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Understanding participant actions in OR interventions using practice theories: a research agenda

Richard Ormerod, University of Warwick, Coventry, CV4 7AL
Mike Yearworth, University of Exeter, EX4 4SZ
Leroy White, University of Exeter, EX4 4SZ

Abstract

Practice theory is a collective concept embodying a group of social theories that take practice, in other words *actions*, as the central focus of their theorising. In this paper we examine the intellectual development of practice theory, highlighting the importance of the key ideas that have shaped thinking on organisational activities and show their relevance to OR. In particular, we examine the social theories that OR researchers have adopted, what data was captured, and how it was analysed in order to establish empirical grounding in case studies involving workshops and meetings published by OR researchers. The cases thus provide a useful empirical basis for comparison to outline the prospects for the use of practice theories by OR academic researchers. Finally, we propose an agenda to advance the understanding of practice theories and their contribution to the theory and practice of OR.

Key Words: Decision Processes; Process of OR; Social Theory; Interpretivism; Practice Theory

1. Introduction

> *For the things we have to learn before we can do them, we learn by doing them, e.g. men become builders by building and lyre players by playing the lyre; so too we become just by doing just acts, temperate by doing temperate acts, brave by doing brave acts.* (Aristotle).

What is OR practice? Despite decades of the broad acknowledgement of this question's prime importance for theorising on OR (see for example, Keys, 1997), it remains largely unresolved. Early debates focus on either the philosophical basis of the developing practice of OR (Dando and Bennet, 1981), or concern for understanding the development of OR in terms of the broader context in which OR activities take place (Jackson, 1999), or by which models of practice are suitable to non-traditional clients (Rosenhead, 1996). These are mostly concerned with the macro context in which OR practice is based. Recently, attention to micro understandings of OR practice is beginning to emerge (e.g., Ackermann, Yearworth and White, 2018), which, it is claimed, holds the promise for developing a more nuanced perspective on the practice of OR. However, what is clear from this view is the lack of an overarching framework, in that concerns about micro-processes continue to take an individualistic, behavioural perspective (Brocklesby, 2016; White, 2016). In contrast, in earlier developments, a collective perspective draws on an interpretivist stance to understand what is generally referred to as the process of OR (Horlick-Jones and Rosenhead, 2007; White, 2009; Keys, 1997). Fortunately, we see no need to choose one perspective over another; we argue that by taking a practice theory view we learn how to accommodate both. In fact, we argue for the possibility of extending an understanding of the process of OR by blending these perspectives by adopting a practice theory lens (Reckwitz, 2002). Thus, this paper extends thinking by building on the growing interest in practice in OR scholarship. This is to further a view of OR practice as a nexus of activities (Nicolini, 2012) conducted by OR practitioners; it is also to adopt the notion of practices as performed in the world and that this

performance in turn also shapes what we do (Pickering, 1995). It is a *performance* (Latour 1993); in fact, everything we do can be considered as performing a practice – including doing our academic research and writing this paper. The notion of practice also brings with it a sense of belonging, of having shared interests with a group of people also engaged in the intervention, who share language and jargon such that we can enjoy and understand a conversation with a fellow OR practitioner. However, while the current interest of OR scholars in some of the ideas from practice theory have advanced our understanding of the process of OR, understanding of the implications for OR from an extended practice perspective remains under-examined. Thus, the aim of this paper is to expand insights from practice theory, the opportunities and challenges it represents to OR scholarship.

In the paper, the main contribution made is theoretical, addressing the question: what is practice theory and how can OR scholars make use of it? To do this we review practice theory and what is involved; in so doing we examine the implications of the theories for OR scholarship. In particular, we contribute to debates on OR micro processes by aligning them with a performative view of OR practice (Ormerod, 2016). In this way we also show how OR practices are not disconnected from the macro perspective, but may be potentially enhancing this perspective by supplementing it with a micro processes view. To do this, rather than presenting new empirical evidence, we draw on published reports of cases or vignettes of OR interventions; from this, our theorising has an empirical grounding. Where the data of interest to our theorising has been found in these publications, we undertake our analysis of these case studies and across them. To achieve the blended (micro, macro) perspective we alluded to above, we analyse our data by 'zooming-in' and 'zooming-out' as a more *fluid* approach (see Nicolini, 2012).

These concepts are not new to OR. Horlick-Jones and Rosenhead (2007) set out quite clearly the complementarity of an ethnographic approach (a practice theory) with the use of PSMs in establishing both "insights into the nature of organizational processes" (zooming-out/macro) as well as "insights into the nature of PSM practice" (zooming-in/micro). In their review of historical examples, they draw out the existence of "quasi ethnographic" practices – exemplified by concepts such as "regard lontain" (distant gaze), "operational outlook", and "operational facts of life" as zooming-out/macro; and "participant observation", "vulgar competence" and "observational fieldwork" as zooming-in/micro – as inherent in the way in which the "craft skills of the profession" of OR as it has developed in the UK. Thus, our study explores the distinctive perspective that practice theory, generally, offers for the analysis of participant action in OR interventions. Our findings suggest that the advantage of adopting practice theory is that it enables OR scholars to interpret, at the micro level, data recordings of what an actor says or does (in isolation or interactively with others) and integrating it with the macro perspective (cultural, social, political and material) analysis of the actor's situation; in other words, it helps the researcher gain insight into each actor's performance in their operational context.

The next section, section 2, examines the social and economic context of the development of OR, the development of OR academic research, and the way that OR scholars have made use of philosophy and sociological theory to guide the approaches they have taken in conducting their research. In section 3 we turn to practice theory, and the philosophers and sociologists who have contributed to the development of their ideas. We believe that it is important to introduce an understanding of practice theory and scholars have grappled with scrutinising practices at the micro level in order to elevate

addressing concerns at the macro level. In section 4 we examine the published cases in which OR scholars describe their analysis of the practice as performance of both OR specialists and participants in an intervention. Our aim is not to evaluate the success or otherwise of the performances themselves and the supporting methods they use; rather it is to explore and fill some important gaps in our understanding of the social analysis of the process of OR undertaken by these OR academic researchers, the theories and methods they favour in their research, the data they collect and their method of analysing the data. Section 5 focuses on the implications of adopting practice theory as a framework for OR academic research and identifies both a research agenda and a few practical recommendations for conducting future research. Finally, in section 6 we discuss the implications for OR practice itself.

2. The philosophical and sociological foundations of OR academic research

The recent paper by Franco and Greiffenhagen (2018) contained a section on research which addressed "the need to understand and unpack the complex nature of OR interventions" (p. 674) (see also, Horlick-Jones and Rosenhead, 2007, for a discussion addressing similar issues). Their purpose was to provide the motivation and background for their focus on field studies which provided detailed data of real-time OR activity, and sociological analysis based on ethnomethodology. Franco and Greiffenhagen raise the problem of theorising OR practice when empirical investigation presents methodological challenges. Their ethnomethodological approach (Garfinkel, 1967) relies on micro-level observations of participant and facilitator behaviours in workshops and is enabled by the data logging capabilities of the *Group Explorer* platform that supports the creation of causal maps for strategy making (Franco and Greiffenhagen 2018; Yearworth and White, 2019). However, such opportunities to study the activity of OR practice with this level of data collection are rare. Notwithstanding Ormerod's exhortations for OR practitioners, of both 'hard' and 'soft' inclinations, to write in-depth case studies (Ormerod, 2014, 2017), most of what we know about OR practice at a detailed practice level arises from the Soft OR/PSM community and specifically academic researchers writing about workshops (for instance, White et al, 2015). Much of the material Franco and Greiffenhagen cite is relevant here, but our interest is not limited to the sayings and doings at the micro level, we also want to consider the macro contexts deemed relevant to action at the micro level by practice theory, as exemplified in the work of Bourdieu (1972/77; 1980/90) and Giddens (1979; 1984). For example, both these authors stress the importance of the social influences on decision-making.

Thus, the review of OR scholarship we offer in this section briefly considers the historical development of efforts against a background of the changing social context and technological change. After WW2, OR's initial self-image was that of scientists applying the scientific method to develop mathematical models in order to clarify the facts during decision making (Blackett, 1995/1948). This self-image applied to both practice and academic research. While practitioners struggled to establish the value of OR in non-military organizations, OR scholars fought to establish OR as a distinct academic discipline; the prestige associated with science was vital to them. The scientific credentials of OR, the arguments for adopting science as the foundational philosophy for OR, were laid out by Miser (1991a, 1991b, 1991c, 1993). In the 1970s the dominance of science in OR academic research started to be strongly criticised. One of the earliest critics was Churchman who had a background in the American philosophy of pragmatism; he was intent on bringing systems theory into the discussion including the concept of

the “whole system”, and in raising the central importance of ethics (Churchman, 1968a, 1968b, 1970, 1971, 1979). His book, *The Systems Approach and its Enemies* (Churchman, 1979), was particularly influential. As Ulrich, a student and research collaborator of Churchman, explains:

> *[The Systems Approach and its Enemies] represents yet another attempt by Churchman to pursue his fundamental vision. Improvement implies learning; can systems design secure learning? His idea was to look at different epistemological conceptions in the philosophical tradition as designs for ‘inquiring systems’, that is, systems that would be capable of learning. What could we learn from Leibniz, Locke, Kant, Hegel, and Singer about the possibilities and limitations of systems design in securing improvement?* (Ulrich, 2004, p. 212).

Churchman opened up a debate about the inclusion of subjective rationality of morality, politics, religion and aesthetics. He was promoting an interpretive approach. Ulrich continued to explore philosophical ideas, developing a *critical* stance based on American pragmatism, Kant and Habermas (Ulrich, 1980, 1983). But it was Ackoff, also a PhD student and colleague of Churchman, who provided the stimulus for a debate about the philosophical and social foundations of OR in his paper, published as the very first paper in this journal, “*optimization + objectivity = opt out”* (Ackoff, 1977), and two further papers, delivered and published in the UK (Ackoff, 1979a, 1979b). Together, these three papers directly challenged the objective, scientific approach which was assumed by operational researchers, that is, building and analysing mathematical and statistical models, and assuming that they can be taken to represent reality. He was questioning the very foundations of OR, the epistemological stance and the ontological assumptions. A number of researchers in the UK were already thinking about the relative merits of scientific, interpretive and critical foundations (for instance, Checkland, 1981, 1983; Dando and Bennet,1981; Eden, 1980; Jackson. 1982; Mingers, 1980). At the University of Hull in the UK a cluster of researchers became engaged in exploring the relative merits of using different methods with different foundations for different situations and purposes (see for instance, Jackson and Keys, 1984, Flood and Jackson, 1991). New directions were explored, for instance, post-modernism (White and Taket, 1993, 1996).

Economic growth has sustained and increased the opportunities for OR professionals, and the greater complexity of modern society in economic and social terms has ensured a richer variety of complex problems, which clients may want help in addressing (Keys, 1995; Kirby, 2003; Morse, 1977). On the other hand, it has also put OR in the position where its self-professed claims of objectivity are contested. Considering Ackoff’s ‘*optimization + objectivity = opt out’* equation today suggests a re-interpretation of the right-hand side, not so much as an opt out but instead raising the question “for whom?”[1].

Opportunities for OR practitioners provide the context for OR academic researchers; but academic researchers are also affected directly by economic, social and technological developments. Like practitioners, researchers benefit from healthy economic conditions; since WW2, higher education has

[1] The contested nature of objectivity is simply revealed whenever any OR practitioner mentions optimization. Optimal for whom? Contested stakeholder viewpoints and worldviews emerge from this simple question – if it is treated seriously. Of course, the OR practitioner can still opt out, but would this be ethical today? Or indeed at any time? We can imagine that Churchman might have posed a similar question.

grown continuously, at times rapidly. OR teaching and research groups have been located within mathematics and business faculties (or business schools). A healthy higher education system has ensured that lecturers can obtain time and support for their research activities including conferences and visits, which enable collaboration. The growth of the higher education sector has also ensured that there has been a growing population of researchers in other disciplines offering new ideas and affording possibilities for collaboration (see for instance, Jackson et al, 1989; Lawrence, 1966). However, the increasing marketization of higher education introduces competitive pressures that can constrain interdisciplinary collaboration. Another important social context, in this case shared with practitioners, has been the growing supply of graduate and postgraduate students available for recruitment as OR lecturers and researchers.

Like practitioners, researchers have benefitted from the growing power and scope of information and communication technology (ICT). In the first instance it was simply the availability of, what we would now consider to be, low powered computers to run relatively simple computing tasks such as linear programming and critical path analysis. As computing power advanced, more complex, computer hungry, applications such as integer programming, optimization (hill climbing) and simulation could be explored (Kelly and Walker, 1989; Ranyard, 1988). On the other hand, the same availability of computer power and access to big data that has enabled the burgeoning of machine learning techniques, has contributed to the detriment of OR *practice* as the problematising (Sandberg and Alvesson, 2011; White 2009) role of the practitioner is squeezed-out by the direct connection from data to algorithm to decision maker (Burger, White and Yearworth, 2019; Vidgen, Shaw and Grant, 2017).

Past and present reflection on OR practice still leaves us needing to understand and unpack the complex nature and context of OR interventions. While these reflections have improved our understanding, we now explore whether practice theory can elevate this further.

3. The development of practice theory by philosophers and social theorists

So, what is practice theory? In the first instance, as the name suggests, practice theory takes practices, in the sense of what is said and done, as the unit of analysis. Practice theory stresses the importance of social influences on practices, in other words on an actor's sayings and doings. For example, a practice could be doing research and writing this paper. It is a performance which consists of several elements interconnected to one another – forms of bodily activities, things and their use, a background knowledge in the form of understanding and know-how, and states of emotion and motivation. A practice is constituted by a bundle of these elements whose existence depends on the interdependencies of its elements. An individual, as a bodily and mental agent, acts as the carrier of a practice and, in fact, of many different practices which need not be coordinated with each other. Thus, they are not only carriers of patterns of bodily behaviour, but also of certain routinized way of understanding, knowing how and desiring. These conventionalized 'mental' activities, of understanding, knowing how and desiring, are necessary elements and qualities of a practice in which an individual participates, but they are not qualities of the individual. Moreover, a practice is not only understandable to the agent who carries it out, but also to potential observers within the same culture (Reckwitz, 2002, pp. 249-250). We examine some of these ideas below.

Alexander and Smith (2010), suggest the following historical pattern of development of sociology during the second half of the last century: "Wittgenstein's linguistic philosophy emerged in the 1940s and 1950s. The French structuralists and semioticians peaked in the 1950s and 1960s. The great cultural anthropologists Douglas Turner, and Geertz wrote their most influential works from the mid-1960s to the early 1970s. … The revolt against Parsons in particular [see Ormerod, 2020], and functionalism more widely, instigated a sharp turn away from culture as a valid mode of explanation. In the mid-1980s, things started to change." (Alexander and Smith, 2010). It is from here we pick up the story that leads to practice theory. But first we need to briefly reach back to Karl Marx and Heidegger and learn a bit about Wittgenstein. No-one can doubt the profound effect of Marxist philosophy and sociology, and Reckwitz (2002, p. 250) suggests that everything that is original in practice theory is already to be found in the works of Heidegger and Wittgenstein.

3.1 Foundational work

Marx (1818-1883), in developing his theoretical framework for the economic, social and political structures of society, focused on the activities of capitalists and workers in the bourgeois state (for a simple account see Ormerod, 2008a). Marx adopts a similar approach to Hegel, for whom labour is a central feature of human existence through which men and women come to know and understand their worlds. For Marx, labour defines humanity; society develops out of the activity of labour; the object of scientific inquiry, should be *praxis*, the practical real-life activity of people in the social circumstances in which they find themselves. Marx opened a new, and in many ways revolutionary way of thinking. He introduced the idea that humans were corporeal beings, with minds developed by action, and knowledge derived from the interaction between social subjects and between such subjects and objects.

Martin Heidegger (1889-1976) provides one of the two key building blocks of Bourdieu's and Giddens' work; the other being provided by Wittgenstein (see below). Nicolini (2012, p. 34) points to Blattner (2000) who argues that "Heidegger's project to rebuild the Western tradition on the ruins of Cartesian metaphysics is firmly rooted in what he calls the 'primacy of practice.'" Although Heidegger did not develop a coherent account of practice theory, Nicolini (2012, p. 34-37) observes that "according to Heidegger's 'everydayness', the basic ontological dimensions of our being in the world is, in fact, meaningfully structured by a texture of social and material practices that remain unthought of as such, but that we more or less share in common…. starting with *Being and Time* and throughout his career Heidegger moved towards granting a primacy of one type of practice – discursive – over all others. Heidegger was extremely influential on most contemporary authors that have contributed … to the 'practice turn,' from Michael Foucault (who once said that his entire philosophical development was determined by his reading of Heidegger) to Pierre Bourdieu, Schatzki, and many others." A brief explanation of Heidegger's approach can be found in Appendix A and Foucault's position is briefly described in Appendix B.

