Making more of middles: advancing the middle-out perspective in energy system transformation

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Abstract

Social and technological innovations are commonly seen as either being induced from the 'top-down' – e.g., by policymakers – or evolving from the 'bottom-up' – e.g., by consumers. Instead, a 'middle-out' perspective (MOP) focuses on agents of change that are located in the middle, between the top and the bottom. Janda and Parag (2013) and Parag & Janda (2014) describe how middle actors include (but are not limited to) such groups as building professionals, religious congregations, and commercial property owners (Janda & Parag 2013; Parag & Janda 2014). In recent years, these and other authors have further developed the MOP to address providers of housing refurbishment (Janda, Killip & Fawcett 2014), heating engineers (Wade, Hitchings & Shipworth 2016), community-based organizations (Hamilton et al. 2014), facilities managers (Goulden & Spence 2015), social housing providers (Cauvain & Karvonen 2018), and actors involved in energy storage (Devine-Wright et al. 2017). This paper focuses on recent advances in the 'middle-out perspective'. It considers several new middle actor groups, including an energy committee for orthodox Jews in Israel (Parag 2018), code officials in India (Janda & Khosla 2018), formal social groups in Swiss cities (Blumer et al. 2018; Frick et al. 2017), professionals working with housing providers in Sweden (Reindl 2017), local authorities and delivery agents in Scotland (Bush, Wade & Webb 2018), and housing developers in the USA (Agee et al. 2018). These cases demonstrate new applications of the MOP, bring additional theoretical perspectives to bear (such as practice theory) and further develop the use of perspectives already recognized within the MOP (e.g., system of professions). By looking across these, this paper develops the MOP with respect to other work on intermediaries, professionals, and communities of practice. To increase practical use of the MOP, the paper encourages future authors to clarify both the direction and scale of middle-actor impacts.

Introduction

The socio-technical transition to a low carbon society is a long and complex process, which requires change and innovation in public policies, economic markets, organisational and social practices, values, norms and behaviour. How to promote multi-faceted innovations to enable and support this transition remains a challenge. Social and technological innovations are commonly seen as either being induced from the 'top-down'– e.g., by policymakers – or evolving from the 'bottom-up' – e.g., by citizens. Instead, a 'middle-out' perspective focuses on agents of change that can promote transition and which are located in the middle, in between the state and its citizens. The Middle-Out Perspective (MOP) developed by Janda and Parag (2013) and Parag & Janda (2014) shows that middle actors can affect change in several different directions: *upstream* to policymakers, *downstream* to clients or members and *sideways* to other middle actors (often by enabling and sharing new professional norms and working practices). By linking the top and bottom more explicitly, the MOP is both an alternative and complementary to existing 'bottom-up' and 'top-down' efforts to implementing low-carbon innovations and practices in society.

Further, the MOP hypothesizes that, relative to top and bottom actors, 'middle' actors may have a better balance of agency and capacity to make change. They may also influence the agency and capacity of other actors, positioned at the 'top', 'bottom', or 'middle'. 'Agency' refers to actors' willingness and ability to make their own free choices and 'capacity' refers to actors' ability to perform the choices they made (Parag, Zur & Raz 2017; Parag & Janda 2014). According to the MOP hypothesis, change is more likely to happen when actors' levels of agency and capacity are high; unlikely to happen when these levels are low and uncertain when there is a mismatch between levels of agency and capacity (one is high and the other low). These hypotheses were supported by Parag, Zur & Raz's (2017) recent field study about energy demand reduction in a collective community.

Compared to studies of the state or the citizenry, the MOP is a relatively new and evolving approach to understanding socio-technical energy transitions. It aims to find new ways of approaching existing or wicked problems (Rittel & Webber 1973). As such, the MOP has attracted a diverse range of research topics and field studies. The initial work of Parag and Janda described how middle actors include (but are not limited to) such groups as building professionals, religious congregations, and commercial property owners (Janda & Parag 2013; Parag & Janda 2014). In recent years, these and other authors have further applied and developed the MOP to address a number of other middle actor groups, including: providers of housing refurbishment (Janda, Killip & Fawcett 2014), heating engineers (Wade, Hitchings & Shipworth 2016), community-based organizations (Hamilton et al. 2014), facilities managers (Goulden & Spence 2015), social housing providers (Cauvain & Karvonen 2018), and actors involved in energy storage (Devine-Wright et al. 2017). However, there is still a need to explore how such varied applications work together to further develop the MOP concept.

