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Decarbonisation, place attachment and agency: just transition in old industrial regions

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ABSTRACT

There is growing awareness that the effects of decarbonisation are highly spatial and will impact regions differentially. Old industrial regions are likely to be particularly affected but it is debateable how well equipped they are to engage with transition and for it to be just. Extant literature suggests that this will be highly contingent on the acceptability of this transition amongst old industrial communities, with a call to understand what and who will be impacted. There is, however, a need for more granularity of evidence on how acceptability is formed and how it plays out in practice. Taking the case of Port Talbot in the UK, this paper provides new insights into the interplay between place attachment and a 'just transition' in an old industrial region. This paper finds that there is a strong community understanding of and support for decarbonisation but an equally strong perception of powerlessness to act. There is an enduring sense of place attachment within Port Talbot but the lack of place-based consultation and engagement with the community means that there are no effective development strategies in place. Thus, it can be concluded that there is acceptability but without agency.

Introduction

The argument for decarbonisation has been won, with more than 100 countries having targets around the reduction of carbon use and net-zero greenhouse gases (Van Soest et al., 2021). There is also growing awareness that decarbonisation will be highly spatial – with likely significant societal restructuring as new opportunities may not occur within the same place that decarbonisation is undertaken (While & Eadson, 2019; Wallace-Stephens, 2021). Old industrial regions are likely to be particularly impacted, but questions emerge as to how well equipped they are to respond to these changes

(Wallace-Stephens, 2021). Thus far, there has been an assumption that green jobs will arise in the areas most needed (Garvey et al., 2022) with skills that can be easily transferred to the decarbonisation opportunities (Evans & Phelan, 2016; Garvey et al., 2022; Sovacool, 2017; Sovacool et al., 2019). Yet recent evidence shows that low-carbon transitions are leaving some regions behind and creating new patterns of vulnerability (Garvey et al., 2022; Golubchikov & O'Sullivan, 2020; Kanger et al., 2020). This paper seeks to contribute to the understanding of the distribution of opportunities and the impact of decarbonisation on industrial regions.

The effect of decarbonisation or economic restructuring within a region is contingent on many factors, with the acceptability of change to the community playing a notable role in the transition process (Brown & Perkins, 1992; Poortinga et al., 2023). The crux of the reaction to this change is the degree of disruption residents can expect physically and conceptually to 'their place' to which they are attached (Devine-Wright & Howes, 2010). In this context, acceptance of this change might be enacted through re-skilling or non-acceptance through resistance or migration, with the latter aspect influenced by place attachment. Place attachment constitutes the emotional bonds with a place (Devine-Wright & Batel, 2017; Rubinstein & Parmelee, 1992), contributing to a sense of identity, well-being, and resilience (Amundsen, 2015, Adger et al., 2013; Proshansky et al., 2014). There is increasing focus on place attachment and its interaction with decarbonisation of industrial regions (Żuk, 2023) or renewable energy expansion (Goudriaan et al., 2023). However, granularity of data is needed to understand how acceptance of change is formed and how it plays out in practice to shape community responses.

To explore the impact of decarbonisation on a carbon-intensive region, data was gathered through documentary analysis, surveys, and interviews, and confirms previous findings that living in an area with a long industrial heritage is associated with a high level of place attachment and an increased likelihood of residents wishing to ensure a just transition process. This paper therefore asks, what is the role of place attachment within industrial decarbonisation and just transition narratives?

Case study region

Taking the case of Port Talbot, situated in Neath Port Talbot County Borough Council in South Wales, this paper provides new insights into the interplay between place attachment and just transition in an old industrial region. Neath Port Talbot has the highest proportion of residents employed in heavy industry within the UK (8.7%) (Wallace-Stephens, 2021). The steel industry itself remains a key player in the Welsh economy, making the largest contribution to GVA of any private sector employer (Pinto & Jones, 2012) and Port Talbot is the symbolic heart of the industry in Wales.

Port Talbot has long been synonymous with steelmaking. The town's origins lie in the opening of operations by the English Copper Company in the Cwmavan valley in the 1770s. In the 1880s these works were closed, and the focus of steel making migrated down the valley to Port Talbot, where a docks facility had been established in the 1830s. Between 1901 and 1926 two steel plants opened in Port Talbot followed by major investment in a new site (known as the Abbey Steelworks) in the early 1950s, bringing rising levels of employment, public services and supply chain activities. By the end of

the 1960s, closure of the two original plants left the Abbey Steelworks to dominate the town, both physically and economically. Since this heyday, the steelworks has been nationalised, privatised and changed ownership through mergers and acquisitions to its present structure as part of the Tata Group multinational conglomerate.

Once the largest employment site in Wales, with more than 20,000 employees, the plant now directly employs some 4,000 workers. It is estimated that a further 3-4,000 agency and contract workers are employed at the plant and that up to 4,000 jobs in the Port Talbot area might indirectly rely on the steel works. Neath Port Talbot and the Tata steelworks are on the frontline of efforts to decarbonise the economy. In 2018 Neath Port Talbot had the highest rate of CO_2 emissions in Wales (6,506 kilotons of CO_2 or c.45.5 kilotons per capita) which is around 47% of total industrial emissions in Wales and 15% of overall emissions came from the Tata steel plant located in the region (Burkitt, 2021). Aberpergwm, one of the last remaining coalmines in Wales is also threatened with closure owing to Welsh Government commitments to end coal production. Both Trade Unions and employers cite the value of the mine for maintaining local supplies of coal to the Tata steelworks, positing this as a more carbon-friendly option than importing coal from outside of the UK.