The later work of Ludwig Wittgenstein (1889-1951), captured in *Philosophical Investigations* (Wittgenstein, 1953/67) and published lecture notes (Wittgenstein, 1969), is found by (social) practice scholars to be highly relevant. For instance, Schatzki (1996) draws on Wittgenstein's critical work on how to conceive the psychological and bodily activities (practices) of everyday life. In *Philosophical*

Investigations Wittgenstein addresses 'the concepts of meaning, of understanding, of a proposition, of logic, the foundation of mathematics, states of conscious, and other things' (Wittgenstein, 1953/1967, p. vii). Central to his approach is his analysis of language, how it is constructed (grammar) according to structural rules (syntax), how it conveys meaning (semantics), how it is used (praxis). Wittgenstein uses the term *language game* to indicate that language is a game with rules. This theme has been adopted by OR scholars (see e.g., Gregory, 1993). A brief explanation of his approach giving examples of his method of exploring everyday language can be found in Appendix C.

3.2 The development of structural functionalism and the interpretivist response

Talcott Parsons' grand social theory, referred to as functionalism or structural functionalism, sets out to characterize the social system and the actors within it in a descriptive model consisting of two elements. First, the *theory of action* (Parsons, 1937) provides the motivation for actors to act: it provides the element which allows the actor freedom to act, or not; to choose. Second, the *structure* of society (Parsons, 1951) provides a characterization of the context within which an actor takes decisions; the structure both constrains and enables. For a brief account of structural functionalism see Appendix D. Empirical sociologists in the 1960s and beyond found the detailed structure of society very useful, but many social theorists felt that the attention paid to the structural element overly constrained an actor's freedom to act, particularly those actions that broke with societal conventions – deviant and revolutionary acts. This led to the development of interpretivist theories, and reinvigorated others such as conflict and critical theories (which will not be considered further here). Two interpretivist theories, the symbolic interactionism of Mead and Blumer, and the ethnomethodology approach of Garfinkel, illustrate the interpretivist stance.

While Parsons emphasised shared social context, Mead's *symbolic interactionism* places the emphasis on micro-scale interaction, a model of action that followed more closely the actor's conscious awareness of what they are doing, a model that does not involve explanations at a radically different level. Thus, whereas Parsons contended that a person's behaviour responded to values, norms, roles and status, Mead argued that the self is far more than an internalization of components of structure and culture. Mead, according to Blumer, suggested that it is 'a social process, a process of self-interaction in which the human actor indicates to himself matters that confront him in the situation in which he acts, and organises his action through his interpretation of such matters' (Blumer, 1975 p. 68). Blumer's contribution was to clarify the methodology of research, the result being 'grounded theory', an approach used by many academic researchers including cases featured here (see for instance Franco, 2008; Henao and Franco, 2016).

Ethnomethodology was founded by Harold Garfinkel who took Parsons' *Structure of Social Action* as his starting point and set out to remedy Parsons' sketchy treatment of the actor's knowledge and understanding. Drawing on the phenomenological approach of Alfred Schütz (1899-1959), ethnomethodology examines how people make sense of their everyday lives (Garfinkel, 1967; Heritage, 1984). Taking common sense as the starting point, the ethnomethodologist asks 'How do people present to others an orderly social scene?' or "How do people render scenes or situations intelligible or reasonable?" (Wallace and Wolf, 2006, pp. 268-270). Both functionalism and ethnomethodology take

underlying trust as the basis for human behaviour, but Garfinkel denies that social facts have a reality of their own that impinge on the individual. ‘Order’ is to be treated, not as something that is ‘out there’, but as the lived experience of the individual. “Neither does ethnomethodology study how role expectations are created in the interaction process, as does symbolic interactionism. Instead, ethnomethodology studies the process by which people invoke certain taken-for-granted rules about behaviour with which people interpret an interaction situation and make it meaningful” (p. 271). Ethnomethodologists, like symbolic interactionists, employ a rich variety of methods. They do not aim to explain human behaviour or to show, for example, why places and generations vary in their suicide and divorce rates or why religions exist. The emphasis of ethnomethodology is on description; the object of study is the methods by which people make sense of their social world (Wallace and Wolf, 2006).

3.3 Anthony Giddens: from interpretivism to structuration

Giddens approaches sociology from a theoretical perspective. His aim was to produce, like Parsons, an all-embracing social theory, but which did not fall into the functionalist trap of over emphasis on social structure, nor into the interpretivist trap of an over emphasis on the agents themselves. Giddens wanted to reconcile the tension, then current in social theorising circles, between structure and agency, developing an approach which he called the ‘theory of structuration’ (Giddens, 1993/1976; 1979). Giddens argued that no matter how ‘macro’ the concerns of social theories are, they demand a sophisticated understanding of agency and the agent just as much as an understanding of the complexities of society. (Giddens, 1993/1976, p. 5). To understand the ‘interpretive’ approaches favoured in the 1960s, Giddens examined the phenomenology of Schütz (1972/1932) and, the ethnomethodology of Garfinkel (1967), which seeks to distance itself from phenomenology by moving towards the analysis of ‘situated actions’ as ‘publicly’ interpreted linguistic forms (p.42). Giddens concludes that Garfinkel’s approach “cuts off the description of acts and communication from any analysis of purposive or motivated conduct, the strivings of actors to realize definite interests” (Giddens, 1993/1976, p. 46). An account of Giddens’s analysis of Schütz’s phenomenology and Garfinkel’s ethnomethodology is given in Appendix F.

Giddens concludes from his examination of Schutz, Garfinkel and interpretive social theory in general, that “the mediation of frames of meaning is a *hermeneutic* task …” (p. 46; italics added). Hermeneutic philosophy’s central concept is *verstehen* whereby a researcher, in trying to understand another person’s experience, should try to put himself in the other person’s shoes. However, the understanding of philosophical hermeneutics took a new twist when Hans-Georg Gadamer, building on Heidegger, argued that interpreting the past actions of people (*verstehen*) was not a subjective matter, but rather a question of entering another *tradition* (or as Wittgenstein would put it, ‘form of life’), such that past and present constantly mediate one another (Gadamer, 2004/1960). The hermeneutic circle provides Giddens with a way of reconciling the agency versus structure dilemma; both could be conceptualized as working together in a hermeneutic circle with actions giving rise to structure which subsequently influences actions. (Giddens, 1993/1976, p. 63).

Giddens says that social life may be treated as a set of *reproduced practices* and argues that the interpretivists fail to achieve what they set out to do, namely, to develop a satisfactory way of relating

to everyday life and the common sense of lay actors (Giddens, 1993/1976, pp. 119-120). He describes the process whereby structure is engaged in practice as 'structuration'. Structuration is the process by which structure is deployed in practice at a particular time in a particular situation and by which structure is updated in the light of the experience of interaction at different times in different places. See Appendix E for a fuller version of the above including the example of a doctor/patient relationship. See Appendix G for Giddens' theoretical analysis of everyday social interactions in terms of structure.

3.4 Ethnographic study and Pierre Bourdieu

Pierre Bourdieu (1930-2002) does not approach the development of his social theory from a theoretical perspective. Bourdieu's seminal text on practice theory, *Outline of a Theory of Practice* (Bourdieu, 1972/1977), opens with a detailed analysis of data collected during his ethnographic study of the Kabyle people of Algeria at the time of the Algerian war (Bourdieu, 1958/62). Unsupervised and without prior allegiance to any particular ethnographic method, Bourdieu's approach can be described as learning-by-doing. To throw light on the situation he engaged with a great variety of methods, instruments and strategies; he used questionnaires, qualitative interviews, participant observation, photographs, sketches, and so on (p. 5). As a result, he was critical of the 'theoreticism' dominant in France, in particular the structuralism of the anthropologist Claude Lévi-Strauss (1908-2009) and the phenomenology of the philosopher Maurice Merleau-Ponty (1908-1961). In observing the Kabyle people, in interacting with them, and in trying to fathom out what was going on when they give gifts, marry, engage in honour disputes, and interact with neighbouring tribes, he was struck by the difficulties of ascertaining the rules and customs of the tribesmen both from his own observations as an outsider and from the explanations given by the people themselves. Bourdieu (1972/77, p. 29) quotes Wittgenstein's neat summary of the difficulty of reconciling different accounts in *Philosophical Investigations*:

> *What do I call 'the rule by which he proceeds'– The hypothesis that satisfactorily describes his use of words, which we observe; or the rule which he looks up when he uses signs; or the one which he gives us in reply if we ask him what the rule is? – But what if observation does not enable us to see any clear rule, and the question brings none to light? – For he did indeed give me a definition when I asked him what he understood by "N", but he was prepared to withdraw and alter it. – So how am I to determine the rule according to which he is playing? He does not know it himself. – Or, to ask a better question: What meaning is the expression "the rule by which he proceeds" supposed to have left to it here?* (Wittgenstein, 1953/1967, #82).

Bourdieu attacks attempts to model (describe the structure of and predict) behaviour in terms of the rules and customs which inform decisions and actions; any attempt is found to be wanting, requiring special cases to reflect different situations, at different times, with different ends, and with different histories (for instance, the giving of a gift could be an expression of respect in some circumstance at certain times and an insult at others). Bourdieu concluded that it was necessary to abandon all theories which explicitly or implicitly treat practice as a mechanical reaction. Having abandoned existing social theories, Bourdieu constructs his own theory with a focus on practice, actions, what people do. The resulting theory rests on three key terms: field, capital, and habitus. The concept 'field' is taken to be

the location of the social action, where the everyday practice under consideration takes place; it is what other scholars variously describe as the situation or site of the action. The notion of capital indicates the relevant assets that agents bring to the game; the capital can take the form of social capital, cultural capital, symbolic capital or financial capital, all of which affect the disposition of the agents on the 'field of play'.

> An example: the OR offer. In the OR consulting field, consultants bring to bear social capital in the form of networks of contacts, the clients bring financial capital in their ability to fund the assignment, both bring their understanding of how the game should be played, the rules of the game, both bring their own symbols in the form of the names and reputations of their organizations, and their learnt cultural understanding which enables those concerned to decode the signals of others. The agents, or players develop dispositions over time as a result of playing game after game (assignment after assignment). A particular assignment both draws on the deeply engrained habits, skills and dispositions developed when working on previous assignments, and in turn provides new experiences which will affect the habits, skills and dispositions carried forward to the next assignment. The players thus develop a 'sense of the game', a practical sense involving both intuitive and reflective thinking, of combining both an objective and subjective understanding of the situation.

A system of evolving dispositions is referred to by Bourdieu as 'habitus'. Bourdieu, (1977) takes the term habitus to mean "the durably installed generative principle of regulated improvisations" (p.78). Habitus makes it possible to inhabit social structures as fields, to draw on them practically, enacting their principles allowing for revisions and change. Bourdieu has described this system of evolving dispositions as a 'logic of practice', expressed in the relationship [(habitus) (capital)] + field = practice (Bourdieu, 1984. p101). Further explanation of Bourdieu's position can be found in Appendix G. A critique of both Giddens and Bourdieu by Schatzki can be found in Appendix H. Schatzki's own approach is then summarised in Appendix I. The ideas of Bourdieu have not been extensively taken up by OR scholars. There are but a few examples (e.g., Johnston, 1995).

3.5 Actor network theory (ANT), the mangle perspective, and activity theory (AT).

Like Bourdieu, the authors of actor network theory (ANT) base their approach on their experiences of conducting ethnographic studies (Callon, 1984; Latour, 1987; Law, 1984). ANT takes as its focus the relationship between natural entities and social actors and seeks to recast our understanding of this relationship within a new epistemology. ANT considers both people and technologies as enacted through networks, in particular in terms of what people and things become as a result of their position in the network, and the power that emerges. (Latour, 2005; Callon, 1984, 1999; Law, 2008). Actor networks are often highly dynamic and are prone to instability. They can be stabilized to some extent when people, technologies, roles, routines and so on are aligned. This alignment is achieved through *translation* (Callon, 1984), an analytical framework from ANT that describes four distinct 'moments' (problematization, interessement, enrolment, and mobilisation) in the ongoing process of researchers imposing their conception of a problematic situation on others. ANT's emphasis on the dynamic and relational aspects of an intervention is a useful lens for the study of change and the unintended outcomes of intervention (Keys, 1995; White, 2009).

The mangle perspective is an extension of the academic research programme known as the sociology of scientific knowledge (SSK) (Bloor,1976). ANT expands the human-centred view of SSK with the claim that material, machinic things (such as radar and computers) can also be taken to provide agency; Pickering goes a step further allowing agency to reside in 'concepts' as well. Pickering (1995) starts from the idea that practice should not be viewed in terms of facts and observation but should rather be approached from the perspective that scientific practice involves actions through time. This he refers to as the "performative idiom, an idiom capable of recognizing that the world is continually doing things and so are we" (p. 144). Such a view requires the concept of agency: who or what motivates and controls the forward momentum of action? As agency passes from one human, material or conceptual entity to another, so does power. The mangle and ANT provide social theoretical lenses which operate at the same sort of micro-level as ethnomethodology (Franco and Greiffenhagen, 2018), through the idea of translation and its constitutive elements, and at a much finer granularity of analysis than the Bourdieusian lens envisages.

Activity Theory (AT) was developed during the 1920s in the Soviet Union principally by Vygotsky (1981, 1986). It was based on two assumptions; the first is that knowledge is mediated through tools and artefacts; the second is that *activity* (big or small) is the basic unit of analysis. It didn't reach the West until Engeström popularised it in the 1970s (Engeström & Miettinen, 1999). The central concern of AT is the relationships between material action, mind, and society: the approach explores links between thought, behaviour, individual actions and collective practices. Thus, AT is seen as rooted in practice (Schatzki, 1996; White, Burger and Yearworth, 2016, p. 986). AT is also referred to as cultural historical activity theory (CHAT), emphasising that it is a cultural theory which pays attention to the preceding history. AT is very similar to ANT; both comprise a unique combination of material, mental, social, institutional and historical factors and both provide analytical tools to understand the nature of the reciprocal action-shaping of humans and non-humans; theoretically they are very close, particularly in adopting theories of language and semiotics (White, Burger and Yearworth, 2016, p. 988).

In this section we have highlighted some of the efforts and insights of key philosophers and social theorists of practice, each one of whom warrants much deeper coverage than we can offer here. However, some of the ideas have penetrated OR scholarship, others not so much. In the next section we turn to work we believe provides a basis for further elaboration of the value of PT for understanding OR practice.

4. **Case study comparison**

In this section we examine existing published cases of facilitated workshops and meetings and present our analysis of the cases. We selected cases relying on the principle of representing diversity (White & Taket, 1996). This method selects cases such that they reflect the variety within important, theoretically relevant dimensions. The analysis has an empirical dimension but does not present new data, the data being found in existing publications. The aim is to select case study papers written by OR scholars which present records of the activities (the sayings and doings) of facilitators, clients and participants engaged in workshops and meetings. Such workshops and meetings provide examples of actual practice and are not designed as experiments.

We have concentrated on papers which examine in depth (as advocated by Tsoukas, 2009a) participant and facilitator actions and in which decision support, problem structuring, and other methods were being used in workshops, meetings or interviews. We have chosen to focus on cases about workshops because they provide a context in which researchers, who are generally interested in philosophical and social aspects, have been able to study interventions in detail (in other words at the micro level). Moreover, participants are committed to attend workshops in a particular place at a particular time enabling recording technology to be deployed in advance. On the day of a workshop the participants generally include a facilitator, the work usually utilizes problem structuring methods, and sometimes software support. However, our concern here is not with the methods being used to conduct the workshops per se; rather it is research into how the participants act and interact; how they take decisions and how these are affected by the cultural, social, political and material context. Nor are we concerned with whether the workshop was a success or not, nor the issue of how this can be assessed. Rather, we are interested in the social theory adopted explicitly or implicitly and the implications for the design and conduct of OR academic research. Some papers on workshops featured here include records of pre- and post-activity (meetings/interviews); these are potentially useful sources of information and can themselves be studied; some reports may involve interviews and meetings but no workshop. These may be of interest from a practice theory perspective if suitable records are kept (such as audio or video recordings).