As each new application slightly adapts the MOP's original ideas to suit their needs, these diverse uses could make the MOP seem somewhat amorphous. Like many other new theories in their 'construction' phase, the MOP needs further definition, critical reflection, and additional development. Borrowing from Börzel's (1998) phrase – it is time to 'organize Babylon' by making sense of the different conceptions of the MOP. This paper initiates the organising process, by reviewing findings from studies that use the MOP to focus on various aspects of the transition to lower carbon energy systems.

This paper develops the MOP by synthesizing and analysing six recent studies[i], which we use to draw insights about the MOP from crosscutting the papers' middle actor case conceptions. The six studies address several new middle actor groups, including: housing developers in the USA (Agee et al. 2018), building professionals working for and being contracted by a housing company in Sweden (Reindl 2017), formal social groups in Swiss cities (Blumer et al. 2018; Frick et al. 2017), local authorities and delivery agents in Scotland (Bush, Wade & Webb 2018), a "Kosher electricity" committee for orthodox Jews in Israel (Parag 2018), and advice cells for code officials in India (Janda & Khosla 2018). In addition to adding new cases to the literature, these papers further develop the use of per-

spectives already recognized within the MOP (e.g., system of professions), and bring new ones to bear (such as practice theory). We begin by describing the salient aspects of each case. The paper concludes with an analysis of the new insights produced by looking across all six studies. Overall, this paper aims to introduce readers to the use of the MOP, review its strengths and weaknesses, and build a stronger basis for its implementation.

What is a middle actor?

In this section, we organize the six studies into three categories: building professionals, municipalities, and niche governance groups. In each subsection, we introduce how the authors portray different groups as middle actors and reflect on opportunities the authors have seized (or perhaps missed) to use the MOP to expand the reach of their work.

BUILDING PROFESSIONALS: SOME MIDDLES ARE MORE EQUAL THAN OTHERS

Building professionals are one of the original groups that Janda and Parag (2013) consider to be capable of creating change from the "middle-out". The research summarized here examines the work processes and outcomes of two different types of building professionals – new build housing developers in the US and a project team in Sweden selecting housing renovation strategies. Both these groups aim to produce pro-environmental outcomes through their work.

Housing developers in the USA

Agee et al. (2018) focus their attention on Zero Energy Homes (ZEH) developers in the USA. They assert that builder-developers are middle actor organizations that can affect the development of ZEH through their choice of different construction methods. In particular, they are interested in whether the organizational form of "design-build" or "design-bid-build" is more effective in producing high performance housing. Design-build is a project delivery where one entity is responsible for both design and construction "in house." Design-bid-build is the more traditional form of construction, where a design is developed by one entity and others bid on the work to complete the construction. Agee at al. look at one firm of each type; each firm studied is engaged in producing new ZEH in Virginia, USA. Based on their analysis, the authors conclude that:

1. Zero energy builder-developers are important middle actors;

2. Design-build projects demonstrate improved team behaviour and project outcomes compared to design-bid-build teams;

3. Design-build teams are integrated, with common goals, resulting in reduced transaction costs and better performance records (Agee et al., p. 11).

The authors do not clarify how housing developers or their construction methods influence groups that are upstream, downstream, or sideways in the housing system. Instead, they focus mostly on assessing the quality of the housing created. Do different design and construction delivery methods result in different outcomes? Agee et al. (2018) say yes, design build is better.

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i. These papers were first presented in a panel at the 2018 BEHAVE conference in Zurich, Switzerland. This panel was the first dedicated effort to showcase research using the MOP.

We agree with the authors that the "builder-developer's organization system interacts with teams both internal and external to the organization" (Agee et al., p. 10). To make better use of the MOP, however, further work could be done on how builder-developers' internal and external interactions affect other actors in the housing system, either upstream to policy makers, downstream to customers, or sideways to other builder-developers. Agee et al.'s approach could also be expanded to consider how the agency and capacity of housing developers utilizing these different delivery methods affect the market in which they operate.