The pressure to decarbonise steel production at the Port Talbot site adds to the uncertainty of future production in the face of over-capacity in the global steel industry. Recent announcements by Tata Steel and the UK government proposing major subsidies to replace traditional blast furnace technologies with electric arc furnaces may secure a future for steel making but at the risk of further substantial job losses. The contested future of the steel plant highlights the ongoing debate around the balance between decarbonisation, the 'off-shoring' of emissions and the desire to maintain well-paid employment opportunities. The current debate regarding the employment impact of decarbonisation must also be seen in the context of a legacy of significant, and ongoing, economic restructuring since the 1980s, which has adversely shaped Port Talbot's socio-economic situation by limiting opportunities for employment or career advancement. However, the latest Census (ONS, 2023) records that the population of Neath Port Talbot has increased between 2011 and 2021 at a rate exceeding the average growth rate in Wales.

At the policy level the case of Port Talbot encapsulates the complex, multi-level political structure which has emerged since the devolution settlements in 1999. In 2006, the Welsh Government (Senedd Cymru) gained the ability to pass primary legislation in those legislative areas that are not reserved by the government of the UK, including economic development, business, the environment, health, and local government. However, the UK government retains key powers relating to energy policy and sectoral emissions that are particularly relevant to the energy transition, steel making and the move towards a decarbonised economy. The UK's withdrawal from the EU in 2020 also reconfigured the distribution of many legislative powers between the UK and Welsh governments, as powers that previously had been administered by Welsh government under the authority of the EU came under the authority and administration of the UK government.

In Wales, the Well-being of Future Generations Act (2015) requires 'public bodies in Wales to think about the long-term impact of their decisions, to work better with people, communities and each other, and to prevent persistent problems such as poverty, health inequalities and climate change' (Pemberton, 2021, no page). As such,

quality of life and social well-being for the communities directly impacted by decarboni-sation is central to Welsh Government policy (Welsh Government, 2015). This places questions of spatial and temporal justice at the heart of the policy-making discourse.

Literature review

There is much academic debate as to how sustainability transitions will play out spatially, with studies focusing increasingly on the equality of opportunity (Bouzarovski & Simcock, 2017; Cruz-Sandoval et al., 2020; Garvey et al., 2022; Manderscheid, 2012), potential exacerbation of challenges faced by social groups that are already vulnerable (Golubchi-kov & O'Sullivan, 2020; Sovacool et al., 2021) or the creation of new categories of vulner-ability (Garvey et al., 2022). These injustices are often overlooked (Sovacool et al., 2021, 2019) and can shift attention away from the desirable environmental outcomes (Barry & Ellis, 2014) onto the undesirable impacts (Bickerstaff et al., 2013). Crucially, 'the choice of scale influences whether injustices are found' (Lawhon & Patel, 2013, p. 1052), highlighting the need to consider both the changing location of activities and the scale at which we monitor for injustices.

In this context, studies are increasingly establishing that whilst the transition to net-zero will increase the number of jobs available, these effects will be uneven across and within countries (Wallace-Stephens, 2021). In particular, job losses are likely to be concentrated in regions that are carbon-intensive (European Investment Bank), with different technologi-cal pathways that will have varying impacts on employment levels (Wallace-Stephens, 2021).

The steel industry, which will experience the greatest decline in absolute terms (ILO, 2018), is dependent on whether technologies such as carbon capture or low-carbon fuels reach maturity (Wallace-Stephens, 2021). Indeed, around 60% of heavy industry carbon reduction will come from pre-commercialization technologies (IEA, 2021). It can therefore be surmised that old industrial regions will be subject to change as a result of decarbonisation that cannot, as yet, be fully characterised. These regions are known to have a high degree of place attachment (Mah, 2009), which is an important predictor of positive engagement with climate change (Scannell & Gifford, 2014). Conversely, studies on spatial injustice converge on the notion of 'supply side' community justice, where those regions that are caught in the collapse of activities such as coal mining or steel making are often economically marginalised communities that have provided cheap natural resources and undertaken regional sacrifices to serve metropolitan areas (Foz, 199; Malin, 2015). Links have been established between politically conservative par-tisanship in increasingly marginalised industrial regions and climate change denialism (Mayer, 2019, 2022; Abreu and Jones, 2021, Olson-Hazboun, 2018). This introduces a high degree of uncertainty and risk to the transition process and for those that are employed in these industries. This raises many questions around local futures and outlines that there is much still to understand about how the uneven impact of decarbonisation will play out within communities to ensure just distribution of the opportunities and costs.

Indeed, achieving a just transition in an old industrial region is heavily contingent on its acceptability to the community. This is influenced by the values and attachments associated with these landscapes (Brown & Raymond, 2007). Based on subjective elements (Scannell & Gifford, 2014, Devine-Wright, 2013), place attachment is more notable at times when change takes place (Brown & Perkins, 1992; Giuliani, 2003; Devine-Wright, 2013).

