A heuristic for conceptualizing and uncovering the determinants of agency in socio-technical transitions

Journal Article

Author(s):
Duygan, Mert; Stauffacher, Michael (iD); Meylan, Grégoire

A heuristic for conceptualizing and uncovering the determinants of agency in socio-technical transitions

Mert Duygan[1], Michael Stauffacher*, Grégoire Meylan[†]*

[*]Department of Environmental Systems Science, Transdisciplinarity Lab, ETH Zurich, 8092 Zurich, Switzerland

[†]School of Management and Law, ZHAW Zurich University of Applied Sciences, 8401 Winterthur, Switzerland

ABSTRACT

There has been a growing interest in transition studies on the role of agency in bringing about disruptive change. Previous studies have examined how actors perform institutional work to create legitimacy and transform institutions. In doing so, they have provided insights into specific practices and strategies that actors follow. This paper seeks to complement existing studies by elucidating the foundations of agency that transforms institutions through institutional work. Drawing on institutional sociology and organizational studies, resources, discourses and networks of actors are identified as key elements enabling institutional work practices. The agency of each actor is conceived of as dependent on the configurations it possesses with respect to these elements. A heuristic is presented that helps to determine the configurations associated with a strong agency in empirical settings and use Swiss waste management as an illustrative case example. The heuristic enables a systematic analysis of agency across different organizational fields.

Keywords: Agency, institutional work, institutional entrepreneurship, social networks, discourses, resources

---

[1] Present Address: Political Economics of Energy Policy, University of Basel, 4002 Basel, Switzerland

1.   Introduction

Transitions of socio-technical systems require considerable changes along institutional, technological, organizational, political and socio-cultural dimensions (Markard, Raven & Truffer, 2012). Since these long-term, fundamental changes lead to the transformation of regimes that are institutionalized socio-technical structures, transitions can ultimately be defined as processes of institutional change with a particular orientation on technologies (Fuenfschilling & Truffer, 2016). Following this perspective, *transitions* can be viewed as an outcome of a struggle of individual and collective agency to shape technical and institutional structures that influence the extent, pace and direction of change in socio-technical systems. Despite growing attention in the field in recent years (Patterson et al., 2017), transition studies have been criticized for their general tendency of not giving enough attention to political dimensions, actors as well as their agency and power struggles (Farla, Markard, Raven, & Coenen, 2012; Patterson et al., 2017; Shove & Walker, 2007; Smith, Voss, & Grin, 2010; Upham et al., 2018). Although the co-evolution of technologies and institutions has been extensively examined in transition studies, less attention has been paid to the interplay between institutions and actors (Fuenfschilling & Truffer, 2016). Thus, an explicit focus on agency can bring new insights into the stability and change of socio-technical systems. In particular, building on the premise that transitions involve institutional changes, a focus on agency can explicate how these changes can be initiated and which actors can take the lead.

Previous studies on agency in transition literature have mostly dealt with how actors engage in creating, disrupting and maintaining institutions. These purposive actions and strategies are known as *institutional work* (which as a concept extends upon institutional entrepreneurship) and include activities such as building narratives, forming networks, lobbying, mimicry, valorising or demonizing and experimentation in the creation, disruption or maintenance of institutions (T.B. Lawrence & Suddaby, 2006). Although existing studies make important inroads into the role of agency in transitions and particularly the transformation of institutional structures – as well as the strategies and forms of institutional work deployed for that purpose – they do not answer the question of what conditions or factors enable these institutional work practices. In other words, while prior contributions on institutional work have helped to explain the *means* of transforming institutions, our study aims to elucidate the *foundations* of these means and, thus, to bring complementary insight into the on-going research on agency.

To fulfil this objective, this study addresses a central question: *what are the key constituent elements of agency that are relevant for maintaining, disrupting, changing or creating new institutions within the context of socio-technical transitions?* To identify the foundations of agency, we draw on related strands of literature in institutional sociology and organization studies (i.e. institutional entrepreneurship and institutional work) that deal with how organizational processes and institutions are shaped by strategic action (Garud, Hardy, & Maguire, 2007). By reviewing the key activities and strategies mentioned in the literature, we deduce three main categories, which we call key *constituent elements*, that are pertinent for the realization of these strategic actions that transform institutions. These key constituent elements are 1) resources that an actor can deploy, 2) discourses that convey one's beliefs, interests and visions, as well as serving as a means of persuasion and collective sense-making, and 3) social networks that indicate the position and relational stance of an actor with others. We conceptualize the agency of an actor as its capability to impact institutions, with capability being derived from the configuration of these elements. The heuristic[2] we developed enables us to uncover configurations associated with strong agency. Thus, our objective is not only to identify actors with

---

[2]In this context, we conceive of the heuristic as a conceptual tool serving or aiding the analysis of agency in empirical settings.

agency in a system but also to bring explanatory insight into what constitutes the strength of an actor's agency or, expressed differently, what determines why one actor has more agency than others.

While resources, discourses and social networks can be examined independently – and there are indeed examples in transition literature that used discourse analysis (Bosman, Loorbach, Frantzeskaki, & Pistorius, 2014; Fuenfschilling & Truffer, 2014; Markard, Suter, & Ingold, 2016; Smith & Kern, 2009) and social network analysis (Binz, Truffer, & Coenen, 2014; Morone, Tartiu, & Falcone, 2015) – our claim is that an analytical framework that integrates the analysis of these three constituent elements can provide a more comprehensive view of agency. We expect that, depending on the empirical setting, institutional arrangements, socio-political context and types of institutional change, the configurations associated with strong agency might vary. On the other hand, certain configurations could also stand out as relevant irrespective of differing empirical settings and, thus, be considered robust patterns. Hence, our heuristic can enable a systematic analysis that elucidates which configurations are associated with strong agency, how sensitive they are to changing contexts and what relational patterns emerge between contextual elements and configurations.

In this study, we will provide an illustrative case of Swiss waste management to exemplify how the heuristic can be applied in an empirical analysis. Swiss waste management provides an interesting example, as a major change has recently occurred in regulative institutions, implying an important transformation in the social structure. The Technical Ordinance on Waste, which dates back to 1990, underwent a total revision, and the new ordinance came into effect in 2016. As the single most important policy event of last few decades in the waste management sector, the process of its adoption provides ample opportunities to study a battle over field-level institutions (T.B. Lawrence & Suddaby, 2006) and agency of actors determining the outcome of this process. We will demonstrate how the heuristic can help to formulate hypotheses regarding which actors might have the stronger agency to shape such institutional processes.

The paper is structured as follows. Section 2 presents the state of the art in transitions literature for institutional work and also introduces insights from institutional entrepreneurship literature as theoretical background. In section 3, we present the heuristic. In section 3.1., we introduce four presuppositions on which our heuristic rests as ontological basis, and we elaborate on the key constituent elements of agency in section 3.2. In section 4, we introduce the illustrative case of Swiss waste management to exemplify the insights our heuristic can yield. In discussion, in section 5, we elaborate upon the relevance of the heuristic and some important methodological issues relevant for its operationalization in different empirical settings. Finally, the conclusion in section 6 highlights the relevance of the heuristic to transitions literature and to a broader audience, including stakeholders and policymakers.

2. State of the art

One of the notable aspects that differentiates transitions of socio-technical systems from technological transitions is institutional change (Markard et al., 2012). While path dependency, technological paradigms and organizational routines have long been the central aspects explaining change, complementary insights have been provided by recent works that elucidate social structures and institutions. This trend can also be observed in the definition of *regime*. In contrast with some earlier works that describe *regime* in terms of material structures, more recent works provide definitions based on institutional terms, emphasizing dominant rules and institutional logic for the conceptualization of *regime* (Fuenfschilling & Binz, 2018). As the analysis of institutional structures and institutional change has started to gain more focus in transition research, understanding the role of agency and how it is constituted gain a paramount importance.

Institutions comprise written (i.e. codified) und unwritten (i.e. tacit) rules, including regulations, norms and practices that are taken for granted, as well as elements of political structures and traditions that determine which roles actors can have and how decision-making (e.g. in public policy processes) is conducted. Scott (1995) has conceived of institutions as comprising regulative, normative and cultural-cognitive elements that constrain and shape the behaviour of actors. As a social structure, institutions provide a certain degree of stability and regularity. The notion of *embedded agency* (Garud et al., 2007; Sewell, 1992) asserts that while actors operating in an institutional field are bound to such structural constraints, they nevertheless also possess varying degrees of capacity to construct and shape institutions, denoting their agency. Even though structures may have a *longue durée* effect (Geels & Schot, 2007; Geels, 2011), their permanence and even their legitimacy are dependent on interactions among actors and their agency that reconstitutes, redefines or reforms these structures on a continuous basis, which is called *structuration* (Giddens, 1984). This perspective eliminates the dualism between object-based and subject-based social theories, as well as the conception of structures as forces external to human actions (Haugaard, 2002). In a similar vein, Jepperson (1991) has described institutions as a product of purposive action, be it intentional or otherwise. While institutional theory has long dealt with how institutions influence organizations and behaviour of individual and collective actors, how actors can in turn impact institutions has been largely overlooked (Battilana, Leca, & Boxenbaum, 2009b). Two important concepts emphasizing the role of actors, their purposive action and strategies in transforming institutions are institutional entrepreneurship (Battilana et al., 2009b; DiMaggio, 1988; Eisenstadt, 1980; Garud et al., 2007) and institutional work (T.B. Lawrence & Suddaby, 2006). Such a focus on endogenous change to institutional studies was actually already followed by earlier works of old institutionalism (Selznick, 1949, 1957) but this was eventually eclipsed by studies focusing on exogenous shocks as explanations for institutional change (Battilana et al., 2009b; T.B. Lawrence & Suddaby, 2006).

2.1. Agency in shaping institutions: Perspectives from institutional entrepreneurship and institutional work

The notion of *institutional entrepreneur* is used to denote individual or collective actors who leverage resources to create or transform institutions (Battilana et al., 2009b; DiMaggio, 1988; Garud et al., 2007; Steve Maguire & Hardy, 2006). Hence, *institutional entrepreneurship* can be understood as the strategic action exerted by actors who have an interest in a particular set of institutional arrangements and use their agency to pursue them (Levy & Scully, 2007; Steve Maguire & Hardy, 2006).