Swedish housing renovation project teams

Reindl's (2017) study concerns how and why energy efficiency and energy conservation strategies are integrated in building renovations. She followed the planning and design phases of three renovation projects by a municipal housing company in Linköping, Sweden. The housing company has a stated aim to reduce 25 % of the amount of energy it purchases by 2025, compared to its 2011 levels. The aim of Reindl's study is to investigate the promotion or rejection of energy efficiency and energy conservation strategies by building professionals and other actors in the planning and design phase. Her analytical framework combines the middle-out perspective (MOP) with a practice theory approach, as developed by Gram-Hanssen (2010) and Schatzki (1996).

Reindl's research augments the focus of the MOP from looking *between* organizations to looking within them. She finds that the renovation project group can exert influence upwards to the top of the housing company, downwards to tenants as well as sideways to other building professionals. External building professionals as architects, HVAC consultants or electricity consultants are not in-house and are thus contracted for a renovation project coming from the outside into the housing company. The building professionals participate in different construction project settings in Linköping and bring the knowledge from one project to another – sideways. The practice theory element of her study allows her to look at the meeting practice of the planning and design of renovation projects in greater detail. Interestingly, her full study shows that there is more potential for this project team to exert change from the middle-out than it actually uses (Reindl 2017). Another conclusion from this fieldwork is that the teams do not actually use many calculations in their negotiations (Palm & Reindl 2016). This suggests that quantitative "evidence" may play a secondary role to rules of thumb and intuitive expertise.

For the MOP, Reindl's work pinpoints a transition from agency (the ability to make decisions) to capacity (the ability to act), showing that project teams certainly function as middle actors within their system of work. The question is if the increased focus on energy questions in the housing company will have a similar effect in new projects as well as retrofits. Will the external consultants bring that experience to other projects in the future? Will there be a sideways influence in that way?

MUNICIPALITIES: HELP WANTED

Municipalities represent an obvious "middle" between national level policy and citizens. While varying in size, resources and power, cities and communities are increasingly cited as producers of local environmental activities, which fits well with the idea of middle actors having agency. However, what level of capacity do municipalities have? The cases summarized below focus on municipalities seeking to deliver environmental outcomes by engaging with other groups with (possibly) greater capacity to enact change. Two cases are considered: Scottish local authorities and delivery partners, and Swiss municipalities and formal social groups. These cases help us think about the possible limitations of municipalities as middle actors, and to contemplate whether and how their partners can be considered middle actors in their own right.

Scottish local authorities and delivery partners

As eco-renovation goals change from one-off houses of the willing and keen to area-based and cross-sector renovation of the building stock, those delivering retrofit need to reach more diverse buildings and occupants, but may not have prior experience in doing so. Bush, Wade and Webb (2018) focus on local authorities (also known as councils or municipalities) involved in the Energy Efficient Scotland Programme (previously known as Scotland's Energy Efficiency Programme), a large-scale nationally coordinated retrofitting programme. Under the Programme, local authorities (LAs) bid for funding to perform area-based retrofit projects, and then organise a network of partners and sub-contractors to assist in their delivery. Partners include charities, social enterprises and Arms Length External Organisations (ALEOs) who have expertise and established reputations in delivering aspects of energy efficiency programmes. Bush et al. apply ideas from Abbott's (2005) paper on *linked ecologies,* namely *hinges* and *avatars*, to understand the distribution of skills and responsibilities between LAs and delivery partners in their middle actor position.

Hinges are issues that can operate within different ecologies at the same time; they can hold different meanings and rewards for different parties. For local authorities, the Programme presented an opportunity for learning and leveraging additional funding, but was also seen as a burden amidst limited council resources. Meanwhile, representatives from delivery partner organisations saw it as an opportunity to develop their preferred projects, and build partnerships that could lay the ground for future work. *Avatars* describe the replication of the ideas and skills of one profession into a new ecology. For the delivery of the retrofitting pilots, some local authorities had a high level of in-house expertise, but this sometimes existed within specific departments and could be hard to find. Meanwhile, delivery partners have developed a series of avatars which complement local authority skill sets, for example, in the maintenance and analysis of data critical to the retrofit projects. These differences are symptomatic of mis-matches in the agencies and capacities of these two middle actor groups; with LAs holding management responsibility but delivery partners possessing readily accessible skills.