Importantly, place attachment can stabilise communities (Hay, 1998), providing a sense of safety (Billig, 2006; Brown et al., 2003) and can be a driver of adaptation to change (Amundsen, 2015). Place attachment can be a defence mechanism (Hay, 1998) to counter the type of change that can have social and psychological impacts (Mah, 2009). Problematically, place attachment may inhibit the taking up of new ideas and practices (Dale et al., 2008, Marshall et al., 2012) due to a perceived threat to 'place' (Vorkinn and Riese, 2001; McLachlan, 2009; Devine-Wright & Howes, 2010). Where a place's character will be maintained or promoted, then those residents with strong place attachments are likely to be supportive (e.g. Devine-Wright, 2011a, Devine-Wright, 2011b; Venables et al., 2012).

Resistance to change should not be viewed as simple NIMBY-ism (Not in My Back Yard) but instead in the context of socio-demographic factors such as age, environmental beliefs (Firestone, Kempton and Krueger, 2009; Swofford and Slattery, 2010) or how the proposed technology fits in place (Vorkinn and Riese, 2001; McLachlan, 2009; Devine-Wright, 2009). The future that residents imagine for their region, their socio-technical imaginings (Devine-Wright, 2022; Watkins, 2015), may conflict with decarbonisation plans. As a result, there are two core aspects to social technical imaginings – that technological system design is influenced by social values and that technoscientific projects are moderated by understandings of society (Chateau et al., 2021; Jasanoff & Kim, 2009, 2015). A democratic process that consults on a range of socio-technical imaginings can eliminate unwanted impacts and inequalities (Bickerstaff et al., 2013; Newell and Mulvaney, 2013) through seeking to construct a pathway that is a middle ground between firms, consumers, civil society groups, political parties, and government. However, the facilitation of such processes is complex, and the exclusion of citizens not only makes for less representative policy choices but can also create friction and resentment (Barry & Ellis, 2014).

The field of 'just' transition appraises whether decarbonisation processes may create or entrench inequalities (Jenkins et al., 2016) and whether the benefits and inconveniences are spread across society and space (distributional justice) (McCauley et al., 2013). In the context of a region with strong place-attachment, procedural justice relies on ensuring fair consultation and inclusion in decision-making (Martiskainen et al., 2021) and is vital for designing equitable outcomes (Garvey et al., 2022). Yet procedural justice can be spatially variable due to the degree of engagement with communities or the regions' democratic infrastructures (Garvey et al., 2022). The framing of the policy that supports this change is also important, policies that are perceived as fair are more acceptable to communities than policies focus on effectiveness for climate change abatement (Poortinga et al., 2023). Importantly, transition pathways are not preset, and any uneven cost of sustainability transition must be treated as an outcome of multiple interactions and encounters (Garvey et al., 2022).

Figure 1 summarises the relationships between these theoretical fields and outlines the mediating factors through which decarbonisation can be coupled to just transition.

Figure 1. The coupling of decarbonisation and just transition.

Decarbonisation is likely to have spatial impacts, where the geography of this transition can change a place and its identity. The literature shows that there is an iterative relationship between place identity and the geography of a transition that can be moderated by governance. At the same time, this changing place identity has an impact on place attachment – possibly enriching or threatening a community's conceptualisation of 'their place'. This interaction with a community's socio-technical imagining is one of the proponents that influences whether a transition is seen as just. A just transition engages with a community's socio-technical imaginings, focusing on procedural engagement and sensitive treatment of distributive justice.

Knowing that 'injustice is not inevitable' (p.615), Garvey et al. (2022) found that the decarbonisation process' acceptability will be dependent on justice and the distribution of benefits and burdens (Többen, 2017). Whilst inequalities do not have to equate to injustices (Walker, 2009), the evidence shows that these effects will be spatially differentiated and vary across scales (Sovacool et al., 2009). Yet the rapid pace at which net-zero transitions are being brought about arguably conflicts with participatory ways of decision-making (Skjølsvold and Coenen, 2021), jeopardising community agency and the ability to understand the impacts of such change (Garvey et al., 2022). As a result, there remain many 'important questions about agency, and how changes to 'home' places are decided upon in terms of equity, fairness and transparency' (Devine-Wright, 2022, p. 2) within decarbonisation narratives. This outlines the value, therefore, of evaluating these decarbonisation processes at different scales to outline the potential changes to a community's conceptualisation of place, their attachment, and their sense of justice within the transition process – establishing whether there is a sacrifice of places (Devine-Wright, 2022). This defines the unique contribution of this research, as place attachment is less frequently explored within already industrialised places (Devine-Wright, 2022). More broadly, this paper seeks to contribute to literature development through widening the number of case studies that address place attachment and sustainability transition.