The selection of papers chosen for examination was based on a systematic search of the Scopus database. We initially searched on journals in which we judged we might expect to find suitable papers. The OR journals selected were: The European Journal of Operational Research, the Journal of the Operational Research Society, Omega, Management Science, Operations Research, and the Annals of Operations Research. We also included Systems Dynamics Review and Group Decision and Negotiation, since we have observed that they sometimes publish articles by OR authors that are potential candidates for inclusion in our analysis.

The Scopus search was narrowed on the basis of (i) form of engagement (for instance, workshop, problem structuring, group support system, model supported group); (ii) social theory (for instance, practice theory, actor network theory, ethnomethodology, activity theory, personal construct theory, psychology); and (iii) data analysis method (for instance, narrative analysis, attribution theory, conversation analysis, cognitive map, key incident analysis, intersubjective analysis, structuration moves, purposeful text analysis, quantitative analysis, thematic analysis, themes, coding). The Scopus search query was never conceived to be a surgical extraction of precisely the case studies we have chosen to analyse, but a net cast just wide enough to provide us with a manageable number of papers from which we could select our final case studies by applying our collective judgment. The resultant query retrieved 164 articles for further analysis. The exact search terms and the full list of papers can be found in Appendix K.

All 164 papers returned by the Scopus search were reviewed and discussed by the author team. By agreement they were then further down-selected to eliminate those where experiments were conducted with students or consultants as participants. After eliminating those that didn't include video, audio, or computer recordings of participant behaviour, the resulting data set contained 18 papers to which were

added a further two papers, (d) and (n), to provide examples of using other, albeit less desirable, sources of relevant data - causal maps, and transcriptions of interviews. Thus the final data set consisted of 20 papers.

A summary of the 20 selected papers is presented in Table 1, which shows key words for five issues for each paper: the nature of the activity analysed (ACT); the context (CON) in which the activity took place; the underlying social theory (ST) adopted; the main methods of data capture (DCM); and the data analysis method (DAM) used. ACT simply indicates the focus of our attention, usually one or more workshops. CON identifies (i) the substantive focus of the paper (usually the intervention method used) and (ii) the sector and country in which the activities took place. The final three sets of issues form a natural set: the social theory ST can influence the data required DCM and its analysis DAM.

	Article	ACT nature of the activity	CON the context	ST	DCM	DAM
a)	*Niederman, F., & Bryson, J. (1998). Influence of computer-based meeting support on process and outcomes for a divisional coordinating group.*	six meetings of single group	GDSS; professional services sector US	adaptive structuration theory (AST)	video, audio, software aided meeting management (SAMM) system	social information processing analysis (SIPA) manually coded
b)	*Shaw, D., Ackermann, F., & Eden, C. (2003). Approaches to sharing knowledge in group problem structuring.*	four workshops in four different organizations	group sharing of knowledge: 1 business 2 public sector 1. community UK	social psychology/ attribution theory	cognitive maps developed on computer with activity log *Decision Explorer*	attribution theory; structure coded in terms of themes, links and networks
c)	*Horlick-Jones, T., & Rosenhead, J. (2007). The uses of observation: combining problem structuring methods and ethnography.*	several workshops, embedded in a process of interviews and meetings	problem structuring methods (PSM); community UK	ethnographic understanding of context	audio recording, observational notes, flip charts	conversation analysis
d)	*Vo, H.V., Chae, B., & Olson, D.L. (2007). Developing unbounded systems thinking: using causal mapping with multiple stakeholders within a Vietnamese company.*	three workshops	unbounded systems thinking (UST); retail sector Vietnam	philosophical pragmatism, Unbounded systems thinking (Mitroff, & Linstone; 1993a,b)	causal maps	technical, personal and organizational perspectives
e)	*Franco, L.A. (2008). Facilitating collaboration with problem structuring methods: A case study of an inter-organisational construction partnership.*	three workshops embedded in a process of interviews	problem structuring methods (PSMs); construction industry UK	philosophical pragmatism (implicit)	audio recording of meetings, questionnaires, notes	grounded theory: coding and categorizing using *Atlas.ti*
f)	*Volkema, R. (2009). Natural language and the art and science of problem/opportunity formulation: A transportation planning case analysis.*	one meeting	linguistic analysis of natural language; transportation US	linguistic analysis	audio recording, note taking	coded hierarchical issue maps, discursive temporal flow, self-interests (individual and group) qualitative and qualitative

g)	*White, L. (2009). Understanding problem structuring methods interventions*	two meetings and final workshop	problem structuring methods (PSM); public sector UK	actor-network theory	flip charts, observer notes	narrative analysis
h)	*Franco, L.A., & Lord, E. (2011). Understanding multi-methodology: Evaluating the perceived impact of mixing methods for group budgetary decisions.*	two workshops and interviews	application of multi-methodology; Health and social care sector UK	philosophical pragmatism (implicit)	audio recordings and maps on paper from interviews; maps, diagrams and notes from workshops *Decision Explorer*	grounded theory; coding and categorizing
i)	*Ackerman, F. & Eden, C. (2011). Negotiation in strategy making teams: Group support systems and the process pf cognitive change*	three workshops in different parts of the organisation, and one plenary	group support systems (GSS); multinational	social psychology	cognitive maps developed on computer with activity log *Group Explorer* and *Decision Explorer*	Data attribution theory; structure coded in terms of themes, links and networks
j)	*Tavella, E., & Franco, L.A. (2015). Dynamics of group knowledge production in facilitated modelling workshops.*	one two-day workshop	problem structuring methods (PSM); community UK	dialogical theory of new knowledge creation (Tsoukas, 2009a)	audio recording, flip charts, observation notes	knowledge creation and maintenance using conversational analysis
k)	*Tavella, E., & Papadopoulos, T. (2015). Expert and novice facilitated modelling: A case of a viable system model workshop in a local food network.*	one two-day meeting	facilitated viable systems method (VSM); local food network Denmark	positivism (inductive reasoning on limited data)	audio recording	coded according to theoretical definitions of facilitators
l)	*Velez-Castiblanco, J., Brocklesby, J., & Midgley, G. (2016). Boundary games: How teams of OR practitioners explore the boundaries of intervention.*	one meeting between OR team	intervention boundaries; public sector New Zealand	philosophical pragmatism (implicit), language games, boundary theory, relevance theory	observations, audio recording, note taking, and identifying background of participants	an analysis of participants' discursive actions to change the boundaries of their shared cognitive environments using relevance theory

m)	*White, L., Burger, K., & Yearworth, M. (2016). Understanding behaviour in problem structuring methods interventions with activity theory.*	participatory planning; one workshop	understanding behaviour in PSM; public/private UK	activity theory	video recording flipchart	multimodality coding scheme based on activity theory to tag talk, bodily movements and interactions with materials/tools
n)	*Henao, F., & Franco, L.A. (2016). Unpacking multimethodology: Impacts of a community development intervention.*	interviews and workshops	multimethodology; community Colombia	philosophical pragmatism (implicit)	transcripts of interviews	grounded theory interactive-inductive approach with coding using *Atlas.ti*
o)	*Burger, K, White, L., & Yearworth, M. (2019). Why so serious? Theorising playful model-driven group decision support with situated affectivity.*	participatory planning; one workshop	model-driven group decision support (GDS); public/private UK	activity theory	video recording flip chart	multimodality coding scheme based on activity theory; analysis of vignettes chosen to highlight 'playful' moments in a group model building session
p)	*Franco, L.A., & Greiffenhagen, C. (2018). Making OR practice visible: Using ethnomethodology to analyse facilitated modelling workshops.*	one workshop	facilitated modelling; private sector UK	ethnomethodology and conversation analysis	video recording, group support system, diary of events before and after workshop	fragments of a vignette analysed using ethnographic insight without scripts
q)	*Velez-Castiblanco, J., Londono-Correa, D., & Naranjo-Rivera, O. (2018). The structure of problem structuring conversations: A boundary games approach.*	nine workshops	facilitated boundary games analysis; education sector Colombia	philosophical pragmatism (implicit), boundary games theory	video, audio, white board, photos, *PowerPoint*	boundary games theory
r)	*Franco, L.A., & Nielsen, M.F. (2018). Examining group*	one workshop	formulations in facilitated workshops;	conversation analysis; pragmatic iterative-deductive	video and audio, *Group Explorer*	coded using Jefferson (2004);

	facilitation in situ: The use of formulations in facilitation.		university sector UK	process (Orton, 1997)		multimodal conversational analytic process analysis (Goodwin, 1981; Stivers and Sidnell, 2005)
s)	*Tavella, E., Papadopoulos, T., & Paroutis, S. (2020). Artefact appropriation in facilitated modelling: An adaptive structuration theory approach.*	one workshop	facilitated modelling; food cooperative community Denmark	adaptive structuration theory (AST)	audio recording, flip charts	structuration moves
t)	*Valcourt, N., Walters, J., Javernick-Will, A., & Linden, K. (2020). Assessing the efficacy of group model building workshops in an applied setting through purposive text analysis.*	multiple interviews and workshop, prior field work	group model building (GMB); community, water, international (multicultural/multi lingual)	social psychology	audio recording, notes	structural analysis of mental models and causal loops using purposeful text analysis (PTA) coded in *Dedoose* for causality

Table 1. Key attributes of the papers selected

The analysis of the 20 selected papers (**a**) to (**t**) addresses two further questions: what were the *outcomes* of interest to our investigation into practice theory, and *what is lacking* from our point of view. The results are shown in Table 2. To be clear, the outcomes we are interested in are not the substantive outcomes (the success or otherwise of an intervention using particular methods); rather our concern was the outcomes from the application of the ST, DCM and DAM chosen by the authors of each paper. The outcome column entry for each paper consists, whenever possible, of quotes from the paper being considered. It was not always easy to pick appropriate quotes and judgement had to be applied. The results are not even; more insight could be obtained by questioning the authors. On reviewing outcomes, we detected a theme – learning. At the beginning of each outcome statement, we have indicated in square brackets where learning at the individual or group level is indicated from the accounts of the authors. The term 'lacking' could be misunderstood. It should not be taken to indicate criticisms; rather it is meant as a factual indication of additional information that would have been pertinent for our study. For instance, video and audio recording may have been considered unnecessary in a computer centred analysis, but from our point of view they would have provided additional information – they were lacking.

The outcomes and lacking columns provide the motivation for the research agenda addressed in the next section and some themes for the direction which further research might take.

	Article	Outcome	What is Lacking?
a)	*Niederman, F., & Bryson, J. (1998). Influence of computer-based meeting support on process and outcomes for a divisional coordinating group.*	[Learning by the group for performance] “Adaptive structuration theory (AST) emphasizes that variations in outcomes depend not only on the features inherent in a technology but also on how the group appropriates the technology and its various features. The AST perspective is useful in explaining performance differences between groups given essentially constant input that appropriated GDSS differently. This study is not inconsistent with the AST approach, in that it takes an input-process-output approach (…) focusing on the influence of GDSS on outcomes and selected behaviours and outcomes for one group over a series of meetings. It does not, however, focus on the specific constructs designed to measure amount or nature of appropriation”.	use of ACT for data analysis purposes. Analysis of the influence of the cultural context – professional service providers with positive attitude to computers
b)	*Shaw, D., Ackermann, F., & Eden, C. (2003). Approaches to sharing knowledge in group problem structuring.*	[Learning from others, extend understanding by learning within the group] “[Our] explorations suggest a typology of knowledge sharing … a participant might naturally access knowledge about a problem through four approaches, called here stories, expanded sequences, broadcasts and newsflashes”. “[evidence of] stories were found in the maps”. “[evidence of expanded sequences] were found through the analysis of the participant-entered links “. Evidence of broadcasts and newsflashes were also found in the links.	video or audio recordings; empirical evidence of how the flow is constructed in the interactions; personal cognitive maps analysed in terms of cultural, social, political and material context
c)	*Horlick-Jones, T., & Rosenhead, J. (2007). The uses of observation: combining problem structuring methods and ethnography.*	[Tacit learning from the problem owners, social learning] “as we are aware, this specific context [the Notting Hill Carnival] did not significantly influence our fieldwork practice.” "with orthodox PSM deployment … the PSM analyst's emerging appreciation of the nature of the problem situation develops through tacit learning processes from the accounts provided by problem owners. In contrast, the form of ethnographic investigation we utilized views such accounts as topics for further investigation, rather than as resources that can be used to inform OR practice in unproblematic ways”.	analysis of the relationship between cultural, social, political and material context and the observed micro behaviour of participants; video recording
d)	*Vo, H.V., Chae, B., & Olson, D.L. (2007). Developing unbounded*	[Learning how to design a research system by the group]	audio, video recordings or computer logs; notes on

	systems thinking: using causal mapping with multiple stakeholders within a Vietnamese company.	"this research has demonstrated that an [unbounded systems thinking] UST process gave the stakeholders an opportunity to consider other perspectives in learning about the problem situation". "The issues range from personal (what personal perspectives may inhibit the acceptance of other perspectives) and organizational (what organizational factors are influential such as culture, political environment, etc) to technical (how to design a research system that is able to monitor the changes in mental models of the stakeholders)".	dynamics of individual behaviour
e)	*Franco, L.A. (2008). Facilitating collaboration with problem structuring methods: A case study of an inter-organisational construction partnership.*	[Learning how to improve method/practice by the group] "The use of a grounded theory framework for data analysis was found particularly appropriate in gaining a further understanding of the perceived role and impact of PSMs in this particular collaboration. This paper argues that the grounded theory approach to data analysis has potential for use in a variety of contexts for group decision support researchers".	video, audio or computer recording of the workshops
f)	*Volkema, R. (2009). Natural language and the art and science of problem/opportunity formulation: A transportation planning case analysi.s*	[Better tacit understanding of the problem by the group] "understanding group or team-based problem/opportunity formulation requires an appreciation for the syntax and semantics of natural language". "the study demonstrates the viability of a framework and method for identifying linguistic structures. … This grammar … allows for further investigation into the manner in which problem/opportunity-space is explored, the role that the chair or leader can play in this exploration, and the means by which radical reformulations can occur". "researchers must re-focus their own goals and agendas, tracking the development of issues in real time, rather than focussing on decisions or decisional outcomes as the unit of analysis".	video recording; analysis of the interaction of cultural, social, political and material context with linguistic behaviour
g)	*White, L. (2009. Understanding problem structuring methods interventions*	[Learning the value of seeking collaboration with those not involved] Use of a PSM brought clarity to the situation and helped shift the objective for the project from a competitive to a collaborative one. In particular "in recognizing which voices were missing from the situation (farmers)". "The use of ANT provides a means for realising the importance of context and politics and for recognising the shifting interest and alliances".	Field notes, audio recordings, context analysed through narrative analysis
h)	*Franco, L.A., & Lord, E. (2011). Understanding multi-methodology: Evaluating the perceived impact of mixing methods for group budgetary decisions.*	[Organisational learning about working in a multi-organisational context] "the intervention reported shows that in the multi-organisational context within which the intervention was carried out, no particular criteria or values associated with decision making effectiveness were dominant. The values embedded within our approach to and in decision support as illustrated in the multi-methodology intervention also show no particular concern or criteria as	audio or video recordings of the workshops. While the salience of political considerations and the norms of rationality are mentioned, no analysis of the links

		dominant". "we could have spent more time researching the context and budget processes within the TPSC to further increase our awareness of the political implications of different recommendations during the intervention design phase". "We hypothesise that the intervention impacts observed may be related to the organisational context within which the multi-methodology is undertaken, and the contested nature of budgetary decisions".	between the micro data and the cultural, social, political and material aspects are reported.
i)	*Ackerman, F. & Eden, C. (2011). Negotiation in strategy making teams: Group support systems and the process of cognitive change.*	[Learning to develop the potential of the DCM utilised] "The research involved the analysis of detailed time series data logs that exist as a result of using a GSS that is a reflection of cognitive theory". "As a result of analyzing the logs, it became clear that the data logging process should be enhanced by additional facilities, for example, inclusion of on-line statistics (both for links and preferences)". "this study cannot be regarded as a study of cognition per se".	No video or audio recording; no cultural, social, political data; GSS at this time under developed for data analysis purposes.
j)	*Tavella, E., & Franco, L.A. (2015). Dynamics of group knowledge production in facilitated modelling workshops.*	[Need for micro-level analysis to learn how to develop better group processes] "We have identified certain facilitated modelling practices linked to generative and collaborative patterns that resemble a relational mode of engagement among those involved, as well as to assertive patterns that resemble a calculative mode of engagement among those involved". "there is a need for more micro-level analyses of other facilitated modelling workshops to examine what is it that facilitators and workshop participants actually do as they interact in a model-supported discussion".	participants' cultural, social and political reality and its reflection in observed micro behaviour; video recording
k)	Tavella, E., & Papadopoulos, T. (2015). *Expert and novice facilitated modelling: A case of a viable system model workshop in a local food network*.	[Analysis of social learning required] The DAM, clearly allowed the research aims of the project to be reached in a structured way. "we do not examine their different experiences before the workshop and how these impacted their behaviour … this would be an avenue for further research".	video recording; analysis of non-facilitating participants; analysis of the impact of the cultural, social, political and material context on behaviours (see outcome)
l)	*Velez-Castiblanco, J., Brocklesby, J., & Midgley, G. (2016). Boundary games: How teams of OR practitioners explore the boundaries of intervention.*	[From power and influence to collective learning] "Using the theory of boundary games, an intervention process can be expressed as a succession of actions on boundaries. It is possible to identify the actors carrying out the actions, and processes of generating, strengthening and weakening boundaries and their associated assumptions can be traced through analysis. This allows for an understanding of how individual actors affect the shared cognitive environment of a group (e.g., how an individual OR practitioner affects the thinking of his or her team), and it is also possible to	video recordings; more cultural background information about individual participants to support application of relevance theory

