installed, need to invest time into understanding who their consumers are, and how they make judgements when deciding where to charge, and what they find to be valuable to make them choose CMS chargepoints. According to UK government data, in 2022, the majority of EV drivers in England, were white males, over 55, with no disabilities, and approximately half had children (GOV.UK, 2023c). This suggests as the EV market emerges, this demographic may influence the future of the market, as well as where value is place and generated.

Public evaluation often enforces a standard of legitimacy and accountability, which can inform and shape evaluative practice in democratic societies (Rijcke et al., 2015). Such evaluations need to note where there is conflict of interest. This is where interaction with service users is useful, as it will ensure that these conflicting interest areas are identified, but also engage with the space in which evaluative and valuative practices occur. Hence, this research needs to make sure that it considers the service users' interaction with the charging devices.

Karababa and Kjeldgaard (2014) argue that value in marketing and consumer research is interconnected, with foundations in the notions of field, practice, and markets as networks, and their relation to culturally informed understanding of value. They conceptualise the idea of complex value, and value being generated in the creation process. They focus specifically on CCT. Karababa and Kjeldgaard (2014) discuss the different value types and how they are conceptualised. Engaging with the different notions of value in relation to chargepoint valuation ensures that all aspects are discussed, not all the conceptualisations will be relevant to this research. However, understanding them is vital to ensuring the most relevant and fitting are considered. This is in line with the previously discussed literature, as they have highlighted the impact of social systems, institutions, and marketing (Karababa and Kjeldgaard, 2014).

Araujo (2007) discusses an earlier Latour (1987) conclusion which considers the idea that there is no powerful 'centre of calculation' that mobilises different activities in a well-aligned network, but are in fact generated through consumer choices, and these format the market. Furthermore, they cannot be calculated or easily understood as examples of aligned calculative agencies (Araujo and Mason, 2021). In some instances, there is the expectation of customers to be able to choose, within a set of specific parameters created by the market, such as in an online purchasing platform, with specific filters (Antal et al., 2015). But other customers breakout of these entanglements and mobilise outside resources, such as consumer reports and product guides subverting these frames (Antal et al., 2015). This can allow consumers, or service users to specifically delineate and engage with service providers,

like CMS, who may hold the same set of values. Hence, CMS needs to engage with tools to identify service users' valuation and judgement systems.

Perceived value's definition is congruent with the consumer's assessment of a product, based on perceptions as to what is received, as well as given. Karababa and Kjeldgaard (2014) consider Zeithaml (1988) conceptualisation of perceived value, and how it relates to perceived quality, and price in relation to product information retention in consumer's minds. This also considers emotional payoffs for consumers; however, such personal values are abstract and complex in their ability to define. The concept of perceived value considers more than the economic perspective, it also includes the functional, practical, and emotional benefits. Karababa and Kjeldgaard (2014) further argue about the social aspect of value using Sheth et al. (1991) concept, which is compatible with exchange value in relation to product consumption, as they extend the perceived value definition by introducing different types of perceived value; namely, functional, conditional, social, emotional, and epistemic value, suggesting that these five categories have impact on a consumer choice. Karababa and Kjerdaard (2014) concur that perceived value incorporates the juxtaposition and translation of different types of value at conception. Consequently, consumer judgment of value extends beyond the ability to charge their vehicles whilst in Cumbria, as there needs to be consideration of their emotional and personal values, and the type of perceived value with which this is congruent.

Karababa and Kjerdgaard (2014) conclude that value systems are reconceptualised as networks of narratives which are uncovered through consumer experience, namely in relation to brand valuations and perceptions. When considering experiential value, in a market context it needs to integrate semiotic value, especially meaning associated with feelings, as well as economic value. Kjeldgard *et al.,* (2013) suggested that these are specifically related to process of experience, and how this related to our interests, desires, and expectations. Subsequently, this leads to further questioning as to how values travel as well as how they become linked (Kjeldgard *et al.,* 2013). However, assessing such an approach and concept is a challenge to valuation studies, as this experience is very individual, and there are contestations and conflicts between such individual experiences, and approaches to valuation.

Consequently, when trying to engage with consumer valuation and judgement of chargepoints, its vital that CMS are engaging with tools such as Zap-Map (Alkhalisi, 2020). Applications such as this, allow its users to identify a chargepoint on their mobile phone. Other users can comment on their charging experience and rate the site. As a public network, they are reliant on users or EV chargepoint networks to inform them on where new public chargepoints are installed (ZapMap, 2023). Such applications and networks allow the user to identify the length

Shove and Pantzar (2005) explore how products and objects are accommodated within existing social and technical systems using the example of the invention and reinvention of Nordic walking. They conclude, products can be directly integrated within daily life, and there is a material practice dimension to this. Non-human actors are significant to consumers, as they share a life, and as Latour (1992) suggests, there is a missing section of social theory, through which exploring the relationship between materials and practices can be realised.

In the last five years, there has been a dramatic increase in the popularity of EVs, as technology has developed and costs have been reduced (Muratori et al., 2021). Mobility, and consequently automobility, exists within a complex network of social and cultural hardware, and infrastructure levels. There is a hybridity between drivers and vehicles regarding their patterns of behaviour, attitudes, and identity (Sovacool, 2017).

2.4.1 Tensions between Service Users, Host, and Providers

The final tension of where value is created to be discussed, is the site at which service users, hosts, and service providers interact the most, at the chargepoint itself. This is a confluence between three distinct actors within the chargepoint market. Consequently, when discussing where value is generated and the collision of the three judgement and valuation systems, it is a prerogative to assess value as being co-created (Cova et al., 2011).

Vargo and Lusch (2004) suggest the concept of value is co-created by the consumer and the marketer with the integration and application of operand and operant resources. This value-in-use is subjective to the perceived and experienced value of consumers, and the role of marketers is limited to the value proposition. Despite the generation of a new concept, there has been some criticism of the co-creation processes as there is a lack of explicit theorisation, as Karababa and Kjerdgaard (2014) discuss, using Grönroos (2012) approach to

Similarly, Karababa and Kjerdgaard (2014) discuss the approach of value as the co-creation of meaning. It removes the creation of value from a traditional setting, in relation to production and marketing, but focuses on the role of the consumer in the role of value creation, with specific focus on Porter (2011) approach. Along with this, they also consider Holbrook and Hirshmann's (1982) perspective on value creation, which highlights the balance between consumer and supplier centricity in understanding value or meaning creation.

For this research, there is a triad of consumers and suppliers, each taking a different roll depending on whose perspective is used to discuss where value is generated and how judgements are made (Antal et al., 2015).

Sites of valuation can often involve the deployment of a rating system, which garner feedback from different parties such as the consumer, supplier, and expert (Liu et al., 2014). As discussed above, value comes from consulting experts and considering their opinions, but also from consumer perspectives and feedback. There is a crux between the two, and it is here that value is generated (Hui et al., 2016). Objects, for this scenario, chargepoints, have symbolic meaning depending on the context in which they are placed, for example, in Shove and Pantzer (2005), equipment on its own, such as walking sticks and walking shoes, are a symbol of leisure walking, but placing them together and putting a specific perspective on them, namely, Nordic Walking, gives them new value and symbolisms.

Chargepoints are a symbol of a societal transition to low carbon technology (Spaven et al., 2022), service providers are generated through a market need for EV infrastructure. Service hosts are the intermediary in this setting as they are both a consumer to the service provider and a gatekeeper to users. Service users then gain access to the specialist equipment needed to transition to low carbon technologies, and then the cycle repeats as society transitions further into new technologies and modern mobility.

2.5 Relevance to Charge My Street

This literature review set out to explore valuation and judgement theory and how its applicable to the three keystone actors involved in installing a chargepoint. It has discussed how each individual actor may experience value creation, and consequently, the tensions that are generated through their judgements, and actions. This leaves the problem of its relevance and how it can aid CMS in installing future chargepoints.

First, it is clear from the review that all those involved, all keystone actors, need to have similar values, namely, social, environmental, and economic values. However, these will be from all different perspectives. The following analytical framework aims to explicitly show where there will be crossover of values for these three keystone actors (Figure 5). The values shown are examples deemed relevant, as discussed above, when installing chargepoints and transitioning to low carbon technologies.

Value	Service Provider	Service Host	Service User
Social	X	X	X
Community	X	X	X
Environmentalism	X	X	X
Financial	X	X	
Cost	X		X
Profitability	X	X	
Sustainability	X	X	X
Accessibility	X		X

Figure 5 - Analytical Framework – Visualisation of Value: Matrix table to show where there are value cross overs between service providers, hosts, and users.

The analytic framework generated from the literature proposes to inform on these aims:

- Understand the decision process behind service hosts having a chargepoint installed.

- Investigate what 'value' is generated at EV chargepoints – i.e. how do the service providers, hosts, and users, value chargepoints?

- Investigate how chargepoint service providers, hosts, and users, perceive chargepoint value in contrast to traditional Internal Combustion Engine Vehicles.

The overall project aim is to unravel the interwoven threads of valuation, and judgement systems. The keystone actors may have the same values in place when they decide to install or use a chargepoint. But this needs to be highlighted, and furthermore, integrated by generating a decision tree showing the current process through which CMS engages with host sites, and where valuation judgements are made in-line with this process, as well as where there have been previous failures to install chargepoints. This will allow a better understanding as to the processes at play when valuing and judging investments into the EV chargepoint industry 'in the wild'.

3.0 Methodology

3.1 Introduction to Methodology

This chapter addresses the methods used within this research and will explain, critique, and justify why such methods were chosen. Qualitative methods were used, which is well suited to this type of research and the dynamic processes involved. The chapter is structured to introduce the research context, then provide an overview of the data collated, and what has informed the research. It is followed by why an abductive research approach was chosen and most appropriate.

Following this, it introduces the method of interviews, used to determine answers for all three aims, and inform on how the actors engage with their notions of values. From this, other data collections will be discussed, such as the autoethnographic influence, as well as additional data from CMS. The chapter will conclude comparing the research matrix and the identified themes of value from the data, and their implications on the research.

3.1.1 Research context

This project questions a confluence between three valuation and judgement systems, hence there is a constant influx and integration of different beliefs and values. Therefore, the methods need to be flexible and malleable as more information is gathered from different service actors (Barbour, 2013). Thus, using abductive reasoning will allow a more intuitive approach to what is uncovered during the research.

Specifically, the focus is on the service provider, Charge My Street, and their approach to installing chargepoints in Cumbria, or the wild, and the consumers with whom they engage, both the service hosts, and the service user.

3.2 Data Collection and Analysis

3.2.1 Data Bank

Data Source	Notes
Formal Interviews	Service User 1
	Service User 2
	Service User 3
	Service Host 1
	Service Host 2
	Service Host 3
	Service Provider 1
Online Documents Read	241
CMS Data Shared	205
Chargepoint Sites Visited	42
Photographic Data	357
Weekly Interviews with Service Provider	49
Chargepoint Installation Meetings with CMS	26
Dodona Probability CMS	This involved being trained in how to use software to predict where successful chargepoints could be installed and their probability of use.
CMS Annual General Meeting (AGM) attended	1
EV conference and Event	Electricity North West Conference 'EVs, renewables and energy efficiency for Business Cumbria's EV charging Partnership Event 'Leading the Charge – Electrifying Travel in Cumbria'.
Chargepoint Reports Generated	4
Electric Vehicle Driven	8 days
Chargepoint Launch Events attended	2

Figure 6 - Data Bank showing the various data collection methods informing this research

These datasets have informed on this research (Figure 6), they have influenced how the interviews were conducted, as well as the knowledge considered. This project has included partnership with CMS, consequently, access to their data records have been given, approximately 205 documents and data sets were read. In twelve months, 42 sites have been visited and examined producing field notes, as well as photographed, producing 357 visual pieces of data. Additionally, within this time 49 weekly informal interviews have occurred with the service provider, similarly, approximately 26 chargepoint installation and planning meetings have been observed and noted. CMS engaged a new software to predict where successful chargepoints could be placed, by the company Dodona e-Mobility, the researcher was trained in how to use such software and produced reports for CMS. Within the time, the AGM for CMS also occurred, and was attended, informing on CMS's future plans, and projected aims.

It is also worth noting that two conference events were attended, where different service providers and potential service hosts interacted. The service providers extended beyond CMS and included others such as PodPoint and Fuuse, and encouraged potential service hosts to interact with CMS, producing a set of informal fieldnotes. Consequently, observations and interactions at these events has informed this research discussion, alongside documents and interviews. In the same vein, when new chargepoints have been opened and an event has been organised, these were also attended, where informal discussions and interviews occurred with the local residents, the service providers, and those who had commissioned the chargepoint installation. Perhaps most importantly, to understand and experience EVs, whilst visiting chargepoints in Cumbria an electric vehicle was hired, informing user experience of EVs and giving insight into chargepoint contestations, from this, thoughts and experiences were noted.

3.2.2 An Abductive Approach

Abductive reasoning can be used as a tool, as it permits an inference mechanism, which allows knowledge and observations to be used to find various hypotheses, and further explain observation (Hwang et al., 2019). Abductive reasoning is a conjecture process which can yield the simplest and best explanation of a course of events. It ensures that the initial hypotheses are plausible, and then informs where the next stage of inquiry needs to be (Cramer-Petersen et al., 2019). Previous research has used abductive reasoning to assess pattern recognition and idea generation (Benson and Dresdow, 2017; Bruggeman et al., 2023; Cramer-Petersen et al., 2019; Dreamson and Khine, 2022; Garbuio and Lin, 2021; Koskela et al., 2018). It allows the generation of new rules and the various relationships that can show different outcomes.

Using abductive reasoning alongside interviews allows assumptions and questions to be asked, which can uncover areas of interests, without directing the focus to a specific area.

3.2.3 Introduction to Interviews

Interviews allow an in-depth and rarefied exchange between the researcher and the researched (Barbour, 2013). Using interviews to obtain data for academic research is interwoven into most social science disciplines including management, psychology, and anthropology (Block and Erskine, 2012). With thoughtful questioning, sensitive probing, and reflective listening, there is an increased likelihood those being interviewed will respond and engage, telling stories of their individual lived experience, leading a researcher to capture effective and relevant data (Bauman, 2015). Creating a space in which those being interviewed feel safe, and have trust in the researcher conducting interviews, is a skill of a successful qualitative researcher (Roulston, 2010).

Traditional forms of data collection such as in-person and face-to-face interviews have always been a part of qualitative data (Creswell, 2013). As a tool, interviewing involves orally asking participants quantitative and qualitative questions (Block & Erskine, 2012). This method facilitates high quality personal data collection, and in the right setting it can allow researchers to probe deeply into the opinion, thought processes, and memory of participants (Block & Erskine, 2012).

Interviews involved 3 groups of people:

```
                    ┌─────────────┐
                    │  Interview  │
                    │   Groups    │
                    └─────────────┘
          ┌───────────────┼───────────────┐
    ┌──────────┐    ┌──────────┐    ┌────────────┐
    │  Hosts   │    │  Users   │    │ Providers  │
    └──────────┘    └──────────┘    └────────────┘
```
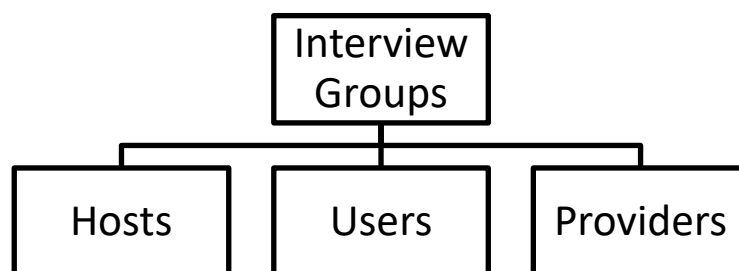
Figure 7 - A visualisation of the three actor groups interviewed.

The three actors identified allow a comprehensive insight into how different actors value and judge where to place chargepoints (Figure 7). This also influenced how they were contacted, and chosen, as participants.

3.2.4 Service Providers

This research project was created in collaboration with CMS. Interviewing service providers allows insight into the process of installing a chargepoint, and the questions they pose to prospective service hosts. Interviewing this group ensures that there is understanding of the different perspectives of those involved in chargepoint infrastructure.

To gain participants from this group, the staff of CMS were emailed (Appendix-1), provided with a copy of the participant information sheet (PIS) (Appendix-2) and asked if they gave consent to participate (Appendix-3).

Those who responded positively were then contacted via email to discuss a suitable time to be interviewed, the consent forms were shared and signed, and any questions about the project were answered.

3.2.5 Service Hosts

The chargepoints are not managed or owned by the service/site host. CMS manages the chargepoint, pays for the installation and maintains it. The service host enters into a tenancy agreement with CMS. Engaging with this group to understand the mental process they undergo, and what value they assign to the chargepoints, is vital to understanding the valuation and judgement of investments into EV infrastructure 'in the wild'.

To gain participants from this group, there was recommendations by CMS, and an email sent out to service hosts (Appendix-4), asking if there were willing to be interviewed. In the email they were provided with a copy of the PIS (Appendix-5). Those who responded positively were then contacted, provided with a consent form (Appendix-6), and an appropriate interview time and date was scheduled.

However, there was some difficulty engaging those who would be willing to be part of this research, due to a lack of response. From this initial contact, five service host members did respond positively, but, due to time constraints in their schedules, two of these interviews could not take place.

3.2.6 Service User

The users are the driving force for investments in chargepoint installation. Therefore, engaging with their thoughts and value systems ensures that users are considered when addressing the process of where to install chargepoints.

The method of gathering participants for this group differed, as initial planning engaged the proposal of approaching users whilst they were charging their EV at CMS chargepoints,

making this more spontaneous. CMS chargepoints within Cumbria were visited, and when users plugged their car in, they were approached and asked if they were willing to be interviewed. However, as the research progressed, users at chargepoints were unwilling to be part of the project. Furthermore, despite assessing the most appropriate time to visit the chargepoints, namely when they were frequently in use, there was a lack of potential participants at the sites visited.

To resolve this, service user interview participants were gathered through the same method as the service hosts and providers. From conversations with CMS, 'chargepoint champions' were contacted. These were chargepoint users who had regular contact with the CMS team, as they are part of a scheme that ensures the usability of the chargepoint. These chargepoint champions were emailed and asked if they would be willing to take part in the research (Appendix-7) and provided with a copy of the PIS (Appendix-8) and they were also provided with a copy of the consent form (Appendix-9). This was signed when they were met in person.

Overall, despite contacting the targeted ten participants for this research project, and with the given interview period, only five were available and responded to the invite to interview.

3.2.7 Setting

To ensure an effective data collection period is successful, setting was specifically considered. This was especially important after a failure to engage with interview participants at chargepoints. The physical setting of an interview can influence how a rapport is developed between the individual being interviewed and the researcher, a certain level of comfort is required to ensure the collection of robust data (Salmons, 2014). Interviews can obtain data in a variety of different styles, depending on their setting and their structure (Morse, 2012). This is relevant, as during this research the interviews took place in various settings, for example, service hosts were interviewed at their site, service providers through online interviews, and service users in a public location.

There is an interesting power dynamic between a researcher and those being researched (Longhurst, 2016). Setting can influence this. This contention could be solved by interviewing in a public setting such as a café, allowing the interview space to be neutral, but could inadvertently influence participants willingness to discuss more controversial opinions (Longhurst, 2016). Furthermore, in spaces such as a café, the interview recording could be compromised due to the surrounding sounds, making it difficult to produce a transcript from the collected data, impacting on its ability to inform the research (Barbour, 2013).

Another setting that could offer a solution is using online tools such as Skype, Microsoft Teams or Zoom (Mirick and Wladkowski, 2019). During the last two decades, the internet has become an integral part of daily life, and access to web technologies enabled a growth in opportunities for researchers and using web tools during research (Hamilton, 2014). For this to be a successful method, participants need to have access to suitable internet and technology, as well as have the technological skills to use programs such as Microsoft Teams and Zoom (Gray et al., 2020). Video conferencing grants the ability to interview more participants, it can allow greater time flexibility (Nehls et al., 2015) , as well as this, it eliminates travel times (Winiarska, 2017). Additionally, when interviewing a vast geographical area for differing participants, it reduces GHG emissions released during travel by both the researcher and the participants (Versteijlen et al., 2017). In the current climate, this is becoming increasingly important.

Studies by Lobe et al. (2022) and Mirick and Wladkowski (2019) compared the quality of face-to-face interviews to online video interviews and suggested there was little difference in data quality. Notably however, there is a different set of skills needed to ensure rapport is built and maintained during video interviews (Gray et al., 2020). Using online interviews can provide the researcher an insight into a participant's space without it being overtly 'invaded', and offer the opportunity to build rapport more easily, as the participants can feel grounded surrounded by their personal effects (Kendall and Halliday, 2014). The researcher is virtually invited into a participant home, rather than physically, which may be preferable (Mirick & Wladkowski, 2019). As with other interview settings, there can be challenges when using online interviews, namely technical issues such as lag time, connection issues, and participants being distracted by their mirrored image (Deakin and Wakefield, 2014; Oates, 2015).