Methodology

A mixed-methods approach was adopted based on a multidimensional assessment framework developed as part of the ENTRANCES H2020 project (Speisberger et al., 2021). The method seeks to combine relevant perspectives from multiple actors (residents, public sector, private sector and academic) across multiple scales (local through to national). This approach recognises that sustainability transition impacts and place attachment can play out at multiple scales, where the granularity of data can influence whether injustices are found (Garvey et al., 2022). The approach recognises six key dimensions to the energy transition: socio-economic perspectives; socio-psychological perspectives; socio-political perspectives; socio-cultural perspectives, socio-ecological and socio-technical perspectives.

An online survey of Port Talbot residents focused on the socio-psychological perceptions relating to place attachment and transformation in the steel industry. The survey was distributed to 157 members of the Citizens Panel, established by Neath Port Talbot County Borough Council, registered as living in the post code districts of Port Talbot and neighbouring districts in Neath and the Afan Valley. A total of 53 valid responses were received (a response rate of 34%). Use of the Citizens Panel was preferred over a

randomised telephone or online survey owing to the size of the planned survey. Panel members are preselected, broadly representative of the wider population and generally committed to contributing to conversations on issues that are of relevance to the locality. Responses to the survey included one resident currently working in the steel industry and four who had been previously employed in the steel industry. The sample could not be considered as wholly representative of the area but does broadly reflect the wider population in terms of age and employment status. Of the 53 responses received, 27 (51%) identified as 'female', 25 (47%) as 'male' and one as 'other' (2%). This closely reflects the estimated gender composition of Port Talbot in 2020 (51% female and 49% male) (ONS, 2023).

To assess the prevailing socio-political narratives of decarbonisation and the energy transition a documentary analysis of 52 policy documents, policy strategies, media reports, academic and grey literatures was undertaken (Table A1). The selection of documents was based on timeliness (published in previous 10 years), relevance (covering energy transition, net-zero or decarbonisation of steel production) and geography (Port Talbot/Wales). The documents were coded in NVIVO and the nodes are appended in Table A2. To examine the capacity for the socio-ecological and technical transformation towards decarbonisation, eight structured interviews, using a common questionnaire that combined Likert-scale responses and open text, were undertaken with key actors who had professional insights into the decarbonisation process ongoing in Wales and Port Talbot. Four represented local or national government, one represented a key private sector actor (Tata Steel) and three academics provided insights based on their own research expertise. This aspect of the research considered perceptions of the capacity for transformative action in Wales and Port Talbot and the selection of interviewees was based on individual or organisational engagement with the topic. Not all relevant actors are included as some, such as relevant Trade Unions, did not respond to invitations to participate despite multiple approaches. All interviews were recorded, with permission, and transcribed. All actors were senior level decision-makers in their organisations.

The final element of the methodology was to explore the changing socio-cultural context of Port Talbot more deeply with a small number of residents. Owing to the restrictions of Covid-19 prevailing at the time of the research this element had to be undertaken online through two three-hour sessions. This limited the number of residents willing to engage with the study. We also deliberately excluded professional, political, academic or activist representation, further limiting the selection pool. In consequence, this element of the method involved just two residents who were embedded in the civil society of Port Talbot. They demonstrated a deep understanding of the cultural context of Port Talbot and provided in-depth responses to a structured process.

Findings

Place attachment and personal perspectives on decarbonisation

The socio-psychological survey (Table 1) measured the short- and long-term perceptions of decarbonisation on the well-being of residents in Port Talbot. This data can be vital to policymakers at all scales as it allows informed decisions on appropriate actions to respect place attachment and potential wider ramifications resulting from significant change of

Table 1. Socio-psychological survey results.

	Strongly Agree	Agree	No opinion	Disagree	Strongly disagree
Port Talbot means a lot to me.	21	26	5		
I am very attached to Port Talbot.	20	20	6	2	
I identify strongly with Port Talbot.	21	17	7	3	
I feel Port Talbot is a part of me	18	23	4	4	
There is not much future for me in Port Talbot	5	5	10	17	10
I am extremely satisfied with my present home in Port Talbot	15	16	8	5	4
My family is very close-knit and I would be unhappy if I could not see them	17	17	4	7	3
I can deal with whatever comes.	12	28	9	3	1
The environmental benefits of decarbonisation are greater than the damage	16	15	11	5	4
Our region faces greater losses than gains as a result of decarbonisation	8	11	12	10	9
Judging its benefits and costs, decarbonisation is a fair process for the people living in this region	6	14	19	3	6
It is likely that I will move from my region during the next 2 years.	2	2	7	20	21
I believe that I cannot do anything to stop this process of decarbonisation	6	13	26	4	1
In my region there will be less unemployment than now during the coming 12 months.		8	12	18	11
I feel that the organisations behind the decarbonisation process in my region are very strong	1	5	34	9	2

place identity. 79% of respondents identified strongly with Port Talbot, 84% are strongly attached and 90% agree that Port Talbot means a lot to them. 84% view Port Talbot as a part of them, valuing strong social ties, a close-knit family and a sense of satisfaction with their home. However, around half of respondents did not view Port Talbot as a unique place or that it cannot be substituted. Most respondents imagine a future in which they live in Port Talbot, with just under a fifth believing that there is not much future for them in Port Talbot.