		trace how individual communications condition the possibilities for future actions through their effects on boundaries”.	
m)	*White, L., Burger, K., & Yearworth, M. (2016). Understanding behaviour in problem structuring methods interventions with activity theory.*	[Individual and collective learning resulting in emergent properties] “The analysis using AT helped to theorise the micro level dynamics that characterised the collaborative group model building processes in the case study. By applying AT to study how workshop participants use mediating artefacts to grapple with the object of a ‘zero carbon zone’, it was possible to show how a co-constructed, shared activity system can be developed to accommodate contradictions between the subjects’ activity objects”. “For practitioners, this approach should help them think about the intervention process and recognize and intervene when there are problems. Specifically, understanding that collective behaviours are emergent properties can help in planning the interventions and managing expectations”. “By applying AT concepts to the empirical analysis of problem structuring work, the *process of relational co-construction* of collective and joint intentions, which are precursors for collective action, may thus be understood”.	connection between participants’ reported cultural, social and political reality and observed micro behaviour
n)	*Henao, F., & Franco, L.A. (2016). Unpacking multimethodology: Impacts of a community development intervention.*	[Individual and group learning as reported by those involved] “The research reported here identifies a range of cognitive, task and relational-related impacts experienced by the management team”. “our analysis helped us to develop a process model that explains the mechanisms for the personal, social and material changes reported by those involved. The model explains how the intervention's analytic and relational capabilities triggered effortful decision-making processes and integrative behaviours, which underpinned the reported impacts and changes”.	audio and video recordings
o)	*Burger, K, White, L., & Yearworth, M. (2019). Why so serious? Theorising playful model-driven group decision support with situated affectivity*	[Creativity and group learning] “Applying this perspective [situated affectivity] to study what’s going on inside the black box of a model-driven GDS [group decision support] intervention, we have illustrated a micro-moment of human creativity in-situ which may be seen as indicative of our joint ability, drawing on reciprocal scaffolding processes, to overcome obstacles in the context of model-driven GDS”.	cultural, social, political and material contextual data on individuals involved and their organizational roles and status
p)	*Franco, L.A., & Greiffenhagen, C. (2018). Making OR practice visible: Using ethnomethodology to analyse facilitated modelling workshops.*	[Plea for more analysis of behaviour and learning in OR practice] “The ethnomethodology-informed perspective adopted here both complements and broadens the approach and level of analysis typically used to evaluate the impact of OR in practice”. “The use of ethnomethodology to examine video recordings of actual OR practice allows us to show what seem at first	a complementary analysis of the influence of cultural, social and political factors

		unremarkable events (e.g. person A doing x led person B doing y as an example of z". However, what events are chosen for fine-grained analysis (and why they are important) is always driven by the theoretical and practical considerations of the researchers". "If the interest is on revealing not what is said about OR practice, but what is actually done as OR in order to assess and improve it, then undertaking this type of research is needed and complementary addition to more conventional studies"	
q)	*Velez-Castiblanco, J., Londono-Correa, D., & Naranjo-Rivera, O. (2018). The structure of problem structuring conversations: A boundary games approach.*	[Practitioners need to learn how process elements connect including the interaction between the micro and macro levels] "In the context of workshops, we came to realize the importance of the multimodality, namely, the possibility that actors can combine different modes (e.g. speech, gesture, image) to produce multimodal communications". "For BGT, models are just another mode that are part of a multimodal process. Their role, as it happens also with speech, gesture or writing, can be understood through their effects on the boundaries present during the interaction". "The interaction of a micro and a macro level in a workshop calls for developing practitioner's skills to consider both levels when dealing with complex problem-solving settings. Those skills can help the practitioner to understand how flows, configurations and stages of the structuring process connect".	an analysis of the impact of cultural, social, political and material context on the micro behaviour observed
r)	*Franco, L.A., & Nielsen, M.F. (2018). Examining group facilitation in situ: The use of formulations in facilitation.*	[Detailed analysis indicates the facilitator's role in encouraging individual and group learning] "By adopting a conversation analytic approach to examine our video recordings, we were able to provide a fine-grained analysis of the use and interactional impacts of three different types of formulations used by the facilitator." "We see formulations being produced by the facilitator throughout the whole workshop." "Formulations, however, are not to be seen as verbal phenomena alone. As our empirical material demonstrates, formulations are also embodied social actions." "A key requirement of effective facilitation is to support a group process without influencing the content of group discussions …. Our findings show how facilitators use formulations to draw out the participants' contributions on their behalf without influencing content.".	a complementary analysis of the influence of cultural, social, political and material context
s)	*Tavella, E., Papadopoulos, T., & Paroutis, S. (2020). Artefact appropriation in facilitated*	[Individual and group learning through time (longitudinal case studies) and across different contexts are called for] "our paper extends the literature on the material aspects of group dynamics". "In terms of practical implications, we offer managers and organisations an	video recordings; analysis of the impact of cultural, social, political and material context on micro behaviour

	modelling: An adaptive structuration theory approach.	innovative lens to analyse decisions in complex group settings, as well as a framework to influence group settings and outcomes through artefacts"." Future investigations could thus consider more workshops in the same or across different contexts … [and] longitudinal studies that look into how artefacts and group interactions are intertwined."	
t)	*Valcourt, N., Walters, J., Javernick-Will, A., & Linden, K. (2020). Assessing the efficacy of group model building workshops in an applied setting through purposive text analysis.*	[Group learning, in the form of collective and shared mental models, deduced from interview transcripts] [purposive text analysis] "The insights gleaned from this work have also demonstrated a beneficial use of PTA for generating [causal loop diagrams] CLDs of collective and shared mental models from multiple individual interview transcripts".	video recordings, analysis of relationship between records of micro behaviour and the cultural, social, political and material context

Table 2. Outcome and what is "lacking" from the papers selected from a practice theory perspective

As a set of empirical reports, these 20 papers might be expected to provide the data for a formal cross case analysis, but the great variety of methods used, the unique situation of each intervention, and the varied methods of data capture means a structured comparison is not viable. We have to be content with general observations, and we can immediately make two. First, half of the cases are located in the UK: two each are located in, Denmark, Colombia, and in the US; one is located in Vietnam, one in New Zealand and two are international. Second, the cases are based on interventions in a great variety of sectors from retail and construction to community and public sector – however, it is the latter that tend to predominate, perhaps because there are likely to be fewer commercial constraints in reporting detailed accounts and outcomes from engagements.

Given that we are investigating social theory as utilized in academic research into the process of OR and the behaviour of those involved, the question we need to address is whether the choice of ST leads to a significant difference in the way that data is collected and analysed, in other words, how are the ST, DCM and DAM issues, the practical conduct of academic research, addressed?

The ST theories adopted in the case studies are varied. For several papers, discussion of the ST used was clearly not a focus for the authors and was not made explicit; see for instance, (**e**). More significantly there are clusters of cases using the same or similar STs. Six papers were based on philosophical pragmatism, one explicitly (**d**) and five implicitly (**e**), (**h**), (**l**), (**n**) and (**q**); two are based on adaptive structuration theory (**a**) and (**s**), two on activity theory (**m**) and (**o**). One paper was based on attribution theory (**b**), one on actor-network theory (**g**), two on ethnomethodology and/or conversation analysis (**p**) and (**c**), one took a positivistic perspective (**k**), one on a dialogical approach to the creation of new knowledge (**i**), one on natural language analysis (**f**), one on pragmatic iterative-deductive process (Orton, 1997) (**r**), and one on social psychology (**t**). Four of the selected cases (**b**), (**j**), (**p**) and (**r**) are based on causal mapping and JOURNEY making – the PSM involved draws on a psychological theory; however, it does not follow that the researchers involved have to adopt an ST that is primarily psychologically/cognitively orientated. On the other hand, case (**t**), which is based on system dynamics, does adopt a psychological perspective applying positive text analysis.

On the data capture issue, as we have seen, there are essentially four choices: (1) Group Support Systems (GSS) software, which may be preferred because it is integral with the conduct of the workshop and brings in no extra complexity, cost, or negative feelings associated with being continually watched; (2) video recording, which, in addition, enables bodily/facial reactions to be observed; (3) audio recording which is less intrusive than video but lacks any data about bodily movements and facial expressions; and (4) purpose built physical laboratories equipped with a group support system. Making observations and taking notes, usually complement the data collected. Many of the cases mention pre-workshop meetings between the facilitator, clients and participants (and sometimes a researcher who will not be a participant in the workshop) to clarify the objectives and to discuss the methods to be used (for instance, explaining *Group Explorer*, Soft Systems Methodology or the Viable Systems Model). In those cases which do not mention such meetings, they almost certainly occurred but the authors assumed that they were not of sufficient interest to detail in their paper or because the convention is not to do so. More significant are meetings in which an attempt is made by facilitators and researchers to

deliberately discover more about the historical and cultural context of the participants and their organization (in other words at the macro level). In case (**c**), Horlick-Jones and Rosenhead (2007, p. 592-3) the authors describe the history of the issue being addressed (preparation for the Notting Hill Carnival in London) and the many unstructured and semi-structured interviews/meetings aimed at gaining an understanding of the roles, perspectives, cultural background and attitudes-to-risk of the many people involved in the planning and controlling of the Carnival.

> *During two successive Carnivals, we carried out coordinated exercises in group ethnography, the first involving the entire team of five researchers. This included following police officers on patrol, and spending time at the police operations HQ at New Scotland Yard and at the Carnival Trust offices…. The Carnival involves a complex web of relationships between culturally diverse parties with sometimes competing interests.* (Horlick-Jones and Rosenhead, 2007, p. 593).

Here we see the gathering of the sort of data which could help explain how individuals (representing their organization's interests; for instance, the organizers, the council, the police, and artistic and community groups) might react to certain suggestions, reflecting their habits, dispositions and tendencies.

A second example of seeking a deeper understanding of context is given in case (**d**), Vo, Chae, and Olson (2007). Here, considerable time was invested in gaining an understanding of different communities in Vietnam and their languages/vocabularies. The main objective seemed to be to make sure that the translation of transcripts and notes correctly captured the intent of each speaker. No doubt much was also learned about the habits, norms and acceptable behaviour along the way, but there is no indication in the paper of what use was made of this information about the cultural context. As for all the other papers, such cultural understanding was taken for granted or not thought relevant to the paper's main theme. However, authors who frequently work in a particular sector such as in the public sector (e.g. healthcare) would undoubtedly have, prior to the collaboration, a good understanding of the ethos, acceptable attitudes and behaviour in that sector.

We are left with the impression that, apart from the two examples highlighted, the other papers, beyond the description of the workshop itself, generally spend a lot of space reviewing and developing theory and relatively little space reporting on the doings and saying outside the workshop, meetings or interviews where much might have been learned about the way the participants act and interact in relation to their cultural backgrounds and context. We speculate that this could reflect (i) the phase of theory development, the authors were preparing the theoretical basis for more comprehensive reports of all the activities, formal and informal in the future, and presumably (ii) the judgement of the authors about what material should be included in an article to support their theoretical and/or methodological contribution in an OR journal (Ormerod, 2017), a point we return to later.

The 20 cases introduce a wide variety of DAMs including: (i) social information processing analysis, (ii), coding by attribution theory, (iii) conversational analysis, (iv) technical, personal and organizational perspectives, (v) grounded theory: coding and categorizing using *Atlas.ti*, (vi) coded hierarchical issue maps, discursive temporal flow, self-interests, (vii) narrative analysis, (viii) grounded theory; coding and categorizing using *Decision Explorer* software, (ix) data attribution theory; structure

coded in terms of themes, links and networks, (x) knowledge creation and maintenance using conversational analysis, (xi) cognitive mapping, (xii) coded according to theoretical definitions of facilitators, (xiii) coding guided by relevance theory, (xiv) activity theory, (xv) grounded theory interactive-inductive approach with coding using *Atlas.ti,* (xvi) multimodality coding scheme based on activity theory, (xvii) boundary games theory, (xviii) multimodal conversational analytic process analysis, (xix) structuration moves, and (xx) structural analysis of mental models and causal loops using purposeful text analysis (PTA) coded in *Dedoose* for causality.

The choice of DAM depends crucially on the social theory (ST) explicitly or implicitly adopted. Cases (**b**), and (**c**), provide further examples of how DAMs are associated with STs. Case (**b**) uses attribution theory for its DAM. The authors of the paper explain that:

> *Attribution theory suggests that people think about a problem in terms of chains of events. Attribution theory suggests that knowledge is accessed by thinking of, for example, the causes of (chain down) or consequences from (chain up) a particular action. … Attribution theory suggests that the causal links made during the workshops under consideration are likely to be indicative of how participants have thought about the problem.* (Shaw, Ackermann, and Eden, 2003, p. 939).

The DAM of Case (**b**) is therefore a derivative of its ST of personal construct theory. Case (**c**), the Notting Hill Carnival paper, explicitly adopts ethnographic understanding of context for its ST, and uses conversation analysis for its DAM:

> *Conversation analysis is an approach to the study of social interaction and talk-in-interaction that, although rooted in the sociological study of everyday life, has exerted significant influence across the humanities and social sciences including linguistics. Drawing on recordings (both audio and video) naturalistic interaction (unscripted, non-elicited, etc.* [ethnographic data]*) conversation analysts attempt to describe the stable practices and underlying normative organizations of interaction by moving back and forth between the close study of singular instances and the analysis of patterns exhibited across collections of cases.* (Sidnell, 2016).

From the 'lacking' and 'outcome' columns of Table 2 and elsewhere we can detect a number of themes for consideration: (i) video or audio recording were often not available; in fact only 4 papers featured video recordings, the 'gold standard' as far as practice theory is concerned; (ii) 6 papers used pragmatism either directly or indirectly (implicitly because of their use of either grounded theory or boundary theory, both of which derive from the work of pragmatist scholars); (iii) many papers did not report on the cultural, social, political and material context, although as has already been mentioned the authors may have simply considered such matters irrelevant for the main purposes of the paper; what they had learnt was taken for granted. However, a key feature of practice theory is the influence of contextual features on an agent's interests, identities, networks and allies, and hence on an agent's sayings and doings; (iv) no papers in the selection report on the process of developing hard OR solutions; (v) interviews and meetings were seldom the subject of analysis though they might have provided additional insight (vi) none of our selected papers featured Bourdieu's or Schatzki's approaches; (vii) seldom were academics involved as observers without also being the facilitator; (viii)

learning was a common feature identified by the authors as 'outcomes'; and (ix) a small set of scholars were involved in many of the papers.

Practising our own form of 'zooming-out', we provide an overview of the cases. Here, we identify a characterisation that consistently relates to the outcomes of the OR interventions, which can be considered to range from *substantive practice*, *modest practice*, and *indifferent to practice*. From our reflections this characterisation can be made, or literally plotted, on each of the dimensions (or factors) of the generic context-mechanisms-outcomes (CMO) framework (Pawson & Tilley, 1997), which allow us to analyse our cases without predeterminations or prior assumptions. These reflections also allow us to consider previous studies of OR practice that have suggested focusing on the relationship between context and process (Eden, 1982) and context and outcomes (White, 2006). The characterisation of practice over each of the CMO dimensions is flexible enough to allow reflection on the broad range of cases in our study.