For this research, there was a mixture of face-to-face and online video interviews. Face-to-face interviews were used the majority of the time when interviewing service hosts, and service users. Online interviews were used with the service providers due to time and schedule constraints.

3.2.8 Interview Structure

A conversation can provide an indispensable source of knowledge, all research related to humans is based on this conversational ability (Mulhall, 2007). Conversations can be structured with the research topic taking preference. Often, there can be a lack of time devoted to preparing for interviews, and thus the following analysis is impacted as there is a lack of cohesion between the data generation and its analysis (Leavy, 2020). This was avoided by

using an abductive reasoning approach, and a semi-structured interview method (Appendix-6).

Overall, there are three categories when addressing the continuum of interview methods: structured, semi-structured, and unstructured (Qu and Dumay, 2011). Each have their merits and pitfalls. Structured allows a consistent environment to be created, exposing all participants to the same stimulus allowing the data to be easily compared (Rogers, 2008). This structure can be rigid as a set of pre-determined questions are used and this can limit responses (Qu and Dumay, 2011). However, a structured approach suggests a more clinical and quantitative environment opposed to a qualitative and investigative one, there is a lack of flexibility (Fontana and Frey, 1998). Structured interviews are perhaps more applicable when investigating a larger group of participants, as it allows analysis to be more generalised and the search for commonalities and anomalies is simpler (Qu and Dumay, 2011). This approach is not appropriate for this research, as it lacks the ability for participants to ask the researcher questions and engage in a conversation in lieu of a tightly controlled interview.

Conversely, an unstructured interview could have the opposite effect, the approach more generally relates to an ethnographic interview (Qu and Dumay, 2011). It is dependent on the surroundings, setting, and participant, it is reliant on the spontaneously generated questions and answers guiding the discussion (Young et al., 2018).

Hence, this leads researchers to using a compromise between the two, a semi-structured interview (Dunn, 2000). A semi-structured framework ensures there are some standard and pre-conceived questions for the interview, however there is still space to generate spontaneous questions, based on the response by participants, and the natural flow of conversation (Young et al., 2018). This approach feels appropriate for this research, as it allows a general interview schedule to be developed to generate a conversation, but also allowed an organic discussion to be created, thus, allowing new ideas to be debated (Appendix-10). Furthermore, in line with the concept of abductive reasoning, approaching the interviews in a semi-structured format, allowed each interview to inform the ones after, and gain more details, and insights, into the valuation and judgment systems of those involved.

3.2.9 Ethics

Researchers should try to avoid the risk of harm to others (Israel, 2014). All those involved in the interviews were provided with a PIS, as well as a consent form, to ensure they all understood the interview process. Before each interview, they were asked if there were any areas they did not understand from the PIS, or if they needed clarification. Furthermore, the consent form was explained, and the participants were asked if they would give consent to be

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part of the project. It also highlighted how to withdraw their consent within two weeks of their interview, if warranted. As, after this period the data was anonymised and collated with other interview data, therefore making it more difficult to extract. Gaining participant consent is ethically and morally important (Schaber and Müller, 2018). Roulston (2013) suggests that during research with social justice agendas, ensuring participants consent prior to the interviews, is essential.

Overall, this project was focusing on those who already had prior knowledge about chargepoints and their usage. Consequently, there was an ethically low risk to the participants involved in this research.

3.2.10 Date Analysis of Interviews

To allow data analysis to take place, each of the interviews was recorded with a Dictaphone. The audio was transcribed using Nvivo 12 software and manually checked for accuracy. Depending on the strategies used during the research affects the way in which the data is analysed (Longhurst, 2016). As this research is focusing on an abductive approach, it is reflective, allowing the previous interviews, and research experience, to influence how the following interviews were conducted, and the questions asked (Flick, 2017).

Transcription has been used to show evidence about the focus of research, and consequently, it can be influenced by the characteristics of the academic environment, and the social values held by the transcriber (Nascimento and Steinbruch, 2019). Hence, incorporating the researchers' ethnographic experiences alongside the data analysis of interviews can ensure there is a consideration of this impact. The process for this research has been a learning experience for the researcher alongside service providers.

During the transcription process there can be different approaches to how the spoken word is written down (Nascimento and Steinbruch, 2019). Some processes can omit utterances such as 'uh, 'um' and 'yeah', others can include these in the transcript, and this can change the tone of a transcript, implying where there are participant hesitations, or where they take a moment to consider their answer (Flick, 2017). Pauses could suggest that the participants could disagree with the question or phrase posed, equally, they could suggest that participants have perhaps been asked a question or perspective they had not previously considered.

Furthermore, the translation of the spoken word to a written format can omit where emphasis was placed on certain words, or where sarcasm was used (Nascimento and Steinbruch, 2019). Where participants had different verbal inflections, these were noted and highlighted, to take notice of where the participants may joke or make a comment with a sarcastic tone. This

elevates the transcription process beyond simply writing what has been said. However, it is dependent on the rapport built between those interviewed and the researcher, and the level of understanding from the transcriber. But, as this research is being undertaken by one person, myself, the same person is both interviewing and transcribing the interviews, consequently, removing this issue. Therefore, memory can inform on how those being interviewed responded in body language to the questions asked or used facial expressions to add to their answers during the interview.

3.2.11 Inductive Coding

The transcripts were then analysed in Nvivo 12, using thematic coding to examine where each participant, and group, placed value. Following the use of an abductive reasoning approach for this research, the coding followed a similar pattern. Coding inductively allows a 'learn as you go' approach, as it creates spontaneity when generating codes rather than subjecting the data to existing expectations (Saldana, 2021). This inductive coding translates into deductive coding as the analyse takes shape and becomes solidified. The data was approached with a basis of knowledge and the aims being prevalent, but largely, the results were formed throughout the research process (Saldana, 2021).

This inductive approach to coding means that the data was approached without theory playing a role. The first coding analysis, was Open or Initial coding, it took each of the interviewed groups, and highlighted what was 'interesting' from their interviews, whether this was an experience, an explanation, or an opinion (Cooper, 2016).

From this, the coded 'interesting' statements were split into the relevant aims. For example, during the service host interviews, where they discussed the actual process of researching and having a chargepoint installed, these were placed under the aim of 'Understand the process of the Service Host having a chargepoint installed', but other statements such as when they were discussing the impact of having a chargepoint installed or their perception of having it installed, were placed under the aim of 'Investigate how chargepoint service hosts, service providers, and users perceive chargepoints in contrast to ICEVs'.

As the data was spliced into the separate aims, it was then further dissected. Themes began to emerge from this dissemination, for example:

Investigate how chargepoint service hosts, providers, and users perceive chargepoint value:

- Chargepoint experiences

- Environmental Tools

- Opinions

- Technology and the Future

- Services

- Influencing and demonstrating

These were the codes generated during the interrogation of the data placed under the aim for Service User and Service Host perceptions and valuations of chargepoints.

All the coding followed a similar thread of investigation, breaking them down into the various stories told by those interviews, as well as the opinions, and examples, they discussed. But ultimately, these codes appeared to be shaping the data to a few sentences and extending it beyond the scope of this research.

Consequently, the approach was evaluated, and these smaller codes were collated, creating three areas of value: social, environmental, and economic.

3.3 Autoethnographic Research:

It is also worth noting the researcher position within this project. It is rare that research can remain completely unbiased, and there will always be an involvement paradox when questioning how to remain outside of the study (Langley and Klag, 2019).

Acknowledging this, an autoethnographic approach to research, and writing, encourages the systematic analysis of personal experience, and embraces a new cultural experience. It challenges the traditional approach to research, and allows socially conscious considerations (Ellis et al., 2011).

As a novice to the EV and chargepoint culture, considering personal experience and how problems were engaged with, can offer another insight into how value can be perceived when looking at investments into chargepoints. Part of the role within this research project has been in partnership with CMS, and therefore has included visiting, and judging, their chargepoints sites in Cumbria, and generating reports on these experiences.

This research involved interacting with the chargepoints, and creating a representation of how those involved in the chargepoint industry identify whether it is worth investment. This valuation and judgement system is personal to each of the service hosts, and part of an autoethnographic approach is allowing the articulation of insider knowledge of a cultural experience (Boylorn and Orbe, 2020). With the CMS partnership, and twelve-months of

engaging with the processes of having a chargepoint installed, considering an autoethnographic perspective gives insider knowledge into the valuation and judgment systems of the service provider, and how they engage with service hosts (Adams et al., 2017). Therefore, when discussing the results in the following chapters, it will include this personal experience and opinions, providing holistic and comprehensive data (Cooper and Lilyea, 2022).

3.4 Photographs

Within the twelve-month period, approximately 42 CMS chargepoint sites were visited. At each site, photographs were taken to assess whether the site was working, if it was damaged or vandalised, and record any vegetation impeding the use of the site. CMS's aim was to build a chargepoint databank, ensuring that they had a comprehensive collection of photographs and notes about the sites visited (Figure 8, 9, 10, and 11). Consequently, this created a new perspective and valuation to be considered when visiting chargepoints 'in the wild'.

Photographs give a visualisation of data (Prosser and Schwartz, 2005). They are able to provide further input and suggest what perspectives were considered whilst taking them (Cleland and MacLeod, 2021). For example, two distinct perspectives were present during the photographing of the chargepoints.

One was to ascertain and show where chargepoints and their infrastructure were damaged or impeded:

Figure 8 - Carlisle City Centre Chargepoint. Taken by E., Dolmor.

Here foliage is impeding a site in Carlisle City Centre, it is covering the sign that highlights the parking space is exclusive to EV users charging their vehicles.

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Figure 9 - Chargepoint Fuse Cupboard broken door in Cumbria. Taken by E., Dolmor.

This image shows damage to the fuse cupboard housing all of the electrical circuitry and Wi-Fi hub for the chargepoint. The door has become detached and could cause harm to those opening it and is placing the equipment inside at risk of damage.

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Figure 10 - A Dalston Kingsway Car Park Chargepoint QR code faded. Taken by E., Dolmor.

This image showcases how natural sunlight can impede the site. The QR code is faded due to sunlight bleaching it, which can restrict users connecting to the site, as they are unable to scan the code in order to start their charge.

Another purpose was to showcase the chargepoints, as part of visiting included adding photographs to applications such as ZapMap, to provide users with a visual reference for the chargepoints (Figure 11, 12, and 13).

Figure 11 - Harraby Community Campus Chargepoint, Carlisle. Taken by E., Dolmor.

For example, this photograph was taken and added to ZapMap to show Harraby Community Campus in Carlisle. The aim was to provide distinctive identifiable features, so those in search of the chargepoint were able to locate the chargepoint more easily and with more confidence.

Figure 12 - Botcherby Community Centre chargepoint, Carlisle. Taken by E., Dolmor

Botcherby Community Campus is shown above, when locating this site, it was difficult, as it is in an enclosed car park, and there are few signs showing its location.

Figure 13 - Kings Street Car Park, Ambleside, Cumbria. Taken by E., Dolmor.

Each photograph can inform the user of what they are looking for and allow them to make a judgement about whether they feel confident locating the chargepoint, as well as whether they could feel safe at the site whilst waiting for their vehicle to charge.

Two distinctive perspectives had to be considered and this impacted the research and how it was approached; as the service provider aiming to assess their site and take note of any damage or improvement that needed to be made; and as a service user, sharing images to provide context and inform others of the site location, how it looked, and what else was available at the site.

3.5 Additional Data

As this research is in partnership with CMS, access was given to the existing data, such as that collected from initial questions posed to those hoping to host a chargepoint. When prospective service hosts contact CMS they complete a feasibility study online, and from this a set of data is produced.

These feasibility questions ask about prospective locations, access, electricity capacity, and more. Using such data in discussing how service hosts find, and decide to use CMS as a service provider, could provide an insight into the first set of interactions service hosts experience. Furthermore, these data sets generate a basis from which to work, as they can

inform how service hosts found CMS as a company, and consequently, this can be incorporated into understanding of how service hosts make valuation judgements when deciding to use CMS as a service provider.

3.6 Research Matrix

Consequently, the following valuation matrix was compiled (Figure 14).
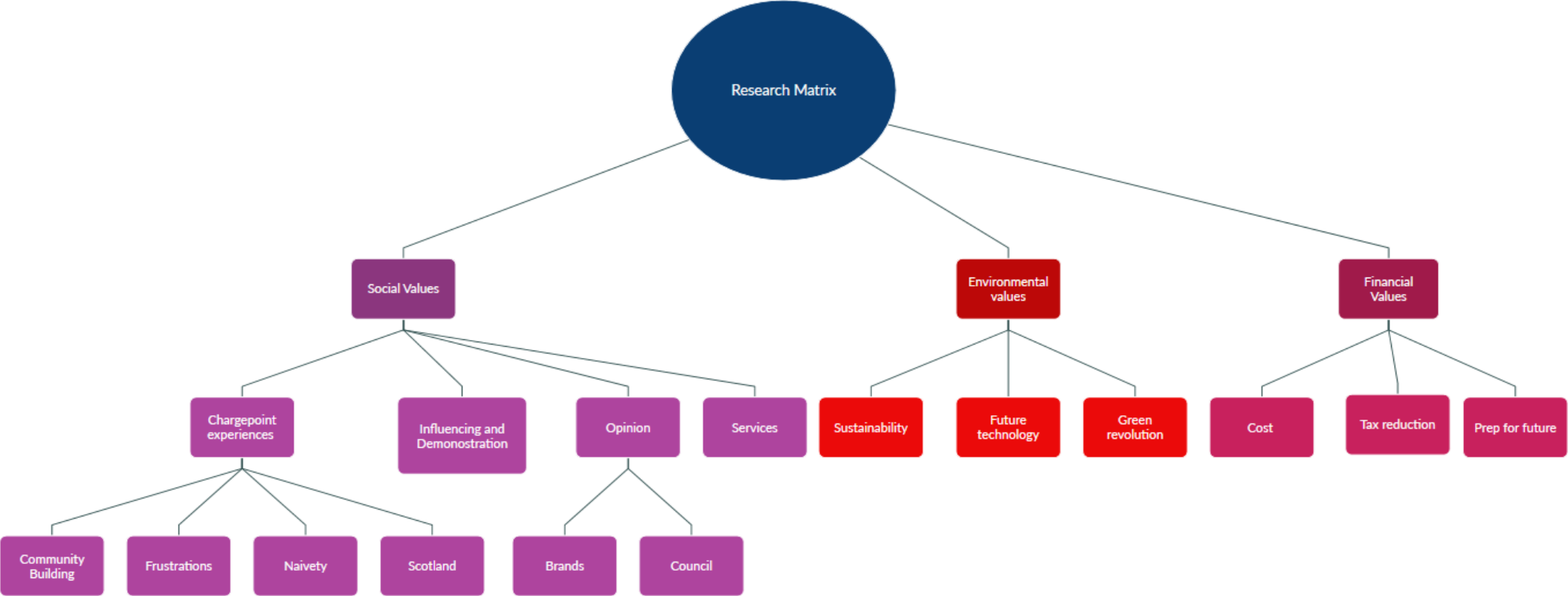
Figure 14 - Valuation Research Matrix produced from the Methods.

For data analysis, this must be compared to the research matrix demonstrated in the previous chapter (Figure 15).

Value	Service Provider	Service Host	Service User
Social	X	X	X
Community	X	X	X
Environmentalism	X	X	X
Financial	X	X	
Cost	X		X
Profitability	X	X	
Sustainability	X	X	X
Accessibility	X		X

Figure 15 - A reiteration of the research matrix

It is clear that the data did identify similar values, namely the three main values: social, environmental, and economic. Other values were either not identified or proposed as a smaller theme. For example, community values were discussed under the theme of chargepoint experience, and furthermore, under the generation of a community produced at the chargepoints, in contrast to the original conceptualisation of the community in the local area.

3.7 Conclusion

All the data collected through these methods informed on the research, allowing investigation into the valuative practices occurring in relation to chargepoints. The interviews allowed insight into the different actor perspectives, and other methods built a background of knowledge to ensure appropriate questions were asked. The ethnographic perspective involved the unique perspective of the users and the providers, but it was more difficult to replicate as a chargepoint hosts. Overall, the data enabled this research to be thorough and insightful. The analysis in relation to the findings will be further discussed in the next chapter.

4.0 Results and Data Analysis

4.1 Introduction to Results and Data Analysis

The aim of this chapter is to bring together the theoretical discussion of valuing and judging investment in Electric Vehicle Chargepoint infrastructure in Cumbria, and the data gathered through the various methods. The data analysis has enabled the identification of themes, and these will be discussed in relation to each of the actors involved in the process of having a chargepoint installed and used.

The structure of this review will place the main themes identified, namely the social, environmental, and economic values, and from this, split each of the themes into the actors, and their valuation systems in relation to the introduced aims.

This chapter is focusing on dissecting the data collected from the methods and considering the answer to the previously discussed aims. In line with the literature review, it is going to assess the value and judgement systems of the service provider, the service hosts, and the service user. Following this it will also cover the relationship between these groups and their dynamic. The chapter will close discussing how CMS can use this research to increase the number of successful chargepoint installations.

4.2 Understand the decision process behind service hosts having a chargepoint installed.

This aim sets out to discuss what tools, values, and judgement processes those having chargepoints installed, exclusively by CMS, use to reach a decision.

The flow diagram shown below demonstrates the process of installing a chargepoint in its simplest form (Figure 16). The choice was made to present only the most relevant tools and judgements, as it can be a highly complex process, with a variety of different inputs and influences. From the analysis of data there are three main values service hosts consider when coming to the decision to install a chargepoint. These are the social values, environmental values, and economic values.
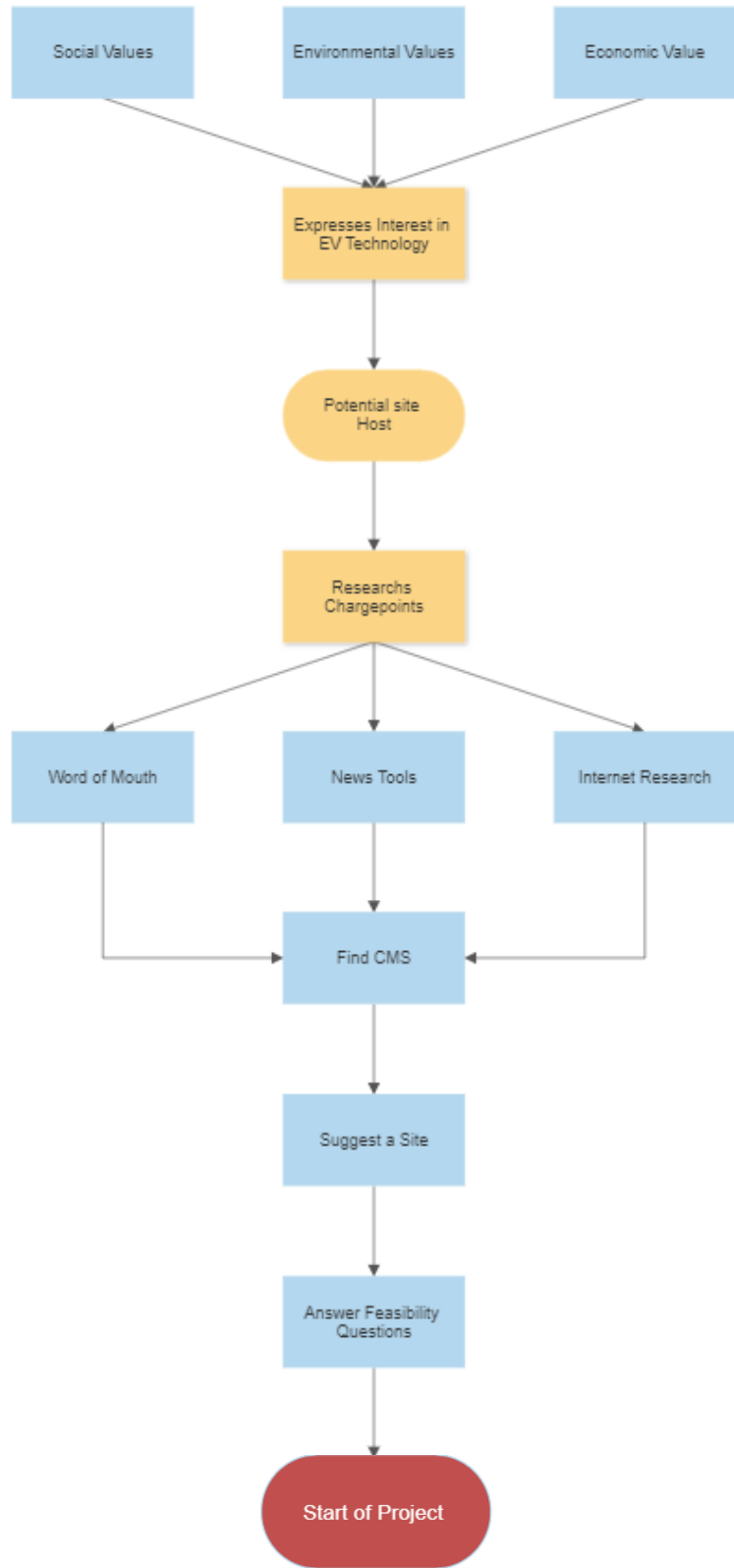
Figure 16 - A Flow Diagram demonstrated the thought process experienced by Service Hosts before chargepoint installation by CMS.