Even though it has attracted growing attention in institutional sociology over the years, institutional entrepreneurship has also been criticised for its conception of institutional change as the attempts of few rational and powerful actors who are portrayed as institutionally disembedded, hyper-muscular, heroic species (T.B. Lawrence, Suddaby, & Leca, 2009). Drawing on insights from institutional entrepreneurship, Lawrence and Suddaby (2006) have introduced a new concept called *institutional work* to bring the increasing number of studies together under a common umbrella and to extend upon the strengths of institutional entrepreneurship while overcoming its aforementioned limitations (Battilana & D'Aunno, 2009a; T.B. Lawrence et al., 2009). As a refinement, institutional work focuses on practices relevant to creating, maintaining and disrupting institutions. These practices do not necessarily lead to accomplishment of creation, maintenance and disruption of institutions. According to Lawrence et al. (2009), this shift in focus from accomplishment to practices is not trivial as it opens up the possibility of taking into account not just powerful actors, but a diverse set of them, and thereby enables to adopt a broader understanding of agency. Reviewing the empirical studies in institutional literature, Lawrence and Suddaby (2006) have identified numerous distinct sets of practices representing different forms of institutional work and grouped them as creating, maintaining and disrupting institutions. The practices that are considered relevant for creating institutions involve

practices that reconstruct rules and property rights and reconfigure beliefs systems and abstract categorizations determining meaning systems. Practices attempting to maintain institutions target social mechanisms that enforce compliance with rule systems and the reproduction of norms and beliefs systems. Finally, the less researched phenomenon of disrupting institutions involves practices that aim to disengage rewards and sanction mechanisms associated with a set of rules, technologies and routines.

2.2. Previous studies in transition literature about institutional work

There has been recent growing interest in transitions research on the role of agency in transforming institutions. Drawing mainly on insights from institutional entrepreneurship and institutional work, some of these studies have explored purposive actions and strategies deployed by actors to create legitimacy and shape institutions in favour of a particular technology or management practice. These studies can be grouped under longitudinal and comparative research design. The former group of studies investigated how the transformation of a sector (Brown, Farrelly, & Loorbach, 2013) or creation of legitimacy for a certain technology (Binz, Harris-Lovett, Kiparsky, Sedlak, & Truffer, 2016; F. W. Geels & Verhees, 2011) has been realized through long-term strategic action. Such research has unravelled the institutional work and other mechanisms of action adopted by actors in different transition phases to overcome opposition and socio-cultural barriers. By covering longer time spans, these studies have elucidated how actors change their strategies and actions in response to unfolding dynamics on technical and socio-political dimensions. On the other hand, comparative case studies have yielded insights into the struggle of rival technologies competing for dominance within a national sector (Fuenfschilling & Truffer, 2016) and differences observed among institutional work or in general forms of strategic agency performed in different regions (Werbeloff, Brown, & Loorbach, 2016) or in different countries (Jolly, Spodniak, & Raven, 2016) to transform a given sector.

While these studies have made important contributions by determining specific forms of institutional work that actors perform, one aspect that has yet to be addressed is what factors enable or orient actors towards these specific practices. We believe this is an important issue to be explored as actors, depending on their attributes or particular relations with contextual factors, might be inclined or predisposed to certain practices or have better chances of being effective with respect to some practices than others. Hence, rather than having limitless access, actors might be bound to carry out certain forms of institutional work which eventually determines the particular strategies they are able to follow. For instance, as lobbying activities are known to be associated with financial resources (McKay, 2012), it is unlikely that actors with inadequate resources will adopt lobbying as their core strategy and have large impact (Binz et al., 2016). Given that the institutional work approach focuses exclusively on the action to impact institutions (T.B. Lawrence et al., 2009), consideration of enabling factors can provide complementary insight not only into understanding the foundations of these practices and, thus, the agency of actors, but also into discerning its institutional origins. The latter aspect is particularly important for uncovering the recursive relation between action and institutions.

2.3. What enables institutional work/entrepreneurship practices?

Insights into enabling conditions for agency can be grouped into three levels – field, organizational and individual – with the latter being the least researched among them (Battilana & D'Aunno, 2009a). Studies that explored field-level conditions have identified crises, social upheavals, technological disruptions, regulatory changes and the pressure of facing complex problems, as well as the degree of institutionalization of values and norms, as factors contributing to the emergence of deviant agency. At an organizational level, the position in the organizational field or institutional environment has been mentioned as an important condition. Previous studies have found organizations on the periphery to be

more likely to engage in transformation of institutions (Battilana & D'Aunno, 2009a; Leblebici, Salancik, Copay, & King, 1991).

With this research, we seek to contribute to the understanding of individual level conditions that set the foundation and act as means of realizing institutional entrepreneurship or institutional work. For this purpose, we considered one of the highly cited review article in the field (Pacheo, York, Dean, & Sarasvathy, 2010) as a gateway to broader literature and enquire what activities or features mentioned in relation to institutional entrepreneurship /work. Table 1 below provides an overview of this review. An appraisal of these activities and features mentioned in the literature point out to resources, discourses and networks as the encompassing categories of key endowments. Similarly, a review of institutional work forms (Lawrence and Suddaby, 2006) also betokens these three elements. For example, the practice of mythologizing, defined as 'preserving the normative underpinnings of an institution by creating and sustaining the myths regarding its history' (Lawrence & Suddaby, 2006, p. 221), requires a delicate articulation of discursive elements. Likewise, a successful practice of advocacy, denoted as 'the mobilization of political and regulatory support through direct and deliberate techniques of social suasion' (p. 230), might be contingent on the possession and mobilization of financial and political resources (e.g. allocative and authoritative resources), as well as allies embedded in social networks. As a result of these reviews, we deduce that actors, in essence depend on their resources, networks and discourses to perform the institutional entrepreneurship and institutional work activities. Hence, we consider them as the individual level enabling conditions, or in other words, the foundations of actors' agency that enables them to carry out institutional entrepreneurship or institutional work. We elaborate on these elements in the next section, in which we introduce our heuristic. By focusing on the foundations on which the practices of institutional work rely, the heuristic seeks to give explanatory insight into actors' abilities to shape institutional structures.

3.   Heuristic

The main goal of our heuristic is to facilitate an analysis of agency in cases of major institutional changes such as transitions. This entails understanding how agency is constituted on an actor basis, what differences are observed among actors, how agency is distributed in an organizational field (i.e. policy subsystem) and which elements stand out for a strong agency. Referring to the latter aspect, the heuristic defines *agency* as the capability of transforming institutions through institutional work. This capability of actors is conceived to be derived from a combination of the three constituent elements, namely, resources, discourses and networks. The heuristic is presented in two sections. First, the ontological basis of the heuristic is presented in section 3.1. The constituent elements, the complementarities among them, and their link with different forms of institutional work are introduced in section 3.2.

3.1.   Presuppositions of the heuristic

In this sub-section, we present the presuppositions that our heuristic rests upon and clarify how agency is conceptualized within the heuristic. As such, these presuppositions can be seen as the building blocks or the ontological basis of our heuristic, which also informs the analytical focus adopted for its application in empirical settings.

First, agency is considered to be relational. It is not an entity in itself, but it comes into being as a result of the interaction between actors and social and physical structures they construct. In Emirbayer and Mische's words (1998, p. 874), '[A]gency is always a dialogical process by and through which actors immersed in temporal passage engage with others within collectively organized contexts of action'. Furthermore, the relevance of an actor's agency can meaningfully be assessed only in relation

to another actors' agency. This means that actors have varying degrees of agency (e.g. actor A can have more or less agency than actor B) and the strength of an actor's agency is always relative to another actors' agency in the field.

Table 1. Activities or features mentioned in relation to institutional entrepreneurs by different scholars. Resources, discourses and networks are deduced as three broad categories that are essential for the attributes or key activities provided in the second column.

Sources in the literature	Key activities or features mentioned in relation to institutional entrepreneurs	Resources	Discourses	Networks
Fligstein (1997)	Social skills (inducing cooperation with providing common meanings and identities)		X	X
DiMaggio (1988)	Garner resources, mobilize constituents, frame issues	X	X	X
Rao (1998); King & Lenox (2000); Lenox (2006); Lawrrence & Philips (2004); Zilber (2002, 2007)	Framing and use of discourse to create legitimacy for new forms and practices		X	
Beckert (1999)	Superior resources, knowledge, strategic position in social networks	X		X
Rao et al. (2000)	Identification of political opportunities, framing of problems, mobilization of constituencies		X	X
Greenwood et al., (2002);Lounsboury (2002); Markowitz (2007)	Theorization		X	
Maguire et al. (2004)	Legitimacy (position driven), bridging stakeholders to gain access to resources			X
Dorado (2005); Seo & Creed (2002)	Background, experience and social capital	X		X
Maguire & Hardy (2006)	Theorizing new practices through discursive and political means and institutionalizing these practices by binding them to the routines and values of stakeholders	X	X	
Levy & Scully (2007)	Shaping organizational, material and discursive forces	X	X	X
Battilana et al., (2009)	Articulation of visions, mobilization of allies		X	X

Second, agency can exist both as an individual and as a collective feature. This means that the unit of analysis can either be individual actors or collective actors, such as organizations. However, the notion of individual agency should not be seen as a feature that each actor develops independently. Even when we talk about the material resources that an actor possesses, they actually represent a broader constellation of human actors such as manufacturers, suppliers and distributors, as well as non-human, material-technical artefacts, including raw materials, machines and algorithms (Latour, 2005; Law, 1992).

Third, agency is conceived of as the capability of actors to impact institutions through institutional work[3]. This capability is derived from the endowments of actors with respect to resources, discourses and networks, which are considered as the key constituent elements of agency. Each actor features a unique configuration of these elements (i.e. particular patterns or arrangements of these constituent elements), acting as individual-level enabling conditions for institutional work, thereby setting the foundation of actors' agency. Through the institutional work they enable, some of these configurations may be associated with strong agency as necessary and/or sufficient conditions. This relation is likely to vary from one organizational field to another as the relevance of different forms of institutional work is expected to change not only with different development stages of innovation systems (Binz et al., 2016) but also with institutional settings. The latter can further affect the distribution of resources and, thus, the agency of actors. This means that, although the constituent elements are complementary, actors do not need to be superior in every aspect to exhibit a strong agency. For instance, in a field that is run by a corporatist style of decision-making (Sciarini, 2015), material and non-material resources might count more than discursive elements as covert forms of advocacy, such as lobbying, might be more relevant than other forms of institutional work that are primarily based on discourse or social networks. This might lead to the mobilization of resources to be sufficient and thereby making a well-articulated discourse or a strong integration in social networks unnecessary.