To illustrate our characterisation, we identify some exemplary results. An example of a contextual factor is the setting for the intervention described as more or less policy-relevant, or organisational or group relevant. The mechanism factor is described as consolidative, or novel processes adopted or used (see Yearworth & White 2014). Finally, descriptions of the modes of organising that emerge through the practices of OR and can be seen as insights regarding the outcomes of the intervention (White, 2009). In short, context matters for the range and types of mechanisms adopted and the range of outcomes that are possible; but we note mechanisms generated or adopted and outcomes achieved may differ considerably under different conditions of context (White, 2006). We can thus now characterise the range of practices that have distinct implications for our understanding of all OR practice. These characterisations also open up the possibilities for further insights into communicative action perspectives on stakeholder engagement (see Mingers and Rosenhead, 2004). At the substantive practice end of the range we find that the context in terms of policy relevance is high, and mechanisms are novel and have the highest potential regarding broader, more macro outcomes. Exemplary is case study (**q**), where novel methods were adopted, underpinned by strong social theory and applied in policy-relevant settings. Towards the middle of the range (modest practice) we see equivocation on context, but the mechanisms are consolidative in either using well-established methods or combining commonly used approaches. The exemplar here is case study (**n**). The study focuses on group processes and is concerned with activities of actors within a group. Studies of this type also focus on internal (group) outcomes. Finally, identified as indifferent to practice, is group-oriented in context using conventional methods in a single workshop or intervention, with social psychology mostly assumed. The exemplar here is case study (**b**). Studies mostly lead to modest outcomes and related to stakeholder engagement.

As we have seen in this section, there are OR examples in the literature of utilizing activity theory (**k**), pragmatism (**n**), actor-network theory (**g**), and adaptive structuration theory (**p**). Adopting practice theory as a framework to study OR processes and practices can have a significant impact on the way a workshop is conceived, data are gathered, and the results analysed. Tavella, Papadopoulos and Paroutis (2020), for instance, use Giddens to address the research question: how are material and conversational

elements imbricated[2] during FM (facilitated modelling)? The authors draw on AST (adaptive structuration theory) to operationalise the process of FM through talk and artefact use. As they explain:

> *AST is a version of structuration theory (Giddens, 1979; Poole et al., 1985, 1996) suitable for the analysis of group interactions. Importantly, from a structurational perspective, group interactions 'can be conceived as the production and reproduction of positions regarding group action, directed toward the convergence of members on a final choice' (Poole et al., 1985, p. 84). Appropriation occurs by members adopting particular structuring moves, for instance, explicitly or implicitly referring to structures, substituting a structure with another one, combining or contrasting structures, and rejecting structures (Poole et al., 1996; Poole and DeSanctis, 1992). Production and reproduction occur within communicative interactions through an increasing stakeholders' joint understanding and coordinated actions. Structures-in-use impose conditions for structuration, thus determining the range of possible actions within the system, in other words, enabling and constraining group action.* (Tavella et al, 2020, p. 4)

What is striking in the above case is the way, on adopting a practice theory lens, attention is focused on the analysis of the entwining of materiality and human interaction, the material agency of artefacts, and the way that knowledge is produced or reinforced and used by participants.

5. Adopting practice theory for OR academic research

To engage in research into the sayings and doings of those participating in a workshop, meeting or interview, academic researchers engage in social research. Any social research is fraught with difficulty. What social activity to focus on? Where and what data to collect? How to collect the data? And perhaps the most difficult question, how to interpret the data? An additional complexity is added when workshops are being studied by an academic researcher who is also the facilitator pursuing the ostensible purpose of the workshop. This immediately places strong boundaries on objectivity and naturally steers the academic researcher towards an interpretive stance in their analysis.

A starting point can be to determine the research question such as how participants generate ideas, engage in analysis and come to conclusions (if any); but equally, one could start from a given set of data (perhaps originally gathered for some other purpose) and see what of interest can be gleaned from it. It is also possible to start from somewhere else entirely; for instance, if a new method of gathering data, such as a GSS, becomes available, how can it be utilized, what new can be learned? Sociology researchers also have to decide on the underlying social theory which they are going to adopt, providing them with a framework. All of the factors entering the research design have to be consistent with one another if the understanding developed from the data is to be credible and stand up to critical scrutiny.

There are also important enabling factors to be taken into account. The most important requirement is to ensure the OR researcher is equipped with the necessary practice research skills so that they are familiar with the issues involved and relevant methods and technologies; secondly, funds will be needed

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[2] To imbricate: to arrange distinct elements in overlapping patterns so that they function interdependently

to support the cost of researchers, transcribers and sometimes translators and any technology used; and thirdly, permission will be needed from participants to observe the sayings and doings of interest, obtain access to data, and make findings public.

Advice on 'how to conduct a practice-based study' can be found in Gherardi (2012); methodological reflections on practice orientated theories can be found in Jonas et al (2017); and suggestions as to how to go about studying practice, including what to do, what to watch out for and how to write about it, can be found in Nicolini (2012, Chapter 9). In each of these sources case studies can be found to illustrate the issues. Table 2 above indicates where the case studies could have been improved in the light of practice theory i.e., the 'what is lacking' column. We have summarised these observations into a set of recommendations, expressed as a set of questions to be addressed by the OR practitioner/scholar, in the next Section.

5.1 Recommendations

Our conclusion from having immersed ourselves in the literature is that practice theory is best understood, in the context of OR, as an evolving form of interpretive theory. Although practice theory provides a change of perspective markedly different from other interpretivist lenses, researchers currently working within an interpretivist framework should have little difficulty in using and exploring practice theory approaches and implications. We thus do not suggest a call to arms to embrace a new paradigm; rather we suggest the implications of practice theory in OR academic research need to be further developed and tested in practice. To do so requires on the one hand, setting out a guiding context for research in this space; and on the other, practical recommendations for taking action. We first address the guiding context by the following recommendations – our agenda:

A. *Broadening the literature reviews for theory and methodology contributions in OR* – for (a) theoretical development of practice theories; (b) critiques of practice theory; and (c) papers describing and evaluating the use of practice theory in other disciplines.
B. *Considering practice theory in its various forms as a foundation for theoretical contributions to OR practice* – such as actor network theory, action theory, ethnomethodology and structuration theory, and the approaches of Bourdieu and Schatzki.
C. *Encouraging as standard practice the collection and reporting of cultural, social, political and material contextual data (perhaps as supplementary information)* – whether needed for the immediate purposes of the paper or not. Authors of already published papers could revisit their records for unreported cultural data relevant to practice theory analysis. To operationalise this requires a commitment between authors and editors that the inclusion of such data becomes normalised for any paper that is reporting on an OR study. As suggested earlier in our analysis of the selected papers, the absence of such data likely represents a mutual understanding between authors, reviewers and editors, on the whole, that such details are not necessary, apart from the exceptions noted.
D. *Considering the use of practice theories for application in specific cases as a methodological contribution to OR practice more widely* – in other words, going beyond workshops to identify opportunities for application at all the interaction points within an OR intervention, such as

advocated by Franco and Hämäläinen (2016). This then looks beyond the binary of OR practitioner and client.

E. *Being alert to the potential that new technologies offer for the collection of data about OR engagements* – to (a) support and collect data from workshops, meetings and interviews; and (b) assist in the analysis and interpretation of data. For instance, recordings of videoconferencing interactions (Zoom, MS-Teams and so on) could be the subject of analysis. The use of computer logs from Group Support Systems, such as *Group Explorer,* has become a standard data collection device for practitioners. As the use of such GSS becomes more prevalent in an online setting for same time/different places workshops (Yearworth & White, 2019) then the conference systems that are used to connect participants can also provide recordings of participant interactions via audio, video, shared screens, and chat.

F. *Conducting comparative studies* – of (a) different research frameworks; (b) projects involving a hard positivistic/scientific perspective or mixed hard and soft interpretivist OR interventions (c) different contexts.

G. *Active seeking of opportunities to observe and record hard OR practitioners working with their clients* – opportunities have been found in 'Soft' OR interventions and reported but opportunities to record behaviour could also be sought in 'hard' OR interventions across the board.

Items F and G suggest the prospect for the OR academic practitioner/researcher devoting more time and effort to the study of the complete range of OR practices, bringing to bear an interpretivist approach even when analysing hard positivistic/scientific interventions. Echoing Dando and Bennett (1981), the positivist outlook is still held by a significant segment of the OR community, who are unlikely to be troubled by the theoretical considerations discussed here. Yet analysis from such studies/observations could add considerably to the pedagogy of OR, by contributing examples of learning through reflective practice such as suggested by Ormerod (2008b) and Ackermann et al (2020). Franco & Greiffenhagen (2018) make a similar observation and suggest that OR training can be improved if learning materials are derived from recordings of actual practice. Furthermore, our reflections on the set of case studies identify a range of practice that we have so far characterised as substantive, modest, and indifferent. These characterisations of practice were thus arrived-at through our own process of zooming-out. According to Bourdieu's logic of practice introduced in Section 3.4 these can be further analysed in terms of what has changed in the system of evolving actors' dispositions and consequent impact in the field of play.

Ultimately the purpose of adopting practice theory is to improve our understanding and practice of OR. We see this as being applicable at the level of the performative elements that make up everyday OR practice (zooming-in) and ranging out to the ways in which the methods and tools of OR practice intersect and interact with wider practices (zooming-out) (Nicolini, 2012).

Table 2 indicates where we believe the existing best examples that we have found of case studies in OR practice could have been improved in the light of practice theory. These observations have been collected together here as a set of recommendations expressed as a set of questions to be addressed by the OR practitioner/scholar. Further, we have linked these recommendations to elements from the

"palettes" – in the sense of a composition drawn from materials on an artist's palette – in Nicolini's conception of a theory-methods package (2012, pp. 219-235). These Nicolini elements are identified in square brackets following each question.

Performative Elements (Zooming-In)

> Q1. Is there a sequential record of the flow of participant-to-participant and participants-to-OR practitioner/scholar interactions over time? For example, audio or video recordings of workshops (especially video), computer logs from Group Support Systems, field notes, interviews, email records… ['sayings and doings', 'interactional order', 'timing and tempo']
>
> Q2. Has the report of the OR study been situated within the everyday activities of the OR practitioner/scholar? Why did they get involved? What was their motivation? Was their contribution successful? What happened next? ['practical concerns']
>
> Q3. How were meetings and/or workshops between the OR practitioner and participants/clients organised e.g., onsite, offsite, online… ['bodily choreography']
>
> Q4. Have the results, recommendations, action plans, models, boundary objects of the OR study been recorded and analysed for their intermediating role and function? ['tools, artefacts and mediation work']
>
> Q5. How did the OR study, as performed by its actors, align with, or challenge, its ownership? How did the interplay of organisational roles and status constrain or expand the OR study? To what degree did constitutive rules of methods lead to generative practices? To what extent was the OR study a recognisable and reproducible (by others) method ['tension between creativity and normativity', 'processes of legitimation and stabilisation']

Intersectional Elements (Zooming-Out)

> Q6. Have the performative elements of the OR study (Q1-Q5 above) been analysed in terms of their cultural, social, political, and material context?
>
> Q7. How has the OR study impacted wider practices within the organisation? Has it supported existing ways of working, created new socio-technical configurations/assemblages (translations), and/or led to tensions or conflicts?
>
> Q8. What possibilities have the OR study opened-up? Where are we now? What is different as a consequence of the intervention?

In terms of zooming-in to the performative elements of practice it is no surprise that Soft OR/PSM engagements provide a rich source of empirical examples, as these questions are frequently addressed in the reporting of interventions. All the questions in the intersectional elements, zooming-out, are generally noted as lacking in Table 2. Question 5 provides an interesting pivot between the performative and the intersectional by specifically looking at issues of legitimation and the challenges of actors' alignment, or breakdown, with ownership. For example, whilst the workshops in cases (**k**) and (**m**) have been analysed extensively at a micro level (zooming-in), the lack of integration with the macro view, or absence of zooming-out, led to what Freeman and Yearworth (2017) diagnosed, from an ANT

perspective, as a problem of ownership and a failure to achieve interessement and thus translation. Zooming-out in the early stages of the project and (re-)engaging with the cultural, social, political and material concerns (especially political) would potentially have mitigated this problem.

The zooming-out to intersectional elements, especially through the use of Q7 and Q8, would have enabled a re-framing or re-interpretation of the outcomes listed in Table 2 following the Bourdieusian logic we mentioned above. These are directly addressing the question of what has changed in terms of actors' dispositions (habitus) and field. See for instance, cases (**e**), (**g**) and (**q**), with (**e**) being exemplar adopting a grounded theory approach. We believe that thinking in terms of Bourdieu's habitus and field would be a better way of framing discussions, i.e., learning from engagements as a change in habitus (following from our identification of modest practices) and group learning or social learning as a change in field (following from our identification of substantive practices).

Implementing these practical recommendations would lead to a breaking down of the (artificial) time-bounded barriers of the OR intervention and offer a much broader and longer view of the impact of an intervention. This would extend beyond evaluation of interventions, which is still necessary, and lead us to a view of OR as a continuous practice, both for the customer and the practitioner, and bound up in Bourdieu's logic of practice such that it transcends the start and end of any specific intervention.

6. The potential impact on OR professional practice

While researchers are interested in designing research and utilizing methods that tell us as much as possible about organizational life – and are thus useful projects, in that they contribute to our stock of knowledge – managers' understanding of 'useful research' usually rests on what the outcome of such projects can actually *do* for the organization regardless of their efficacy in generating new insights. (Warren, 2009, p. 568; italics in the original).

In the Tavella, Papadopoulos and Paroutis case, for instance, the authors claim that, in terms of practical implications, they offer:

> *... managers and organisations an innovative lens [AST] to analyse decisions in complex group settings, as well as a framework to influence group settings and outcomes through artefacts. For instance, managers could use artefacts during a workshop to keep the discussion going (supportive device) or may need group knowledge to discuss a topic/issue of strategic importance (in this case, groups could use artefacts as strategizing devices).* (Tavella, Papadopoulos and Paroutis. 2020, p. 10).

Research must eventually offer generalities of some sort or another which can be taken as relevant in particular situations. But as Tsoukas (2009b) explains, "The more researchers are concerned with capturing situational uniqueness, the more descriptive they become and the more theoretically open-ended their accounts will be. By contrast the more the researchers try to situate their study within what is already known about the phenomena of interest, in order to decide what a particular case study is a case of, the more they will describe the phenomenon in terms that have already been defined in the literature" (p. 286). Practice theory requires account to be taken of past history and the context of participant values (societal, cultural and ethical norms). As we have already noted, from Table 2 we see

that this has been mostly lacking from the case studies we have analysed and suggests we are only beginning to grapple with the implications of practice theory for OR practice. The agenda and practical recommendations we set out above show how we can raise the bar. Adoption of practice theories thus points away from the possibility of generalising in a way that is useful for practitioners. Tsoukas, however, argues that all is not lost when small numbers of very varied cases are considered: "It is not so much analytical generalization that small-N [only a small number of cases] studies aid, as *analytical refinement* (or *heuristic generalization*). By doing so, the craving for generality is not the craving for subsuming particular instances under general laws or mechanisms, but the craving for a clearer view – higher elucidation. The analytical refinement achieved does provide general concepts, which however, are inherently open-ended – generalizations are heuristic. They are generic understanding without annihilating the epistemic significance or the particular" (pp. 286-287; italics in the original). The OR research community (and we include ourselves in this) has yet to understand this issue. We therefore suggest two additional possibilities to be considered alongside the recommendations listed in the previous section.

First, we should be considering theories and methods that suggest the implications of practice theory for OR practice, deriving appropriate generalizations from case studies, and engaging in the discussions. The impact of this should contribute directly to the managerial implications of theory, and methodological contributions in OR more broadly e.g., connecting to the wider practice literature to position the work – such as technology as practice, strategy as practice, learning and knowing phenomena as situated practices (Nicolini, 2012; p11). What is clear from reading, for instance, Gherardi's 'tricks of the trade' (2012; pp. 201-225) is that there is a rich set of methods available to study practices "that elicit the tacit bricolage of meanings and matters in the field" and that we have hardly scratched the surface in drawing on them in OR scholarship. The zooming-out method we developed – of characterising practice in the range substantive, modest, to indifferent on each of the context-methods-outcomes framework dimensions – provides a practical reflexive approach that could be easily employed.

A problem also arises that mitigates against the possibility of communicating the nature of practice theory. In theory, practitioners might learn about practice theory directly by reading this paper, or attending a conference, or working on a client project with an academic practitioner; they could also learn about it by reading or writing case studies, or from lectures/exercises/case studies at universities, short courses from OR professional societies, or from the internet. Despite the great variety of possibilities, we suspect that not many practitioners would be interested in spending their time pursuing such a theoretical issue, seemingly distant from their day-to-day affairs. However, there are two significant groups of people who might take a different view, namely practitioners who were once academics, and current academics who engage in practice either to enhance their salaries, or as a pro bono activity, and/or to enhance their research.