4.2.1 Values

Presenting these values in the format of a Venn diagram is useful (Figure 17), as it is difficult to extract these values from each other, they all feed into each other and are all relevant to chargepoint installation.
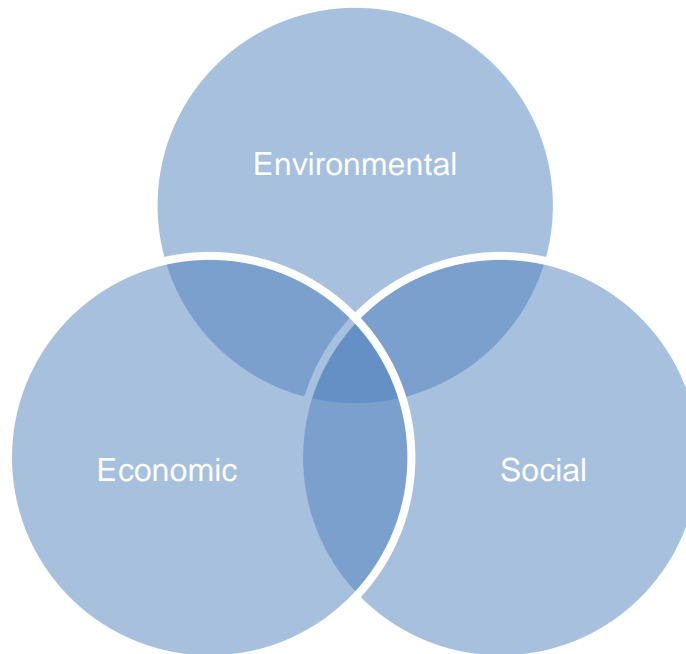
Figure 17 - A visualisation of the integrated nature of the values related to the decision to have a chargepoint installed.

From the perspective of a service host, chargepoints seem to be viewed as two things:

One, a tool for achieving net-zero, and two, they supply a service to the community (Antal et al., 2015). They are a tool for achieving the hosts individual green initiatives, but also a vital part of infrastructure to allow users to charge EVs (Boulanger et al., 2011).

The services hosts, as introduced in the literature, are the intermediary bodies when installing a chargepoint on site, and as Skålén et al. (2023) discusses, when considering the value generated in markets as with such intermediary bodies, each will have their own set of values and judgement systems. However, this situation is unique, it needs to be highlighted that the service hosts and service providers must have some semblance of the same values to ensure chargepoint installation success (Acosta-Prado et al., 2021). But these values extend beyond the conventional economic models of valuation, and assessing the value of chargepoints needs to consider the hidden realities and the values sitting within routines and existing norms (Krenz et al., 2014).

4.2.2 Service Host Values

As shown in the decision tree, service hosts are the trigger for CMS chargepoint installation in Cumbria. As the service providers infer in their interview, the process of having a chargepoint installed '*is reliant on the site host being quite proactive*'. Hence, the decision to install a chargepoint at their site begins before they connect with CMS. This experience was universal for the interviewed service hosts.

The service provider noted that to have a successful chargepoint installation, the service hosts need to have '*the same values and ethos as Charge My Street'.* This is crucial to the success of a community chargepoint installation. They are co-creating value with the chargepoint hosts from the perspective that together they are providing a site at which the user can charge their vehicle (Karababa and Kjeldgaard, 2014).

This co-creation of values between the host and the provider needs to be highlighted through the research and investigation which the hosts undertake prior to installation. CMS's aim is to provide a community service to those who are less likely to convert to an EV due to their lack of driveway, to ensure they are part of the green revolution in Cumbria. They emphasise that, service hosts must have a '*willingness to change, and a willingness to improve'*. This appears essential for installation of a chargepoint for the service provider, as a social benefit society, they are not placing their focus on the economic gain from chargepoints. The terminology used by the service provider in their interviews is curious. The notion of having the '*willingness'* to enact change, service hosts need an eagerness and enthusiasm to install a chargepoint, an interest and readiness to progress to new technologies, with a change of vehicles and a new abundance of greener solutions. There is a need to explore this collision of social values, notably the practices and values of the service provider and host need to align in order to successfully engage with the chargepoint market (Hackett, 2008).

This is particularly emphasised when considering the service hosts and their engagement in greener technologies and more sustainable solutions. This aspect was important when interviewing Service Host 2, as they highlighted that installing a chargepoint on their property was a '*natural step'.* They had made an effort to install solar panels, and a ground source heat pump, and had also considered installing a wind turbine. This infers that they felt installing a chargepoint onsite was an important step in line with their net-zero journey, this is within accordance of CMS's ethos and their efforts to support the net-zero targets set by the government (GOV.UK, 2021). This emphasises that within the service hosts process of deciding to invest and judge the importance of installing a chargepoint, it is worth noting their environmental values.

The chargepoint becomes a marketing foci for different expertise and similar values (Callon et al., 2002). From the provider interview, they concur the notion that sites such as community

centres and village halls are also partaking in an effort to be more sustainable, for example, installing solar panels (Hill et al., 2019).

 'They are very forward thinking and make sure that they are as green as possible. You'll be amazed how many village halls have got massive solar arrays and batteries and all sorts of stuff and EV charging is a next step on that journey.' - Service Provider 1.

This suggests when investing and judging where to put chargepoints in Cumbria, there is a higher likelihood of success if the service hosts have '*forward thinking'* and the *'willingness to change'.* Furthermore, if a potential service host site has interest in sustainable technology it could increase the success of the installation. Hill et al. (2019) suggests that to ensure the success of a green revolution, there is a need to integrate low carbon technologies into business, social spaces, and communities. Consequently, it is essential that from the beginning of the process, the service provider is able to understand the values that have encouraged the service host to have a chargepoint installed on site to ensure success, as the intermediaries provide a new actor within their market (Barraket, 2020).

CMS uses feasibility questions at the beginning of the process to enquire about practicalities (CMS, 2023b). It could be suggested that CMS need to pose questions in relation to their values, to ensure their possible service hosts possess at least some of the same values. Ensuring service hosts engage with such questions creates an essential tool for service providers, they provide a calculative tool which can determine the success of a possible chargepoint installation (Araujo and Mason, 2021). In contrast, the potential service hosts are able to use the feasibility questions to ensure they understand the commitment of having a chargepoint, and can address if their values align with CMS, as an online tool it ensures that only diligent potential hosts are engaging with CMS (Abbate et al., 2019).

4.2.3 Service Providers and Service Hosts

Discussions with the service hosts highlighted that the decision process for installing a chargepoint expanded beyond ensuring their values aligned with the service provider. They summated that placing a chargepoint at their site provided a service to their consumer base.

'I think it's one of the essentials. It's like, you know, you wouldn't consider not having Wi-Fi for your guests now, you wouldn't consider not having a first aid box…, I mean, you can still drive around and some B&B's are still proud of having hot and cold water…, I mean, every (pause) every car park is going to have the…you know, the disabled bay, whatever, and an EV charger has got to be the norm.' – Service Host 2.

Dubbing a chargepoint as an 'essential', highlights the change of technologies and the growth of EV users. There has been a drastic uptake in EVs, with a 77% increase of EVs on UK roads Department for Department for Transport (2022), suggesting that businesses do need to adopt

tools such as chargepoints, to ensure they are in adherence to changing mobility structures (Greene et al., 2020).

After the events of the coronavirus pandemic, tools such as Wi-Fi were highlighted as being essential for the modern day, it allowed some semblance of normalcy. The pandemic emphasised the need to be connected to the internet to be functional for work, but also for contact (Feldmann et al., 2020). Thus, in comparing Wi-Fi to a chargepoint suggests in order to be functional, businesses need one. They concur that it is a vital service, and the service hosts aim to cater for their consumers. Wi-Fi is the more modern notion to which this host compares a chargepoint, but they also compare it to the idea of a 'B&B' having something as simple as hot and cold water. This perspective suggests that during their decision-making process they felt that chargepoints were an essential, and as simple as hospitality businesses having hot water.

This is a fascinating perspective, it suggests that this host in particular felt that when placing value onto a chargepoint, they considered it in the same concept as providing hot water to their consumer. Furthermore, they also consider an EV chargepoint in the same frame as a disabled parking space, which under the Equality Act 2010 guidelines, states that at least 4% of their car park spaces should be larger than standard to provide an appropriate space for disabled drivers and passengers (GOV.UK, 2022a; GOV.UK, 2023b). Interestingly, this could suggest this site host considered having a chargepoint onsite as important as having a disabled space onsite. One inference could imply they believe there is a need for governmental legislation to ensure all car parks have chargepoints available.

Albeit, it does need to be noted, that this service host also did drive an EV, providing an influential context. Valuation models and conclusions such as that of Power (2004) suggest decontextualising value, and removing the interference it promotes, but here it is essential to engage with the value generated. The context ensures that hosts and service users carry the same objectives. Decontextualising this scenario would remove the understanding of value between the two actors, it could create a deficit of information (Miles and Gibson, 2016).

Context provides insight into the decision process and the different tools and inferences used to make judgements when installing a chargepoint (Cova et al., 2011). For example, whether potential service hosts have an EV, which could be part of their motivation to include one within of their services (Bhattacharjya et al., 2023). Placing a particular framing or fixing on the actors' motivation to installing a chargepoint, will influence how they approach the decision (Bessy and Chauvin, 2013).

The aim of this research is not to geographically determine where to place the chargepoints, but there are social and geographical characteristics that will influence valuation practices, as

seen with service hosts owning EVs (Kemp et al., 1998). Furthermore, the service host felt the need to highlight that part of their decision included their geographical context.

'*I think one of the other little things which drove us to acquire a charger is that there wasn't one in [Place name], which was nuts*' (emphasis placed on *nuts*) – Service Host 2.

They highlighted in their interview, that they were not looking to drive an EV at the time, it was only after the installation that they felt they could convert to an EV, as they knew they were able to confidently charge the vehicle.

As the service provider noted, they do aim to install chargepoints in the '*desert zones'* within Cumbria, but as stated at the beginning, this is reliant on the service hosts engaging with them first. Valuation involves bringing order to these different actors and engaging with their relationship to understand it, consequently, the symbiotic relationship between the service provider and the service host is key to the value generated at the chargepoint (Kjellberg et al., 2013).

Overall, there is a need for those hosting the chargepoints to have the same environmental ethos as CMS, as well as the viewpoint that a chargepoint is an essential service. This will be discussed more under the aim of engaging with what value a chargepoint generates. But thus far, to ensure successful chargepoint installation, the service provider needs to ensure their social, environmental, and economic values align with the service hosts, and that these are fundamental when being sought as a chargepoint commercial supplier (Lamont, 2012). Consequently, the calculative tools used by service hosts need to be recognised and considered as they can inform on valuation and judgement practices (Antal et al., 2015).

4.2.4 Service Hosts and Decision Tools

Tools, such as labels and trolleys, given to shoppers in a supermarket, or categories within online shops, are useful when determining what is valuable (Williamson, 2021). Those coming to the decision to have a chargepoint installed at their site will engage in research when determining type and installer (Chen et al., 2020). These journeys will differ depending on who is being engaged with, regarding an installation company, and the location in which they want to install a chargepoint. This can be seen through the service hosts interviewed, for example, one was a small business, and another was a council.

The business expressed their frustration with the process of searching for a chargepoint installer. As the main tool they engaged with was internet research, and when contacting potential installers, due to their location, they felt that they were rejected.

'*Well, they all got quite difficult because when we were making contact with companies about potentially putting our own in or commissioning, they didn't seem to want to go north of*

Manchester or more than a mile or two off the motorway. So, you dropped the post code and yeah, nobody was interested to come to [Cumbria].' – Service Host 2.

As a tool, the internet provided the mechanism for a potential service host to research chargepoint installation, but highlighted the current chargepoint market landscape and the focus on urban areas (Araujo, 2007; Chen et al., 2020). This pertains to the title of this research in particular, as in comparison to the urban landscape of Manchester and the motorway, placing a chargepoint in Cumbria, in a more rural site, was less profitable to the initial companies with which they were engaging. This gives emphasis to the idea that perhaps valuation judgements of investments into chargepoint infrastructure 'in the wild' differs from placing a chargepoint in an urban landscape. Further research into this dichotomy is needed. Conversely, the larger council body invited different commercial suppliers to pitch to them, and the council interviewee acknowledged Daniel Heery, a Director of CMS, was known to them, but this was not the reason they were chosen to install the chargepoints. However, it does inform on another tool, which aids service hosts in their decision to have a chargepoint installed by CMS, in the form of 'word of mouth'.

During the initial questions posed by CMS to potential service hosts, one relates to how the service host found CMS as a chargepoint installer, 33% submitted that it was due to 'word of mouth', the penultimate tool for finding CMS was Google, at 25%, the remaining percentages were through social media such as Facebook, and Instagram, and news sources either in the form of a newspaper or e-newsletter.

'Word of mouth' was the highest percentage of these (Figure 18), hence, needs to be acknowledged. It infers that despite marketing techniques deployed by those installing the chargepoints, an exchange of words is the most impactful, and furthermore is a tool which the service hosts recognise as valuable when making a judgement. This agrees with the sentiments of Mason et al. (2019), as they discuss how markets are shaped through social and economic collisions. Consequently, one epistemic device that needs recognition is the notion that markets are shaped by the consumer, their evaluation of CMS is shared through consumer networks (Branstad and Solem, 2020; Cova et al., 2011; Priem, 2007).
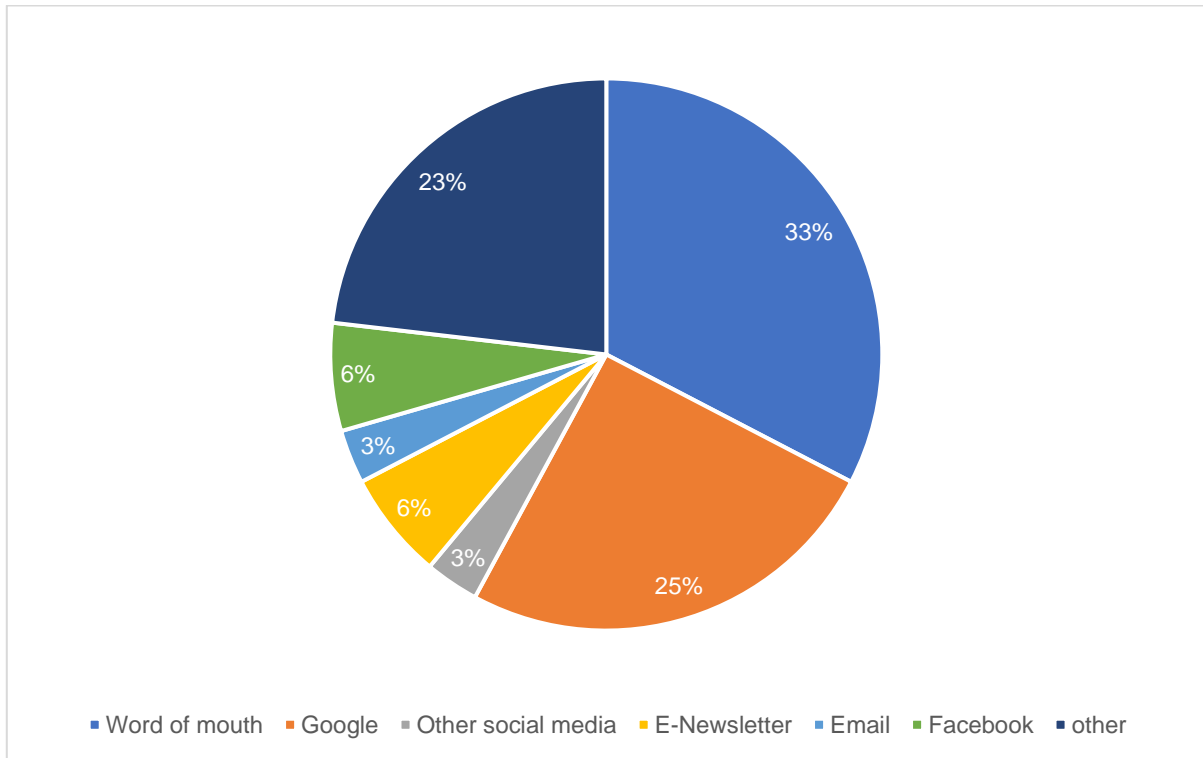
Figure 18 - A summary of percentages pertaining to how service hosts found CMS as a potential service provider

This is acknowledged by the service provider:

'What is useful, is having this network of community venues, and because, as soon as one community venue has got something, the next community venue wants the same thing, and a lot of these community groups are very forward thinking.' - Service Provider 1.

Tools allow information to be gathered from multiple parties, and further can allow valuation to occur where there may be a lack of comparable objects, which may not have been easily or previously valued (Abbate et al., 2019). This community network is vital for the success of CMS chargepoints, and the interconnectedness provides a gateway to others. As Karpik (2010) highlights, tools and devices, such as networks, are confluences of information exchange and ideas. Hence, when researching the decision process of chargepoint service hosts, consideration of these networks, through the notion of 'word of mouth', is important as it is a key tool of evaluation. Suggestibly, at the centre of the success for CMS chargepoint installation is a network of community spaces. Consequently, when examining the investment and judgement of chargepoints in Cumbria, the community spaces, and their role within chargepoint installations, need to be especially considered. This research is particularly focusing on the role of tools when assessing chargepoint installation. Therefore, identifying such bodies, tools, and ideas, is key to the success of installing future chargepoints.

Considering this perspective, the nexus of people involved in the installation of a chargepoint, are vital within the decision process of service hosts. The individuals who work with, and for

CMS, also need to be noted as a calculative device. The mobilisation of markets is reliant on varying bodies of experts, calculative agencies, devices, and practices (Fehrer et al., 2020). Therefore, it is imperative that at the centre of this discussion is the understanding that those who work for CMS are a tool in themselves, they are experts and as highlighted in the interviews:

'The people that work at Charge My Street, or have worked at Charge My Street, or have worked with Charge My Street, on the projects, have got great connections in Cumbria and great connections locally.' - Service Provider 1.

Value comes from consulting experts and considering their opinions (Mason et al., 2019), CMS staff are these experts, but they also provide the connections needed to successfully generate interest in community chargepoints. Furthermore, these connections devise a marketing tool, as those who engage with the staff are likely to hold the same ethos and values as CMS, therefore, the staff are a valuation tool used by service hosts to commit to install a chargepoint. This could warrant comparing CMS within the example of the calculative tool of a shopping trolley, as explored by Cochoy (2009) and Estes and Streicher (2022). But, it is debatable whether CMS *is* the shopping trolley, providing a tool for judgement for investment in chargepoints in the wild, or, whether CMS is *in* the shopping trolley, and being selected as a product (Huitink et al., 2020). As CMS is also a business, they are a commercial supplier and need to ensure a profit to support their social community values. Considering CMS in the concept of a shopping trolley suggests they have a duality of roles in chargepoint installation, this is partially due to their position as a community benefit society, and their business method. But this duality provides them with another advantage. They are co-creating value with the chargepoint hosts from the perspective that together they are providing a site at which the user can charge their EV, but they are also a consumer to their brand. The consumers, such as those of community venues, value the concept CMS have and their relationship with the brand is reliant on this.

Additionally, this duality can enable businesses: service hosts, to provide another device to their consumers or their community, giving them an additional tool for their own evaluation and valuation. There is a crux between the two, and it is here that value is generated (Shove and Pantzar, 2005).

In conclusion, with the combination of the internet, 'word of mouth', and the CMS staff as devices themselves, there are many tools used by service hosts when deciding to have a chargepoint installed. These are the three tools identified within the scope of this research, it is not a mutually exclusive list, it is also framed within the context of those engaged with CMS, and how their values align overall.

4.3 Investigate what 'value' is generated at EV chargepoints – i.e. how do service providers, users, and hosts, value chargepoints?

Chargepoints are a site at which there is a collision between values pertaining to mobility, environmentalism, and technology, consequently, a new market and valuation system is generated (Sovacool, 2017). This aim is being answered with the understanding of a chargepoint as a physical space, a place in which value is generated.