Fourth, agency is seen as a continuum, a process that unfolds with the exercise of power. This presupposition rests on the view that power is generated from the structuration processes (Giddens, 1984), and because structuration occurs through human action – which in some instances might indeed not be fully purposive or intentional – power is seen as the expression of agency. The idea accompanying this view is that power is ubiquitous, actively generated (Giddens, 1984; Parsons, 1963) and performed rather than existing purely as a capacity to act (Latour, 2005). To be clear, some actions that reproduce structures might not be carried out with that intent in mind and instead result from unconscious, taken-for-granted beliefs (e.g. habitus) or purely self-driven interests. However, power generated from the reproduction and enforcement of these structures can be ascribed at least to the agency of those who enable or reward such actions, which eventually become internalized and routine, uncontested practices in a field[4].

Similarly, one can also think of the constraints imposed by physical–material structures or technical artefacts as a power exercised by those actors who legitimized, planned, financially supported and

---

[3] Here we do not exclude institutional entrepreneurship but we prefer to use institutional work as the latter not only originates from the former but also presents a more refined understanding with broader focus on practices that are not necessarily result in successful transformation of institutions (see section 2.1.)

[4] This act corresponds to the third face or dimension of power, known as the invisible, covert face of power (Lukes, 1974). The other two dimensions of power are Dahl's conception (1961), which is getting someone to do something that would otherwise not be done and Bachrach and Baratz' second dimension (1962), which adds the ability to keep some issues or people off an agenda or out of a decision-making setting. For instance, a regulatory framework imposing and constraining certain actions that would go against the interest of some actors could be viewed as an exercise of power resulting from the actions of those who initiated it: the interest groups that lobbied for it, authorities that ensured its enforcement, constituents that voted for it and any other actor who resisted a change or kept it off the agenda.

constructed these infrastructures over future generations (Avelino & Rotmans, 2011). Obviously, not all of the action contributing to structuration has a strategic nature. Yet, not only elites but even common actors – for example, construction workers or engineers – get their share of power generated from structuration in the forms of wages, social security, career opportunities and reputation. This implies that social structures, such as institutions and also physical–material structures, might constrain behavioural options, but they do not exercise power per se. Rather, actors who constitute and reproduce these structures through their agency are the ones exercising power. In other words, it is the agency of actors who give 'life' and 'meaning' on a continuous basis to social and physical structures that transmits power among actors. Therefore, institutions become both the outcome and the medium of agency. This condition is explained by Arts and Tatenhove (2004): 'Structures, orders and institutions cannot act, nor do they mechanistically determine the conduct of agents. They affect human conduct through human conduct' (p. 351). Adoption of an actor-based perspective of power (Hayward & Lukes, 2008) in this heuristic does not draw attention away from institutions and their profound impact on the behaviours and decisions of actors; instead, it ascribes power to actors who are embedded yet can, to varying extents, impact institutions through their agency.

3.2. Key constituent elements of agency

By identifying resources, discourses and social networks as the three broad categories pertinent for the conduct of specific actions labelled as 'institutional work'(see section 2.3), we conceive of them as the key constituent elements of an actor's agency (see Figure 1). In this section, we elaborate on each of these elements, their interrelations and their links with different forms of institutional work (see Table 1).
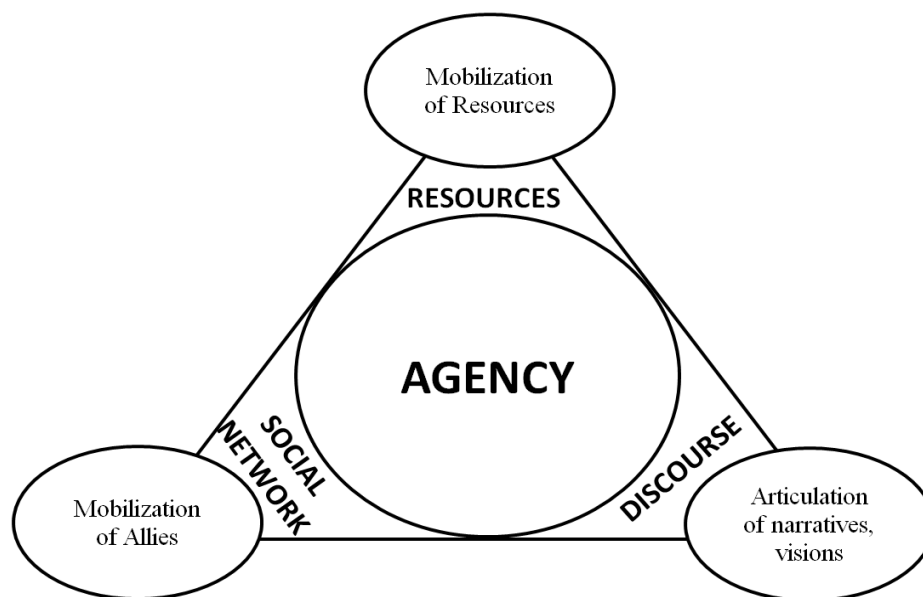

Figure 1. Key constituent elements of agency: resources, discourses and social networks

Resources

The distribution of resources in socio-technical systems has substantial importance for the display of agency. Strategy formation and the resulting action of actors in an organizational field are bound by the resources they and other actors possess. Regarding agency in socio-technical systems, four different types of resources can be inferred as notable: physical–material, financial, intellectual and authoritative (Avelino & Rotmans, 2009; Farla et al., 2012). *Physical–material resources* consist of

the physical and technical artefacts, such as raw materials, technological elements or infrastructures, that actors can develop, own and operate. Actors can have an abiding effect on a socio-technical system through the mobilization of these resources. Considering the lifespans of large-scale infrastructures and the substantial investments and long-term contracts made to ensure a return on investment, technology suppliers and operators can trigger a lock-in in their favour and benefit from path-dependency in the long run. Although technological innovation might provide superior alternatives, it is difficult to instigate a radical change once a hegemony is established that constrains the options available for generations to come (Kemp, Schot, & Hoogma, 1998; Windrum, 1999). Some examples of historical lock-ins that are still prevalent today are internal combustion engines, the centralized provision of public goods (e.g. water, energy), antibiotic drugs and nuclear energy. *Financial resources* constitute the capital, funds and monetary stocks that actors possess and are known to be crucial for activities such as lobbying or running large-scale media campaigns. *Intellectual resources*, on the other hand, refer to the mental abilities, expertise, know-how and experience an actor possesses. Finally*, politico–judicial resources* encompass the formal authority actors hold that facilitates their access to decision or policy-making venues or political instruments, such as veto or referendum. Resources can be particularly important for forms of institutional work such as *advocacy*, *defining*, *vesting*, *educating*, *enabling work* or *disconnecting sanctions* (T.B. Lawrence & Suddaby, 2006).

Discourses

The discourses of actors may contain elements of their beliefs, interests, expectations and visions drawn together to create storylines. Through these storylines, actors in a field construct meanings and frame how issues should be perceived and addressed (Smith & Kern, 2009). Hence, discourses are an important aspect of agency, and their role in policy change is highlighted by Hajer (1995, p. 56): '[P]olitical change may therefore well take place through the emergence of new storylines that re-order understandings. Finding the appropriate storyline becomes an important form of agency. According to Hajer (1995), discourse is not only about arguing for different policy solutions but also about defining what the problems are in the first place, making sense of them and defining who is responsible for them (Benford & Snow, 2000; Entman, 1993). Building on this argument, it has been suggested that discourses may have profound effects on articulated beliefs and interests by giving shape to social and natural realities. Furthermore, discourses can also influence behaviour by providing society with models of good and bad behaviour[5] (F. Fischer, 2003).

Discourses are also claimed to play a critical role in creating the legitimacy of an innovation through the articulation of visions, expectations and framing. As powerful institutional forces, collective expectations and visions are deemed to influence the development of novel technologies and their diffusion (Konrad, Markard, Ruef, & Truffer, 2012). Geels and Verhees (2011) have argued that shared visions have an impact on the alignment of interests, framing of problems and mobilization of support. Actors are conceived to be involved in collective sense-making by interacting over and debating issues, as well as performing cultural action in forums, such as public debates and media,

---

[5] This perspective on discourse relates to social constructionism, which claims that individuals or groups jointly construct reality by drawing on perceptions and interpretations and using language to reify their perceived views of reality (Leeds-Hurwitz, 2009). Acknowledging the social-constructionist epistemology, discourses can be seen as a means of identifying not only actors' views on artefacts but also how they create them. Discourses thus reveal not only the position of actors against the status quo but also the status quo itself as a construct (i.e. what structural elements are drawn together, how they relate to each other and in what ways and to what extent they are contested; (Hajer, 1995).

where they struggle to influence the attitudes, feelings and opinions of other relevant actors, such as policymakers, investors and the wider public. Discourses can therefore be used to influence the cognitive space. Frames compete on the public stage to influence the collective discourse, with some being more salient and flexible than others. Berkhout (2006) has also acknowledged the importance of an active construction of visions and their functions in systems innovations. Visions are claimed to have several different functions in system innovation, including 1) mapping the probability space, 2) serving as a heuristic for defining problems and viable solutions and 3) acting as a metaphor and narrative for bringing actors and resources together. Berkhout (2006) has argued that collective visions of change emerge as resource-dependent actors seek to engage other actors in their strategies.

In consideration of these aspects, discourse as a means of mobilizing normative and cognitive elements in the form of narratives, can be a key element enabling many different forms of institutional work relevant for creating, maintaining and disrupting institutions. Some examples of institutional work that rely directly on discourses *are constructing identities, changing normative associations, mythologizing, theorizing, valorising and demonizing, disassociating moral foundations* and *undermining assumptions and beliefs* (T.B. Lawrence & Suddaby, 2006).