Respondents were assessed to have a strong sense of personal resilience and an optimistic outlook on life. There was strong consensus that the environmental benefits of decarbonisation outweigh the damage that may be caused for people living in Port Talbot as a result of these processes. However, whether Port Talbot will lose or gain from decarbonisation is not decided upon, with 38% thinking that it will and 38% that it will not. Yet it was felt that decarbonisation was a fair process for people living in Port Talbot when weighing the benefits and costs – whilst around 10% of respondents disagreed or strongly disagreed, a notable portion (31%) felt unable to express an opinion. Further, 52% of all respondents had no opinion on whether they would be able to stop the decarbonisation process and 67% had no opinion on the strength of the organisation perceived to be behind the decarbonisation process.

The evidence suggests that respondents are uncertain about their current economic situation with 45% having a sense of economic uncertainty. However, respondents do not believe there will be less unemployment in Port Talbot in the 12 months following the survey or that the degree of poverty will decrease. An important 29% report feeling that their economic future is threatened fairly or very often whilst 35% do not. Survey data also showed that there were no strong anticipatory responses such as

relocation or learning new skills to change occupation. Respondents felt that it was unlikely that they would leave the area in the next two years (79%). This is perhaps linked to a strong community sense of adaptation and ability to respond to 'whatever comes next' (92.4%). Whilst the survey identified a strong level of self-belief, it found that there was uncertainty about the future – with 30% not having a positive outlook. Overall, a high proportion of respondents (57%) had confidence in the future – perhaps linked to adaptability or community infrastructure such as the Neath Port Talbot County Borough Council Citizens' panel which allows opportunities for community agency.

Overall, the survey results suggest contentment with living in Port Talbot with no pressing need or desire to leave the area. This suggests a strong sense of place attachment, but at the same time respondents are also not undertaking new skills training or gaining qualifications to change professions or to adapt to the decarbonisation processes. This could be attributed to an inability to act due to uncertainty around the socio-technical future of the steel industry, which is outlined below in the socio-ecological and technical evidence.

Prevailing narratives of decarbonisation and transformative potential

Our documentary analysis reveals the dominance of positive narratives of decarbonisation in Port Talbot and Wales. A strong, and positive, economic drive for the decarbonisation agenda, focusing on opportunities for growth rather than decline, can be identified. Of the 100 most prevalent words, constructive terminologies are most common, including 'production', 'investment', 'sustainable', 'prosperity', 'development' and 'opportunities'. The possibility of 'deprivation' was only mentioned 13 times throughout the 52 documents analysed and the word 'victim' was only used on 11 occasions. Increased employment opportunities because of decarbonisation were identified in 22 documents analysed, whereas unemployment was mentioned in just 5. However, the analysis also demonstrates a lack of granularity, with most terminology presenting the decarbonisation narrative in abstract terms and rarely relating to the impact of decarbonisation actions on particular sectors, places or communities. The potential closure of the Tata Steelworks as a consequence of the drive towards decarbonisation does not feature, either explicitly or implicitly, in the documents analysed. Instead, a strong techno-narrative, focusing on investment in clean or green technologies underpins the framing of policy documents and strategies. A positive narrative regarding 'just transitions' features in policy documentation, but these lack detail as to what a just transition might constitute.

In terms of the capacity for a socio-technical transformation, the study focused on Wales as an overarching governance unit. The aggregated responses to a series of common questions are provided in Table A3. Whilst the small number of respondents involved mean that the responses are largely indicative, the ranking of responses is informative. Respondents confirmed that a range of actors are participating in deliberative actions relating to decarbonisation within the public sector within Wales, and that there is significant engagement between Welsh Government, the private sector and civil society organisations. However, interviewees were of the opinion that many groups are not participating in the deliberations, with a noted lack of engagement with the public. Interviewees were of the opinion that a few voices dominate and efforts to purposively include less powerful actors in decarbonisation debates have

been limited. Interviewees were asked to rate the transformative capacity of Wales in a number of areas, it was evidenced that Wales is considered to have a high capacity for knowledge production, actor diversity, diverse governance, transformative leadership and disruptive experimentation. However, Wales was considered to have low capacity for reflexive regulation, resource availability, alternative scenarios and system analysis. Notably community empowerment in the pursuit of decarbonisation was ranked lowest of all factors.

Socio-cultural responses acted to illuminate the tension between processes of de-territorialization and re-territorialization (Table 2). Respondents note a sense of distinctiveness of the local area and the importance of self-narrated identity in the face of a cumulative loss of local control over political and economic decision-making over time. The lack of control regarding the future of steel making is a high-profile example but respondents also noted the resistance to the proposed Y Bryn windfarm, which is driven by external investment. Partially countering this feeling of disempowerment, the local community has been active in developing new forms of cultural expression, ranging from The Passion, produced by the local actor Michael Sheen, to a celebration of street art. This speaks to the sense of community and pride present in the area and runs counter to the external negative image of Port Talbot as an environmental and

Table 2. Summary of Responses to Socio-Cultural perspectives on deterritorialization and reterritorialisation.