Within each market, an actor may have ideas of how services or objects should be valued in a monetary term, due to its beauty, purity, might, or high/low standing (Stark, 2009). The actors may have differing opinions as to why the object is of value, for example, the providers view a chargepoint as a device, to achieve their community plans (Antal et al., 2015). A host may view the chargepoint as a step within their sustainability plans, and users value the chargepoint as a tool, through which they can charge their EV, they value the chargepoint as a service.

Consequently, within the three actors, each of their values can be trisected into the summarisation of three overall values, however, they all hold different definitions for the three actors (Karababa and Kjeldgaard, 2014). For this aim, the value is being defined as what occurs at the chargepoint, and the site of engagement with the chargepoint, as opposed to the idea and concept of a chargepoint being installed, which will be discussed under another aim.

4.3.1 Service providers and social values

Moments of valuation can occur when different social values and marketing devices interact to generate economic value (Mason et al., 2019). Part of understanding the value of chargepoint installations is understanding how those interacting with them gain value from the chargepoint. There is a collision between social worlds, generating the space for markets. CMS have found their market in a space of a missing service, providing EV charging for those who lack access to off-street parking, which in turn will deter drivers from converting to greener technologies such as EVs (Frumkin and Andre-Clark, 2000). This suggests that the host, and the provider need to hold the same social values, or value what the chargepoint provides as a tool, as discussed in the previous aim.

At the service provider's core is a central ethos and social value:

'The social values, (pause) basically meaning that we want to achieve net zero as quickly as possible, but also doing that requires all areas participating…, not just the areas that are going to make you loads of money'. - Service Provider 1.

Interestingly, here is where there is a crossover with the economic values of the three actors, or especially the service provider. The economic values are congruent with the social values

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for the service provider, despite being a social enterprise with the aim to help those in areas less likely to transition to sustainable modes of transport, they also need to be a commercial success to achieve their social aims (Henriksen et al., 2016). As discussed in the interview, '*So, you might have a site in, um, the middle of Ambleside and it gets plugged into every single day, sometimes 10-12 sessions a day, thousands of kilowatts, making quite decent revenue and return on investment on that capital cost. However, you might have sites in the middle of nowhere, or in under-served, locations where people haven't made that switch to EVs, but you have to still provide people with the option to be able to do that, if they are on the fence of what to do, because it's quite a big economic commitment for them. And so as long as they've got somewhere reliable and efficient to charge, they can… um… make the switch to EV.*' – Service Provider 1.

This is a unique dilemma for the service provider, and when assessing the value of investing in the EV chargepoint network, is something that needs to be considered. At the centre of CMS ethos, they are committed to providing chargepoints where other commercial suppliers will not, where areas may not initially be economically sustainable due to a lack of customers. CMS is providing those areas with the opportunity to transition to sustainable transport, yet, they still need to consider the economic implications, and that there may be a lack of profit in these less successful areas. It needs to be supported by some commercially successful chargepoints. As Stark (2000) discusses, there is often an overfocus on economic value as the main tool of valuation and judgement within markets, but CMS are aiming to traverse this. Their aims concur that economic profit is important within their commercial success, but their primary purpose is to achieve their environmental and social values. As Antal et al. (2015) suggest, despite this focus on social values for actors, such as the service provider, inevitably it is inseparable from the monetary implications, and the values are placed on monetary and economic scales (Stark, 2009). Where some sites will have economic success, others are likely to have social success, and generate a cycle, the social success leading to commercial and economic, highlighting the cyclical nature of value (Karababa and Kjeldgaard, 2014).

4.3.2 Service providers and hosts – Value Co-creation

Specialist equipment is needed to produce this value, there is a suggestion that when CMS engage with service hosts, they are providing this specialist equipment to create a site of value (Shove and Pantzar, 2005). Chargepoints could be labelled as a site of value co-creation, as within their space is a confluence of social, environmental, and economic values (Choi et al., 2010). The chargepoints are equipment leased to the service hosts but maintained by the service provider, consequently, there is an exchange of services occurring between the service provider and the service host, the intermediary. There is a crucial tension at play between the

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hosts and provider. CMS are providing the equipment for a chargepoint site, as well as supporting and monitoring it, the hosts act as gatekeepers to the local community (Raco, 2005).

'We believe that site hosts have the best local knowledge. If it's their building or they live locally in the village...We only want to deal with people who are really interested because there is a lot of work that goes on behind the scenes...' – Service Provider 1.

This agrees with the notion that the value is co-created and exchanged; the two actors are working together to produce a service for those driving EVs, and provide alternatives to those in the community (Arena et al., 2021). The two actors are consumer and marketer, integrating operand and operant resources, to produce a service and product (Vargo and Lusch, 2004). Consequently, between service providers and service hosts, they are co-producing a valuable service at the chargepoint, from a social values perspective, these actors together are generating a service for those who charge their vehicles (Cova et al., 2011).

The 'value' generated at a chargepoint is based on this symbiotic relationship between the service provider and service hosts. As the service provider argues, the service hosts have the *'best local knowledge'* they are part of the community in which the chargepoint will be placed. The basis of the relationship is an exchange of value between these two actors, the idea that *'people power'* is what brings the chargepoint and its potential value together. After being part of this procedure for twelve months, people are key to chargepoint installation, not only to getting started, but also having enthusiasm from the community is vital for success and for value generation.

4.3.3 Service as a value

Defining the service as a value is perhaps a different approach to value, but in understanding how a chargepoint provides for the actors involved in its installation; it needs to be understood that placing a chargepoint in a community space, and within an area that is perhaps less likely to have a chargepoint installed, or vast amount of EV drivers, generates a service. The three actors are a confluence creating a market, with the collision of three judgement and valuation systems, the integration of their complex notions creates the space for service as a value (Cova et al., 2011; Grönroos, 2012; Karababa and Kjeldgaard, 2014; Vargo and Lusch, 2004). Service Host 1 argues that,

'Who knows what…what the market will look like in 10 years' time. So, it is very much a community service',

The physical site itself could be compared to a traditional fuel station, and the notion that these need to be placed in areas which can generate income, but this host compares it to the idea of generating a service for the local residents. This idea of providing a service, could perhaps

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be compared to the idea, that the chargepoint for hosts, holds economic value (Geiger et al., 2014; Stark, 2009).

'*I think that it probably still exists… an expectation among some local politicians that chargepoints in council car parks become some sort of cash cow.*' – Service Host 1.

Dubbing it a '*cash cow'* implies that a chargepoint is a site that can produce a steady income or profit for those hosting it, but this is where this service suggests that the social value should be much higher than the economic:

'*And I see it as far more than a revenue generating opportunity for a council.*' – Service Host 1.

Phrasing it in a way that shows its '*far more'* than a tool that the council are using to produce profit, again ignites the suggestion that these sites are a service for the community, they are something the council is providing. The chargepoints are a tool which provides towards council social values, and this translates into environmental values, as it ensures that the tools are there to support users transitioning to sustainable options, such as those of EVs (Greene et al., 2020; Hill et al., 2019).

'*It's about the opportunity and being seen'* – Service Host 1.

The service hosts highlight the importance that everyone can be part of the transition to more sustainable solutions, this is congruent with the values the service provider holds. The suggestion, that to ensure net-zero targets are reached, everyone must see them as achievable (Feola and Nunes, 2014), and have the belief that they are '*being seen'.* This is an integral part of ensuring the transition to net-zero and maintaining it. The solutions cannot be facetious, these chargepoints being physically placed in spaces and areas that are outside of typical urban spaces, 'in the wild', further away from the economic capital, at the periphery, but still deemed as important for achieving the UK government's efforts to reach net-zero but also on a global scale (Logan et al., 2022).

This is not suggesting that placing a chargepoint in one community centre is the solution to all the global climate problems, and magically solve these problems, but the focus on presenting at least the opportunity to achieve these targets on local people's doorsteps (Feola and Nunes, 2014). The opportunity to have the chance to adapt, to be '*seen'.* The chargepoint is a physical representation of this, and this is where it holds value, the symbol of the chance to adapt and to change (Wilson, 2014).

The chargepoint market will have different influences as it grows and shrinks, as Araujo (2007) suggests, market mobilisation will influence agency power, and the calculative agencies involved in producing the chargepoint market. But as they suggest, these agencies need calibration, which can be provided in this context by the intermediary bodies of the service hosts.

'it's a…it's a really minor intervention in the market. But sometimes councils do that, don't they? They build swimming pools and leisure centres in places where private enterprise doesn't go'. – Service Host 1.

This interview with a council worker informs how they apply this calibration, but it does suggest the overshadowing of economic values compared to social and environmental values (Choi et al., 2010). Councils will often engage with public services, such as that of leisure centres and libraries, to ensure a service is fulfilled in an area, and consequently, have social impact (Bonner and Abellan, 2023). As a *'minor intervention in the market'* it suggests that perhaps the council is providing this calibration, placing the service value of a chargepoint in a space where less people are driving EVs, due to the lack of ability to charge their vehicle on a private driveway. This could encourage a transition, as they are able to use a public chargepoint close to home.

This follows the ethos of CMS, it is in providing the equipment to induce change that enhances the opportunity, to ensure those who perhaps are on the fringes of environmental transitions, the chance to be part of it, ensuring that they are *'seen'*.

The council becoming involved with public charging provides this intervention and the opportunity, consequently, impacting the market. Demand increases and more chargepoints are needed, and the market grows (Barrey et al., 2000).

'I think it was because it was a community benefit society that was quite a strong selling point.' – Service Host 1.

The ethos and values of CMS is what drew the council to engage with them as a service provider.

One user discussed how having the chargepoint service at their local community centre '*saved [their] life'.* They had a weekly commitment at the local community centre, and during the interview they discussed their reliance on CMS chargepoints.

The chargepoints and their value as a service extends beyond the typical economic models of valuation, they provide the opportunity to change, and an essential service to users.

4.3.4 Values and CMS

For CMS there are three main areas of value, and they all overlap and interchange with each other (Antal et al., 2015), but they aim to have all three be relevant when they are installing and investing in Chargepoints.

It is not as simple as installing a chargepoint and moving once it is installed. CMS engage with their service host and create 'Chargepoint Champions' (CMS, 2023a). This scheme is valuable, as it creates a partnership between those using the chargepoints and those providing the service of the chargepoint, and in doing so, generates value (Cova et al., 2011). This

relationship brings the user into the value creation process beyond the transactional. 'Chargepoint Champions' are ensuring that the various chargepoints are working for other users. They are fulfilling a role as a community liaison and can be contacted by CMS if a fault has been registered by another user. Chargepoint Champions take on the service host role, they are educated in any issues that can occur, but also provide a level of local knowledge, for example, if there is a power outage in the area, or if a chargepoint has been vandalised, providing another level of value (Bednář et al., 2023).

CMS engage with voluntary site hosts, they put themselves forwards to have a chargepoint installed, suggesting that they share CMS ethos when volunteering themselves for chargepoints.

4.3.5 Chargepoints and Service Users

Removing theory momentarily, the main purpose of a chargepoint is presenting those driving EVs with the chance to charge their vehicles and ensure their mobility. Hence, it is vital to engage with the values produced at the site of the chargepoint, how the everyday users determine whether to use it or not, and the opportunities presented at the chargepoint itself. There is a sequential pattern when assessing an object value in relation to Consumer Culture Theory (Karababa and Kjerdaard, 2014). Value can be attached to an object, which is translated in semiotic and exchange value (Araujo, 2007). Determinedly, what can the chargepoint provide the user with, and what is this worth, and how the hidden realities of routines are revealed (Krenz et al., 2014).

After engaging with chargepoints from a service user perspective, the main epistemological value engaged with was frustration, this was backed by the service users interviewed. A

Figure 20 - A CMS Chargepoint to compare to Figure 19, highlighting the difference in chargepoint technology.

Figure 19 - A ProjectEV chargepoint located in Cumbria, to compare to the CMS chargepoint.

frustration stemming from having to use the varying chargepoints in Cumbria. From observations, no two chargepoints are physically the same, unless from the same manufacturer or service provider (Figure 19 & 20).

'I don't always understand the technology behind how to get it to work because a lot of them are quite different.' – Service User 1.

The function of a chargepoint is the same, namely the ability to plug in and charge the vehicle, but the process is not always reproduced at each chargepoint. Stark (2009) discusses how value is produced where there is a deviation from routines and the devices involved, here there is a breakdown of the traditional refuelling routine by users, they engage with the same notions as the traditional routine (Sierpiński and Staniek, 2019). But, the supply differs, consequently producing a new set of values and decision-making tools used. A personal note about the thought process behind using a chargepoint presents itself as the following: (Figure 20 and 21):
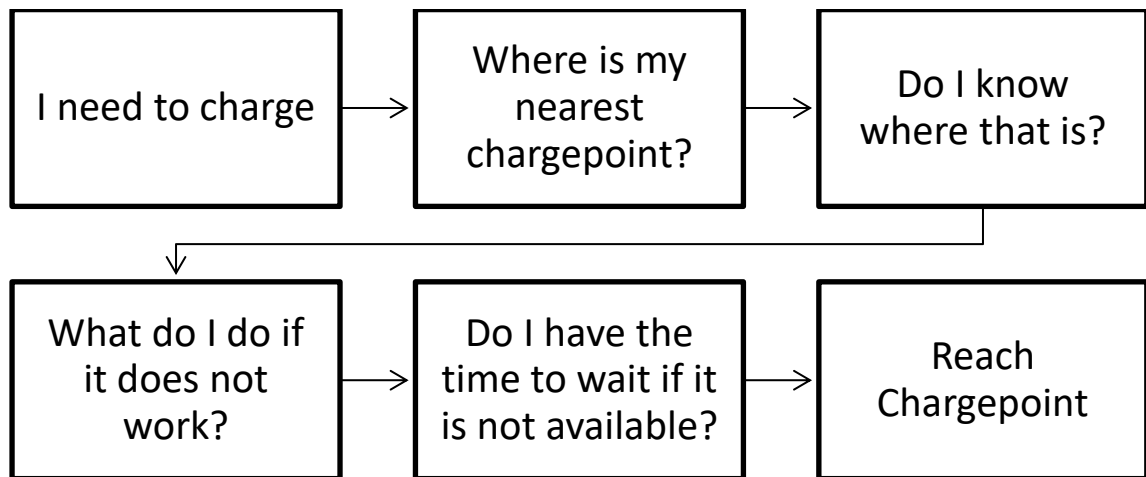
```
┌──────────────┐     ┌──────────────┐     ┌──────────────┐
│ I need to    │ ──▶ │ Where is my  │ ──▶ │ Do I know    │
│ charge       │     │ nearest      │     │ where that   │
│              │     │ chargepoint? │     │ is?          │
└──────────────┘     └──────────────┘     └──────────────┘
                          │                     │
                          ▼                     │
┌──────────────┐     ┌──────────────┐     ┌──────────────┐
│ What do I do │     │ Do I have    │     │              │
│ if it does   │ ──▶ │ the time to  │ ──▶ │ Reach        │
│ not work?    │     │ wait if it   │     │ Chargepoint  │
│              │     │ is not       │     │              │
│              │     │ available?   │     │              │
└──────────────┘     └──────────────┘     └──────────────┘
```

Figure 21 - A flow diagram of the thought process engaged with when reaching the decision to charge an EV.

Once arriving at a chargepoint the following thoughts are engaged with:

```
┌─────────────┐     ┌─────────────┐     ┌─────────────┐
│ Will it     │ ──> │ How do I    │ ──> │ Do I need   │
│ work?       │     │ pay?        │     │ an app?     │
└─────────────┘     └─────────────┘     └─────────────┘
       │                                       │
       v                                       │
┌─────────────┐     ┌─────────────┐     ┌─────────────┐
│ Do I need   │     │             │     │             │
│ to download │ ──> │ Do I have   │ ──> │ Do I need my│
│ a new app?  │     │ signal?     │     │ charger     │
│             │     │             │     │ cable?      │
└─────────────┘     └─────────────┘     └─────────────┘
       │                                       │
       v                                       │
┌─────────────┐     ┌─────────────┐
│ What do I do│     │             │
│ if I get    │ ──> │ Connect to  │
│ stuck?      │     │ charger     │
└─────────────┘     └─────────────┘
```
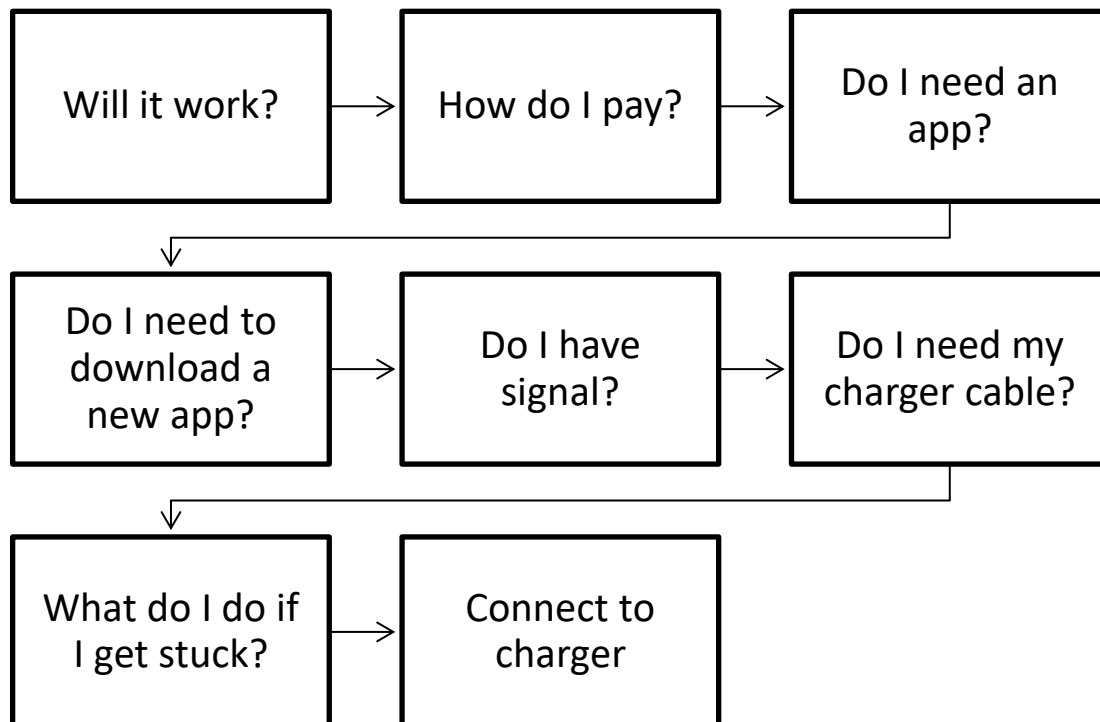
Figure 22 - A flow diagram of the thought process engaged with when at a chargepoint.

This is based on personal experience when driving an EV, and when comparing it to the thought process of having to fuel at a traditional fuel station, the same thought process is not followed. Perhaps at the beginning, the idea that there is a need to find a fuel source and refill, but following the ideas of needing various apps, or the notion that it might not be functional due to a lack of internet is not as considered. There is a deviation from typical routines, and consequently the generation of value, as Stark (2009) suggests, there is a breakdown of traditional routines, but it is reconstituted in the form of EV chargers.

These thoughts and decision processes are all considered within the space of the chargepoint, perhaps presenting a unique judgement system for the EV driver, and often from interviews, and ethnographic experiences, it can lead to frustration. The chargepoints are a site of frustration to users. All the service users interviewed about their experiences at chargepoints expressed this frustration.

'I couldn't get a signal to use the app.' - Service User 1.

'I've got all, you know, apps. – Service User 2.

'But the limit was two hours to no return, but it's just a trickle charge, like 2 or 3kW of charge, you know. So that, that's frustrating.' - Service User 2.

'When I got to the service area on the motorway and what looks like a petrol pump, but it isn't, and the two cables coming out of it. But what I didn't realise was that if somebody else is there

before you, then…, uh, that has got to finish that charge before you can start'. – Service User 3.

This does perhaps converge into another aim, and the understanding of how chargepoints are perceived, but it needs to be understood that these frustrations occur at the chargepoint. As the examples suggest, there is new technology to contend with (Muratori et al., 2021), the space the chargepoint exists, and the confusion at the different sites, especially if there are more than one interconnected chargers.

For users, there is an unknowingness that can present itself at the chargepoint, and they must engage with different tools in order to be able to charge their vehicles, this presents itself as 'charge anxiety' (Chamberlain and Al Majeed, 2021). They may have to download a new app and register on a new chargepoint system, which can be reliant on the Wi-Fi or internet connection available (Garofalaki et al., 2022). If these fail or take too long, it is a cause of frustration. In Service user 2's interview they showed their phone with several different applications, trying to display the excess nature of the apps needed to charge their vehicle. It is not only a frustration at a chargepoint, but is also a barrier to EV adoption, and the ability to charge (Anosike et al., 2023; Berkeley et al., 2018). Those switching to EVs appear to need technical knowledge that is more in-depth than being shown how to simply plug in their vehicle (Muratori et al., 2021). Each time a service user downloads an application to charge their car, they are presented with a new system, a new set of passwords, and another company with access to their banking information, which, if on an unsecure Wi-Fi, could be at risk (Garofalaki et al., 2022).