Social networks

The third constituent element of agency is the social networks formed by relational patterns among actors. The distributed agency concept highlights that there is no single inventor or designer but instead multiple agents trying to influence the course of transitions. Success in initiating a transition may depend on whether there is a sufficient distribution of competence for strategic agency and a connection among competent, yet limited, agents (i.e. limits on their power and competence; (Grin, Rotmans, & Schot, 2011; Voß, Smith, & Grin, 2009). Due to the limits of their agency, actors might seek to form ties with other actors to build trust, gain legitimacy and access resources such as knowledge. Social relations can also be important for creating dependencies by controlling the flow of resources, building alliances and establishing coordination among actors with different resources in order to exploit synergies (Ingold & Fischer, 2014; M. Schneider, Scholz, Lubell, Mindruta, & Edwardsen, 2003; Weible & Sabatier, 2005). Some examples of networks resulting from these activities are communication, information, exchange, cooperation and financial networks.

Networks can play a positive role not only in generating new knowledge (Binz et al., 2014) but also in setting up support structures for innovation systems as well as creating expectations and positive reputations (Musiolik & Markard, 2011; Musiolik, Markard, & Hekkert, 2012). The relational structure and the way actors are embedded within this structure can provide certain advantages, as in the example of social capital, but also some constraints, such as liabilities, obligations and group pressure. In response, actors might shape their social relations and those of others to benefit from the social capital. In other words, social networks, like all other social structures, can be seen as a manifestation of recursive interaction between actors who are constantly reproducing or transforming relational patterns through their actions (i.e. forming ties) and, consequently, being constrained or favoured.

Advocacy, *defining*, *vesting*, *disconnecting sanctions* and *construction of normative networks* (T.B. Lawrence & Suddaby, 2006) can be given as examples of two forms of institutional work that might be particularly dependent on networks. Social networks can as well be instrumental in the realization of other forms of institutional work that require the coordination among actors or generation of support.

Interrelations among constituent elements and their association with forms of institutional work

Resources, discourses and social networks as constituent elements are also likely to be complementing one another in the build-up of an actor's agency. Since agency is shaped by the combination those elements, conclusions drawn from an analysis focused on a single aspect (e.g. only discourses or networks) can be misleading. Therefore, all constituent elements have to be considered jointly to evaluate individual and collective agency in realizing transitions. For instance, an actor can be prosperous with resources, but her position in social networks might constrain her from receiving new information. Or, a group of actor might constitute the largest discourse coalition(Leifeld & Haunss, 2012b) yet it could comprise members with low influence or who share similar policy beliefs but for some reason do not cooperate effectively. These examples show that an integrated analysis that takes into account constituent elements and the possible combinations among them (i.e. the effect of different configurations) is crucial for reaching a sound assessment of the determinants of agency.

Table 2 below displays a first attempt to link these constituent elements with different forms of institutional work. For each institutional work, the elements having primary importance are shown in capital letters. The classification of constituent elements to different forms of institutional work is done by close review of original descriptions and examples provided in Lawrence and Suddaby (2006). In appendix, we provide the original definitions, further descriptions and our explanation for the classification of constituent elements to each form of institutional work. However, this classification should be considered only as a first set of hypotheses that require rigorous testing in empirical studies.

As shown in the table, different forms of institutional work vary with respect to the number of elements required for their realization. While some forms of institutional work might be dependent only on a single constituent element, others depend on the presence of all the elements. Elements that are particularly prominent for the respective institutional work are displayed in capital letters. However, a cautionary note has to be made for clarification. Even though a specific form of institutional work, such as policing or deterring, is shown to be solely dependent on the resources of actors, such as their formal authority, other elements, such as the network of an actor, might have also played a crucial role in attaining that critical resource. As the unravelling of such antecedent mechanisms and their interdependencies falls outside the scope of this paper, the table displays only elements that are assumed to be directly relevant for a given institutional work.

Table 2. Constituent elements required for different forms of institutional work. In the table, only the elements that have primary importance for the respective institutional work are shown in capital letters. Resources are indicated with R, discourse with D and networks with N. The forms of institutional work and their classification into three given groups are taken from Lawrence and Suddaby (2006).

	Forms of institutional work	Constituent elements
Creating Institutions		
	Advocacy	R, D, N
	Defining	R, d, N
	Vesting	R, d, N
	Constructing identities	D, n
	Changing normative associations	D
	Constructing normative networks	r, D, N
	Mimicry	R, D
	Theorizing	D

	Educating	R, D
Maintaining Institutions		
	Enabling work	R, D, n
	Policing	R
	Deterring	R
	Valorising and demonizing	D
	Mythologizing	D
	Embedding and routinizing	D, n
Disrupting Institutions		
	Disconnecting sanctions	R, N, d
	Disassociating moral foundations	D
	Undermining assumptions and beliefs	R, D

Our ascription of constituent elements reveals some interesting patterns that require empirical validation. Through empirical studies, further hypotheses on actors' inclination and performance with respect to institutional work practices could also be tested. Finally, considering the relation between development stages of technological innovation systems and institutional work (Binz et al., 2016), further studies could determine which constituent elements are particularly crucial at different phases of innovation.

4. Illustrative case example: Swiss waste management

To illustrate how the heuristic can be applied to empirical settings and what insights it can yield, we use the example of Swiss waste management. Although it has been the focus of a few studies (Kemp, 2007; Raven, 2007), in general, waste management as an infrastructure-related socio-technical system has not received much attention in transition literature compared with other sectors, such as energy or water management (Geels & Johnson, 2018). Yet, waste management has a crucial impact on the sustainable use of energy and resources. As each product essentially consists of a bundle of resources and embodied energy, an optimized waste management scheme can provide significant environmental benefits (Duygan, Stauffacher & Meylan, 2018a).

In Swiss waste management, a major policy process targeting the most important regulative institution in the field was recently completed. The technical ordinance on waste, which dated back to 1990, underwent a total revision as a result of a process that took several years. The revision process ended in 2015, and the new ordinance came into force as of January 1, 2016. As the most important regulatory framework encompassing the entire field of waste management, the ordinance enforces how different waste streams should be collected, treated and disposed. The ordinance does not impose any technology-specific constraints, yet by regulating waste management practices, it nevertheless indirectly controls which technologies will be favoured in the field. Its impacts transcend technological realms and cause far-reaching changes in actor roles, the distribution of resources and the legitimacy of practices, as institutional elements are closely intertwined with technological changes (Fuenfschilling & Truffer, 2016). Hence, it can be asserted that the revision of the ordinance bears a significant potential for triggering socio-technical transition in Swiss waste management with some influence on other systems (e.g. energy transitions), as well, given the interrelations between energy and resources.

Considering the implications of such legislation, it would be safe to assume that actors had very high incentives to influence the outcome of the revision process. In fact, more than two hundred actors participated in the consultation process even though the official list of invitees was around one hundred. The official list of invitees can be classified into four main groups: waste management organizations; economy and trade organizations, administrative bodies such as cantons (e.g. regional governments) and federal agencies, and finally non-governmental organizations (NGOs), which were represented in much lower numbers. As part of this consultation, actors submitted their position papers on the draft of the new ordinance. In these papers, actors notified the articles they approved, as well as the ones to which they requested a change. Actors also had the opportunity to provide their arguments for their preferred formulation of articles.

In this empirical example, the agency of actors is indicated by the extent of influence they had on the revision process. The revision process can be seen as a battlefield where actors struggle for creating, disrupting and maintaining (regulative) institutions. As this entails the mobilization of constituent elements that make up agency, the revision of the ordinance as a major policy process is a very relevant case for an empirical application of the heuristic. The case study is described in detail in (Duygan, Stauffacher, & Meylan, 2018b). Therefore, here, we present a very brief overview of the methodology, the main results and key insights from the case study to highlight the potential of the heuristic when applied to an empirical setting. For the analysis, we utilized several data sources and methods: We reviewed position papers of actors to identify their frames and concepts they use to enhance their arguments. We also run discourse network analysis (Leifeld, 2012a) to identify discourse coalitions and actors' position in discourse networks. An online survey was conducted to gather information about actors' influence on the revision process and their relational patterns (i.e. collaboration network). The position of actors in these networks (e.g, centrality measures) was assessed through social network analysis (Prell, 2012) and a panel of experts was consulted to find out actors' resources. Finally, fuzzy-set qualitative comparative analysis (fsQCA) (Ragin, 2008) was used to process all these inputs and to determine what configurations of resources, discourses and networks associate with strong agency in Swiss waste management. We reflect on the use of these methods in relation to operationalization of the heuristic in the discussion section.

4.1. Insights acquired through the application of the heuristic

The heuristic is applied in the empirical case of Swiss waste management to address the following points:

1) Who are the influential actors (i.e. actors with strong agency) in Swiss waste management?
2) What makes these actors influential, in other words what features of agency (i.e. which configurations of constituent elements) make influential actors distinct from the rest?

and

3) Why it is so? In what way institutional context affects what features associate with strong agency?

While the first question is descriptive, the latter two uncover the conditions that led to the distribution of agency in the field and thus are explanatory in nature. The added value of the heuristic is to facilitate scholars to engage with such questions and thereby conduct an explanatory research that provides valuable insights for theory development. Below, we present the insights acquired from the case study of Swiss waste management along these three research questions.

Who are the influential actors (i.e. actors with strong agency) in Swiss waste management?

We relied on reputational measures which are widely used in political science (Fischer & Sciarini, 2015) to determine the influential actors. Through an online survey, we asked actors that attended to the revision of the ordinance to identify the actors that had the decisive impact on the policy process. In essence, the influence of each actor is determined by the number of times they are being mentioned by their peers. Among the actors included in the analysis, only a handful stands out as highly influential. These actors have stronger agency than others in influencing the outcome of the revision, implying that agency is not distributed evenly but concentrated among a few actors. This 'elite' group consists of different actor types from waste management organizations – such as treatment plant operators, producer responsibility organizations and recycling organizations – to administrative agencies and economic and trade organizations, including retailers and representatives of the cement industry. Apart from administrative agencies and the Federal Office for the Environment (FOEN) which led the process, what all these influential actors have in common are large financial and material assets with notable technological infrastructures. These include 30 waste incineration plants scattered all over Switzerland, sorting and recycling plants as well as other industrial and commercial plants owned by retailers and cement industry. These actors are also endowed with large non-material resources. While administrative agencies have the formal authority, both waste management and economic organizations possess intellectual resources such as experienced and qualified personnel representing their interests in judicial and political matters. This first observation already hints at the fact that non-material resources, such as formal authority, intellectual capacity, and material resources, such as technological and financial assets, are likely to be highly important for strong agency. To verify this statistically and to investigate whether other constituent elements are also relevant for an actor's agency, a fuzzy-set qualitative comparative analysis (fsQCA) was conducted.