Thus, moving beyond existing retrofitting strategies brings questions about the location and distribution of responsibilities and skills amongst middle actors to the fore. Sideways interactions between these middle actors will be critical to the successful delivery of national policy objectives, and further exploration of the dynamics of these linked ecologies (for example, whether relationships are symbiotic, parasitic, mutualistic, or competitive) and the tensions in agency and capacity amongst these groups would be useful.

Swiss municipalities and formal social groups

Blumer et al. (2018) and Frick et al. (2017) consider how a municipality might promote behavioural change measures through a particular kind of peer-group: formal social groups (FSG). These authors define FSGs as:

> … locally active groups of individuals whose members meet face-to-face on a regular basis. They pursue a certain collective purpose or goal and are characterized by personal ties. Examples of FSG comprise sports and leisure clubs; music groups (e.g. choirs); youth and senior citizen groups; neighbourhood associations; political parties, charity and environmental groups. (Blumer et al. (2018), p. 48.)

An example of Blumer et al.'s work is three field studies, each focusing on a different FSG serving to promote a desirable energy behaviour: local district associations that encourage e-bikes, sports clubs that seek to reduce car usage, and swimming clubs that promote warm water saving.

Blumer et al see FSGs as middle actors with a distinct agency and capacity to exert influence in all directions: downstream (their individual members), sideways (other FSG and local businesses) and upstream (local policy). This activity (particularly upstream and sideways) occurs mainly through personal networks of FSG members who are business owners or local parliamentarians. The FSGs are not identified as shaping the types of behavioural changes. Instead they seem to serve as useful aggregator of its members to facilitate delivery of information, set norms, and provide an arena to diffuse the idea of sustainable lifestyles. The initiatives for each of the energy behaviours studied seem to come not from within the FSG but from outside in – particularly from municipal authorities.

From a MOP perspective, there is certainly a tension between seeing FSGs merely as delivery channels for municipal goals or as middle actors exercising their own independent agency and capacity. Furthermore, this case raises the question whether *any* influence a middle actor induces is a middle out one? Follow-up research to address these questions might explore whether the FSGs continue promoting sustainable behaviours amongst their members after the initial intervention period, and what are the mechanisms through which they induce a middle out change?

NICHE GOVERNANCE

Whether and how governments are adapting to climate change is a large topic. This section looks at two different evolving forms of governance around particular niches: Kosher electricity in Israel and building code officials in India.

Kosher electricity in Israel

In the case of Kosher electricity, Parag (2018) describes the customs of an ultra-orthodox Jewish group in Israel – the 'Misnagdim' – who practice Shabbat in a particular way. Shabbat is generally practiced by doing no work from before sunset on Friday to after sunset on Saturday[ii]. The Misnagdim require that their members practice Shabbat by disconnecting from the grid and connecting to batteries or diesel generators which are deemed

to be "Kosher". To be Kosher, electrical generators must stand alone and not require any "work" from Jewish people during Shabbat, including the grid. This practice is followed by about 50,000 households, which are relatively poor compared to the general population.

The 'Committee for matters relating to energy-use on Shabbos' (hereafter 'the committee') was formed a couple of years ago by the 'Misnagdim' leading figures. Parag (2018) identifies the committee as a unique middle actor in the Israeli energy arena: it does not seek profit, it has no interest in the environment, none of its members is a professional energy expert, and its sole interest in the energy world is the provision of kosher electricity to its members. However, the committee understands that in order to promote any solution – this solution needs to be sustainable, economic viable, and politically and publicly acceptable. For this, the committee needs to build a strong supporting network and apply a middle out strategy to collaborate with as many actors as possible. It operates in three directions: upstream (on the Israeli electricity regulation), sideways (on the Israeli energy private sector) and downstream (on the norm of electricity consumption during the Shabbat).

From a MOP perspective, the upstream and downstream effects of 'the committee' are clear. However, it is so unique that the sideways element is difficult to characterize. Most existing middle-actor research assumes a like-like sideways influence, but 'the committee' may not have any other similar groups to influence. Parag (2018) suggests that the private energy sector serves this role. However, incorporating this group as a middle actor might encourage the development of a new "diagonal" direction of influence to help account for unique groups that have no direct parallel.