This presents a new set of valuation and judgement practices for users at the site of a chargepoint. They need to identify whether they are familiar with the specific chargepoint, and if they have the technical knowledge and connection to ensure they can charge successfully (Kemp et al., 1998).

Following this notion of frustration and chargepoint sites, another tool was highlighted by the users, and their experience of using chargepoints in Cumbria, ZapMap.

As discussed in the literature, ZapMap are a company which tries to collate data on all available public chargepoints and place them onto a map (ZapMap, 2023). This data is presented in their applications, and from this, service users can engage with possible sites to charge at if they are unfamiliar with the area.

Personally, this tool was useful, it did provide information and highlight where possible chargepoints were and during the duration of this research it was used to find the sites within Cumbria and identify where there were chargepoint clusters. Notably, all those interviewed were aware of ZapMap and its function. All noted that this was something they had engaged with during their experiences of driving an EV.

Service User 3 commented before converting to an EV they had a look at *'ZapMap first'*, another noted that during their travel between York and Edinburgh they used it to identify where they could park and charge. Alternatively, a service host implied that it was after looking at ZapMap when they were considering purchasing an EV, that they realised they were in a *'desert zone'* of chargepoints, thus, it further encouraged them to have a chargepoint installed for the community.

This perhaps highlights the use of ZapMap as a tool, as it specifies site location, but it also as a site for frustration. As, despite the ability of ZapMap to suggest live data to those going to charge at the site, it can often be incorrect, namely with the understanding of whether a chargepoint is available, vandalised, or online (Figure 23, 24, and 25). This is something that occurred during the research period, ZapMap requires community engagement to keep information updated (ZapMap, 2023). For example, when selecting a chargepoint, it can show a picture of the site itself, and inform users where the site is located, or other recognisable features. It also informs who is the service provider of the chargepoint (ZapMap, 2023).
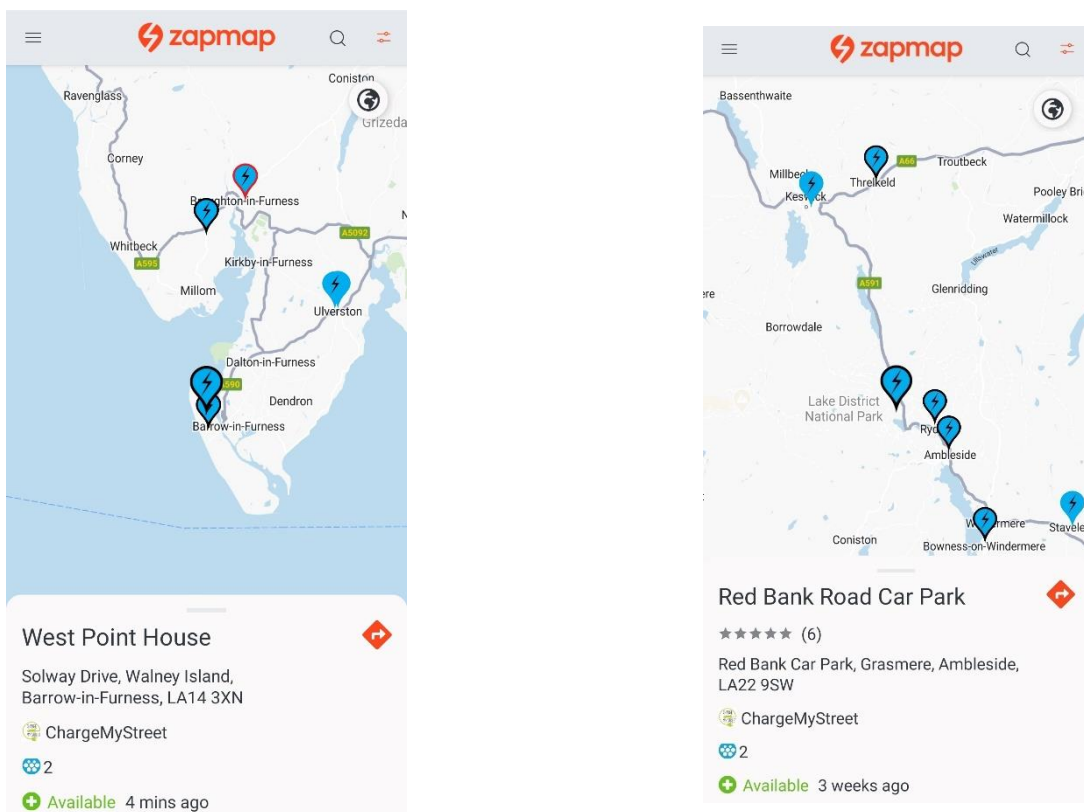

Figure 23 - Screenshots taken from the mobile app ZapMap to show the user interface when interacting with it to choose a chargepoint. The two images show CMS chargepoints, and how ZapMap visualises chargepoints to users. Figure 22.1 shows West Point House, and Figure 22.2 shows Red Banks Road Car Park.

Figure 24 - West Point House chargepoint, as seen in map format at in Figure 22.1. Taken by E., Dolmor

Figure 25 - Red Bank Road Car Park Chargepoint, as seen in map format in Figure 22.2. Taken by E., Dolmor

This can show users if they are already registered with the chargepoint service provider and therefore not have to go through the process of registering with a new provider (ZapMap, 2023). They are able to use the filtering system within the app to locate chargepoints by service providers with which they are familiar and previously registered. However, this data bank is also inaccurate, and the data can be slow to update, and furthermore can suggest a chargepoint is in one place, when it is in fact located elsewhere (GOV.UK, 2023a). A service user highlighted this and commented on their interaction with a local community member, who could inform on where it was based.

'I spent about 10 minutes looking for one of the chargepoints that I've been speaking about. And there was a lady walked past who I knew as it happened, and she asked me what I was there for. So, I said, well, I'm looking for the chargepoint, And she said, well, do you realize that the streets in two parts?' – Service User 2.

This was said with a tone of frustration when they realised the tool, on which they were reliant, was inaccurate. This frustration was shared with system inaccuracy as another user, as they explained their frustration with the system not updating. Despite, this taking place outside of the chargepoint space, it is still within the remit of the chargepoint, as it is related to the geographic location.

'It's live info as well, sometimes you get there and it's not working or whatever. And I think sometimes within that, though, people because they've not been able to connect, maybe because the cards out of order, or they've done it wrong. They might post saying 'No, it's not working' and you don't know, I've been to them where it has said it's not working, and it has.' – Service User 2.

Interestingly, it is perhaps a lack of clarity between the steps needed to use a chargepoint that has encouraged this frustration. As previously discussed, the concept of a chargepoint site is the same, providing the ability for users to charge their vehicles, but the process to charge is not always repeatable, and sometimes there can be a lack of clear signage as the step-by-step process needed to charge at a specific chargepoint. This was a commonly shared frustration from personal experience as well as with those interviewed. This confusion causes those at the chargepoints to comment on ZapMap that the chargepoint is not functioning, and as Service user 2 here notes, they have visited them and the chargepoints have worked. This presents a new set of frustrations and perhaps gives insight as to how those engaging with the app are sometimes incredulous when accepting the information presented to them. Consequently, at the site of the chargepoints, the tools required to charge an EV are not perceived as functional, this is shared, and furthermore followed by other users, unless there

is a deviance from the existing situation, as explored by service user 2. Suggesting that valuation and evaluation tools are used by users when assessing chargepoints, but they are not always reliable.

4.3.6 EV Community

Perhaps, one positive alternative bore through this frustration, is the generation of community. This is generated by the interaction of people with the chargepoint. Throughout all interviews, service users commented on their more stressful experiences at chargepoints and when they received help from a stranger at the chargepoint.

'I couldn't get a signal to use the app. And the only way I'd got around that, in actual fact, was that there was another man at the next, uh, electric chargepoint, and he allowed me to use his RFID card, which probably was probably a little bit dodgy. Um, but he was happy to do it because in actual fact, at that particular ChargePoint point, the electric service was free' – Service User 3.

This highlights a new conception of value, the suggestion that the physical installation of a chargepoint is generating a community space in itself. The ethos of CMS is to ensure communities are provided with the opportunity to convert to low carbon technologies, but there is a community generated at the site of chargepoints.

The service users were grateful when discussing their downfalls at chargepoints, as they experience the 'best of humanity'. These interactions generated a positive image of those driving EVs, the natural response to help someone else in need, not for benefit of their own. This is outside of calling for assistance from the service provider or engaging with the service host. It is a fascinating conception of value, as those using the chargepoints are generating the value themselves, as Karababa and Kjeldgaard (2014) explored, consumers can be the co-creators of value. This conceptualisation of the consumer suggests this co-creative ability, and the notion market provides the space for evaluation to occur, but consumers are the actor that generates the value (Holbrook and Hirshmann, 1982).

This concept that community is generated at chargepoints is further supported by tools such as ZapMap, users can interact, comment, and provide details about the chargepoints, they are able to share with other users where a site is perhaps faulty, or if there is a suitable internet connection allowing the charge (Figure 26 and 27).
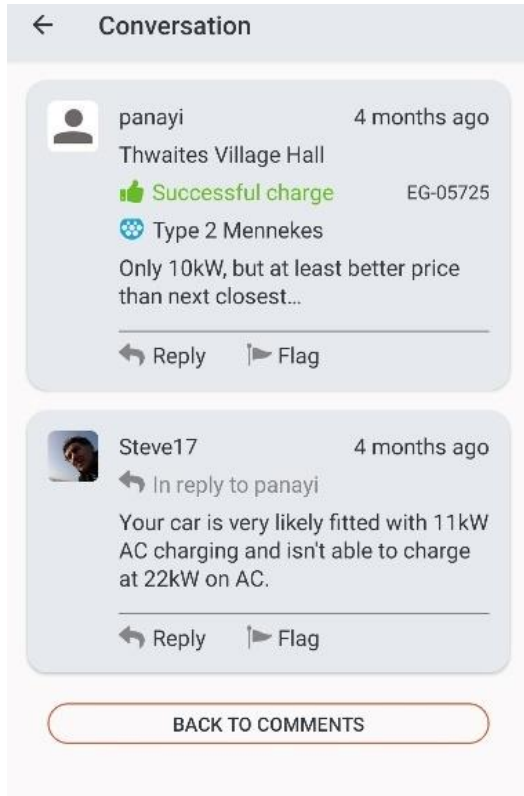
Figure 26 - A ZapMap user discussion screenshot of Thwaites Village Hall a CMS chargepoint.
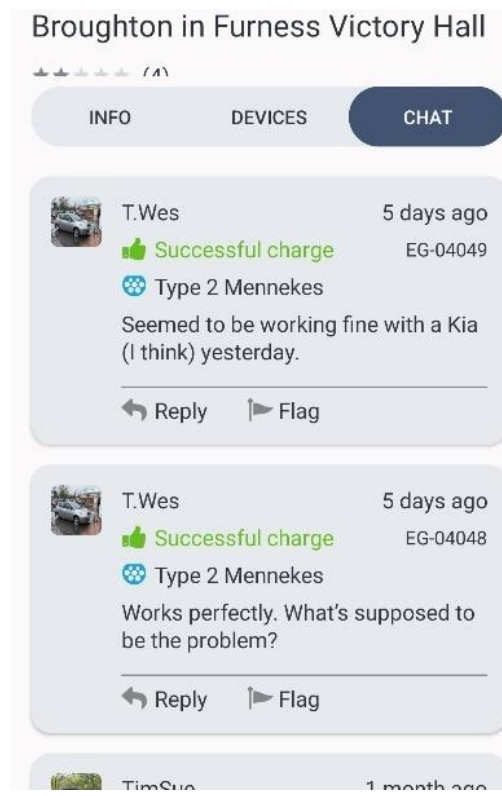
Figure 27 - A ZapMap user discussion screenshot of Broughton In Furness Victory Hall a CMS chargepoint.

Those at the chargepoints have also been the assistance to those who needed help,

'*There was a lady there the other day. I told her what she was doing wrong, but it wasn't. I think she was maybe just doing it in the wrong order because some of them you pull up, do your card, then menu click and then you plug it in. That one in York you plug it in first and then use the app'* – Service User 2.

The site of the chargepoint has become a space for a community to emerge, they are a unified body of people with a common characteristic, and ideation.

4.3.7 Service Hosts – Frustration and Community

The service hosts, also experience this frustration and sense of community.

'*It's a general warm glow that we've done something. We've done something right. (big smile)'.* – Service Host 2.

This juxtaposes with the notion that they also have negative realisation of what having a chargepoint at their site means:

'*Yeah, you can get glum about it. So, I don't know what. I don't know what having an EV point means for anybody else.*' – Service Host 2.

This was in response to the housing development built surrounding the service hosts business. As they had been built without visible sustainable technologies such as solar panels, and the installation of plastic grass next door to their business.

Service hosts have been given specialist equipment, as Shove and Pantzar (2005) explored, taking something of mobility and reforming it, as with Nordic walking, humans have always walked, some with a sticks, others with shoes, comparing this to the EV and ICEV, there is a change of equipment. The charging an EV allows a creation of a new space, this is a new experience and a new mobility. It is a vehicle getting customers from A to B, but with a new set of rules, guidelines, and restrictions.

Overall, there are several values generated at the chargepoints. At the sites there are a confluence of valuation and judgement systems, these are reliant on those involved in the chargepoint installations. One clear tool that has been seen as essential to Chargepoint usage and installation, is ZapMap, it provides a visual representation of chargepoints location, and provides a tool for the users with which to engage. It generates value, the context of using it, for example when comparing it to Shove and Pantzar's (2005) exploration of value, with a new context of walking, highlights the need for community to develop the new routines. Also, it suggests the need for new tools that did not exist in 2005, such as the use of applications like ZapMap. Context is very influential, and if this had research occurred earlier and when the technology was lacking, it could be suggested the value would not be the same. The digital space created by the use of apps such as ZapMap, is unique as a supporting infrastructure, creating a decision tool, and a community space for the chargepoint.

4.4 Investigate how chargepoint service providers, hosts, and users, perceive chargepoint value in contrast to Internal Combustion Engine Vehicles

The purpose of this section differs from the previous aim, as it is approaching the chargepoint as a concept and as an idea, contrasting the previous aim, which focused on the physical representation of a chargepoint. This is assessing a chargepoint from a conceptual perspective, as what it provides as an idea, or as a symbol (Lamont, 2012). The previous aims have been answered within the structure of each of the actors and their relationships, to understand the systemic value of chargepoints, whereas for this aim, they need to be integrated due to the inability to exclusively separate the actors and their conceptualisation of a chargepoint.

4.4.1 Demonstrating a Concept

When asked what a chargepoint represented to the council, the service host enthused that it had '*value in demonstrating to people*' – Service host 1. Suggesting, that the installation of the chargepoints presents a unique opportunity for the council, creating a demonstration of mobility evolution. The 'concept' they are demonstrating is the capability to change to more sustainable modes of transport (Greene et al., 2020), but with specific focus on the areas where people lack the space and driveway to charge.

One service user highlighted:

'*The ethos of trying to put them in where there aren't any, the people living in rural places is just a gem*' – Service User 1.

They noted that this was one of the things that drew them to using CMS. They also commented that they had been '*banging on about environment for over 30 years now.*' This infers that perhaps the transition to low carbon technologies, and the demonstration of having a chargepoint installed, within their local community, has provided them with some consolation that something is happening and changing (Hill et al., 2019). It came across as if they were almost dismissing their concern for the environment, but they enthused about the idea of a local chargepoint. The chargepoint installation possibly challenged 'the laissez-faire' attitude they felt was previously executed. Referring to the ethos as a '*gem*' suggests its precious and needs to be coveted as a concept.

At a chargepoint opening, a service host, a council member made the statement:

'*We want to look for the future, thinking globally and acting locally, is our mantra.*' – Service Host 3.

This is specifically highlighting the response to this as an aim, and what it represents as part of a step within environmental activism for communities. This quotation is from a chargepoint

opening within Cumbria, and the councillor speaking, was keen in the demonstration of the chargepoint, and the notion that it was something they considered as futuristic, and part of a solution to a global issue. This is the value generated and motivation for chargepoint installations. They followed this with:

'it's a perfect example of an attitude of do what you can with what you've got, where you are.'
– Service Host 3.

Despite the clear political agenda being promoted at a council chargepoint launch, this statement is an example of how demonstrating a concept aid in EV interest. As another council service host member suggested, the value is in the demonstration (Kanda et al., 2020). The market intervention by a council installing chargepoints can instigate confidence when converting to EVs, and consequently, increase demand for EV chargepoints in areas, leading to greater installations and producing a cycle of values.

'The value of that is in influencing the people who actually come to make decisions,' - Service Host 1.

Interestingly, it is debatable who this host is referring to in relation to the decision makers. There are two possibly actors they could be discussing, either the Service users, those purchasing and using an EV, or the council, the actors commissioning the chargepoints. Considering this quotation is from a member of the council, its perhaps discernible that this was placing the service users in the position of power. As they had previously argued, the council installing the chargepoints has provided the opportunity to transition to an EV, perhaps engraining the confidence within constituents that they have the capability to charge if they transition to an EV.

When comparing the traditional fuel station to a chargepoint, it needs to be addressed both are primarily led by commercial businesses (Zhang et al., 2019). This research is particularly unique as it is reliant on the partnership of CMS, who, as previously discussed, are a social enterprise. Their first value is based on providing a social service to those who are perhaps ignored by other commercial chargepoint operators (Chamberlain and Al Majeed, 2021).

This was addressed by the council service host when interviewed:

'And the real value is it is in places where commercial operators probably wouldn't be interested. Small off-street locations where you can only fit one or two chargepoints in and there you know that that commercial value is limited.' – Service Host 1.

They are suggesting that in contrast to ICEV fuel stations, the social enterprise approach encouraged the council to commit to partnering with CMS to provide chargepoints in places as suggested, that are of limited commercial value. This places chargepoints on a spectrum of a service in contrast to traditional fuel stations (Dietsche and Kuhlgatz, 2014). Another

service host highlighted that it was the criteria for CMS that drew them to partnering with them to provide a chargepoint to their community.

'*We met the criteria for Charge My Street, which was really good. Uh, the density of housing and erm, the type of housing on the block and all the requirements*.' – Service Host 2.

There was some contrast as to where users and hosts felt chargepoints should be, one service user was discontent when they spotted a chargepoint at a fuel station.

'*I was stopped at a fuel station and, you know, I just didn't understand that no fuel stations had chargers*.' - Service User 1.

This was followed by a conversation discussing the notion that charging placed the users in a state of limbo at times, unless sites were placed at spaces that enabled the users to engage with something outside of charging the car (Bonges and Lusk, 2016). A service host also considered this idea:

'*So, the National Trust, all their properties should have a charger… I wouldn't look to a petrol station to charge an electric vehicle because I just don't want to be there. They should be in happier, nicer places. So, if you can site them somewhere where you can kill an hour?*' – Service Host 2.

They also agreed with the idea that chargepoints at traditional fuel stations was not preferable. Suggesting future chargepoint investments should place them within areas that allow other actions.

The time spent at chargepoint is dependent on the kilowattage of the charger and it can range between 10 hours to 45 minutes to charge an EV, this is also dependent on the level of charge the vehicle needs (Wolbertus et al., 2018).

Hence, a space of limbo is created (Bonges and Lusk, 2016). Users need to consider this when they are planning a journey or placing their car on charge within a walk from their house, as CMS aims. This is not always possible. Chargepoints, in contrast to traditional fuel stations, are a site where a journey is paused, or there is a period of time that needs filling and those charging their vehicles need to adapt to this. The users commented that this required a '*change in lifestyle habits'*. One would take their dog for a walk whilst the car charged, another commented that they made sure their charge coincided with when they visited their local community centre.