What makes these actors influential? What features of agency make influential actors distinct from the rest?

Our detailed analysis revealed that both material and non-material resources are indeed necessary conditions for strong agency. However, they alone are not sufficient; some of the other constituent elements must also be present. More concretely, two configurations stand out as causal paths to strong agency:

i) Large resources (material and non-material), high degree and betweenness centrality which indicate high activity and embeddedness in social networks
ii) Large resources, high betweenness centrality (i.e. embeddedness) in social networks and active use of discursive / narrative elements rich in concepts

Several important aspects are revealed about the determinants of strong agency in Swiss waste management. First of all, it is shown that actors do not have to be superior with respect to all different aspects of agency. Second, there is not one but two robust alternatives associated with strong agency. In other words, it is shown that there can be more than one pathway leading to the outcome of interest. Presence of several pathways might imply that actors have relatively more space and flexibility in adapting their strategies to align their endowments in accordance with the winning formulae. Third, while large resources are the most distinct difference between influential and less influential actors, they, alone are not sufficient for a strong agency. In addition to resources, actors should be highly active in social networks by forming ties (i.e. high degree centrality) and strategically positioned to bridge actors that are otherwise not linked (i.e high betweenness centrality). Or, alternatively, larger resources should be compensated by a rich discourse abundant in various concepts (i.e. second causal path) and high betweenness centrality in social networks. Fourth, while resources stand out as the most

important dimension (despite not sufficient alone) for strong agency, networks seem to be the second prevailing discourses. In fact, the first pathway indicates that discourses are irrelevant as long as actors possess large resources and central positions in social networks. In contrary, presence of large resources and superiority in discursive aspects alone are not found to be sufficient. This is an interesting result that needs further elaboration such as how institutional context might have influenced what dimension and configurations become prominent for strong agency and why discourses turned out to have less influence in this particular example.

In what way institutional context affects what features become prominent for strong agency?

One likely factor making resources highly crucial over other elements for strong agency could be institutional arrangements at the field or even higher level such as the Swiss political system. For example, in contrary to changes regarding laws, the revision of this ordinance did not go through the Swiss Parliament but was handled by FOEN. After a few years of preparatory work and deliberation carried out within different task groups and platforms such as roundtables, FOEN issued a draft of the new ordinance and organized a consultation process in which actors were invited to submit their written statements. These written statements contain both general and specific comments by actors on the formulation of the articles in the new ordinance. Actors were provided the opportunity to state whether they approved a certain article and could also provide their preferred formulations and the reasons for them. FOEN, however, did not disclose these statements to the public, as there was no such mandate at the time of the revision. Hence, for most of the statements, FOEN remained the only addressee. There is a further ambiguity regarding the finalization of the new ordinance such as how the statements were evaluated and how contestations were reconciled. Under such circumstances, political discourse can be expected to be less important compared to a case where most processes are subject to public scrutiny. In fact, the institutional setting for the revision process was conducive for rather covert, 'behind the curtain' political action such as lobbying, persuading and bilateral negotiations with FOEN. Therefore, it is not surprising that resources, by enabling the aforementioned kind of institutional work, stand out as the most crucial element for strong agency.

5.   Discussion

As demonstrated by the case example above, the heuristic can yield several important insights. Through the use of configurational tools such as fsQCA, the heuristic can be applied to assess the combined effect of constituent elements (i.e. configurations of resources, networks and discourses) and uncover different pathways leading to strong agency. Furthermore, in addition to quantifying the prominence of constituent elements and their configurations, it also qualifies their causal relevance as necessary and/or sufficient conditions. These inquiries, which are often not possible to make with conventional multivariate techniques such as regression analysis, can inform actors in developing more effective and sophisticated strategies. For instance, actors can develop their strategies knowing that resources are crucial but not sufficient to be influential on key issues, such as the change of regulative institutions.

The heuristic also opens up a few avenues for further research. To begin with, it provides a means of analysing how embedded agency is unfolded in a given empirical setting. Besides contributing to the institutional work approach by identifying the constituent elements setting the foundations of these practices, it also presents an opportunity to explore how existing institutional arrangements create selection pressure over what forms of institutional work practices matter and, thus, which configurations of constituent elements foster one's agency. Further studies can empirically test the

pretension put forward in this paper about the relation between constituent elements and forms of institutional work (see Table 2.). The heuristic provides an opportunity to run systematic analyses to uncover which constitutive elements are pertinent for which types of institutional work and whether general patterns occur across different settings. Moreover, inquiries can be made as to how internal features (i.e. a configuration of constituent elements that an actor possess) and external factors (i.e. institutional arrangements) condition actors' strategies with respect to forms of institutional work and how variations in social skills can influence the performance of an institutional work practice.

The heuristic can be applied for analysing the agency of actors in various different empirical settings. However, there are some important methodological aspects worth elaborating to facilitate its application in empirical studies.

The first issue to be confronted is how to determine and differentiate the strength of actors' agency. If agency can be defined in relation to one's ability to impact institutions, a starting point could be to identify instances in which such an act becomes evident. These could be decision- or policy-making instances taking place at the field level influencing institutional arrangements such as revision of laws, setting of technology standards, decisions on major infrastructure investments, changes in city planning policies, implementation of large-scale programs or funding schemes. Since agency involve continuous, repeated processes, it is analytically difficult to assess it without reference to such instances, which can be seen as highlight events. Therefore, observing these events and their outcomes can provide a reference for assessing an actor's impact. A further challenge, then, is to estimate an actors' agency in relation to the outcome of such key events. It might not be difficult for an analyst familiar with a field to differentiate the actors who get what they want from those who do not. However, in order to advance from a categorical level of assessment to an ordinal or even interval level measurement that is suitable for more sophisticated analyses, reputational approaches that are widely acknowledged in political science can be used (Fischer and Sciarini, 2015).

The second issue relevant for the application of the heuristic is the operationalization of constituent elements namely resources, discourses and social networks. As explained in section 3.2., different types of resources can be defined and operationalized. A main distinction can be made between material resources that denote capital and infrastructure-based assets and non-material resources that indicate expertise in political and judicial realms and 'softer' resources enhancing diplomatic abilities such as negotiation, persuasion and deliberation. While material resources might be somewhat more evident and easier to assess from 'outside', for non-material resources, consulting actors in the field might be more appropriate as they can better judge most of these aspects that are obscure to an outside researcher. An assessment of actors' networks can be done by running a social network analysis (SNA). As a formal technique, SNA offers several ways of disentangling relational patterns and determining key actors, their embeddedness and role in networks (Prell, 2012). Centrality measures are particularly important for identifying the most important nodes (e.g. actors) in a network as they indicate the influence and prestige of the actors, as well as their strategic importance for the functioning of the network. There are several centrality measures, each exposing different aspects (Prell, 2012). Therefore, it is advisable to operationalize the ones most relevant for specific research interests. Regarding discourses of the actors, it is important to cover both substantive elements and relational aspects. The former indicates elements related to framing and, particularly, concepts used for making an argument more salient and convincing (Geels and Verhees, 2011). Actors can be differentiated by the variety and abundance of concepts they use to legitimize and increase the saliency of their arguments. A content analysis of key documents, such as position papers, can be conducted to assess actors' narratives. The second, relational dimension draws attention to the position

of actors in a discursive field, which discourse coalitions (Leifeld & Haunss, 2012b) they belong to and what positions they occupy in a discourse network.

The third essential point is the choice of analytical technique to be used for investigating the relation between operationalized elements and actors' agency. The heuristic conceptualizes the agency of an actor as a configuration of its constituent elements and seeks to determine the particular configurations associated with stronger agency. Since the focus is on configurations and not on comparing the net effects of different elements on the outcome (strength of agency), configurational comparative methods, such as qualitative comparative analysis (QCA), are more suitable than variable-oriented conventional multivariate techniques, such as regression analysis. QCA techniques apply set-theoretic reasoning to analyse causal conditions that are sufficient and/or necessary for the occurrence of an outcome (Ragin, 2008).

6.   Conclusion

Considering agency as the capability of actors to impact institutions through institutional work practices which act as a *mechanism of action*, the heuristic presented in this paper strives to uncover the foundations of actors' agency. Drawing on the institutional entrepreneurship and institutional work literature, we deduce the resources, discourses and networks of an actor to be essential for the conduct of strategic institutional work practices aimed at creating, maintaining and disrupting institutions. Assuming that actors rely on these three elements to perform institutional work, we consider them as the key constituent elements setting the foundation of an actor's agency in transitions. We conceive of the agency of an actor as a configurational entity composed of a combination of its constituent elements. Hence, the heuristic provides a means to examine less studied yet crucial aspects, such as the articulation (framing) of actors' beliefs, values and relational patterns. By uncovering configurations associated with a strong agency, the heuristic serves to elucidate the determinants that make an actor influential in shaping institutions in socio-technical systems.

Depending on the particularities of the political context and institutional setting not all elements have to be present for an actor to have notable influence. Furthermore, there might be not just one, but several paths linked with strong agency. In our empirical case of Swiss waste management, two robust paths stand out with material and non-material resources being present in each (i.e. resources are found as necessary conditions). In addition to resources, the first path included only network related elements. This suggests that if actors pose large resources, collaborate with large number of actors and bridge the ones that are otherwise not linked in the network, they do not have to be superior with respect to discursive aspects. The second path indicates an alternative configuration associated with strong agency: large resources, enriched discourse with abundant use of concepts – in relation to argumentation - and serving as bridges in collaboration networks. While these findings uncover the determinants of strong agency in Swiss waste management, further studies can show to what extent these configurations appear in other empirical settings.