The most direct way to reach practitioners is to offer something tangible that they could use; for instance, Horlick-Jones and Rosenhead concluded that "added value arises in particular from the insight provided by ethnography into informal and real-world aspects of problem situations, and into the modes of reasoning adopted towards these problems by relevant actors" (Horlick-Jones and Rosenhead, 2007,

p. 599). Perhaps a new method based on a practice theory could be developed. Another possibility could be to introduce some sort of participant approval/disapproval system into existing group decision software such that participants can display their attitudes (a FaceBook 'like' or emoji) when any change to a model is proposed by another participant. These could alert the practitioner/facilitator as to which a participant is influencing others (for instance, as a result of cultural/social capital in the form of role and status) as the group makes choices. For instance, GSS such as *Group Explorer* (for causal mapping or JOURNEY making), which already supports preferencing and voting, could be developed further to support participant/facilitator alerts. Yearworth and White (2019) make the argument that GSS for PSMs should be enhanced with such capabilities.

Second, we thus suggest a possibility to consider – developing tangible GSS-based feedback mechanisms for use by practitioners. Such approaches would consider how practice theory can inform improvement in practice by the incorporation of dynamic feedback from participants/clients to the OR practitioner during an engagement. This tangible feedback will need to include elements concerning participants' actions that previously would have been considered part of an evaluation process. For example, the evaluation framework of (Midgley et al., 2013) could be re-purposed and incorporated into the GSS.

In summary we have suggested a total of seven recommendations with specific actionable questions to be addressed and two more speculative activities to be included on the agenda of any researcher intent on exploring practice theory and its implications for research and for practice. Within this broad agenda we have further provided a specific set of 8 questions that can be used by OR scholars and practitioners alike in the process of "bringing it all together" (Nicolini, 2012. p213). Such an agenda we think is rich with possibilities.

7. Conclusions

Practice theories potentially enable OR scholars to analyse the behaviour of participants in OR interventions. Workshops and meetings provide the opportunity to observe behaviour; video, audio, GSS and now videoconferencing platforms provide opportunities for data capture; practice theories and related data analysis methods provide the theory and tools with which to derive insights into the interaction between OR practitioner and client/participant. Having examined the theoretical development of practice theories, and the use of a range of social theories in published OR case studies, an agenda is proposed to advance the exploration of practice theory, its application in OR scholarship, and its potential impact on OR practice. We suggest that it is unhelpful to consider whether the adoption of practice theory should be viewed as a paradigm shift, primarily because in practical terms it seems perfectly possible for individual researchers currently utilising an interpretive framework to adapt their current research practices to the new way of thinking; practice theory is a development of, rather than an overturning of, interpretive theory. We note that most adherents of a positive/scientific persuasion, the approach favoured by most OR scholars, have yet to be persuaded to change their perspective and take advantage of interpretive theories. However, an agenda has been proposed – a practice-theory-for-OR (PT4OR) agenda – to advance understanding of practice theories, its application in OR academic research, and its potential impact on OR practice that can be operationalised by any OR practitioner.

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Online Supplementary Material

Appendix A: A brief explanation of Heidegger's approach

Heidegger teaches his reader; his challenging method and approach is best appreciated by reflecting on an example of his writing. The following is taken from the beginning of his book *The Question Concerning Technology and Other Essays* (Heidegger, 1997), a passage chosen to reflect both his teaching style and the way it addresses technology and human activity (practice), subjects of particular interest to us:

> *In what follows ... we shall be questioning concerning technology, and in doing so we should like to ... [open] our human existence to the essence of technology. ... Technology is not equivalent to the essence of technology. When we are seeking the essence of a "tree," we have to become aware that That which pervades every tree, as tree, is not itself a tree that can be encountered among all other trees. Likewise, the essence of technology is by no means anything technological. Everywhere we remain unfree and chained to technology, ... But we are delivered over to it in the worst possible way when we regard it as something neutral, for this conception of it ... makes us utterly blind to the essence of technology. ... [is it] a means to an end ... is it a human activity ... [These] two definitions of technology belong together. For to posit ends and to procure and utilize the means to them is a human activity. ... The whole complex of these contrivances is technology. Technology is itself a contrivance.* (Heidegger, 1997 pp. 3-5).

Practice scholars also draw on his most famous book *Being and Time* to try to understand his approach to understanding a thing (a hammer, a door knob, a chair) through experiencing it (using it in practice): 'The process of hammering does not simply have knowledge about the hammer's character as a tool. … The less we stare at the hammer-thing, and the more we seize hold of it and use it, … the more unveiledly [transparently] is it encountered as that which it is' (Heidegger, 1929/1996). The extensive example of a carpenter using a hammer shows that we don't experience tools in isolation but as a web of references between objects (hammer, nails, wood, carpenter). The carpenter doesn't need to 'think a hammer' in order to drive a nail in the setting of his carpentry practice. Only when the hammer becomes unusable will the unreflective use of the hammer become problematic, requiring reflective, investigative and theoretical knowledge to come into play (Nicolini, 2016, p. 34). To delve deeper into Heidegger it is advisable to seek the help of the secondary literature; see for instance, Dreyfus (1991).

Appendix B: Foucault's contribution briefly explained

Foucault (1972/1983) elaborated histories of social institutions as diverse as the penal system, psychiatry and the social systems. He believed that such institutions were not independent and examined how they were tied to the operation of power in our society. He called for the development of "action, thought, and desires by proliferation, juxtaposition, and disjunction, and not by subdivision and pyramidal hierarchies" (p. xiii). According to Best and Kellner (1991) Foucault describes power as "defused throughout the social world, constituting individual subjectivities and their knowledge and their pleasures, colonizing the body itself, utilizing its forces while inducing obedience and conformity.

Since the seventeenth century, individuals have been caught within a complex grid of disciplinary, normalizing, panoptic powers that survey, judge, measure, and correct every move. There are no 'spaces of primal liberty' in society; power is everywhere" (p. 54).

As Ward (1997) explains, Foucault tends to talk about subjects rather than people, treating an individual as being, not simply a conscious person, but a social fact, a being that is, at least in part, subjected to social constraints and divisions. The subject cannot be reduced to the individual consciousness; there are only practices or techniques of the self. Discourse, as Foucault tends to mean it, involves a social institution, an academic discipline, and the language; it is the controlled system for knowledge production. Discourses put a limit on what is sayable at any one time; they define what counts as 'legitimate' or 'illegitimate'. Foucault sees discourse everywhere. They are the very stuff of society and they mediate all aspects of life. For instance, in his studies of the mental hospital he looks at how professional discourse employs 'scientific' knowledge to make the distinction between the sane and the insane, the normal and the abnormal. These 'dividing practices' (judgements) are always historically particular, variable from culture to culture, and subject to change (pp. 127-130).

According to Nicolini (2012, pp. 196-7), for Foucault discourse has a constitutive nature; far from being a way of signifying and representing the world, discourse is involved in the definition and structure of the lived world. However, discursive formations cannot be reduced to their linguistic and symbolic elements alone. Rather they must be seen as configurations of statements, techniques, interventions and norms held loosely together by a body of anonymous historical rules directed towards the practical exercise of power and control of specific organizational sites.

The practices that Foucault places weight on, interview, counselling, and so forth, are to a degree discursive practices (Fairclough, 1992, p. 50). This establishes an inherent relationship between power and knowledge and clarifies the nature of power. Discursive practices are not simply the traces of past struggles or the outcome of systems of domination; instead, they become both the object and the media of power struggles, the very thing which is to be seized and the arenas where such things take place. Power/knowledge discourses should be conceived as 'highly provisional, localized and contingent expressions of a multiplicity of forces, energies, materials, and interventions consistent with an overarching framework of ontological imperatives and methodological protocols' (Reed, 1998, p. 197). Discourse must be considered a dispersion of objects and concepts which exhibit, at the same time 'order in the appearance of their elements, correlations in their simultaneity, assignable positions in common space, reciprocal functioning, and/or linked and hierarchical transformations' (Foucault, 1972/1983, p. 37). 'Foucault helps us see that the task of practice theories is not that of explaining social order of the basis of practice, as much as it is asking why and how practices come to exhibit overarching regularities across time and space, and how the apparent unity of (discursive) practices, from which the discourse derives its power and influence, is achieved and maintained in practice' (Nicolini, 2012, p198).

Foucault's work translates almost directly into a set of tools for understanding practice visible in the work of, for instance, Schatzki (see section 5.1). It has given rise to developments such as critical discourse analysis, mediated discourse analysis and nexus analysis.

Appendix C: Wittgenstein and examples of his argumentation

Nicolini relates the Shotter and Katz (1996) argument that Wittgenstein's approach gives rise to important consequences: "First, for Wittgenstein, to make sense of why we act, we have to look around us, not within us. … Second, … the texture of practices that constitute the unarticulated background of our sense-making is not a static repository as much as a living part of our dealing with the world to which we turn constantly in order to proceed in our daily activities, and third and finally, for Wittgenstein practices are also constitutive of the criteria of fitness of our concepts and provide us with a solid criteria of truth" (Nicolini, 2012, p. 38). As Wittgenstein explains he does not manage to 'weld' his results over the previous 16 years into a unified whole, as a result the very nature of the investigation "compels us to travel over a wide field of thought criss-cross in every direction. – The philosophical remarks in this book are, as it were, a number of sketches of landscapes which were made in the course of these long and involved journeys" (Wittgenstein, 1953/1967, p. vii). This criss-crossing results in revisiting the same questions again and again, surprising changes in directions, and logical progression being difficult to discern. The thoughts are written down as numbered *remarks*, short paragraphs, examples of which are given in the following extracts, which might catch the eye of a would-be OR practice scholar, and give pause for thought. The topic addressed is *rule*s.

53 Our language-game [example] has *various* possibilities. … if it were set down in writing, say in the form of a table, that this element corresponds to this sign … we can also imagine such a table's being a tool in the use of the language. … If we call such a table the expression of a rule of the [example] language game, it can be said that what we call a rule of a language-game may have very different roles in the game.

54 Let us recall the kinds of case where we say that a game is played according to a definite rule. The rule may be an aid in teaching the game. … – Or it is an instrument of the game itself. – Or a rule is employed neither in the teaching nor in the game itself; nor is it set down in a list of rules. One learns the game by watching how others play. But we say that it is played according to such-and-such rules because an observer can read these rules off from the practice of the game – like a natural law governing the play. – But how does the observer distinguish in this case between player's mistakes and correct play? – There are characteristic signs of it in the player's behaviour.

198 "But how can a rule shew me what I have to do at this point?" …what has the expression of a rule – say a sign-post – got to do with my actions? What sort of connection is there here? – Well perhaps this one: I have been trained to react to this sign in a particular way, and now I do react to it. … a person goes by a sign-post only in so far as there exists a regular use of sign-posts, a custom.

199 … To obey a rule, to make a report, to give an order, to play a game of chess, are customs (uses, institutions). …

201 … there is a way of grasping a rule which is *not* an *interpretation*, but which is exhibited in what we call "obeying the rule" of "going against it" in actual cases.

202 And hence also ‘obeying a rule’ is a practice. And to *think* that one is obeying a rule is not to obey a rule. Hence it is not possible to obey a rule ‘privately: otherwise thinking one was obeying a rule would be the same thing as obeying it.

206 Following a rule is analogous to obeying an order. We are trained to do so; we act to an order in a particular way. But what if one person reacts in one way and another in another to the order and the training? Which one is right? Suppose you came as an explorer into an unknown country with a language quite strange to you. In what circumstances would you say that the people there are giving orders, understood them, obeyed them, rebelled against them, and so on? The common behaviour of mankind is the system of reference by means of which we interpret an unknown language. (Wittgenstein, 1953/1967).

Towards the end of his life, in response to G.E. More’s claim to *know* a number of propositions for sure (see, *A Defence of Common Sense* (Moore, 1925) and *Proof of an External World* (Moore, 1939)), Wittgenstein wrote some draft notes. After his death, these, in their unfinished state, were published in the book *On Certainty* (Wittgenstein, 1969). Wittgenstein concentrates on what can one say about what we know, how it and be justified and in what circumstances; can we rely on mathematics, science, our empirical judgements, what others say, what we know, or what we think we know. A few statements that may have relevance to the subject here, practice theory, are:

139 Not only rules, but also examples are needed for establishing a practice. Our rules leave loop-holes open, and the practice has to speak for itself.

140 We do not learn the practice of making empirical *judgements* by learning rules: we are taught judgements and their connexion with other judgements. A *totality* of judgements is made plausible to us.

142 It is not single axioms that strike me as obvious, it is a system in which consequences and premises give one another *mutual* support.

211 … Perhaps it was once disputed. But perhaps for unthinkable ages, it has belonged to the *scaffolding* of our thoughts. …

219 There cannot be any doubt about it for me a reasonable person. – That’s it. –

220 The reasonable man *does not* have certain doubts.

225 What I hold fast to is not one proposition but a nest of propositions.

336 But what men consider reasonable or unreasonable alters. At certain periods men find reasonable what at other periods they find unreasonable. And vice versa. …

410 Out knowledge forms an enormous system. And only within this system has a particular bit the value we give it.

434 Now does *experience* teach us that in such-and-such circumstances people know this and that? Certainly, experience shews us that normally after so-and-so many days a man can find his way about the house he has been living in. …

As we write, the world is experiencing the covid-19 pandemic. In the UK, at the height of the crisis, we were told that the only way to protect ourselves and others was to "Stay at home: this advice is not a request; it is an instruction". We receive instruction and advice from our political masters (national and local), relevant experts (qualified and recognised as such), whom we may or may not believe, and personal witness statements by those affected: patients, relatives, carers or medical staff, mischief makers and so on. We have observed how such rules are set, how they are justified, how they are communicated, and how they need endless clarification and interpretation. We have learned new words (such as asymptotic) and acronyms (PPE), and have come to understand the significance of distinctions (bacteria/viruses; evasive/non-evasive ventilation), and have become aware of new facts (about vaccine testing, for instance). Our customs and practices have changed. We no longer shake hands, we stand apart, we work from home, we have conference calls. We no longer go to football matches or concerts. Our conversations have changed. We applaud our health care workers. Our culture is changed, at least for a time.

John Searle (speech acts, illocutionary force, utterances) has attempted to synthesize Wittgenstein's ideas with those of J.L. Austin (illocutionary acts), G.C.J. Midgely (the distinction between regulative and constitutive rules), and other linguists. Giddens observes that there was 'a flood of writings by British philosophers from the 1960s onwards, in which the influence of the later Wittgenstein loomed very large; they were concerned with problems of action and meaning and with the explication of these in terms of "intentions". "reasons". 'motive" etc. (Giddens, 1993/1976, p. 56). For Giddens, the work of Winch stood out, not because of its specific originality but from the fact it was explicitly focused on the social sciences. Winch attracted a good deal of telling criticism but provided a stepping stone for others.

Appendix D: A brief explanation of Parsons' conceptualization of the social system and the role of the motivated actor within it

Functionalism, as developed by Talcott Parsons, provided a bridge between classical and modern sociology (Ormerod, 2020). It achieved a dominant position for an extended period after WW2, primarily because it provided the growing number of empirical researchers in the sociology community with a descriptive framework for the structural elements of the social system. The cornerstone of the framework was his "voluntaristic theory of action" (Parsons, 1937), a synthesis of the 19th century social theories, particularly those of the sociologists Émile Durkheim (1858-1917), the leading positivist, and Max Webber (1864-1920), the leading idealist. Starting with his voluntaristic theory of action and what he referred to as his overall action frame of reference, he set out to build a comprehensive descriptive framework. To do so, drawing on his time as a biologist, he conceived social phenomenon as a system. In developing his approach, he drew on concepts from, *inter alia,* linguistics, psychology, economics, political science and social anthropology; the various concepts provided by these disciplines, together with his voluntary theory of action, were then integrated in a systems framework (Parsons, 1951). Parsons' ambition was to develop a complete characterisation of social activity from the everyday to the worldwide economic and political system. For Parsons, a social system "consists in a plurality of individual actors interacting with each other in a situation which has at least a physical or environmental aspect, actors who are motivated in terms of a tendency to the 'optimization of gratification' and whose

relation to their situations, including each other, is defined and mediated in terms of a system of culturally structured and shared symbols" (p. 5).