The annual general survey from CMS asked their users what they engaged with whilst their car charged (Figure 28).
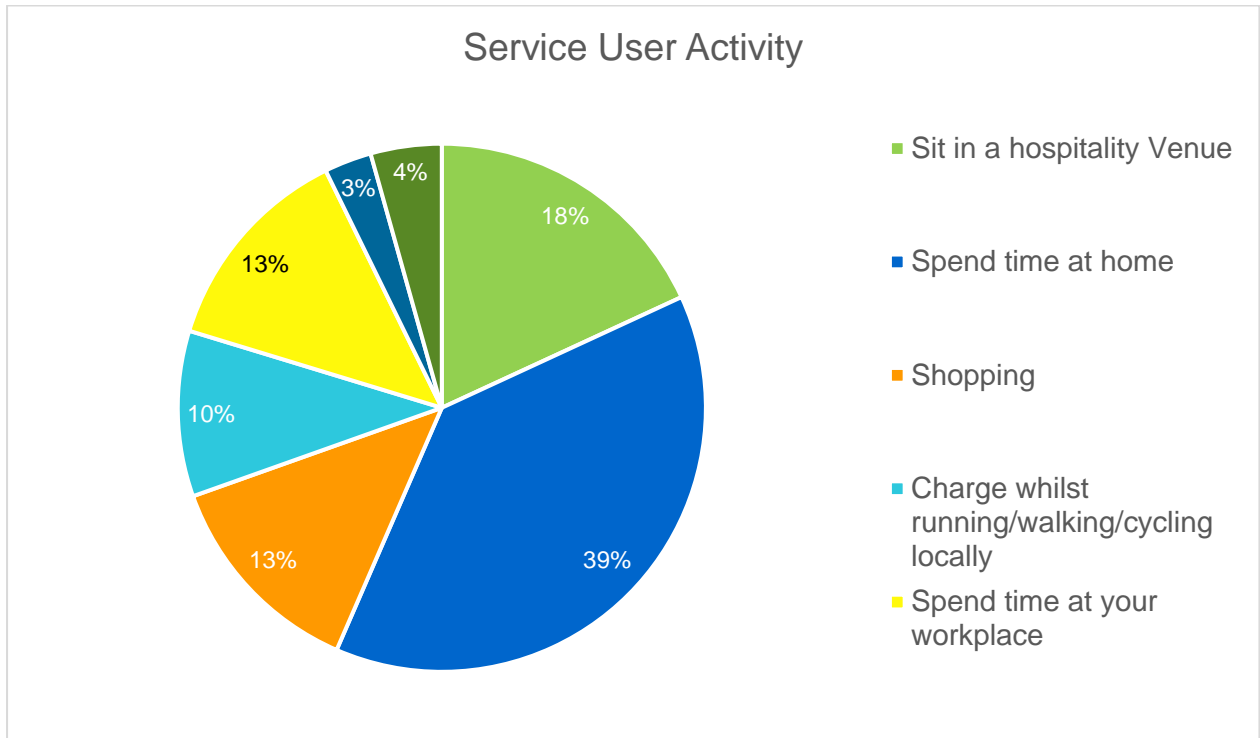
Figure 28 - Service User Activities data collected from the annual CMS survey to users.

As shown, it is apparent that CMS are achieving their aim of providing chargers within a walking distance of user's homes, with 39% spending time at home when charging. There is a variety of other activities that users engage with whilst they are charging. This vastly differs from the traditional ICEV refuelling, as this is completed within five minutes, as they reach a fuel station, fuel the car, pay, and then leave (Chamberlain and Al Majeed, 2021). This experience is different for users when charging as it could take more than an hour. For hosts, they can perceive the chargepoint as an opportunity to engage with these service users whilst they wait for their vehicle to charge, and benefit from additional revenue.

'*There's various Facebook sites and things you know. Holidays with chargers…so when there's a query saying, Hey, does anybody know another glamping site in Cumbria with a charger?*' - Service Host 2.

This service host highlighted the community aspect of the chargepoints, and the tool Facebook provided, as they were able to share their ability to provide their consumers with a chargepoint on site, as well as to the local community. They, in contrast to the council who are providing a service, are also providing a tool to their consumers. This contrasts a traditional ICEV, as they can provide the service on site, and use the chargepoint as a marketing tool.

During the service provider interview, they shared a story about a recent chargepoint launch event, explaining the significance of the new chargepoint placement:

'…something that stuck with me from the event at the [chargepoint site] last week is that the site that chargepoints are on currently is where the stables would have been 300 years ago.'
– Service Provider 1.

This is a fascinating perspective and generates an insight pertaining to the geography of transportation. The space in which the chargepoint has been placed is a historic site of mobility, and perhaps this was a calculative device the service hosts engaged with when deciding to install a chargepoint. When considering that the service host felt the need to share this knowledge with the service provider, evokes the suggestion that it did play a part when they considered a chargepoint installation. It engages with a legacy, built through historic transportation routes. Therefore, it is arguable, that installation of a chargepoint within the same site as where horses were housed is the same routine in a reinvented format (Shove and Pantzar, 2005). Both are modes of transport, and the space in which they take pause in a journey engages with recharging, for a horse and an EV. Consequently, using this perspective, the value of the chargepoint is akin to the previous use of the land, and the service hosts, aware of this fact, could have been further encouraged to install a chargepoint within this specific site.

4.4.2 Ethos

CMS ethos is to provide chargepoints within places that lack access to personal charging. It is apparent that they are a connecting with their target consumer, as several users mentioned in their interview. They do have a commercial agenda like traditional fuel stations, however, chargepoints have more values ingrained in their conception, namely, moving to greener technology and transitioning to a net-zero target. This is at the centre of the ethos for CMS, with the added social value. It is dependent on those installing the chargepoints.

'*I'm totally reliant on the street charging systems*.' – Service User 2.

This value is generated through this reliance. There is a need to supply a chargepoint as a tool to charge. The consumer is where value is generated, as it has been generated by the consumer choices, and their judgment and valuation systems. The consumer experience, and perceived experience is where value is generated (Cova et al., 2011; Karababa and Kjeldgaard, 2014).

'*That's basically the reason I used Charge my street because it…it suits my requirement best'.*
– Service User 1.

4.4.3 New Technology

Users shared their perception of the chargepoints that they were part of the 21st Century, an indication that mobility was moving forwards.

'I always think they look of place, and I don't know what the phrase is, but they look like they belong in the 21st century, some of them are modern and futuristic.' – Service User 2.

One perception by a user indicated that they felt as if there had been a lack of communication by those involved in developing and installing the chargepoints.

'it's understanding the system they work on because I kind of get the impression they've all been designed differently by some teenager sitting in his bedroom and not talking to anybody. You know, communication is so important, and I don't think there's enough of it. So, they all work differently is what I'm saying' – Service User 1.

This user brought the idea of chargepoints to the notion of understanding it as a system, taking it beyond the physical site of a chargepoint, and the perception that it is actually the network that they are engaging with, presenting a new way to judge chargepoint installations (Lee et al., 2021).

As previously discussed, the idea that they are providing a service to the user and a tool to the host, the discussion debated how those engaging with the site decide whether to use it or not, and this related to whether the site was on a network or by a company that they recognised. Users felt that there was a lack of communication, consequently making it more difficult to actively engage with the chargepoints, as their image vastly differs (see previous Figures 18 and 19).

It has been noted that they all work differently, in contrast to a traditional fuel pump, where within the UK there is a universal design for refuelling. Perhaps this highlights the difference in technology, traditional fuel pumps have not vastly differed in their function. They are all designed to transfer either petrol or diesel into an ICEV. In simplistic terms, this involves a supply depositing fuel from one place to another, namely, using a pipe. Whereas there is more complex technology in use when charging an EV, and furthermore, this technology is constantly evolving and transforming (Jin et al., 2013). This is seen through the rapid development of the different chargepoint kilowattages, and the increase from the first chargepoints providing 2-3kW and newer chargepoints providing upwards of 50 kW. There is a constant evolution of this technology. It is something a user noted in their interview, and they highlighted that keeping up with technological advancement was the reason they converted to an EV:

'if you're going to go up-to-date, then you've got to live with it with whatever goes on now. And hopefully the, uh, the networks will increase in what's available'. – Service User 3.

For this user they were conscious of ensuring they were 'up-to-date' with technology and appeared less concerned with the chargepoint network available. However, when discussing this with them, they also highlighted that they mainly used only two of CMS chargepoints, using their subscription system.

CMS need to acknowledge the conceptualisation of a chargepoint and use it as a tool within their efforts to provide chargepoints within Cumbria. This is perhaps already being undertaken by the service provider, and those having chargepoints installed understand the notion that they are part of a network of chargepoints, enabling those who lack access to private chargepoints, the opportunity to convert to sustainable transport. It is suggestible that within the values of those engaged within the chargepoint industry, at least, those engaged with CMS, a social enterprise, are instrumental in the demonstration of chargepoints as a concept, and it is a calculative device they engage with when deciding to have a chargepoint installed. Perhaps it needs to be made explicit.

There is need for integration of technologies, as suggested by the confusion some service users feel, as they are contending with a new technology, that has not yet become universal and there is no one design of the physical form of the chargepoints. This is perhaps outside the remit of CMS to consider when engaging with EV infrastructure in Cumbria. They are contracted with a chargepoint supplier, and the majority of their chargers have the same form and structure. But the chargepoint industry is in contest with traditional fuel stations, which have had decades to secure their form, to ensure all users experience the same routine whilst at a fuel stations. This is not completely replicable at chargepoints, as various bodies, companies and technologies must be contended with whilst at a chargepoint (Stark, 2009). This conception and perception of chargepoints could dissuade those who have considered converted to EVs, as they must content with unfamiliar technology, and a routine that is not always repeatable, especially in comparison to traditional fuel stations.

Considering this within the scope of future chargepoint installations is essential, at each chargepoint, the routine must be repeatable to ensure success, both for the user to charge, but also for CMS chargepoints to be trusted by service users.

4.5 Understand how CMS can use this research to increase the number of successful chargepoint installations. – i.e. how is this research valuable to CMS?

One purpose of this research has been to engage with CMS and aid them with how chargepoint installations can be more successful. Their installation process can be demonstrated in figure 29, a Gantt chart, created by CMS:
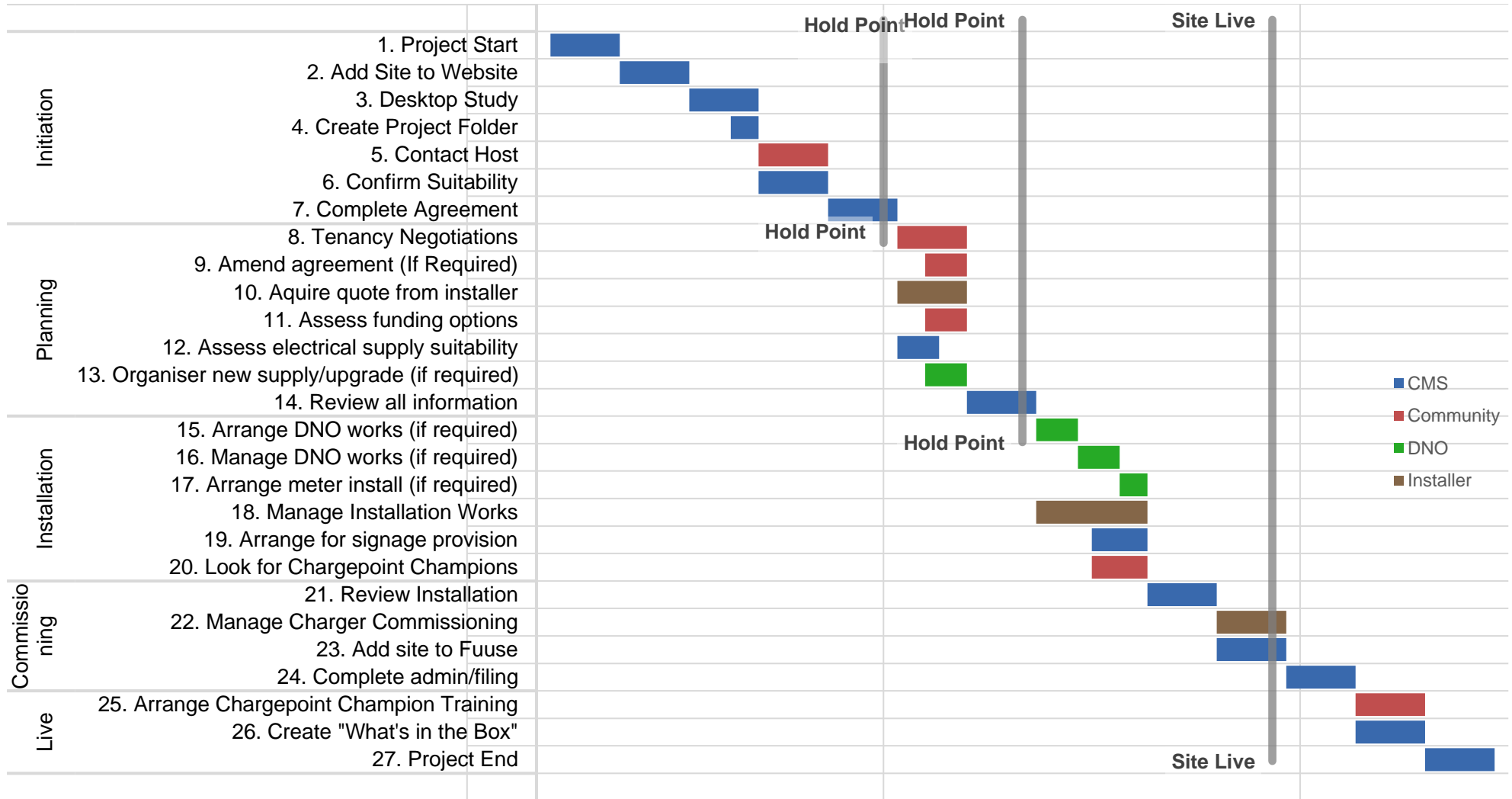
Figure 29 - Chart produced by CMS to demonstrate their chargepoint installation process.

The following flow diagram has been produced, considering all the observations during the twelve months of this project, the CMS data shared, and the research produced (Figure 30, 31, and 32).

Consequently, it will inform on a suggested process for those installing the chargepoints to engage with to improve the success of chargepoint installations, and in combination with the diagram produced within the first aim, provide insight into where decision tools are recognised as aids to the service hosts when they have decided to have a chargepoint installed. Timeframes have been omitted from both diagrams as each installation has different circumstances, affecting the ability to commit to a specific timeframe.
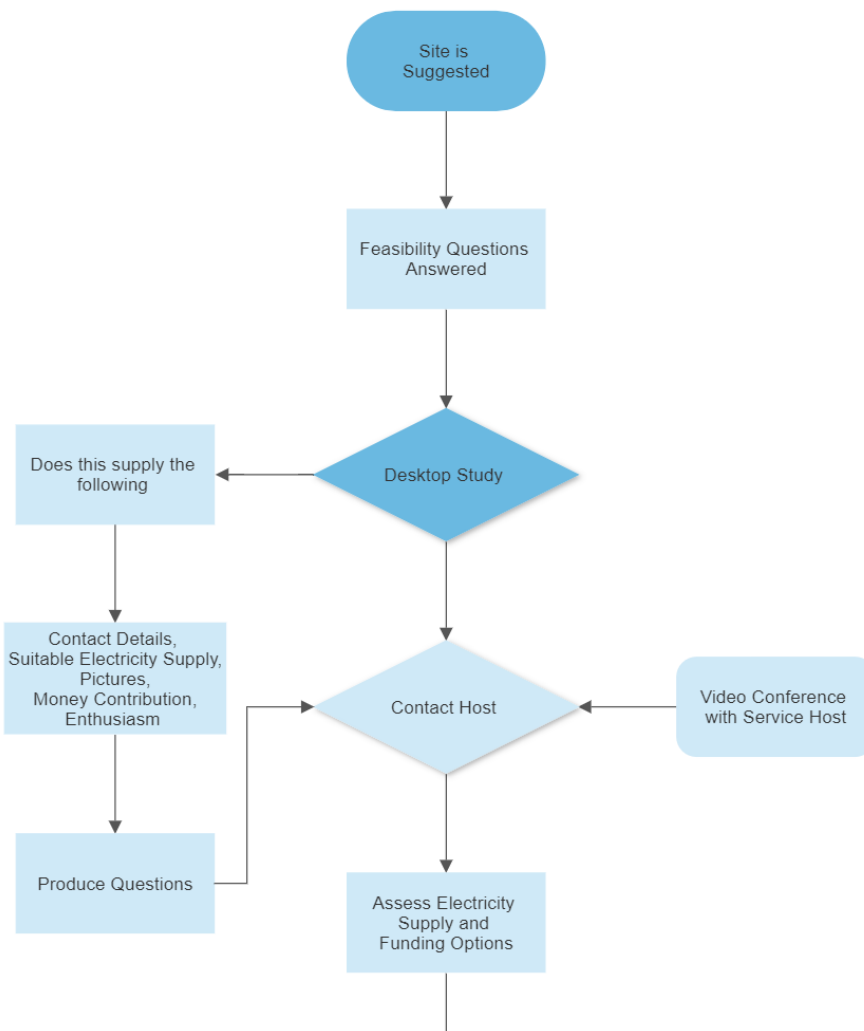
Figure 30 - Part one of three showing a visualisation of the installation flowchart produced from the Installation chart created by CMS.
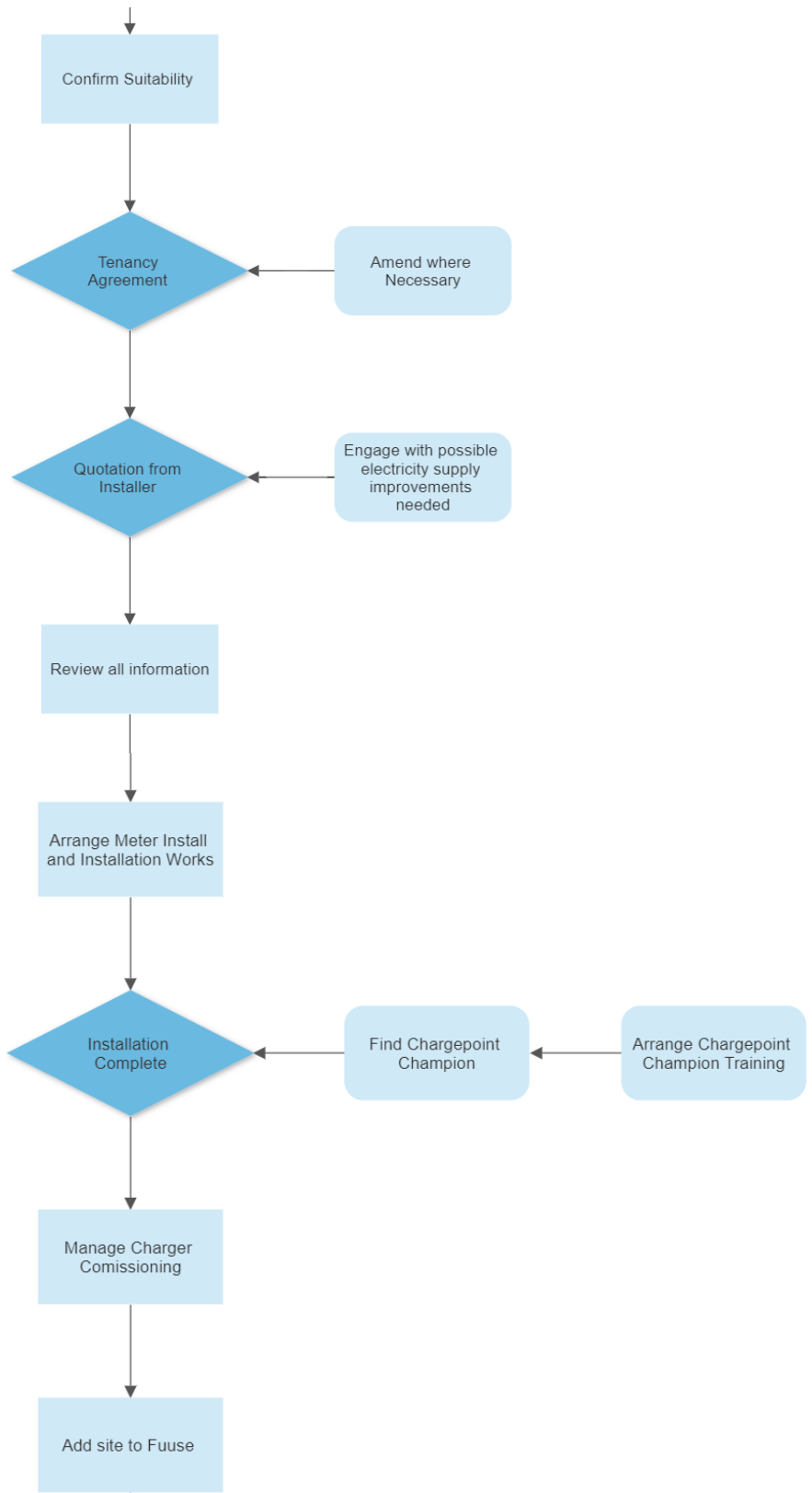
Figure 31 - Part two of three showing an visualisation of the installation produced from the installation chart created by CMS.
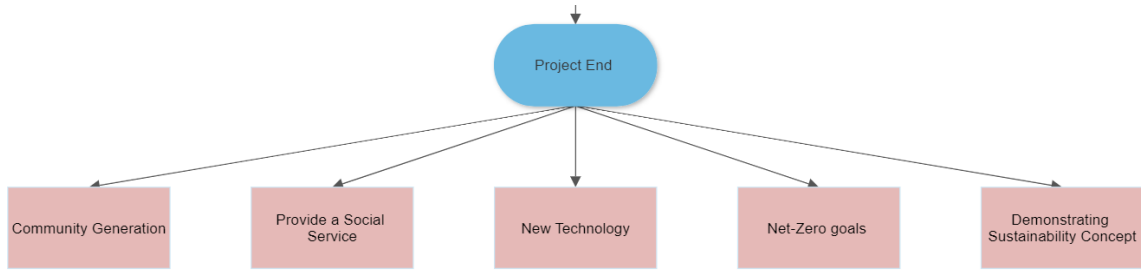
Figure 32 - Part three of three showing a visualisation of the installation produced from the installation created by CMS. Showing the values identified within the main three, social, environmental, and economic.