	De-territorialisation	Re-territorialisation
Continuity	The continuity of the territory is challenged by the uncertainties associated with the future of the steel works, which remains a dominant economic actor.	Respondents highlighted numerous continuities with the past which are contributing to a re-territorialisation trend. These include Michael Sheen's Passion and the strengthening of natural and cultural heritage assets, such as the regeneration of the Aberavon beachfront.
Distinctiveness	In many respects, the traits that are being challenged are the negative perceptions held by those external to the area.	Respondents highlight the strength of community identity and the significance of a self-narrated identity.
Self-narration	It may be too strong to speak of a crisis of the territory. The uncertainty facing the steel works has been present for many years, the energy transition and pressure for decarbonisation is simply another manifestation of long-standing global trends.	Respondents highlighted numerous positive narratives of the territory, focusing on cultural and natural assets. Whilst these are 'self-narrated' in so far as they are held by the community, they are also being given voice by external actors (including national arts bodies). What is significant is that these bodies enable the self-narrated voices of local actors to be heard, rather than imposing a narrative upon them. The involvement of external actors not only enables the articulation of local voices it also helps others from outside of Port Talbot see the area for themselves and 'see through the stigma'. The power of this self-narration is it also changes how those in Port Talbot 'see ourselves'.
Self-governance	The territory is losing control of its own governance as the locus of power has been raised to a larger administrative unit (Neath Port Talbot County Borough), whilst there has been a centralisation of powers both by Welsh Government as part of the devolution of powers from Westminster and by the UK government.	A new locus of self-governance is emerging within the locality as the community rediscovers, reinvents and reasserts its identity. Local activism is on the rise with a strong community spirit.

Source: Authors' analyses of respondent responses.

economic 'blackspot'. In highlighting these examples, the respondents chose to focus on the continuity of community activities stretching back into the 1950s, whilst noting the potential discontinuity that closure of the steelworks would represent.

The significance of an emerging self-narrated identity, distinct from that imposed by external actors, is central to the socio-cultural resistance to globalisation. In their responses, respondents choose to focus on the emergence of new symbols (such as cultural transformations) rather than be defined by a territorial stigma and identified the importance of emerging visions over a predilection for old-time nostalgia.

Discussion

The discourse around decarbonisation in South Wales is found to be predominantly positive. It is widely agreed amongst national and local governments, industry, trade unions and communities that carbon industries need to become 'greener' and decarbonise to benefit the climate and the physical, economic and social health of local communities. Advances in clean, green technology are overwhelmingly said to offer opportunities for economic growth and long-term well-being for local communities. Therefore, the Net-Zero approach, driven by the Welsh national government, is broadly accepted and unquestioned in South Wales. However, this report has also revealed a strong call from local governments, trade unions, workers in carbon industries and local communities that the transition from carbon to green technologies must be a 'Just Transition'. This aims to prevent communities currently reliant on carbon industries losing out economically, socially and environmentally during the decarbonisation process. To ensure this happens, industry, unions and communities are heavily reliant on the center, calling for the Welsh and UK governments to heavily invest and support the transition sooner rather than later. Indeed, there are calls to go beyond the inclusion of compensatory measures in Wales to engage 'with communities across Wales to discover what sort of economy, and what sort of society, they want to live in' (Price, 2020, no page). In this regard, the Unite trade union advocates that 'the necessary transition to a new green economy must put workers and communities at its heart' (Barry, 2021, no page).

Significantly, no strong counter narrative towards decarbonisation is identified and no stakeholders are publicly resisting decarbonisation. The debate is how decarbonisation should be achieved in practice with questions raised as to the impact within local communities, particularly where employment may be at risk. Documentary analysis demonstrates the prevalence of a technocentric narrative to decarbonisation, and most particularly to the steel transition in Port Talbot. Economic drivers for change such as increased employment due to new industries, and the export of low-carbon goods and services worth up to £170billion to the UK by 2030 are cited in support of the approach (Welsh Government, 2015). The closure of Tata steel is not featured in any documentation and 'clean' technology is positioned as the answer to decarbonisation (Burkitt, 2021). This is most recently visible in the publication of proposals to replace the existing blast furnaces with electric arc furnaces focused on recycling existing steel products (UK Government, 2023). Trade Unions have produced their own counter proposals, advocating a more staged approach to reduce employment losses, with one Union advocating for an approach that increases employment at the plant. In all cases, the arguments focus on the pathway to decarbonisation rather than resisting the decarbonisation process.

A key theme that emerges across the study has been the lack of a 'roadmap' for the decarbonisation journey. Whilst transitions are, almost by definition, evolutionary in character, the absence of a shared understanding of what the transition involves risks fragmentation of activity and the privileging of those who are able to act. In addition, the decarbonisation discourse remains markedly aspatial, with limited consideration of the spatiality of a just transition. Where a spatial discourse can be identified this tends to focus on maintaining existing development paths, such as through the evolution of the Tata Steel plant in Port Talbot; alternative futures and the creation of new paths do not feature.