Our research aims to contribute to recent advances in transition studies with respect to the conceptualization of agency and mechanisms of strategic action in institutionally bound socio-technical systems. While earlier studies investigated the institutional work that actors have carried out in transforming institutions, our study brings a complementary insight by addressing the enabling conditions for those practices. Furthermore, the heuristic enables to carry out a systematic analysis targeting determinants of strong agency in different empirical settings. By doing so, it addresses the recursive relation between structure and agency. Researchers can untangle how these determinants vary with institutional settings and how the latter influences what accounts for strong agency in a given organizational field. Since the institutional work approach is analytically concerned with the

effect of action on institutions but not vice versa (Lawrence et al., 2009), such insights can be crucial for further refinements in the conceptualization of embedded agency and theory building in transition research. Overall, we claim that the novel contribution of the heuristic is to facilitate analyses that seek to transcend from 'who' has agency to 'why' by identifying the determinants or, to be more precise, the necessary and sufficient conditions for strong agency in a given field. Further steps in this endeavour could be to explore 'how' these key configurations are attained (how actors construct their agency), how constituent elements interrelate with each other (e.g. how acquiring material resources might enable better positions in a network) and how the relevance of different forms of institutional work are conditioned by particularities of an institutional setting. While the heuristic serves primarily to explain causal effects (i.e. conditions enabling strong agency), further studies can unravel the causal mechanisms behind these effects by using methods such as process tracing (Bennett & Checkel, 2014)..

Apart from researchers, policymakers, practitioners and stakeholders can also benefit from our approach. First, actors in policy subsystems – which themselves are the subject of analysis – can benefit from other actors' perceptions (e.g. reputational power). Any insight into the causal conditions associated with strong agency would clearly be valuable for strategy development. Second, policymakers can attain valuable inputs for designing effective governance measures (e.g. setting the rules of the revision process so that actors have a more level playing field), as it is essential for any policy action or intervention mechanism to be well grounded in the political context with insights drawn from the distribution of agency and power relations. On that account, policymakers may consider redesigning governance structures to alter the selection conditions for strong agency (i.e. sufficient and necessary conditions) in favour of frontrunners or transition advocates. As a result, power imbalances that might lead to a stall in or deceleration of transitions could also be eradicated.

References

Arts, B., & Tatenhove, J. V. (2004). Policy and power: A conceptual framework between the 'old' and 'new' policy idioms. *Policy Sciences, 37*(3), 339-356. doi: 10.1007/s11077-005-0156-9

Avelino, F., & Rotmans, J. (2009). Power in Transition: An Interdisciplinary Framework to Study Power in Relation to Structural Change. *European Journal of Social Theory, 12*(4), 543-569. doi: 10.1177/1368431009349830

Avelino, F., & Rotmans, J. (2011). A dynamic conceptualization of power for sustainability research. *Journal of Cleaner Production, 19*(8), 796-804. doi: http://dx.doi.org/10.1016/j.jclepro.2010.11.012

Bachrach, P., & Baratz, M. S. (1962). Two Faces of Power. *The American Political Science Review, 56*(4), 947-952.

Battilana, J., & D'Aunno, T. (2009a). Institutional work and the paradox of embedded agency. In T. B. Lawrence, R. Suddaby, & B. Leca (Eds.), *Institutional Work: Actors and Agency in Institutional Studies of Organizations* (pp. 31-58). Cambridge Cambridge Universtiy Press

Battilana, J., Leca, B., & Boxenbaum, E. (2009b). How Actors Change Institutions: Towards a Theory of Institutional Entrepreneurship. *The Academy of Management Annals, 3*(1), 65-107. doi: 10.1080/19416520903053598

Beckert, J. (1999). Agency, Entrepreneurs, and Institutional Change. The Role of Strategic Choice and Institutionalized Practices in Organizations. *Organization Studies, 20*(5), 777-799. doi: 10.1177/0170840699205004

Benford, R. D., & Snow, D. A. (2000). Framing Processes and Social Movements: An Overview and Assessment. *Annual Review of Sociology, 26*, 611-639.

Bennett, A., & Checkel, J. (Eds.). (2014). *Process Tracing: From Metaphor to Analytic Tool (Strategies for Social Inquiry)*: Cambridge Universtiy Press.

Berkhout, F. (2006). Normative expectations in systems innovation. *Technology Analysis & Strategic Management, 18*(3-4), 299-311. doi: 10.1080/09537320600777010

Binz, C., Harris-Lovett, S., Kiparsky, M., Sedlak, D. L., & Truffer, B. (2016). The thorny road to technology legitimation — Institutional work for potable water reuse in California. *Technological Forecasting and Social Change, 103*, 249-263. doi: https://doi.org/10.1016/j.techfore.2015.10.005

Binz, C., Truffer, B., & Coenen, L. (2014). Why space matters in technological innovation systems — Mapping global knowledge dynamics of membrane bioreactor technology. *Research Policy, 43*(1), 138-155. doi: https://doi.org/10.1016/j.respol.2013.07.002

Bosman, R., Loorbach, D., Frantzeskaki, N., & Pistorius, T. (2014). Discursive regime dynamics in the Dutch energy transition. *Environmental Innovation and Societal Transitions, 13*, 45-59. doi: http://dx.doi.org/10.1016/j.eist.2014.07.003

Brown, R. R., Farrelly, M. A., & Loorbach, D. A. (2013). Actors working the institutions in sustainability transitions: The case of Melbourne's stormwater management. *Global Environmental Change, 23*(4), 701-718. doi: http://dx.doi.org/10.1016/j.gloenvcha.2013.02.013

Dahl, R. A. (1961). *Who Governs? Democracy and Power in an American City* New Haven: Yale Universtiy Press.

DiMaggio, P. J. (1988). Interest and agency in instiional theory. In L. Zucker (Ed.), *Institutional patterns and organizations: Culture and Environment* (pp. 3-22): Cambridge, MA: Ballinger.

Dorado, S. (2005). Institutional Entrepreneurship, Partaking, and Convening. *Organization Studies, 26*(3), 385-414. doi: 10.1177/0170840605050873

Duygan, M., Stauffacher, M., & Meylan, G. (2018a). Discourse coalitions in Swiss waste management: gridlock or winds of change? *Waste Management, 72*, 25-44. doi: https://doi.org/10.1016/j.wasman.2017.11.006

Duygan, M., Stauffacher, M., & Meylan, G. (2018b). Determinants of strong agency in socio-technical transitions: A case study of Swiss waste management [working paper].

Eisenstadt, S. N. (1980). Cultural Orientations, Institutional Entrepreneurs, and Social Change: Comparative Analysis of Traditional Civilizations. *American Journal of Sociology, 85*(4), 840-869.

Emirbayer, M., & Mische, A. (1998). What Is Agency? *American Journal of Sociology, 103*(4), 962-1023. doi: 10.1086/231294

Entman, R. M. (1993). Framing: Toward Clarification of a Fractured Paradigm. *Journal of Communication, 43*(4).

Farla, J., Markard, J., Raven, R., & Coenen, L. (2012). Sustainability transitions in the making: A closer look at actors, strategies and resources. *Technological Forecasting and Social Change, 79*(6), 991-998. doi: http://dx.doi.org/10.1016/j.techfore.2012.02.001

Fischer, F. (2003). *Reframing Public Policy: Discursive Politics and Deliberative Practices*: Oxford University Press.

Fischer, M., & Sciarini, P. (2015). Unpacking reputational power: Intended and unintended determinants of the assessment of actors' power. *Social Networks, 42*, 60-71. doi: http://dx.doi.org/10.1016/j.socnet.2015.02.008

Fligstein, N. (1997). Social Skill and Institutional Theory. *American Behavioral Scientist, 40*(4), 397-405. doi: 10.1177/0002764297040004003

FOEN. (2011). TVA Revision - Normkonzept. Available at: http://www.bafu.admin.ch/abfall/02202/12415/12418/index.html?lang=de.

Fuenfschilling, L., & Binz, C. (2018). Global socio-technical regimes. *Research Policy, 47*(4), 735-749. doi: https://doi.org/10.1016/j.respol.2018.02.003

Fuenfschilling, L., & Truffer, B. (2014). The structuration of socio-technical regimes—Conceptual foundations from institutional theory. *Research Policy, 43*(4), 772-791. doi: http://dx.doi.org/10.1016/j.respol.2013.10.010

Fuenfschilling, L., & Truffer, B. (2016). The interplay of institutions, actors and technologies in socio-technical systems — An analysis of transformations in the Australian urban water sector. *Technological Forecasting and Social Change, 103*, 298-312. doi: http://dx.doi.org/10.1016/j.techfore.2015.11.023

Garud, R., Hardy, C., & Maguire, S. (2007). Institutional Entrepreneurship as Embedded Agency: An Introduction to the Special Issue. *Organization Studies, 28*(7), 957-969. doi: 10.1177/0170840607078958

Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. *Research Policy*, *36*(3), 399–417. https://doi.org/10.1016/J.RESPOL.2007.01.003

Geels, F. W., & Johnson, V. (2018). Towards a modular and temporal understanding of system diffusion: Adoption models and socio-technical theories applied to Austrian biomass district-heating (1979–2013). *Energy Research & Social Science, 38*, 138-153. doi: https://doi.org/10.1016/j.erss.2018.02.010

Geels, F. W., & Verhees, B. (2011). Cultural legitimacy and framing struggles in innovation journeys: A cultural-performative perspective and a case study of Dutch nuclear energy (1945–1986). *Technological Forecasting and Social Change, 78*(6), 910-930. doi: http://dx.doi.org/10.1016/j.techfore.2010.12.004

Giddens, A. (1984). *The Constitution of Society: Outline of the Theory of Structuration*: Polity Press, Cambridge.

Greenwood, R., Suddaby, R., & Hinings, C. R. (2002). Theorizing Change: The Role of Professional Associations in the Transformation of Institutionalized Fields. *The Academy of Management Journal, 45*(1), 58-80. doi: 10.2307/3069285

Grin, J., Rotmans, J., & Schot, J. (2011). On patterns and agency in transition dynamics: Some key insights from the KSI programme. *Environmental Innovation and Societal Transitions, 1*(1), 76-81. doi: http://dx.doi.org/10.1016/j.eist.2011.04.008

Hajer, M. A. (1995). *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process*. Oxford: Clarendon Press.