Overall, it is clear, that to ensure the success of the installation of a chargepoint, CMS are already engaging with tools such as 'word of mouth', and ZapMap. CMS are working with outside parties, the intermediaries of the site hosts, identifying the necessity of local stakeholders and their role as gatekeepers. Putting the chargepoints into place and providing a service are the ethos of CMS, they provide value within the communities.

4.6 Data Analysis and Results Conclusion

Initially, this part of the chapter was going to be structured under the different headings of the social, environmental, and the economic value, however, they are all so intertwined and interwoven that it is difficult to differentiate them. A chargepoint is installed, presenting an economic gain for the service provider, and ensuring their business growth. Despite the need to install chargepoints to support their economic interest, this is not where CMS values focus, they are a social enterprise, and are interested in providing those in different social settings the opportunity to convert to EVs to achieve net-zero targets set by the government, hence achieving their environmental values.

As shown with their intermediaries, the service hosts engage with CMS because they are a social enterprise, and furthermore can aid them in achieving their personal net-zero targets within their green transition plans (Barraket, 2020). The service hosts aid in providing a service to the community and consequently produce a form of social value, whilst also providing them with another tool when engaging with their own consumer base, producing economic value from the chargepoint and using it as a tool for marketing (Bessy and Chauvin, 2013).

All of this indicates how difficult it is to remove one value from another, and what makes the notion of what makes a successful chargepoint, as it is dependent on the context in which it is framed (Antal et al., 2015). For CMS, a successful chargepoint is enabling those who cannot charge on a private driveway the opportunity to convert to an EV because a CMS chargepoint is an available, whereas for a commercial supplier, success is perhaps the chargepoint profitability (CMS, 2023b).

This is something to be explored in further research, as the notion of success is variable, and as Stark (2009) suggests, often this becomes the focus of what economic value it has, namely how much profit, and how much use it has. But this particular research is taking this a step further, the success is not deemed by how often it is used and what profit it generates, it is assessing the chargepoint from different perspectives and thus different valuation preferences. These valuation perspectives will differ even within the same actor, as from the perspective of a service provider, they have the same agenda in providing a service, they are a social enterprise, but they also do need to consider the economic success to ensure they can continue to provide the service and engage with their targets to reach net-zero (Skålén et al., 2023).

The following will explore suggestions which could improve the installation process, and perhaps ensure success of future chargepoints. For example, during the research conducted by the service hosts before they have a chargepoint installed, perhaps it could be agreeable

for the service provider to share a diagram of the chargepoint installation process (Figure 29, 30 and 31).

Chargepoint hosts have a higher likelihood of being interested in green technologies, thus it is suggestible that they have engaged with research about such technology (Greene et al., 2020). However, a chargepoint is a specific piece of technology, and presenting a visual representation of how the process of having it installed takes place will provide a better understanding (Shove and Pantzar, 2005). Similarly, it can allow the potential site host to understand the various steps they are committing to. Additionally, presenting the host with a process before they commit can provide them with clarity as to what stage they are at, and something to consult when unsure. For community venues, such as village halls, that have a board involved in the decision process, a diagram could ensure that before CMS is engaged, the potential hosts understand the process the site could undergo. Having something to follow will allow their assessment to be more competent, and the board to complete a vote before contacting CMS.

Obviously, CMS's aims are what has drawn their service hosts to become an intermediary, and in finding CMS online, or through word of mouth, they will have similar interests, and values (Bäumle and Bizer, 2023). Providing as much detail as possible before the site hosts engage the services of CMS will ensure greater success of chargepoint installation, notably, ensuring they understand the process, including the legalities.

Another suggestion relates to the community generated at the chargepoints among users. To increase chargepoint installation success, perhaps as akin to the Chargepoint Champion scheme, a chargepoint host community could be created. Ideally, this could be a forum for CMS hosts to engage with each other and provide the space for potential hosts to discuss the process with existing hosts, asking questions. Additionally, a forum such as this could be included within the website, providing chargepoint host testimonials as to the process of having a chargepoint installed.

Furthermore, a couple of chargepoint hosts mentioned their interest in the chargepoint usage, thus, something could be developed that displays the usage of the chargepoint in more easily digestible format, rather than reporting on the carbon reduction, or the kilowatts used, it could present the data in the form of the number of trees it equates to, or the number of ICEVs being removed from the roads. This is not suggesting sharing service user data, as this could be a breach of data protection. But, giving a space and voice to existing service hosts, allowing them to specifically see the impact that having a chargepoint installed is having on their local community. As noted, those who have a chargepoint installed do so for numerous reasons. These can mainly be defined as: the social value in providing a service to their local community; the environmental value in being part of the green revolution in Cumbria; and the

economic value, as they are able to provide a service, and ensure they are providing another tool for their consumers.

This forum could provide another set of tools for potential hosts' decision-making. It will also show the service hosts that they have a community of likeminded people. This is not suggesting that all service hosts will be interested in such a forum, or become a new social media, but it will allow connections to occur, and possibly allow the hosts to engage with each other to answer questions and queries about chargepoint installation. Furthermore, it could be used as a bulletin board for the service provider to highlight upcoming improvements, and share information such as a site being offline due to electrical interruptions or scheduled maintenance work.

Existing service hosts could share their experiences and insights into the chargepoint installation process with potential service hosts, who have a viable site, providing a perspective unique to service hosts, presenting another tool for valuation judgements (Araujo and Mason, 2021).

This research has highlighted the need for human interaction when assessing where chargepoints should be placed, from the generation of a community at the chargepoint, it demonstrates a concept, and the ability to be '*seen*' and partake in the green revolution in Cumbria. Perhaps it needs to provide the hosts with this connection to a community of likeminded people, as at the centre to having a chargepoint installed is their willingness to change and engage, especially in the context of CMS.

5.0 Conclusion and implications

5.1 Introduction to Conclusion

This concluding chapter will close this research and summarise the answers to the aims set out at the beginning. The chapter will discuss a future research agenda and the questions generated from this project.

At the beginning of this research project, three aims were identified:

- Understand the decision process behind service hosts having a chargepoint installed.

- Investigate what 'value' is generated at EV chargepoints – i.e. how do the users and hosts value chargepoints?

- Investigate how chargepoint service providers, hosts, and users perceive chargepoint value in contrast to traditional Internal Combustion Engine Vehicles.

The previous discussions have aimed to answer these questions, whilst also considering the title aim of the project.

'*Valuing and Judging Investments in Electric Vehicle Chargepoints infrastructure 'in the wild'.'*

It is vital that this research provides the opportunity to answer this overall aim. Notably, when assessing the valuation and judgement of investments in Cumbrian EV charging infrastructure, the three actors introduced in this research, the service provider, the service host, and the service user, are the keystone players within chargepoint installation. However, they are not the only actors involved, the network is constantly at adapting, changing, and growing, naturally with the annual growth of the EV market. This aim is perhaps not framed in the traditional sense, as it is a statement as opposed to a question, perhaps it should read, 'what valuation and judgement processes are occurring when investing in EV chargepoints outside of densely urban areas?'.

Inevitably, this research has produced more questions than perhaps answers. It has grappled with the three actors and their involvements, how their perceptions will influence the process of chargepoint installation, as well as the role they play in pursuing greener technologies to achieve Government net-zero targets. This can be further explained by addressing the aims:

5.2 Summary 1: Understand the decision process behind service hosts having a chargepoint installed.

It is indisputable, that value is co-created, and that chargepoint installation from the service providers requires active engagement from the service hosts themselves, they need to possess a willingness to change and adapt (Bhattacharjya et al., 2023). Hosts are presented with the opportunity to provide a service to their local community. They co-create a site of value with the chargepoint service provider, and their context influences their decisions and ability to provide this service (Karababa and Kjeldgaard, 2014).

The collision of social values is important, as they are providing this service, they infer it is a natural step with their green technology plans, presenting their calculative tools when deciding to invest in chargepoint infrastructure (Mason et al., 2019). Such tools and calculative agencies are only engaged with through the service providers committing to achieving their goals. They are part of a mobility structure, ensuring that those who possess the environmental ethos, social comfort, and economic capability, can transition successfully to an EV(Aljaidi et al., 2020).

Providing the space for users to connect, charge, and continue their journey appears to be a natural decision for some service hosts. As they hold the social, environmental, and economic values which first project them into installing their chargepoints. This needs to be reflected by other hosts for successful installation. Object value, as discussed by Arjalies in Kjellberg et al. (2013), is only as valuable as those interacting, purchasing, or engaging with the ideas, beliefs, and the nexus of marketing behind such object, otherwise it could be inconsequential.

5.3 Summary 2: Investigate what 'value' is generated at EV chargepoints – i.e., how do the service providers, hosts, and users, value chargepoints?

The chargepoint as an object, provides a service, it enables users to charge their vehicles. The value generated at these sites is dependent on the perspective of the person interacting with it. It is a site at which there is a collision between mobility, environmentalism, and technology, generating a new valuation system (Sovacool, 2017). Each actor will observe different notions of value, and it could be hollowed into only the economic value of a site. But, due to the nature of the provider, CMS, they are focused on their social and environmental values, juxtaposing the traditional values of a business, which can focus on the monetary value of an object (Stark, 2009). Value is generated when social settings and markets interact to create a product, or in this case a service (Fisher et al., 2016; Mason et al., 2019). The service hosts and providers co-create value, but they require specialist

equipment in the form of the chargepoints (Bessy and Chauvin, 2013). Together these actors generate a space for value to occur, but it is reliant on this specialist equipment being shared and integrated into service user routines (Shove and Pantzar, 2005). The chargepoint is of value, providing a service to users, especially when comparing to a traditional fuel station, it is a space for a reformed routine (Sierpiński et al., 2020). It is an integration of environmental, social, and economic values. However, one value and judgement that was uncovered during the research highlighted the frustrations, and the community generated at the chargepoints, for the users, and these sentiments can influence how they value chargepoints.

These were noted within the answering of this question as they presented decision tools for the user and are generated experiences at the chargepoint site themselves. Therefore, these experiences influenced how they valued and judged the chargepoints. The main tool they identified related to using ZapMap, it provides a map to locate local chargepoints, allowed user interactions in the comments section, and shared service information (ZapMap, 2023). A chargepoint, as experienced by the service users' interviews, is also a place for communication to occur between users. Whether this is due to needing assistance or sharing their experience, it is providing a social value at the site. The users are creating the value through their use of the site (Axsen et al., 2013). Contextually, these sites are providing an essential service within communities. This is the main value these chargepoints provide, from the perspective of a service provider, host, and user.

5.4 Summary 3: Investigate how chargepoint service providers, hosts, and users perceive chargepoint value in contrast to traditional Internal Combustion Engine Vehicles

This question specifically focused on the conceptual dynamic of the chargepoint, and the idea surrounding it, taking it out of the physical location and interpreting the concept in relation to traditional mobility and transport structures. The value generated by the installation of a chargepoint is the ability to demonstrate the capability to transition to sustainable technology (Grönroos, 2012). Additionally, a chargepoint being managed by a community benefit society, rather than a typical commercial business, exhibits a different set of values when discussing the creation of values and the importance of demonstration.

The perspective generated from this question is highlighting the possibly to be capable of change. The idea that when a chargepoint is installed presents the opportunity for converting to EVs by users. Interacting with this new technology, in places that commercial operators do not typically install chargepoints, provides a whole new space for social values to be generated, and encourages those who perhaps felt they were unable or unsuitable to be part of a national shift in mobility (Dimanchev et al., 2022).

The chargepoints also present new technologies for users to contend with, their perceptions imply that chargepoints are modern and futuristic, but some felt disconnected from the technology (Chamberlain and Al Majeed, 2021). One user felt there was a lack of communication between the service providers as the various providers use different types of chargepoints, and this can cause users to experience this disconnect. The different charging levels can generate a limbo for chargepoint users, as they experience a new setting, and it is drastically different temporally and spatially from the typical experience when refuelling at a fuel station (Sierpiński et al., 2020).

When assessing the value and judgement of chargepoint investments, the interactions between the different actors and the values they produce must be considered beyond the physical representation of a chargepoint and consider their conceptualisation as a tool for judgment and valuation practices.

5.5 Overall conclusion

The aim of the research was to investigate chargepoint investment using the concept of how value and judgement is placed on the investments. It has been highlighted that the main values generated are the social, environmental, and economic. The initial research matrix highlighted many more possible valuation points and possible points of judgement. But this research concludes that the several values identified at the beginning were collated into the three value areas listed. The matrix suggested by the literature almost placed too complex a notion on the different values chargepoints evoke, and these three highlight the main valuation points for chargepoints, and it is the collision of these three that produce the provider, hosts, and users (Maller, 2023). The values do further breakdown into the idea of community and integration of new technologies, and the ability to provide a service, but not all are universal when discussing the different actors. As, the values are dependent on the context, it is vital that this context is considered as it will influence what perspective is taken (Antal et al., 2015). This can be visually seen when considering the photographs taken, specifically the divergence between the provider focused photographs and the users' expectations of the chargepoints.

The actor perspective and context influence how the collision of different social experiences impact the generation of values. The main tools highlighted that chargepoint providers need to consider, are tools such as ZapMap, as they are a space where the users can interact with each other and generate community (Shove and Pantzar, 2005). Furthermore, the understanding of the hosts and their role in the creation of value as a service, needs to be encouraged. The council interview suggested they were aware of this value when adding this service to an area, and other hosts interviewed noted that they were playing a role in

supporting EV infrastructure in areas where it is lacking. But perhaps this could be taken a step further, if the users are engaging with each other, perhaps another tool could be generated through the connection of service hosts and their role as an intermediary within this industry. This could improve the installation process, if those considering the installation of a chargepoint have the capacity to interact, gathering perspectives, and questioning existing chargepoint hosts, and engaging with each other, to produce another calculative tool for chargepoint installation (Callon and Muniesa, 2005).

5.5 Future research – research agenda

This research project has concluded with the acknowledgement that there is still more to understand and investigate. Consequently, the following discusses a possible future research agenda to further understanding about valuation, and value processes, when in the context of chargepoint installation in Cumbria.

First, future methods. Developing and sharing a survey as an additional method to collect a baseline of valuation processes. Ideally, this would be shared with the service hosts from a wide range of businesses and settings. Furthermore, this would be distributed to existing service hosts, but also to the sites which were proposed and then either withdrawn or delayed. This would aim to engage with their understanding of the process and investigate if the recommendations within this study would improve their experience or provide insight as a decision tool (Galabo and Cruickshank, 2022).

Secondly, this research has focused on existing hosts, some of which have had chargepoints installed for several years, hence, they engaged with their valuation and judgment practices before this research took place. Thus, it would be an interesting perspective to engage and work with service hosts at the very beginning of the process. Discussing with such actors their process as they experience it, could be in the form of a research diary, or repeated interviews, within the timeframe of the chargepoint being installed. This could expose even greater insight into the valuation and evaluation process the actor experiences as an intermediary (Barraket, 2020). Such a perspective could inform on a detailed step-by-step valuation of chargepoint installers, perhaps showing which values they determine as most important at the time. A question raised from this research is, which values identified take precedent? Within the three values: social, economic, and environmental, could these be interchangeable, or does one remain the constant centre value in the initiation, preparation, installation, and outcome of chargepoint commissions.

Additionally, are values heuristic for all? If from this research project those involved were sent a copy, or abridged version, showing the areas of value identified, would they agree with the notions put forward?

Thirdly, one conclusion which could be further explored as a tool for valuation was 'word-of-mouth', and the network of community sites that can inform others about CMS. Examining this network would be another research project, what does this network of valuation look like? If there is value being co-created between service providers and hosts, how is this value being shared and demonstrated to others, namely, who is talking to whom about the chargepoints? The service provider observed that the network of community centres appears to fall in line with one another, does this occur? and how does it occur? Generating a map of this network would be an intriguing research area, a visualisation of valuation tools being shared and used (Karababa and Kjeldgaard, 2014).

This research set out to investigate the valuation and judgment tools being used to install chargepoints within Cumbria. It has concluded that intrinsic to valuation and judgment processes the main values are social, environmental, and economic, and that these are interwoven. The further research suggestions above could provide a greater insight into the decision tools, valuation practices, and judgement processes undertaken when installing chargepoints 'in the wild'.

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7.0 Appendices

Appendix-1: Interview Invite Email to Service Providers

Hello,

Hope this email finds you well.

I am emailing to ask if you would be willing to participate in an interview for my research project. Please see the attached project information sheet for further information.

If you are willing, please let me know and we can arrange an interview time and date accordingly.

Best Wishes,

Ellie Dolmor

Appendix-2: Interview Participant Information Sheet – Service Provider

Valuing and Judging Investments in Electric Vehicle Charging Points "In the Wild"
A Research Project being carried out by Lancaster University in conjunction with the
Partners: Charge My Street and Centre for Global Eco-Innovation

Participant Information Sheet

We are working with a team of partners and with academics from Lancaster University. Our role in this project is to understand how Electric vehicle chargepoints are valued and judged within Cumbria to optimise and improve future installation projects. We are academics at Lancaster University Management School. We specialise in understanding the process in which people choose to suggest a site and have chargepoints installed. We are keen to talk with you to understand your thoughts, and decision process.

Please take time to read the following information carefully before you decide whether or not you wish to take part.

What is the study about?
This study aims to help us understand how to value and judge investments in Electric Vehicle charging points and explore your decision process behind having a chargepoint installed. We aim to do this by first building a general profile of Charge My Street chargepoints, and their usage, following this use interviews to gain insight into the decision process behind successful chargepoint installations. We want to understand your experience linked to chargepoint installations as a service provider. Using this knowledge, our objective is to identify your lived experience of engaging with chargepoint installation and how your experience can aid in optimising future chargepoint installations. We want to put in place measures that enable active and ongoing assessment and of the impacts of these technologies as they develop and are adopted in communities. This will enable us to develop management toolkits to optimise future chargepoint installations.

Why have I been invited?
We have approached you because of your work for Charge My Street and think you have a valuable point of view and experiences that we might learn from.   We would be grateful if you would agree to take part in this study.

What will I be asked to do if I take part?
We want to talk to you about your experience and role when installing electric vehicle chargepoints in Cumbria. Our interview with you will follow a loose structure, but really, we want to understand your ideas, thoughts, and opinions. There are no right, or wrong answers and we are not making any kind of value judgements about what you say.

What are the possible benefits from taking part?
Usually, participants benefit in at least two ways from our research: First, talking through some topics with someone, who might ask quite different questions and encourage you to think in different ways, can be interesting in itself; Secondly, our goal is to generate research outcomes that are genuinely useful to you, your community, and to others who may have chargepoint installed in the future.

Do I have to take part?
No. It's completely up to you to decide whether or not you take part. Your participation is voluntary.

What if I change my mind?
If you change your mind, you are free to withdraw at any time during your participation in this study. If you want to withdraw, please let us know, and we will extract any ideas or information you contributed to the study and destroy them. However, it is difficult and often impossible to take out data from one specific participant when this has already been anonymised or pooled together with other people's data. Therefore, you can withdraw up to 2 weeks after taking part in the study.

What are the possible disadvantages and risks of taking part?
There should be no disadvantages, other than you sparing us some of your time for this discussion and, possibly, follow up conversations if you have time for those, to clarify points that you raise.

Will my data be identifiable?
After any interview only the researchers conducting this study will have access to the ideas you share with us.
We will keep all personal information about you (e.g. your name and other information about you that can identify you) confidential, that is I will not share it with others. I will remove any personal information from the written record of your contribution the day of the interview. For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection.

How will we use the information you have shared with us and what will happen to the results of the research?
We will use the information you have shared with me for the production of academic research, which will then be used to generate: 1) management toolkits, models or frameworks to help future installations, 2) articles for academic journals, and 3) slide decks or more practitioner-oriented books, reports or articles in order to share the insights that we have gained from this work.