A challenge within the journey to an equitable transition is the financial support offered by the UK Government to the Welsh Government; a history of unfulfilled promises on large infrastructure projects leads to scepticism that the needed investment will be available. Indeed, there is a need for collaboration as the decarbonisation of the steel industry in South Wales goes beyond one actor. The delay in committing the resources to the steel decarbonisation agenda has put the industry at a competitive disadvantage in the international arena. It could be ventured that the local political situation has failed to engage with wider narratives. Indeed, one trade union engaged in Port Talbot highlights that there are a lot of unanswered questions in the workforce and that 'everybody will steal a march on us'. The need for government support is highlighted and that 'for our towns, our cities, our country and our planet – it is time for the government to step up and deliver'. Indeed, governmental bodies have two critical roles in innovation-led sustainability transition – shifting expectations or reducing the risk associated with green technology investment (Aghion et al., 2019). Whilst Governments can be at risk of over-reach (Hepburn, 2010; Aghion et al., 2019), if a market for a technology stalls, this amplifies the time period that government intervention is necessary (Aghion et al., 2019). It can therefore be inferred that in under-engaging with decarbonisation innovation, the resources required to encourage a just transition will also be increased.

A key finding of this study has been the strong sense of place attachment reported by respondents. Most see their future tied to Port Talbot, which is a place that currently provides a sense of life satisfaction. The absence of migration narratives in the survey comes not from inertia but a positive living environment. This is important in the context of a currently carbon-intensive industrial environment. However, the local expert panel identified that previous out-migration owing to reduced opportunities to access highly skilled and/or paid employment in the locality had eroded community infrastructure. Port Talbot, of course, is a place entwined with migration, as its current form and scale is the result of in-migration of steelworkers in the 1950s. Loss of place identity and control are the key challenges identified outside of innovation for steel decarbonisation. Very few coping strategies are highlighted in any of the research, outlining that changes are happening to Port Talbot as a place over which residents have little control, or a belief that they will not be personally impacted. Whilst narratives of exclusion are present in Port Talbot, these relate primarily to the Aberpergwm colliery. The long-term process of economic restructuring that has been taking place in Port Talbot since the 1980s comes from decisions made by exogenous parties, and the steel industry is a continuing example of the precarity of non-local decision-making, especially for just transition. This is a greater challenge for Port Talbot due to low job density and industrial diversification. In this regard, the decarbonisation debate can be imagined as one more chapter in the ongoing deindustrialisation and de-territorialisation of older industrial regions.

The local panel for the socio-cultural component also highlighted the major concern that exogenous private investments expose the local economy to decisions being taken elsewhere regarding the Tata Steel Works. This is seen as a particular risk due to the investment asked of Tata Steel to the UK Government (BBC, 2022) and the company being headquartered outside of the UK. Further, the Y Bryn windfarm proposal is driven by a private company not headquartered in Wales. There is strong local opposition to the development which includes visual impact, loss of green space, and limited local economic benefits. Here, a key area of concern was the lack of consultation with local residents – an area identified as problematic for procedural justice. This opposition is linked to the existing industrial landscape of Port Talbot, highlighting place attachment and the desire of residents to preserve valued aspects of their community – in this instance green space. Public sector investments to diversify the local economy also rely on external funds, including the Welsh Government previously utilising European Commission funds and now reliant on payments from the UK Government, highlighting the spatial scales at which sense of place may play out. A further stress identified in this theme is the overriding nature of a move towards a more neoliberal free market ethos. In this context the competitiveness of Port Talbot has been affected by low steel prices elsewhere. Similarly, public investment is often dependent on securing success in competitive bidding processes, which can work against more joined-up and long-term investment strategies.

The perceived lack of control is also found in the political sphere, where the major political party in Port Talbot for decades is now at odds with the party of the UK Government, the party of the UK Government is widely cited to be disconnected with the local ethos. Further, within Wales, there have been gradual changes to have larger administrative units across Wales. The panel cited concerns as to a loss of political identity for the town as administrative boundaries have gradually become larger units within Wales. This loss of granularity can pose a risk for distributive justice, as local issues could be masked by the larger trends. At a personal level, residents feel in control of their own futures, but an important minority do not feel in control or resilient to changing circumstances highlighting the subjective aspects of place attachment and 'just' transition. In part, these findings may reflect the make-up of the study's respondents, with an older demographic profile and few currently employed in the steel industry itself. It is plausible that older residents are more likely to be attached to place owing to deeper social ties and to the fact that they have 'remained' in place. However, whilst this population may be regarded as 'having less to lose' from an economic transition than younger populations it is also true that they may also be most affected by losses of local services emanating from economic decline.

The evidence shows that much of the approach to a just transition is at the scale of Wales, rather than targeting those places that stand to lose the most from the decarbonisation process. It therefore seems evident that a higher level of policy granularity is required. This scale is also problematic for residents who feel that they have a low level of influence in high-level decision-making. This is significant for place identity and attachment as residents have been subject to ongoing economic restructuring as a result of external forces for decades. This has led to a rise in community-based cultural activity amongst other strategies to compensate for the waning of place identity. This limited control manifests itself in resistance to non-local activities, even those that would contribute to decarbonisation that is much accepted as needed by residents, namely the

proposed windfarm. Decarbonisation trade-offs are accepted by residents, but the evidence suggests that there are limited opportunities for residents to manifest their own agency in driving a more just transition. Across Wales, the participatory process appears to rely on those organisations that are large enough to engage with the processes, without the introduction of systems to engage smaller organisations or individuals.