Haugaard, M. (2002). *Power: A Reader* Manchester Manchaster University Press.

Hayward, C., & Lukes, S. (2008). Nobody to shoot? Power, structure, and agency: A dialogue. *Journal of Power, 1*(1), 5-20. doi: 10.1080/17540290801943364

Ingold, K., & Fischer, M. (2014). Drivers of collaboration to mitigate climate change: An illustration of Swiss climate policy over 15 years. *Global Environmental Change, 24*, 88-98. doi: http://dx.doi.org/10.1016/j.gloenvcha.2013.11.021

Jepperson, R. L. (1991). Institutions, institutional effects, and institutionalism. In W. W. Powell & P. J. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 143-163). Chicago: University of Chicago Press.

Jolly, S., Spodniak, P., & Raven, R. P. J. M. (2016). Institutional entrepreneurship in transforming energy systems towards sustainability: Wind energy in Finland and India. *Energy Research & Social Science*, *17*, 102–118. https://doi.org/10.1016/J.ERSS.2016.04.002

Kemp, R. (2007). An Example of a "Managed Transition": The Transformation of the Waste Management Subsystem in the Netherlands (1960–2000). In M. Lehmann-Waffenschmidt (Ed.), *Innovations towards sustainability : conditions and consequenses* Heidelberg: Physica.

Kemp, R., Schot, J., & Hoogma, R. (1998). Regime shifts to sustainability through processes of niche formation: The approach of strategic niche management. *Technology Analysis & Strategic Management, 10*(2), 175-198. doi: 10.1080/09537329808524310

King, A. A., & Lenox, M. J. (2000). Industry Self-Regulation Without Sanctions: The Chemical Industry's Responsible Care Program. *Academy of Management Journal*, *43*(4), 698–716. https://doi.org/10.5465/1556362

Konrad, K., Markard, J., Ruef, A., & Truffer, B. (2012). Strategic responses to fuel cell hype and disappointment. *Technological Forecasting and Social Change, 79*(6), 1084-1098. doi: https://doi.org/10.1016/j.techfore.2011.09.008

Latour, B. (2005). *Reassembling the social : an introduction to actor-network-theory* Oxford Oxford University Press.

Law, J. (1992). Notes on the theory of the actor-network: Ordering, strategy, and heterogeneity. *Systems practice, 5*(4), 379-393. doi: 10.1007/bf01059830

Lawrence, T. B., & Phillips, N. (2004). From Moby Dick to Free Willy: Macro-Cultural Discourse and Institutional Entrepreneurship in Emerging Institutional Fields. *Organization, 11*(5), 689-711. doi: 10.1177/1350508404046457

Lawrence, T. B., & Suddaby, R. (2006). Institutions and institutional work. In R. S. Clegg, C. Hardy, T. B. Lawrence, & W. R. Nord (Eds.), *The SAGE Handbook of Organization Studies* (2 ed., pp. 215-254). London: SAGE Publications Ltd.

Lawrence, T. B., Suddaby, R., & Leca, B. (2009). Introduction: theorizing and studying institutional work *Institutional Work: Actors and Agency in Institutional Studies or Organizations* (pp. 1-27). Cambridge Cambridge University Press.

Leblebici, H., Salancik, G. R., Copay, A., & King, T. (1991). Institutional Change and the Transformation of Interorganizational Fields: An Organizational History of the U.S. Radio Broadcasting Industry. *Administrative Science Quarterly, 36*(3), 333-363. doi: 10.2307/2393200

Leeds-Hurwitz, W. (2009). Social Construction of Reality. In W. S. Littlejohn & K. A. Foss (Eds.), *Encyclopedia of Communication Theory*: SAGE Publications.

Leifeld, P. (2012a). Discourse Network Analyzer Manual (version 1.30). Available at: https://github.com/leifeld/dna/tree/dna-db/manual.

Leifeld, P., & Haunss, S. (2012b). Political discourse networks and the conflict over software patents in Europe. *European Journal of Political Research, 51*(3). doi: 10.1111/j.1475-6765.2011.02003.x

Lenox, M. J. (2006). The Role of Private Decentralized Institutions in Sustaining Industry Self-Regulation. *Organization Science*, *17*(6), 677–690. https://doi.org/10.1287/orsc.1060.0211

Levy, D., & Scully, M. (2007). The Institutional Entrepreneur as Modern Prince: The Strategic Face of Power in Contested Fields. *Organization Studies, 28*(7), 971-991. doi: 10.1177/0170840607078109

Lukes, S. (1974). *Power: A Radical Review*: Macmillan Press.

Lounsbury, M. (2002). Institutional Transformation and Status Mobility: The Professionalization of the Field of Finance. *Academy of Management Journal*, *45*(1), 255–266. https://doi.org/10.5465/3069295

Maguire, S., & Hardy, C. (2006). The Emergence of New Global Institutions: A Discursive Perspective. *Organization Studies, 27*(1), 7-29. doi: 10.1177/0170840606061807

Maguire, S., Hardy, C., & Lawrence, T. B. (2004). Institutional Entrepreneurship in Emerging Fields: HIV/AIDS Treatment Advocacy in Canada. *The Academy of Management Journal, 47*(5), 657-679. doi: 10.2307/20159610

Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: An emerging field of research and its prospects. *Research Policy, 41*(6), 955-967. doi: http://dx.doi.org/10.1016/j.respol.2012.02.013

Markard, J., Suter, M., & Ingold, K. (2016). Socio-technical transitions and policy change – Advocacy coalitions in Swiss energy policy. *Environmental Innovation and Societal Transitions, 18*, 215-237. doi: http://dx.doi.org/10.1016/j.eist.2015.05.003

Markowitz, L. (2007). Structural Innovators and Core-Framing Tasks: How Socially Responsible Mutual Fund Companies Build Identity among Investors. *Sociological Perspectives, 50*(1), 131-153. doi: 10.1525/sop.2007.50.1.131

McKay, A. (2012). Buying Policy? The Effects of Lobbyists' Resources on Their Policy Success. *Political Research Quarterly, 65*(4), 908-923. doi: 10.1177/1065912911424285

Morone, P., Tartiu, V. E., & Falcone, P. (2015). Assessing the potential of biowaste for bioplastics production through social network analysis. *Journal of Cleaner Production, 90*, 43-54. doi: http://dx.doi.org/10.1016/j.jclepro.2014.11.069

Musiolik, J., & Markard, J. (2011). Creating and shaping innovation systems: Formal networks in the innovation system for stationary fuel cells in Germany. *Energy Policy, 39*(4), 1909-1922. doi: http://dx.doi.org/10.1016/j.enpol.2010.12.052

Musiolik, J., Markard, J., & Hekkert, M. (2012). Networks and network resources in technological innovation systems: Towards a conceptual framework for system building. *Technological Forecasting and Social Change, 79*(6), 1032-1048. doi: http://dx.doi.org/10.1016/j.techfore.2012.01.003

Myeong-Gu, S., & Creed, W. E. D. (2002). Institutional Contradictions, Praxis, and Institutional Change: A Dialectical Perspective. *The Academy of Management Review, 27*(2), 222-247. doi: 10.2307/4134353

Pacheco, D. F., York, J. G., Dean, T. J., & Sarasvathy, S. D. (2010). The Coevolution of Institutional Entrepreneurship: A Tale of Two Theories. *Journal of Management*, *36*(4), 974–1010. https://doi.org/10.1177/0149206309360280

Parsons, T. (1963). On the Concept of Political Power. *Proceedings of the American Philosophical Society, 107*(3), 232-262.

Patterson, J., Schulz, K., Vervoort, J., van der Hel, S., Widerberg, O., Adler, C., . . . Barau, A. (2017). Exploring the governance and politics of transformations towards sustainability. *Environmental Innovation and Societal Transitions, 24*, 1-16. doi: https://doi.org/10.1016/j.eist.2016.09.001

Prell, C. (2012). *Social Network Analysis: histroy, theory & methodology*: SAGE Publications

Ragin, C. C. (2008). *Redesigining Social Inquiry: Fuzzy Sets and Beyond*. Chicago and London University of Chicago Press.

Rao, H. (1998). Caveat Emptor: The Construction of Nonprofit Consumer Watchdog Organizations. *American Journal of Sociology, 103*(4), 912-961. doi: 10.1086/231293

Rao, H., Morrill, C., & N. Zald, M. (2000). *Power Plays: How Social Movements and Collective Action Create New Organizational Forms* (Vol. 22).

Rao, H., Morrill, C., & Zald, M. N. (2000) Power plays: How social movements and collective action create new organizational forms. *Vol. 22. Research in Organizational Behavior* (pp. 237-281).

Raven, R. (2007). Co-evolution of waste and electricity regimes: Multi-regime dynamics in the Netherlands (1969–2003). *Energy Policy, 35*(4), 2197-2208. doi: https://doi.org/10.1016/j.enpol.2006.07.005

Schneider, M., Scholz, J., Lubell, M., Mindruta, D., & Edwardsen, M. (2003). Building Consensual Institutions: Networks and the National Estuary Program. *American Journal of Political Science, 47*(1), 143-158. doi: 10.1111/1540-5907.00010

Sciarini, P. (2015). Introduction In P. Sciarini, M. Fischer, & D. Traber (Eds.), *Political Decision-Making in Switzerland: The Consensus Model under Pressure* (pp. 1-23): Palgrave Macmillan UK.

Scott, W. R. (1995). *Institutions and organizations* SAGE Publications

Selznick, P. (1949). *TVA and the grass roots: a study in the sociology of formal organization* Universtiy of California Press.

Selznick, P. (1957). *Leadership in administration: A sociological interpretation*: Evanston, Ill: Row, Peterson. .

Sewell, W. H. (1992). A Theory of Structure: Duality, Agency, and Transformation. *American Journal of Sociology, 98*(1), 1-29.