When writing up the findings from this study, we would like to reproduce some of the views and ideas you shared with us. We will only use anonymised quotes (e.g. from our interview with you), so that although we will use your exact words, you cannot be identified in publications. If we wish to attribute any specific comments to any individual, we would always ask for their permission in advance, and would not proceed until this was received.

How my data will be stored
Your data will be stored in encrypted files (no-one other than us, the researchers will be able to access them) and on password-protected computers. We will store hard copies of any data securely in locked cabinets in our office. We will keep data that can identify you separately from non-personal information (e.g. your views on a specific topic). In accordance with University guidelines, we will keep the data securely for a minimum of ten years.

Who has reviewed the project? Lancaster University FASS LUMS Research Ethics Committee

What if I have a question or concern?

If you have any queries or if you are unhappy with anything that happens concerning your participation in the study, please contact either of us:

- Katy Mason, Researcher (k.j.mason@lancaster.ac.uk)
- Daniel Heery, Charge My Street Director (daniel.heery@cybermoor.org.uk)

If you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, you can also contact: Professor Lola Dada, Head of Department, Lancaster University Management School, call: 01524 510752 and ask for Professor Dada, or email: l.dada@lancaster.ac.uk. For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection.

Thank you for considering your participation in this project.

Appendix-3: Interview Consent Form – Service Provider

This research project on **Valuing and Judging Investments in Electric Vehicle Charging Points 'In The Wild**' is managed by Katy Mason (k.j.mason@lancaster.ac.uk) of Lancaster University in conjunction with the Centre of Global Eco-Innovation and Charge My Street.

Consent Form: Group 1: Project partners and collaborators

Please tick each box

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	yes
2. I understand that my participation is voluntary and that I am free to withdraw at any time during my participation in this study and within <u>2 weeks</u> after taking part in the study, without giving any reason. If I withdraw within 2 weeks of taking part in the study my data will be removed. If I am involved in workshops/meetings and then withdraw, my data will remain part of the study.	yes
3. I understand that any information given by me may be used in future reports, academic articles, publications or presentations by the researcher/s, but my personal information will not be included, and I will not be identifiable.	yes
4. I understand that my name will not appear in any reports, articles, or presentation without my consent.	yes
5. I understand that any interviews or workshops/meetings will be recorded and transcribed, and that data will be protected on encrypted devices and kept secure. All internal project documentation is similarly saved securely. For further information about how Lancaster University processes personal data for research purposes and your data rights visit our webpage: www.lancaster.ac.uk/research/data-protection	yes
6. I understand that written transcripts will be kept according to University guidelines for a minimum of 10 years after the end of the study.	yes
7. I understand any photos taken of me may be used for data analysis and included in future reports, academic articles, publications, or presentations by the researcher/s where faces will be pixelated or blurred.	yes
8. I understand that I have the right to refuse permission to take or use photos of me.	yes
9. I agree to take part in the above study.	yes

_____   _____   _____
Name of Participant   Date   Signature

Hi [Service Host],

Hope you're doing well.

May I introduce you to our current Masters by research student from Lancaster University, Ellie.

Ellie is looking to organise interviews with a range of stakeholders that are/have been involved in the installation process of electric vehicle chargepoints.

I've suggested you as a potential interviewee, Ellie will be in touch to organise if you're happy to go ahead.

Project Officer for CMS

Appendix-5: Interview participant information Sheet – Service Hosts

Valuing and Judging Investments in Electric Vehicle Charging Points "In the Wild"
A Research Project being carried out by Lancaster University in conjunction with the
Partners: Charge My Street and Centre for Global Eco-Innovation

Participant Information Sheet

We are working with a team of partners and with academics from Lancaster University. Our role in this project is to understand how Electric vehicle chargepoints are valued and judged within Cumbria to optimise and improve future installation projects. We are academics at Lancaster University Management School. We specialise in understanding the process in which people choose to suggest a site and have chargepoints installed. We are keen to talk with you to understand your thoughts, and decision process.

Please take time to read the following information carefully before you decide whether or not you wish to take part.

What is the study about?
This study aims to help us understand how to value and judge investments in Electric Vehicle charging points and explore your decision process behind having a chargepoint installed. We aim to do this by first building a general profile of Charge My Street chargepoints, and their usage, following this use interviews to gain insight into the decision process behind successful chargepoint installations. We want to understand your reasoning, decision process and experience linked to having a chargepoint installed. Using this knowledge, our objective is to identify your lived experience of engaging with chargepoint installation and how your experience can aid in optimising future chargepoint installations. We want to put in place measures that enable active and ongoing assessment and of the impacts of these technologies as they develop and are adopted in communities. This will enable us to develop management toolkits to optimise future chargepoint installations.

Why have I been invited?
We have approached you because of your involvement with Charge My Street and think you have a valuable point of view and experiences that we might learn from. We would be grateful if you would agree to take part in this study.

What will I be asked to do if I take part?
We want to talk to you about your experience and thought process behind having an electric vehicle chargepoint installed at your business or community venue. Our interview with you will follow a loose structure, but really, we want to understand your ideas, thoughts, and opinions. There are no right, or wrong answers and we are not making any kind of value judgements about what you say.

What are the possible benefits from taking part?
Usually, participants benefit in at least two ways from our research: First, talking through some topics with someone, who might ask quite different questions and encourage you to think in different ways, can be interesting in itself; Secondly, our goal is to generate research outcomes that are genuinely useful to you, your community, and to others who may have chargepoint installed in the future.

Do I have to take part?
No. It's completely up to you to decide whether or not you take part. Your participation is voluntary.

What if I change my mind?
If you change your mind, you are free to withdraw at any time during your participation in this study. If you want to withdraw, please let us know, and we will extract any ideas or information you contributed to the study and destroy them. However, it is difficult and often impossible to take out data from one specific participant when this has already been anonymised or pooled together with other people's data. Therefore, you can withdraw up to 2 weeks after taking part in the study.

What are the possible disadvantages and risks of taking part?
There should be no disadvantages, other than you sparing us some of your time for this discussion and, possibly, follow up conversations if you have time for those, to clarify points that you raise.

Will my data be identifiable?
After any interview only the researchers conducting this study will have access to the ideas you share with us.
We will keep all personal information about you (e.g. your name and other information about you that can identify you) confidential, that is I will not share it with others. I will remove any personal information from the written record of your contribution the day of the interview. For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection.

How will we use the information you have shared with us and what will happen to the results of the research?
We will use the information you have shared with me for the production of academic research, which will then be used to generate: 1) management toolkits, models or frameworks to help future installations, 2) articles for academic journals, and 3) slide decks or more practitioner-oriented books, reports or articles in order to share the insights that we have gained from this work.

When writing up the findings from this study, we would like to reproduce some of the views and ideas you shared with us. We will only use anonymised quotes (e.g. from our interview with you), so that although we will use your exact words, you cannot be identified in publications. If we wish to attribute any specific comments to any individual, we would always ask for their permission in advance, and would not proceed until this was received.

How my data will be stored
Your data will be stored in encrypted files (no-one other than us, the researchers will be able to access them) and on password-protected computers. We will store hard copies of any data securely in locked cabinets in our office. We will keep data that can identify you separately from non-personal information (e.g. your views on a specific topic). In accordance with University guidelines, we will keep the data securely for a minimum of ten years.

Who has reviewed the project? Lancaster University FASS LUMS Research Ethics Committee
What if I have a question or concern?

If you have any queries or if you are unhappy with anything that happens concerning your participation in the study, please contact either of us:
- Katy Mason, Researcher (k.j.mason@lancaster.ac.uk)
- Daniel Heery, Charge My Street Director (daniel.heery@cybermoor.org.uk)

If you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, you can also contact: Professor Lola Dada, Head of Department, Lancaster University Management School, call: 01524 510752 and ask for Professor Dada, or email: l.dada@lancaster.ac.uk. For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection.

Thank you for considering your participation in this project.

6.

This research project on Valuing and Judging Investments in Electric Charging Points 'In The Wild' is managed by Katy Mason (k.j.mason@lancaster.ac.uk) of Lancaster University in conjunction with the Centre of Global Eco-Innovation and Charge My Street

Consent Form: Group 2: Project Participants

Please tick each box

10. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	yes
11. I understand that my participation is voluntary and that I am free to withdraw at any time during my participation in this study and within 2 weeks after taking part in the study, without giving any reason. If I withdraw within 2 weeks of taking part in the study my data will be removed. If I am involved in interviews or meetings and then withdraw, my data will remain part of the study.	yes
12. I understand that any information given by me may be used in future reports, academic articles, publications or presentations by the researcher/s, but my personal information will not be included and I will not be identifiable.	yes
13. I understand that my name will not appear in any reports, articles or presentation without my consent.	yes
14. I understand that any interviews or meetings will be recorded and transcribed and that data will be protected on encrypted devices and kept secure. All internal project documentation is similarly saved securely. For further information about how Lancaster University processes personal data for research purposes and your data rights visit our webpage: www.lancaster.ac.uk/research/data-protection	yes
15. I understand that written transcripts will be kept according to University guidelines for a minimum of 10 years after the end of the study.	yes
16. I understand any photos taken of me may be used for data analysis and included in future reports, academic articles, publications or presentations by the researcher/s where faces will be pixelated or blurred.	yes
17. I understand that I have the right to refuse permission to take or use photos of me.	yes
18. I agree to take part in the above study.	yes

_____   _____   _____
Name of Participant   Date   Signature

Appendix-7: Interview Invite Email to Service Users

Hi [Service User],

Hope you're doing well.

May I introduce you to our current Masters by research student from Lancaster University, Ellie.

Ellie is looking to organise interviews with a range of stakeholders, including those that are current EV drivers/subscribers.

I've suggested you as a potential interviewee, Ellie will be in touch to organise if you're happy to go ahead.

Project Officer for CMS

Appendix-8: Interview Participant Information Form – Service Users

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Valuing and Judging Investments in Electric Vehicle Charging Points "In the Wild"
A Research Project being carried out by Lancaster University in conjunction with the
Partners: Charge My Street and Centre for Global Eco-Innovation

Participant Information Sheet

We are working with a team of partners and with academics from Lancaster University. Our role in this project is to understand how Electric Vehicle chargepoints are valued and judged within Cumbria to optimise and improve future installation projects. We are academics at Lancaster University Management School. We specialise in understanding the process in which people choose to suggest a site and have chargepoints installed. We are keen to talk with you to understand your thoughts, and decision process.

Please take time to read the following information carefully before you decide whether or not you wish to take part.

What is the study about?
This study aims to help us understand how to value and judge investments in Electric Vehicle charging points and explore the decision process behind having a chargepoint installed. We aim to do this by first building a general profile of Charge My Street chargepoints, and their usage, following this use interviews to gain insight into successful chargepoints. We want to understand your reasoning, decision process and experience linked to using a chargepoint. Using this knowledge, our objective is to identify your lived experience of engaging with chargepoints and how your experience can aid in optimising future chargepoint installations. We want to put in place measures that enable active and ongoing assessment and of the impacts of these technologies as they develop and are adopted in communities. This will enable us to develop management toolkits to optimise future chargepoint installations.

Why have I been invited?
We have approached you because of you are charging your EV at a Charge My Street chargepoint and think you have a valuable point of view and experiences that we might learn from. We would be grateful if you would agree to take part in this study.

What will I be asked to do if I take part?
We want to talk to you about your experience and thought process behind having an electric vehicle and using rural chargepoints. Our interview with you will follow a loose structure, but really, we want to understand your ideas, thoughts, and opinions. There are no right, or wrong answers and we are not making any kind of value judgements about what you say.

What are the possible benefits from taking part?
Usually, participants benefit in at least two ways from our research: First, talking through some topics with someone, who might ask quite different questions and encourage you to think in different ways, can be interesting in itself; Secondly, our goal is to generate research outcomes that are genuinely useful to you, your community, and to others who may have chargepoint installed in the future.

Do I have to take part?
No. It's completely up to you to decide whether or not you take part. Your participation is voluntary.

What if I change my mind?
If you change your mind, you are free to withdraw at any time during your participation in this study. If you want to withdraw, please let us know, and we will extract any ideas or information you contributed to the study and destroy them. However, it is difficult and often impossible to take out data from one specific participant when this has already been anonymised or pooled together with other people's data. Therefore, you can withdraw up to 2 weeks after taking part in the study.

What are the possible disadvantages and risks of taking part?
There should be no disadvantages, other than you sparing us some of your time for this discussion and, possibly, follow up conversations if you have time for those, to clarify points that you raise.

Will my data be identifiable?
After any interview only the researchers conducting this study will have access to the ideas you share with us.
We will keep all personal information about you (e.g. your name and other information about you that can identify you) confidential, that is I will not share it with others. I will remove any personal information from the written record of your contribution the day of the interview. For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection.

How will we use the information you have shared with us and what will happen to the results of the research?
We will use the information you have shared with me for the production of academic research, which will then be used to generate: 1) management toolkits, models or frameworks to help future installations, 2) articles for academic journals, and 3) slide decks or more practitioner-oriented books, reports or articles in order to share the insights that we have gained from this work.

When writing up the findings from this study, we would like to reproduce some of the views and ideas you shared with us. We will only use anonymised quotes (e.g. from our interview with you), so that although we will use your exact words, you cannot be identified in publications. If we wish to attribute any specific comments to any individual, we would always ask for their permission in advance, and would not proceed until this was received.

How my data will be stored
Your data will be stored in encrypted files (no-one other than us, the researchers will be able to access them) and on password-protected computers. We will store hard copies of any data securely in locked cabinets in our office. We will keep data that can identify you separately from non-personal information (e.g. your views on a specific topic). In accordance with University guidelines, we will keep the data securely for a minimum of ten years.

Who has reviewed the project? Lancaster University FASS LUMS Research Ethics Committee
What if I have a question or concern?
If you have any queries or if you are unhappy with anything that happens concerning your participation in the study, please contact either of us:
- Katy Mason, Researcher (k.j.mason@lancaster.ac.uk)

− Daniel Heery, Charge My Street Director (daniel.heery@cybermoor.org.uk)

If you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, you can also contact: Professor Lola Dada, Head of Department, Lancaster University Management School, call: 01524 510752 and ask for Professor Dada, or email: l.dada@lancaster.ac.uk. For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection.

Thank you for considering your participation in this project.

Appendix-9: Interview Consent Form - Service User

Centre for Global Eco-Innovation | CHARGE MY STREET | Lancaster University Management School

This research project on Valuing and Judging Investments in Electric Charging Points 'In The Wild' is managed by Katy Mason (k.j.mason@lancaster.ac.uk) of Lancaster University in conjunction with the Centre of Global Eco-Innovation and Charge My Street

Consent Form: Group 2: Project Participants

Please tick each box

19. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	yes
20. I understand that my participation is voluntary and that I am free to withdraw at any time during my participation in this study and within <u>2 weeks</u> after taking part in the study, without giving any reason. If I withdraw within 2 weeks of taking part in the study my data will be removed. If I am involved in interviews or meetings and then withdraw, my data will remain part of the study.	yes
21. I understand that any information given by me may be used in future reports, academic articles, publications or presentations by the researcher/s, but my personal information will not be included and I will not be identifiable.	yes
22. I understand that my name will not appear in any reports, articles or presentation without my consent.	yes
23. I understand that any interviews or meetings will be recorded and transcribed and that data will be protected on encrypted devices and kept secure. All internal project documentation is similarly saved securely. For further information about how Lancaster University processes personal data for research purposes and your data rights visit our webpage: www.lancaster.ac.uk/research/data-protection	yes
24. I understand that written transcripts will be kept according to University guidelines for a minimum of 10 years after the end of the study.	yes
25. I understand any photos taken of me may be used for data analysis and included in future reports, academic articles, publications or presentations by the researcher/s where faces will be pixelated or blurred.	yes
26. I understand that I have the right to refuse permission to take or use photos of me.	yes
27. I agree to take part in the above study.	yes

_____   _____   _____
Name of Participant   Date   Signature

To be completed by the researcher:

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I

confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher   Date _____

One copy of this form is for the participant, the original kept securely in the researchers' files.

Appendix-10: Interview schedules

Appendix-10.1: Annotated Service Provider Interview Schedule

Charge My Street Staff

What is your role when going through the site installation?

What is the first step to proposing a site for a charge point?

How do you engage with previous site hosts?

What is something that immediately makes the site unsuitable?

Can you talk me through your thought process when looking at possible charge point sites?

What have been the main barriers when you have had previous sites suggested that have failed?

What do you think the main reason is for sites failing to progress to have a charge point installed?

What do you think is the biggest hurdle for the site host to overcome?

Do you think that there is a changing attitude to EVs?

What is the average time it takes for charge points to be installed from suggestion to being used?

What do you think it the biggest barrier for EV chargepoint installation?

What do you think of when I ask you about the 'value' of a charge point? How do you judge its value?

Dismissing monetary value for a moment – what do you think the main value of EV charge points is? -(socially? Environmentally? Etc)

From my previous interviews with site hosts, they have expressed interest in seeing some of the data about the use of their chargepoints, is this something you'd be willing to share with them?

What is something that you think is integral for a successful chargepoint?

What tools does CMS use to engage with possible site hosts?

Have you ever considered revisiting existing sites and expanding the number of CP there?

What is something that stands out to CMS as important for chargepoint installation?

What sort of traits do you think chargepoint hosts need to have for successful installations?

Have you had a chargepoint installation reach a near final stage and then the host has dropped out? Do you know why they did?

What makes putting chargepoints in the lakes and Cumbria worthwhile?

What makes CMS worth investing in – what value do they add to where you install chargepoints?

What tools do you use to determine whether a site is successful or not? Or of value?

Appendix-10.2: Annotated Service Host Interview Schedule

Interview Schedule – site hosts

How did you get involved with Charge My Street?

What brought Electric Vehicles and chargepoints to you attention?

How long did it take you to come to a decision to have a charge point installed at your site?

Thinking about the process of having a charge point installed is there anything that could have made the process easier?

What do you consider the biggest benefit to having a charge point installed on site?

What do you consider the biggest drawback to having a charge point installed on site?

Do you use the charge point on site?

Do your service users comment on the charge point site? Or use it?

Can you walk me through the process that brought you to commit to have a charge point installed?

How long has this charge point been fully installed?

What would you say to others thinking of having charge points installed in rural areas? What do you think they should be considering when making the decision?

Do you own an EV?

Did you do any research on electric vehicles and charge points before you had it installed?

What made you want to install a charge point at your business?

At what point in the charge point installation processes are you at?

What made you choose Charge My Street to install your charge point?

What word or phrase would you use to describe EV chargepoints?

Have you seen a change in customers/site users since the charge point has been installed?

What do you think having this charge point brings to you local community?

Do you feel that there has been an adequate increase in EV infrastructure?

What do you think the biggest barrier is to increased EV usage?

What is your attitude towards EVs?

Is this your first EV? — Yes

How long have you owned your EV? — June - 30

Did you transition from petrol straight to Full EV or have a hybrid in between? Petrol → EV.

What type of EV do you have? worried.

How did you find the transition? Alarming - didn't understand charge rate.
↳ plugs →

What steps did you go through to before transitioning to an EV? E.g. research, experiences, chat with? research Jan 22

Decision process etc ↳ moved house → solar panels
may → operation ↳ CP + EV... ↳ newhouse wasn't suited Afford

How did you approach charging your EV for the first time?
→ Autotrader solar panels. found
→ never car. ↳ workers.

How have you found your local chargepoints? ↳ seen them Golf previously found used.
↳ App → diads v. few renault ↳ battery
How safe do you feel at chargepoints? Disaster manuues at home. zoe. size
Brampton → rough couple ↳ Lidl. needed. ↳ price ↳ tyred millage.
How easy have you found it to use chargepoints? ↳ app → podpoint. used ↳ used first
Scotland → tap card on machine → only scottish seems experience.

Can you tell me about your experiences of charging your car in rural areas such as this?
↳ no major issues → -10°C → abandoned → ↳ life.

What level of difficulty have you experienced when trying to find a chargepoint?
↳ understanding the systems → different →.

Do you subscribe to a charging company? ; If so which one? – CMS subscribers – do you use any other

regular charge points ↳ bait to leave.

What would you like to say to those thinking about installing charging points in rural areas?
↳ future - phase out car →. ↳ public venues ↳ full station
What do you think they should be thinking about when making this decision? ↳ farmer type offul.

Thinking about your charging experiences, what would make your life easier? → don't always understand
↳ CP. → different technology → unified planning technology.
Do you now have a home chargepoint? What prompted you to install it? ↳ → eco slow.
↳ had it a week. ↳ planned from start.

What sort of tools do you use to identify a chargepoint? – apps / internet
↳ ZapMap.

When you're planning a journey do you plan which chargepoints to use before you set off?

Value → ethos → social value.
environment → 3° years.
lack of public transport.

No issues → disability issues → school picking uptime.
Brampton → can't charge between 12 - 4pm.