Parsons writes: "Since a social system is a system of processes of interaction between actors, it is the structure of the *relations* between the actors involved in the interactive process which is essentially the structure of the social system. The social system is the network of such systems" (Parsons, 1951. p 25; italics in the original). The structure of the interactive relationship is formed by considering two aspects: the positional aspect locates the actor in the social system relative to other actors and is referred to as the *status* of the actor; the processual aspect identifies what the actor does in his relations with others seen in the context of its functional significance and is referred to as the *role* of the actor. The actor is a social unit, the organized system of a bundle of all his statuses and roles as a social object and as the 'author' of a system of role-activities. Cutting across the individual actor is the 'collectivity' of a number of actors, which can be treated as an actor, in other words an object in the social system. A collectivity has associated with it norms which both constrain behaviour (through sanctions) and provide moral motivation. This basic line of thought essentially follows Durkheim.

The motivated actor provides the ultimate source of energy. Action is a process having a bearing on the actor achieving gratification or avoiding deprivation; it is related to the actor's situation and history, in other words his experience. Action does not only consist of *ad hoc* responses to particular situational "stimuli," the actor also develops a system of "expectations" relative to the various physical, cultural and social objects of the situation. In the case of interaction with social objects a further dimension is added: the actor's choices will be affected by his expectation of the probable reaction of the person with whom he is interacting (pp. 4-5).

The voluntaristic (individual actors pursuing their goals, interests, and normative standards) aspect of Parsons' schema manifests itself in the actor's motivation in the action scheme. The actor's orientation with regard to a particular situation consists of three modes of thinking. The first, the "cognitive' mode, addresses the question: what can I do to pursue my goals in this situation? The second, the "cathectic" mode, addresses the question: in carrying out this particular action, what pleasure or pain will be experienced? But acts do not occur singly and discretely, they are organised in systems, thus a component of "systems integration" must enter in. This is provided by the third "evaluative" mode, which addresses the question: what are the pros and cons?

Appendix E: Giddens structuration theory

Giddens approaches sociology from a theoretical perspective. His aim was to produce, like Parsons, an all-embracing social theory, but which did not fall into the functionalist trap of over emphasis on social structure, nor into the interpretivist trap of an over emphasis on the agents themselves. Functionalist approaches concentrate on characterizing social structure within which the actor is constrained, leaving only limited scope for the actor to determine the action to take; interpretivist approaches concentrate on the actor as decision maker, free to choose and act within the specific social circumstances as experienced. Giddens wanted to reconcile the tension, then current in social theorising circles, between structure and agency, developing an approach which he called the 'theory of structuration' (Giddens, 1993/1976; 1979). Giddens argued that no matter how 'macro' the concerns of social theories are, they

demand a sophisticated understanding of agency and the agent just as much as an understanding of the complexities of society. (Giddens, 1993/1976, p. 5).

To understand the 'interpretive' approaches favoured in the 1960s, Giddens examines the phenomenology of Schütz (1972/1932). He concluded that the problem was that the purely subjective nature of the approach does not connect the subjectivity of an individual with their outside world of things and people. A second interpretive approach examined by Giddens, the ethnomethodology of Garfinkel (1967), seeks to distance itself from phenomenology by moving towards the analysis of 'situated actions' as 'publicly' interpreted linguistic forms (p.42). Giddens concludes that Garfinkel's approach "cuts off the description of acts and communication from any analysis of purposive or motivated conduct, the strivings of actors to realize definite interests" (Giddens, 1993/1976, p. 46). An account of Giddens's analysis of Schütz's phenomenology and Garfinkel's ethnomethodology is given in Appendix F.

Giddens also concludes from his examination of Schutz, Garfinkel and interpretive social theory in general, that "the mediation of frames of meaning is a *hermeneutic* task …" (p. 46; italics added). Hermeneutic philosophy's central concept is *verstehen* whereby a researcher, in trying to understand another person's experience, should try to put himself in the other person's shoes. However, the understanding of philosophical hermeneutics took a new twist when Hans-Georg Gadamer, building on Heidegger, argued that interpreting the past actions of people (*verstehen*) was not a subjective matter, but rather a question of entering another *tradition* (or as Wittgenstein would put it, 'form of life'), such that past and present constantly mediate one another (Gadamer, 2004/1960). The hermeneutic circle provides Giddens with a way of reconciling the agency versus structure dilemma; both could be conceptualized as working together in a hermeneutic circle with actions giving rise to structure which subsequently influences actions. (Giddens, 1993/1976, p. 63). But first more needs to be said about Giddens's concept of agency. Giddens describes action as a "continuous flow of 'lived-through experience' and defines action or agency as *"the stream of actual or contemplated causal intervention of corporeal beings in the ongoing process of events-in-the-world*. The notion of agency connects directly with the concept of *praxis* [practical knowing or doing]. And when speaking of regularized types of act, I shall talk of human *practices* as an ongoing series of 'practical activities'" (p. 81; italics in the original).

According to Giddens language is 'mastered', and 'spoken' by actors; it is employed as a medium of communication between them; and it has structural properties which are in some sense constituted by the speech of a 'language community' or collectivity. Thus, for an individual speaker language is a series of speech acts; it is a skill, used to 'make sense', and is something which is done. Although it is something accomplished by the speaker, he or she is only able to offer a fragmentary account of what and how such skills are exercised. More widely Giddens says that social life may be treated as a set of *reproduced practices*; social practices may be studied as (i) consisting of a series of *acts*, (ii) constituting *forms of interaction* involving the communication of *meaning*, and (iii) constituting *structures* which pertain to collectivities or *social communities*. (pp. 109-110). Giddens argues that societal norms are both constraining (perhaps involving sanctions) and enabling. However, he treats norms as a sub-category of the more inclusive notion of *rules*, as he wants to use rules to connect action

to structure. To illustrate the part played by rules, consider the example of a profession we are all familiar with – the doctor/patient relationship.

> An example: the doctor/patient relationship. When a patient presents their problems to a general practitioner (GP), the doctor needs to make a diagnosis and, in consultation with the patient, determine the next stage (do nothing, change life style, prescribe drugs, arrange for tests, refer to a specialist, call for an ambulance and so on). The GP can draw on their accumulated knowledge and know-how, obtained through upbringing, education and experience. GP decisions will be based to a large extent on the expected efficacy of treatment options and the preferences expressed by the patient. However, many other factors may come into play. There will be organizational and economic factors – for instance, who will be paying, are there budget constraints, and are there rules set by the state health service or insurance company? There may be operational constraints - such as the travel distance to obtain the treatment and long waiting times for appointments. There may be material constraints such as the location of the work – the GP's surgery, the patient's home, or at the roadside. There may be cultural constraints such as social or religious taboos. There may be political influences, for instance, being urged to get vaccinated, and to avoid personal contact. A GP may have a personal preference for using drugs, another may favour a change in habits. There may be social taboos (and some enabling exceptions) relating, for instance, to plastic surgery, abortion and euthanasia. Giddens depicts these various factors which could influence the decisions of a GP as rules; these may by followed, amended, overridden (trumped) by other rules, or simply ignored.

The example of GPs' practices brings the impact of rules (actual or social) into sharp relief. OR practitioners' practices (in their interactions with clients and others) are impacted in an analogous manner.

Giddens argues that the interpretivists fail to achieve what they set out to do, namely, to develop a satisfactory way of relating to everyday life and the common sense of lay actors (Giddens, 1993/1976, pp. 119-120). He describes the process whereby structure is engaged in practice as 'structuration'. *Structure* consists of the rules and resources, or sets of transformation relations, organized as properties of social systems. *System* consists of reproduced relations between actors or collectivities organized as regular social practices. *Structuration* is the conditions governing the continuity of transmutation of structures and therefore the reproduction of social system (p. 25). Structuration is the process by which structure is deployed in practice at a particular time in a particular situation and by which structure is updated in the light of the experience of interaction at different times in different places. See Appendix G for Giddens' theoretical analysis of everyday social interactions in terms of structure.

Domination and power provide the key to Giddens' solution to the agency/structure problem. To act is to make a difference. To make a difference is to have and to apply power. Power becomes manifest in practice when actors act, when they are engaged in practice. The application of power involves deploying the structures of domination using the facilities at hand, consisting of *allocative resources* (personal skills or material assets) and *authoritative resources* (ability to command and control others). In turn, the experience of practice reproduces the domination structure, or may change it, depending on

the unintended consequences that result from the action. A similar reflexivity is inherent in the relationship between specification and communication, and between legitimation and sanction. All structural elements reproduce and produce; this reproduction and production of structure is the essence of structuration which provides continuity and change over time.

Appendix F: A fuller account of Giddens's rejection of Schütz's phenomenology and Garfinkel's ethnomethodology

To understand the 'interpretive' approaches favoured in the 1960s, Giddens examines the phenomenology of Schütz (1899-1958). Phenomenology itself was originally developed by Edmund Husserl (1859-1938) in reaction to the dominance of the scientific approach applied to human behaviour (positivism). In the 1960s it was also a response to the emphasis on social structure found in Parsons' functionalism. The attraction of phenomenology lies in its emphasis on the common-sense interpretation of everyday life. Social-scientific concepts, Schultz explains, "must be constructed in such a way that a human act performed within the life-world by an individual actor in the way indicated by the typical construct would be understandable for the actor himself as well as for his fellow-men in terms of common-sense interpretation of everyday life" (Schütz, 1972/1932, p. 220). The problem was that the purely subjective nature of the approach does not connect the subjectivity of an individual with his or her outside world of things and people.

A second 'interpretive' approach examined by Giddens, the ethnomethodology of Garfinkel (1967), seeks to distance itself from phenomenology by moving towards the analysis of 'situated actions' as 'publically' interpreted linguistic forms (p.42). Giddens observes that it is not hard to see [in Garfinkel's approach] that the direction in motion is towards Austin (an ordinary language philosopher) and towards the later Wittgenstein, though in practice, Garfinkel makes more use of concepts derived from the semiotics of the American pragmatist Charles Saunders Peirce (1839-1914). Ethnomethodology emphasises the everyday language of ordinary people: 'the ethnomethodologist does not differentiate, for the purpose of his or her own studies, between the sociology that lay members of society do in the course of their day-to-day lives, and the sociology done by professional social scientists' (Giddens, 1993/1976, p. 34). In other words, 'lay' members of society, in attributing meaning to their own situation and those of others, are continuously performing sociological analysis in their everyday lives, analysing what to do and say, and how others might react; "social science is a practical accomplishment like any other rationally accountable form of social activity and can be studied as such" (p. 34). On the negative side, Giddens concludes that Garfinkel's approach "cuts off the description of acts and communication from any analysis of purposive or motivated conduct, the strivings of actors to realize definite interests" (p. 46).

Appendix G: Giddens' theoretical analysis of everyday social interactions in terms of structure

In everyday social interactions, for analytical purposes one can separate out three knowledgeable capacities of agents: *communication* of meaning enables interaction with other actors within a collectivity of common interests; the application of *power* in pursuit of interests and wants; and an awareness of normative *sanctions* which ensures that actors can predict the reaction of others within a

community. Giddens explains how these tangible everyday human capacities are enabled by, and interact with the abstract notions of structure (see Figure 1).

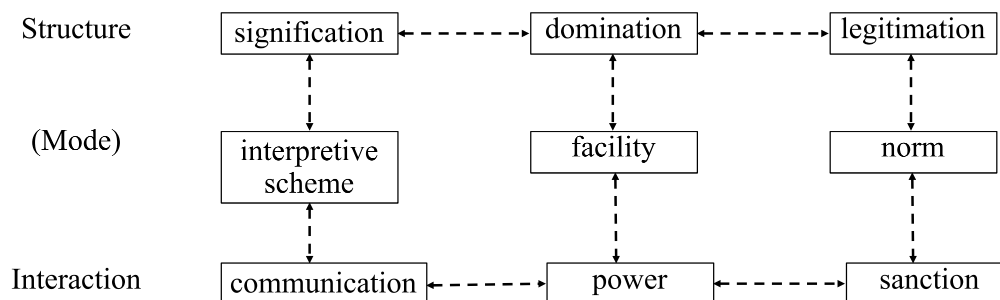

Figure 1. The analytical dimensions of duality of structure

In Figure 1 the three (tangible) everyday human capacities are shown along the bottom, with three (abstract) structural elements, *signification*, *dominance* and *legitimation,* shown along the top. Figure 1 also introduces the notion of "modes" which mediate between interaction and structure: "The division of rules into modes of signifying or meaning constitution and normative sanctions, together with the concept of resources – fundamental to the concept of power – carries various implications which need to be spelled out. What I call the 'modalities of structuration' serve to clarify the main dimensions of the duality of structure in interaction, relating the knowledge capacities of agents to structural features. Actors draw upon the modalities of structuration in the reproduction of systems interaction, by the same token reconstituting their structural properties" (p. 28). In simple terms Figure 1 depicts the relationship between human agency and structure, a relationship that social theorists have struggled with since the attempt to develop a theory of human social behaviour was first embarked on. This agency/structure problem was brought to a head with Parsons's development of a structural functionalist approach at a time when sociologists were striving to establish sociology as a proper subject area for academic study. The structural elements of both signification and legitimation are depicted in terms of rules along the lines of Wittgenstein, Austin, Lévi Strauss, Winch and other linguistic scholars. Communication involves using signs and symbols in interpretive schemes such that actors can understand the meaning of their own sayings and doings, and that of others. Sanction is based on informal and formal rules (codes) of accepted behaviour in the form of norms.

Appendix H: Further explanation of Bourdieu's position

As explained by Schatzki, "Bourdieu's central intuition is that practices (in his language: the activities, or 'games' found within specific 'fields' or 'domains of practice') are self-perpetuating. Participant's actions are produced by dispositions (habitus) that, in being acquired under the objective conditions

that characterize existence in the context of certain practices, generate actions that reproduce and perpetuate the practices and conditions. Practices, conditions and dispositions are mutually calibrated." (Schatzki, 1996, p.137). The selection of action conforms to what Bourdieu calls 'practical logic'. According to Schatzki, Bourdieu's practical logic is a description of the principles that govern the assignment of meaning to the situations and functions of action through the construction and application of families of opposition; it is "a representation of the principles the bodily schemes observe in selecting actions. In any context, according to Bourdieu, habitus selects actions by producing (1) a definition of the situation of action, which assigns meanings to objects, persons and events, delineates a probable upcoming future, and prescribes 'objective potentialities' (things to say and not to say, to do and not to do); and (2) a definition of the function of action in that situation (Bourdieu, 1972/77, p. 142; Bourdieu, 1980/90, p. 267). (Habitus then generates the action that best fulfils these functions.) Practical logic describes the principles the bodily schemes follow in rendering these definitions" (Schatzki,1996, p. 140).

To clarify the link between habitus and field, Bourdieu introduces the term 'practical sense', or in sporting parlance a 'feel for the game'; he links it to what we experience as 'sensible' or common sense practices, intelligibility between players, and a shared feeling of rationality:

> *Practical sense is a quasi-bodily involvement in the world which presupposes no representation either of the body or of the world, still less of their relationship ... this phrase (like 'investment sense', the art of 'anticipating' events, etc.) gives a fairly accurate idea of the miraculous encounter between habitus and a field, between incorporated history [incorporated in the body] and objective history, which makes possible the near-perfect anticipation of the future in all the configurations on the pitch or board [think of a player's bodily response as a ball comes towards him or her] . Produced by experience of the game, and therefore the objective structures within which it is played out, the 'feel for the game' is what gives the game a subjective sense – a meaning and a raison d'être, but also a direction, an orientation, an impending outcome, for those who take part and therefore acknowledge what is at stake ...* (Bourdieu, 1980/90, p.66).

Appendix I: Schatzki's critique of Bourdieu and Giddens

From his analysis of practice theorizing by Bourdieu, Giddens and others, Schatzki identifies four theses that link practice theorists' accounts of social affairs: (1) social life is composed, at least centrally, of practices (in Bourdieu, of practices-in-social spaces); (2) practices are not isolated from one another, they connect; (3) social phenomena (e.g. scientific labs, loving family relations, the dissemination of photos on social media and so on) are either aspects of, complexes of, or rooted in constellations of, practices; and (4) practice theories have emerged on the background of the philosophical ideas of Wittgenstein and Heidegger (Schatzki, 2019, pp. 3-4). Schatzki observes that "the central philosophical inheritance is the idea that human activity rests on something that cannot be put into words … habitus (Bourdieu), practical consciousness (Giddens), inarticulate embodied understanding (Taylor), knowing how to go on (Kemmis), and know-how (Ryle) or skills (Dreyfus)" (Schatzki, 2019, p. 4). These concepts all denote an ability to get along in constantly varying circumstances, which is acquired in practice and establishes a form of continuity with past activity. However, all of these expressions

designate human attributes that underlie human activity but whose bearing on what people do on a specific occasion cannot be captured in any finite collection of symbolic formulation.