Shove, E., & Walker, G. (2007). Caution! Transitions Ahead: Politics, Practice, and Sustainable Transition Management. *Environment and Planning A, 39*(4), 763-770. doi: 10.1068/a39310

Smith, A., & Kern, F. (2009). The transitions storyline in Dutch environmental policy. *Environmental Politics, 18*(1), 78-98. doi: 10.1080/09644010802624835

Smith, A., Voß, J.-P., & Grin, J. (2010). Innovation studies and sustainability transitions: The allure of the multi-level perspective and its challenges. *Research Policy, 39*(4), 435-448. doi: http://dx.doi.org/10.1016/j.respol.2010.01.023

Upham, P., Dütschke, E., Schneider, U., Oltra, C., Sala, R., Lores, M., . . . Bögel, P. (2018). Agency and structure in a sociotechnical transition: Hydrogen fuel cells, conjunctural knowledge and structuration in Europe. *Energy Research & Social Science, 37*, 163-174. doi: https://doi.org/10.1016/j.erss.2017.09.040

Voß, J.-P., Smith, A., & Grin, J. (2009). Designing long-term policy: rethinking transition management. *Policy Sciences, 42*(4), 275-302. doi: 10.1007/s11077-009-9103-5

Weible, C. M., & Sabatier, P. A. (2005). Comparing Policy Networks: Marine Protected Areas in California. *Policy Studies Journal, 33*(2), 181-201. doi: 10.1111/j.1541-0072.2005.00101.x

Werbeloff, L., Brown, R. R., & Loorbach, D. (2016). Pathways of system transformation: Strategic agency to support regime change. *Environmental Science & Policy*, *66*, 119–128. https://doi.org/10.1016/J.ENVSCI.2016.08.010

Windrum, P. (1999). Unlocking a Lock-in: Towards a Model of Technological Succession. MERIT Paper, Maastricht Economic Research Institute on Innovation and Technology [available at www.merit.unu.edu/publications/rmpdf/1999/rm1999–010.pdf].

Zilber, T. B. (2002). Institutionalization as an Interplay between Actions, Meanings, and Actors: The Case of a Rape Crisis Center in Israel. *The Academy of Management Journal, 45*(1), 234-254. doi: 10.2307/3069294

Zilber, T. B. (2007). Stories and the Discursive Dynamics of Institutional Entrepreneurship: The Case of Israeli High-tech after the Bubble. *Organization Studies, 28*(7), 1035-1054. doi: 10.1177/0170840607078113

APPENDIX

Classification of constituent elements to different forms of institutional work

Below we provide the original definition and further descriptions provided in Lawrence and Suddaby, (2006) for different forms of institutional work. We also provide our explanations for the classification of constituent elements to each forms of institutional work. For simplicity, we depict the constituent elements that we claim to be relevant next to the name of each institutional work in parenthesis. R stands for resources, D for discourses and N for networks. Uppercase of the symbols denotes the primary importance or relevance whereas lowercase stands for secondary relevance. When a constituent element is not considered to have a direct relevance, then its letter is not shown. For example, for advocacy, we claim each of the three constituent elements are primarily important to carry out that particular institutional work. Whereas, for constructing identities, we claim that discourses are highly relevant, networks are less so and resources do not have any direct relevance. However, it should be noted that even though resources may not have a direct relevance to constructing identities, it can still be important for networks or discourses. However, such indirect or antecedent mechanisms were not considered in this classification.

Advocacy (R, D, N)

Definition: "The mobilization of political and regulatory support through direct and deliberate techniques of social suasion" (p.221)

Further descriptions/examples: Apart from the definition above, different forms of advocacy mentioned in the literature include lobbying, advertising and litigation. We claim this action requires mobilization of resources and networks as well as discursive elements to realize suasion.

Defining (R, d, N)

Definition: "The construction of rule systems that confer status or identity, define boundaries of membership or create status hierarchies within a field" (p.221)

Further descriptions/examples: Construction of rule systems, defining membership rules and practice standards, certification, formalization of concrete standards (such as ISO standards) (p.222)

Verdict: All three elements are thought to play an important role but, we claim resources and networks to be more important than discourses for defining.

Vesting (R, d, N)

Definition: "The creation of rule structures that confer property rights" (p.221)

Further descriptions/examples: "Right to set prices", "changing the pricing formula", "micro-processes of creating new actors and new field dynamics by changing the rules of market relations", "advocacy work is an important precursor to the defining of rules that confer status and privilege,

which in turn provide the foundation for vesting work; vesting, in turn, constrains and constitutes those actors with preferential ability to advocate" (p.222-223).

Verdict: Similar to defining above, our assertion is that vesting requires, primarily resources and networks and less so discourses.

Constructing identities (D, n)

Definition: "Defining the relationship between an actor and the field in which that actor operates" (p.221)

Verdict: We believe discourses of actors to play a prominent role, while networks to have secondary importance in managing the relationship between actors and the field.

Changing normative associations (D)

Definition: "Re-making the connections between sets of practices and the moral and cultural foundations for those practices" (p.221)

Further descriptions/examples: "Involves work that manipulates the relationship between norms and the institutional field in which they are produced" (p.225)

Verdict: Different to construction of identities which strives to define actor-field relations, this form of work is about the relation between norm and field through establishing links between practices and their moral and cultural foundation. Therefore, we assert only discourses to be primarily important.

Constructing normative networks (r, D, N)

Definition: "Constructing of interorganizational connections through which practices become normatively sanctioned and which form the relevant peer group with respect to compliance, monitoring and evaluation" (p.221)

Further descriptions/examples: "Normative networks are interorganizational connections through which practices become more normatively sanctioned and which form the relevant peer group with respect to normative compliance, monitoring and evaluation." (p.224-225) "It alters the relationship between actors in a field by changing the normative assumptions that connect them" (p.225).

Verdict: We assert that networks are primarily important for establishing interorganizational connections and discourses in creating normative sanction while resources to have a secondary importance for these activities.

Mimicry (R, D)

Description: "Associating new practices with existing sets of taken-for-granted practices, technologies and rules in order to ease adoption" (p.221)

Further descriptions/examples: "Drawing on public's pre-existing understandings of the technology, its values and its uses" (p.225)

Verdict: Most of the examples provided for mimicry involve not only communication stage for which discourses would be of direct relevance, but also the deliberate design of a technology or product to draw on the existing set of understanding or practices. Therefore, we hypothesize both resources and discourses to be highly important for mimicry.

Theorizing (D)

Description: "The development and specification of abstract categories and the elaboration of chains of cause and effect" (p.221)

Further descriptions/examples: "Naming of new concepts and practices so that they might become a part of the cognitive map of the field" (p.226) "highlights the narrative component of theorizing in which actors articulate the causal and consequently temporal relationships among institutional elements." (p.227)

Verdict: As implied in the descriptions given above, theorizing is closely related to creating narratives, categories and models of cause and effect relations. Therefore, we assert discourses to be the only prominent factor for it.

Educating (R,d)

Description: "The educating of actors in skills and knowledge necessary to support the new institution" (p.221)

Verdict: We claim actors rely primarily on their resources and less so on discourse when it comes to educating actors for new practices such as recycling programmes.

Enabling work (R, d, N)

Definition: "The creation of rules that facilitate, supplement and support of institutions, such as the creation of authorizing agents or diverting resources" (p.230)

Verdict: Because we claim some degree of advocacy is involved for enabling work, we believe resources and networks to be the most important elements and discourses to a lesser extent.

Policing (R)

Definition: "Ensuring compliance through enforcement, auditing and monitoring" (p.230)

Further descriptions/examples Involves using both "sanctions and inducements" such as states' use of both penalties and incentives (p.231)

Verdict: We claim policing to be dependent on resources as it, in essence, requires authority and labour force to carry out the enforcement, auditing and monitoring.

Deterrence (R)

Definition: "Establishing coercive barriers to institutional change" (p.230)

Further descriptions/examples: "Targets at maintaining institutions by compliance with rules", "Effective deterrence is highly dependent upon the legitimate authority of the coercive agent" (p.232)

Verdict: For reasons similar to policing and the quotation just above which emphasizes the legitimate authority, we claim deterrence to be primarily dependent on resources of an actor.

Valourizing and demonizing (D)

Definition: "Providing for public consumption positive and negative examples that illustrates the normative foundations of an institution" (p.230)

Further descriptions/examples: "It represents institutional work in which actors identify and evalutate the moral status of participants in the field, both as an enactment of institutionalized beliefs and as a way of maintaining the power of these beliefs" (p.232)

Verdict: We assert discourses to be the key element for illustrating the normative foundations of an institution with positive and negative examples.

Mythologizing (D)

Definition: "Preserving the normative underpinnings of an institution by creating and sustaining myths regarding its history" (p.230)

Further descriptions/examples: "To create and sustain a myth, one needs a story and an occasion to tell it" (p.233)

Verdict: Since mythotologizing is about creating a myth or a story, we expect discourses to be the key element for it.

Embedding and routinizing (D, n)

Definition: "Actively infusing the normative foundations of an institution into the participants' day to day routines and organizational practices" (p.230)

Verdict: In difference to mythologizing, embedding and routinizing also involves infusing the normative foundations into practices of participants and organizations. Therefore, in addition to discourses, network of actors are also thought to play a role.

<u>Disconnecting sanctions (R, N, d)</u>

Definition: "Working through state apparatus to disconnect rewards and sanctions from some set of practices, technologies or rules" (p.235)

Verdict: As disconnecting sanctions requires engagement with state mechanisms through some form of advocacy work, we expect all three elements to be relevant with resources and networks being primarily important.

<u>Disassociating moral foundations (D)</u>

Definition: "Disassociating the practice, rule or technology from its moral foundation as appropriate within a specific cultural context" (p.235)

Verdict: We expect discourses to be crucial and directly relevant for undermining of moral foundations of an institution.

<u>Underpinning assumptions and beliefs (R, D)</u>

Definition: "Decreasing the perceived risks of innovation and differentiation by undermining core assumptions and beliefs" (p.235)

Further descriptions/examples: "In the institutional research we examined, there was little documentation of institutional work of this type. Two kind of such work, however, did emerge: innovation that broke existing, institutional assumptions, and gradual undermining through contrary practice." (p.237)

Verdict: While discourses can be highly important for undermining core assumptions and beliefs, undermining through contrary practice would also require resources. Therefore, both resources and discourses are ascribed for this work.

References

Lawrence, T. B., & Suddaby, R. (2006). Institutions and institutional work. In R. S. Clegg, C. Hardy, T. B. Lawrence, & W. R. Nord (Eds.), *The SAGE Handbook of Organization Studies* (2 ed., pp. 215-254). London: SAGE Publications Ltd.