Related to the framework outlined in Figure 1, our study emphasises the current decoupling of the decarbonisation process and a just transition. In Port Talbot at least, the twin forces of place attachment and place identity do not currently connect to the decarbonisation agenda, possibly due to the very strength of the socio-technical narrative identified in this work. The lack of widespread consultation in Port Talbot continues to reinforce power imbalances, with a risk of exacerbating or creating new categories of exclusion. Whilst governance efforts drive towards decarbonisation at a Wales-scale, limited activities focus on mediating place identity and the geography of the transition. Likewise, the limited consultation with the community as to their socio-technical imaginings and a reliance on existing actors that were often external to Port Talbot can make it difficult to reconcile place attachment and achievement of a just transition. In interviews, key stakeholders stated that the transition, in practice, was being driven by siloed interests rather than driving for a transition that was equitable for the community. A more pluralistic and place-based focus is required if the costs and benefits of the decarbonisation process are to be more equitably distributed. This will also require inclusion of wider policy realms beyond those linked to carbon-intensive activities. By example, the potential to reimagine Port Talbot as an artistic and cultural center appears only to be imagined by locally embedded actors.

In undertaking this study, the authors were guided by a common methodology adopted as part of a European research project. The strength of the approach has been the ability to draw upon different insights into the decarbonisation process, combining socio-psychological, socio-cultural, socio-political, socio-economic and socio-ecological components. Together these provide a valuable overview of the transformative capacity and potential of the area, but offers only limited sampling across each of the components. This limitation provides scope for future research that addresses particular elements of the territorial dimension of the decarbonisation process. The spatiality of the 'net-zero' transition remains a work in progress. Our work demonstrates that whilst communities may lack the agency to make a material contribution to a just transition, they are not passive actors. Indeed, in the highlighting of the strength of community actions promoting cultural heritage, study participants point to potential new visions for positive territorial futures.

Conclusion

In all, it can be concluded that the residents of Port Talbot have a strong alignment with their sense of place but at the same time a high level of dependence on decisions made outside their place. The evidence outlines the importance of spatially attuned transition processes that introduce functions that promote local agency and ultimately spatial justice. In Port Talbot, limited opportunities are presented to the community by either the Senedd Cymru or Tata steel to engage with the transition process and outline characteristics that will facilitate a just transition. This loss of control is problematic and can be

categorised as an injustice. Indeed, it could be surmised that with the ongoing decarbo-nisation process the mobilisation of residents can make it possible to achieve a spatially just transition that resolves some of the issues highlighted here. It is notable that endogenous conflicts were not identified in the research, participants spoke more of the impasses and contradictions with other territorial scales.

There are, however, notable dissonances with strong support for biodiversity yet oppo-sition to an additional windfarm – this is perhaps attributable to the lack of local consul-tation and understanding of residents' attachment to place. The strategies adopted in Port Talbot to cope with these stresses center on the rise of self-narrated identities where residents seek to control the way in which their place is perceived. Local expert panel members recognised the importance of external actors for these goals but saw an emphasis on co-creation and co-governance.

Research participants were keen to highlight that although external perceptions of Port Talbot are characterised by territorial stigma, these stigmas were not perceived by residents outside of the visual cues associated with industrial pollution. The place identity dynamics recognised were a continuity of valuing heritage but at the same time carving a new identity. There is uncertainty as to the future of the territory, but not a crisis – dec-arbonisation is simply viewed as a factor of ongoing global trends which have become part of the ongoing economic restructuring experienced by Port Talbot. This is resulting in a growing push towards self-governance which could be considered a reaction to limited power to influence territorial processes, an opportunity for the community to express agency.

Multiple actors without an agreed roadmap can pose a great challenge for ensuring just transition, with residents aware of the likely uneven spatial impacts. As such, it is recommended that explicit focus on the spaces that will be subject to change as a result of decarbonisation is required, with spatial justice brought to the fore through local consultation, promoting local agency. There is a need to engage with locals to ascertain their visions of all possible futures for an old industrial region, not only the industry that is subject to decarbonisation. Indeed, there are gender pay disparities in Port Talbot due to the predominant makeup of steel employment, yet respondents did not identify gender challenges. This perhaps suggests a unique opportunity for just transition, highlighting the opportunities that come with a reimagining of a place. The dilemma and trade-offs between rapid transformations and inclusive development are evident in energy and climate transitions (Skjølsvold and Coenen, 2021), through undertaking transformations at pace, the ability to make decisions in participatory ways is eroded. This outlines a need to consider which processes need to be acceler-ated and those that are more beneficially undertaken at a slower pace in order to enable just transition that does not exacerbate spatial inequality or put pressure on citi-zens' attachment to place. Possible strategies could include a task force approach pre-viously used to address loss of industry (Bailey and MacNeill, 2008). Through creating detailed roadmaps for spatial hotspots of territorial decarbonisation, more effective pro-cesses of transformation can be achieved. This said, such processes must be supported by extensive community consultation and sufficient funding to ensure that the decar-bonisation process is just and representative of the community. Otherwise, as high-lighted in the case of Port Talbot, whilst there may be acceptance of change, there is no agency.

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