Energy Conservation of Buildings Code (ECBC) Cells in India

India's Energy Conservation Building Code (ECBC) is the primary regulatory instrument designed to achieve energy efficiency in new construction. Energy codes must be implemented to be effective, however, and to be fully effective in India this requires formal adoption by 35 different Indian states and territories. In the last 10 years since the ECBC was enacted, only seven Indian states have formally adopted the ECBC, and almost none see widespread compliance. In response, state-level "ECBC Cells" are being set up and supported by international aid agencies to coordinate code adoption and build capacity for implementation. Since 2015, three ECBC cells are functional and four more are underway.

Janda and Khosla (2018) focus on the development and operation of these ECBC cells, which recognize the importance of code officials and their institutions as essential "middle actors" in managing the energy transition in India's building stock. Their research recognizes that "code officials are people, too" and seeks socio-technical ways to support their work practices.

The authors find that implementation of energy codes is limited by the agency and capacity of code officials at the local level. They argue that creating an ongoing, multi-level code community (of which the ECBC cells are currently a part) could help develop and grow this scarce social capital. In particular, they recommend providing more opportunities for code officials and ECBC cells to work *sideways* to share knowledge across state boundaries, as state-level energy code officials do in the United States. Such knowledge networks are also ide-

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ii. Often, the Shabbat follows or is followed by a religious holiday, in which the same 'kosher electricity' rules apply. This means that the disconnection from the grid is longer than 24 hours, and could last even 72 hours.

ally suited to share experience *downstream* to cities, where the implementation and enforcement of the code needs to happen regularly at a local level. These ECBC knowledge networks are essential for India to seize a narrow window of opportunity to lock-in low-carbon construction practices across one of the world's most rapidly urbanizing and populous countries.

From a MOP perspective, these authors see code officials as middle actors and ECBC cells as intermediaries, specifically created to augment the expertise of the code officials over the short term. In the longer term, the authors expect code officials themselves to develop more agency and capacity as the knowledge networks catalysed by the ECBC cells take root.

Conclusions and next steps

A strength of the MOP is that it has attracted a diverse range of research topics. A corresponding weakness is that it is somewhat amorphous. This is not necessarily a fatal flaw; instead, it opens avenues for developing and strengthening the MOP as a more robust theory of socio-technical transition, from which practical strategies could be drawn to approach both new problems (like peer-to-peer trading), as well as old problems, such as improving energy efficiency or achieving energy sufficiency.

The studies we reviewed raise some fundamental questions as well as terminological issues requiring further investigation and elaboration. First, simply declaring that an actor is "in the middle" does not necessarily provide insights into how transitions may grow or develop from this group. Some of the research collected here, for example, has been quick to pronounce that a group is a middle actor without carefully articulating the system that this group is in the middle *of*, or how the broader system might be influenced by changes to or activities initiated by the middle actor. Some important questions for further research include: Are the subject groups of interest to researchers *really* in the middle, or are they just understudied? Are there degrees of middle actors? For example, if two groups could be seen as middle actors, which one is "better" in promoting or discouraging change, the one with more agency or the one with more capacity?

Second, it seems that there is an underlying assumption in most of the studies presented here that middle actors are normative actors working toward achieving a 'good' and common goal, like mitigating climate change. In fact the opposite might be true and middle actors are not necessarily devoted to making positive environmental change. Further research is needed to explore how this influences the case conceptions and the research results.

Third, the studies presented here portrayed a snapshot of reality. As such they did not examine the dynamics between actors' agency and capacity over a period of time. For example, while building professionals might have always had capacity, their agency to promote an energy transition might have grown over time (e.g. triggered by authorities, new business opportunities, or concerned individual members of that group). Further research over a longer period of time will allow further examination of the changes in actors' agency and capacity, as well as in the effectiveness of a middle-out induced change over time.

Last, facing the immense challenge to become a low carbon society forces us to apply more and better transition strate-

gies. A better understanding of the MOP and the mechanisms through which middle actors induce a middle-out change could help us design additional fit-for-purpose and effective transition strategies.

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