Schatzki allies his perspective with micro-orientated approaches such as ethnomethodology, symbolic interactionism, and actor-network theory; like these approaches, he contends that "all social orders and formations arise from – in this case are instituted in or constituted by – local phenomena. It also concurs with those micro-approaches that do not deny the existence or efficacy of 'macro' formations and structures, insisting only that the existence and efficacy of such phenomena be comprehended as and via interrelated practice-arrangements bundles" (Schatzki, 2005, p. 479). He notes that his theory draws heavily on Heidegger and Wittgenstein and is kin to the accounts found in Dreyfus (1991) and Bourdieu (1980/1990). "This family of accounts is an alternative to both rational actor models of action and the idea that action largely follows taken-for-granted or nonconscious scripts, routines, or schemes" (Schatzki, 2005, p. 481).

Schatzki makes his contribution to social theory as an insightful interpreter of late Wittgenstein, critic of Bourdieu and Giddens and others, and a creator of a new distinctive practice theory. According to Schatzki "Bourdieu's theory of practice and Giddens's theory of structuration boast profound visions underwriting unified positions on a wide variety of social theoretic issues. Bourdieu deftly captures practical difference and highlights the role of the body and the constitutive significance of intelligibility in social life. Giddens accents regularity and routine and the omnipresence of power in everyday interaction. Both, moreover, intend to let stand the practical nature of action, practice, and intelligibility. Both, however, fail to acknowledge this nature fully and uphold the integrity of social science only by clinging to the thorny road of intellectualism" (Schatzki, 1996, pp. 136-7).

On Bourdieu's key concept of habitus, Schatzki writes: "The principles and structure of practical logic are mostly put aside, moreover, and habitus is primarily treated simply as 'practical sense' or as a constellation of senses (e.g., Bourdieu, 1987/1990, Chapter 3). To the extent that these changes have occurred, however, Bourdieu's account of practices indeed becomes vacuous: habitus becomes an empty intermediary between objective conditions and practices, i.e. lifestyles (c.f., Bourdieu, 1979/1984, pp. 171, 467). Habitus becomes content-less insofar as it loses structure, i.e. practical logic. … habitus also lacks explanatory power, since it explains neither why an actor, on any occasion, performs one sensible and condition-perpetuating action rather than another nor why people do anything at all that perpetuates these conditions. Perhaps for this reason Bourdieu continues to speak of 'practical logic' and to describe dispositions, inter alia, as 'the practical mastery of the logic or immanent necessity of a game' (Bourdieu, 1987/1990, p. 16). As we have seen, however, this 'logic' and 'necessity' cannot be adequately articulated. To speak of them is to gesture at the impossible content that Bourdieu needs to lend his account substance" (Schatzki, 1996, p. 226).

Giddens fares little better under Schatzki's critique (see Schatzki, 1997). According to Giddens, practices are structured by the rules and the resources that are embedded in practical consciousness. However, drawing on resources, Schatzki points out, is not distinct from drawing on rules. For instance, when social position is the source of command, an actor, drawing on a resource to induce others to perform certain actions, relies on the codes and norms that define social identities and rights as well as

obligations attending these. (Schatzki, 1996, pp. 155). Giddens characterizes practical consciousness, the understanding of rules, as a "generalized capacity to respond to and influence an indeterminate range of social circumstances" (Giddens, 1984, p. 121). According to Schatzki, "practical understanding/consciousness cannot be formulated. Knowing how to go on is the mastery of a technique, of a way of acting, that in principle defies adequate formulation in words, symbols, diagrams, or pictures. … Wittgenstein's considerations problematize any account of social life that promotes rules as the chief determinant of action. By collapsing the organization of practices into practical understanding, consequently, Giddens, like Bourdieu, backs himself into an impossible situation" (Schatzki, 1996, pp. 157-8).

Appendix J: Theodore Schatzki's practice theory

For Schatzki, behaviour, sensations and images express particular conditions of life in specific circumstances: the past and future behaviour (and inner phenomena) of the person involved; the immediate 'web of life' conditions in which at any particular time a person finds herself; the wider situation; and the practices in which she participates. Practices embrace behaviour, speech acts, training and learning. There are four main categories of life conditions: (i) conditions of consciousness (what one is specifically aware of) such as being in pain, feeling an itch, imagining, seeing, hearing; (ii) emotional moods (how it is going with one) such as being joyful, being happy, fearing, depression, and anxiety, referred to by Wittgenstein as 'mental conditions, having the property that they extend over time – duration; (iii) cognitive or intellectual conditions (one's stances and attitudes) such as doubting, believing, being certain, wanting, intending, remembering, and understanding, which are attitudes and stances which are expressed in behaviour (action) – they lack 'genuine duration'; and (iv) actions (what one is doing). In this fourth category Schatzki distinguishes between the behaviours associated with the mental conditions and bodily behaviours involved in conducting an act, and the act itself. (Schatzki, 1996 pp. 36-39). A full account of an organization must also consider its material arrangements, the ways humans, artefacts, organisms, and things are ordered in it; non-humans are active components of practice-arrangement bundles, shaping activity, redirecting practices, and inducing decisions. (Schatzki, 2005, p. 478).

The site of the social is a *mesh* of practices and material arrangements (in which for instance, educational practices are carried out). By practices, he means organized human activities; the set of actions that comprises a practice being organized by three phenomena: *understanding of how to do things*, *rules*, and *teleoaffective structure*. Understanding how to do things refers to know-how, skills, inarticulate embodied understanding and so on. By rules he means explicit formulations that prescribe, require, or instruct that such and such be done, said, or is the case. By teleoaffective structure he means an array of ends, projects, uses (of things), and even emotions that are acceptable or prescribed for participants in the practice (pp. 471-2).

On issues of power, the position that Schatzki (pp. 478-479) adopted is closely allied with that of Foucault (1972/83), who argued that power is one person's actions structuring other people's possible actions. Sites, as Schatzki uses the term, are arenas, or broader sets of phenomena, as part of which something, a building, an institution, an event, exists or occurs. This implies that humans' coexistence

inherently transpires as part of practice-arrangement bundles (for instance education at a school). Chains of actions (a teacher raises a question, students raise their hands, the teacher ask one to provide an answer, …) and commonalities in ends, projects and emotions, help humans coexist. Meshes intrinsically interlace to form a wider *net* of practice-arrangement bundles (the school). A *confederation* of nets (the American schooling system) links to other such confederations (universities, the military, employers and so on). All these meshes, nets, and confederations form one gigantic metamorphosing *web* of practices and orders (Schatzki, 2005, pp. 472-3). Schatzki's conception is thus not limited to the consideration of individuals and their interactions, nor does it prescribe the structure or systems that constitute society; it places itself in between. For an account of Schatzki's critique of Bourdieu and Giddens see Appendix I.

> An example: Discussion about company strategy at the ABC company. Jim is the managing director, Susan the finance director and George the HR director.
>
> Jim: We need to rank the criteria.
>
> George: I think the limit-redundancies criterion is very important. Redundancies would impact on many employees who were loyal during covid – doing extra shifts to cover those isolating.
>
> Jim: I was thinking the same thing. OK we can agree on that.
>
> George: In particular, [Susan, interrupts]
>
> Susan: We can't do it.
>
> George: But we have done very well out of covid. The money is rolling in; our bonuses are going [Susan interrupts]
>
> Susan: [firmly in raised voice] We can't [Jim interrupts]
>
> Jim to Susan: George must be allowed his say. I, urm, agree with you George, but Susan has said we can't do it. Susan, we must have a chat about this after the meeting.

Analysis: The exchange is surprising in that Susan keeps interrupting George, leading Jim to interrupt Susan to allow George to have his full say. However, finally Jim, who is the managing director, defers to Susan, his finance director, without discussion. We can't just guess what the actors are thinking when they say and do things; but we can try to identify factors (for instance, Susan's connection with the corporate finance functions which oversees the ABC company and other subsidiaries) that may be having an effect. The actors' actions become clearer when it is recognised that 'social phenomena … are either aspects of, complexes of, or rooted in constellations of practices' (Schatzki, 2019, p.3).

Appendix K: Initial list of selected articles

The following Scopus search query

> SOURCE-ID (22489) OR SOURCE-ID (22236) OR SOURCE-ID (21307) OR SOURCE-ID (22238) OR SOURCE-ID (23090) OR SOURCE-ID (21915) OR SOURCE-ID (19318) OR SOURCE-ID (23651) AND ("workshop*" OR "problem structuring*" OR "PSM" OR "group support system" OR "model supported group") AND ("practice theory" OR "actor*network theory" OR "mangle" OR "interpretiv*" OR "ethnographic" OR "ethnomethodology" OR "activity theory" OR "personal construct theory" OR "post*modern*" OR "psycholog*") AND ("narrative analysis" OR "attribution theory" OR "conversation analysis" OR "cognitive map" OR "key incident*" OR "relevance theory" OR

"activity theory" OR "coding" OR "ethnomethodology" OR "intersubjective analysis" OR "structuration moves" OR "purposeful text analysis" OR "structural analysis" OR "quantitative analysis" OR "thematic analysis" OR "themes")

returned 164 articles [Accessed 9th February 2021]. Articles selected for analysis in the paper are highlighted**.**

1.	Abuabara, L., & Paucar-Caceres, A. (2020). Surveying applications of Strategic Options Development and Analysis (SODA) from 1989 to 2018. *European Journal of Operational Research*. doi:10.1016/j.ejor.2020.11.032
2.	Abuabara, L., Paucar-Caceres, A., Belderrain, M. C. N., & Burrowes-Cromwell, T. (2018). A systemic framework based on Soft or approaches to support teamwork strategy: An aviation manufacturer Brazilian company case. *Journal of the Operational Research Society, 69*(2), 220-234. doi:10.1057/s41274-017-0204-9
3.	Ackermann, F., & Eden, C. (2005). Using causal mapping with group support systems to elicit an understanding of failure in complex projects: Some implications for organizational research. *Group Decision and Negotiation, 14*(5), 355-376. doi:10.1007/s10726-005-8917-6
4.	Ackermann, F., & Eden, C. (2011). Negotiation in Strategy Making Teams: Group Support Systems and the Process of Cognitive Change. *Group Decision and Negotiation, 20*(3), 293-314. doi:10.1007/s10726-008-9133-y
5.	Agarwal, A., Gupta, A., Kumar, A., & Tamilselvam, S. G. (2019). Learning risk culture of banks using news analytics. *European Journal of Operational Research, 277*(2), 770-783. doi:10.1016/j.ejor.2019.02.045
6.	Anderson, R. D., & Vastag, G. (2004). Causal modeling alternatives in operations research: Overview and application. *European Journal of Operational Research, 156*(1), 92-109. doi:10.1016/S0377-2217(02)00904-9
7.	Bartelt, V. L., Dennis, A. R., Yuan, L., & Barlow, J. B. (2013). Individual Priming in Virtual Team Decision-Making. *Group Decision and Negotiation, 22*(5), 873-896. doi:10.1007/s10726-012-9333-3
8.	Beers, P. J., Boshuizen, H. P. A., Kirschner, P. A., & Gijselaers, W. H. (2006). Common ground, complex problems and decision making. *Group Decision and Negotiation, 15*(6), 529-556. doi:10.1007/s10726-006-9030-1
9.	Borri, D., Camarda, D., & Grassini, L. (2006). Distributed knowledge in environmental planning: Hybrid IT-based approaches in scenario-building contexts. *Group Decision and Negotiation, 15*(6), 557-580. doi:10.1007/s10726-006-9033-y
10.	Burger, K. (2020). Understanding participant engagement in problem structuring interventions with self-determination theory. *Journal of the Operational Research Society*. doi:10.1080/01605682.2020.1790307
11.	Burger, K., White, L., & Yearworth, M. (2018). Why so Serious? Theorising Playful Model-Driven Group Decision Support with Situated Affectivity. *Group Decision and Negotiation, 27*(5), 789-810. doi:10.1007/s10726-018-9559-9
12.	Burger, K., White, L., & Yearworth, M. (2019). Developing a smart operational research with hybrid practice theories. *European Journal of Operational Research, 277*(3), 1137-1150. doi:10.1016/j.ejor.2019.03.027
13.	Carley, K. M. (1997). Organizational adaptation. *Annals of Operations Research, 75*, 25-47. doi:10.1023/a:1018963630536
14.	Casu, B., Shaw, D., & Thanassoulis, E. (2005). Using a group support system to aid input-output identification in DEA. *Journal of the Operational Research Society, 56*(12), 1363-1372. doi:10.1057/palgrave.jors.2601965
15.	Charon, I., & Hudry, O. (1998). Lamarckian genetic algorithms applied to the aggregation of preferences. *Annals of Operations Research, 80*, 281-297. doi:10.1023/a:1018976217274
16.	Chidambaram, L., & Bostrom, R. P. (1997). Group Development (I): A Review and Synthesis of Development Models. *Group Decision and Negotiation, 6*(2), 159-187. doi:10.1023/A:1008603328241
17.	Cronin, K., Midgley, G., & Jackson, L. S. (2014). Issues Mapping: A problem structuring method for addressing science and technology conflicts. *European Journal of Operational Research, 233*(1), 145-158. doi:10.1016/j.ejor.2013.08.012
18.	Cruz Neto, J. X., Oliveira, P. R., Soubeyran, A., & Souza, J. C. O. (2020). A generalized proximal linearized algorithm for DC functions with application to the optimal size of the firm problem. *Annals of Operations Research, 289*(2), 313-339. doi:10.1007/s10479-018-3104-8

19.	Damart, S. (2010). A cognitive mapping approach to organizing the participation of multiple actors in a problem structuring process. *Group Decision and Negotiation, 19*(5), 505-526. doi:10.1007/s10726-008-9141-y
20.	DeTombe, D. J. (1999). Moments of support by a groupware brainstorming tool in handling complex technical policy problems. *European Journal of Operational Research, 119*(2), 267-281. doi:10.1016/S0377-2217(99)00130-7
21.	Doyle, J. K., & Ford, D. N. (1998). Mental models concepts for system dynamics research. *System Dynamics Review, 14*(1), 3-29. doi:10.1002/(SICI)1099-1727(199821)14:1<3::AID-SDR140>3.0.CO;2-K
22.	Doyle, J. K., & Ford, D. N. (1999). Mental models concepts revisited: Some clarifications and a reply to Lane. *System Dynamics Review, 15*(4), 411-415. doi:10.1002/(SICI)1099-1727(199924)15:4<411::AID-SDR181>3.0.CO;2-R
23.	Durugbo, C. M. (2020). Affordance-based problem structuring for workplace innovation. *European Journal of Operational Research*. doi:10.1016/j.ejor.2019.12.044
24.	Eden, C. (2004). Analyzing cognitive maps to help structure issues or problems. *European Journal of Operational Research, 159*(3), 673-686. doi:10.1016/S0377-2217(03)00431-4
25.	Eden, C., & Ackermann, F. (1993). Evaluating strategy its role within the context of strategic control. *Journal of the Operational Research Society, 44*(9), 853-865. doi:10.1057/jors.1993.155
26.	Eden, C., & Ackermann, F. (2004). Cognitive mapping expert views for policy analysis in the public sector. *European Journal of Operational Research, 152*(3), 615-630. doi:10.1016/S0377-2217(03)00061-4
27.	Eden, C., & Ackermann, F. (2018). Theory into practice, practice to theory: Action research in method development. *European Journal of Operational Research, 271*(3), 1145-1155. doi:10.1016/j.ejor.2018.05.061
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29.	Evans, J. (1989). A review and synthesis of OR/MS and creative problem solving (Parts 1 and 2). *Omega, 17*(6), 499-524. doi:10.1016/0305-0483(89)90055-8
30.	Findlay, S. D., & Thagard, P. (2014). Emotional Change in International Negotiation: Analyzing the Camp David Accords Using Cognitive-Affective Maps. *Group Decision and Negotiation, 23*(6), 1281-1300. doi:10.1007/s10726-011-9242-x
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36.	Franco, L. A., & Greiffenhagen, C. (2018). Making OR practice visible: Using ethnomethodology to analyse facilitated modelling workshops. *European Journal of Operational Research, 265*(2), 673-684. doi:10.1016/j.ejor.2017.08.016
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