

Understanding the influence of values in complex systems based approaches to public policy and management

Abstract

Attempts to apply complexity theory to public management have focused on the dynamic systems environment. This approach accepts that in public policy systems there are many externalities, unstable processes and indeterminate outcomes. Resulting management practices have focused on system resilience, identifying patterns of practice and outcomes and adaptability in the face of dynamic instability. This article revisits the core concepts of complex systems theory and theorizes public organizations as dynamic systems of public values. The rigour of such an original approach requires a juxtaposition of public service values with complexity theory. It is argued that theorizing value systems in public policy implies they are a key element of complex policy systems and provides a significant development for understanding the source of stable and unstable dynamics in public policy and organizations.

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Introduction

A considerable volume of literature and research has been published in the last twenty-five years about the application of complexity science to the social sciences (Byrne, 1998; Cilliers, 1998; Allen, et al, 2011; Byrne & Callaghan, 2013; Boulton, et al, 2015). This literature has influenced the application of theory to management and practice both in the general business environment and more specifically in the public services. Complexity theory has provided a rich range of descriptions of public organizations as complex adaptive systems that exposes the indeterminate nature of these systems and the limitations and challenges this creates for public managers (Allen, et al, 2011; Eppel, et al., 2011; Boulton, et al, 2015). Beyond this rich description, some researchers have promoted alternative perspectives about management practice that assist managers to deal with the complexity of their operating environments (Rhodes, et al.; 2011; Stacey, 2011; Haynes, 2015). It is, therefore, important to distinguish between essentially descriptive approaches that seek to evaluate the degree and nature of complexity within the systems where public managers operate, from the research that moves to propose alternative practices that may enable managers to cope and perform better. The latter tend to be conceptual and rarely offer empirical evidence to justify new practices as measurably 'better' in their resulting influences and outcomes. In part, the lack of empirical evidence about the usefulness of practices designed to cope with complexity relates to the ontology of complexity that sees a complex systems environment as being very difficult to subject to a controlled, experimental based research environment where one can be confident of measuring outcomes. Pollitt (2009) has criticized this lack of evidence. The use of complexity theory cannot remain in abstract discussions of grand meta theory, but must be applied to practical examples of policy management.

The aim of this paper is to consider how the growing body of literature and research published about public service values and their influence on public services can be juxtaposed with the complexity perspective. This is of relevance to the contemporary practice environment where there are examples of management science being applied that appear to result in moral failure (Francis, 2013). This is due to an inability to incorporate values as an element of practice. The paper integrates the turn to public service value and values with the knowledge accumulated through the application of complexity theory to public management. It does this by exploring the concept of value plurality and value hierarchies and theorizing multiple value influences on public management decision-making, including value conflicts. It examines the relevance of complexity theory concepts (Cilliers, 1998) to understanding the dynamic influence of values on complex policy systems.

Public value and values

The New Public Managerialism (NPM) of the last 40 years has had a seminal influence on the study and practice of public management and public administration (Lane, 2000). It has moved the subject of public administration in a managerial direction where part of the shift in emphasis is the de-politicisation of an administrator (who serves a political or politically appointed master) as a locally empowered manager (Hughes, 2012). These reforms are influenced by management practice in business and the private sector and founded on concepts and values linked to marketization and privatization. All this has taken place in an age where there is a growing dominance of market values (Sandel, 2013).

Part of the revision of NPM in the last twenty years has been linked to a rediscovery and re-identification of 'public value' (Moore, 1995) and similarly the influence on managers of 'public values' (Box, 2015). These are the two different but compatible approaches to public value. First, is an approach that asserts a need for public managers to realize the public value of their policy activities. This is the 'public good' and collective benefit of public policy. This public value, it is argued, should be at the core of public management practice and evidenced in the strategies and operations of public policy (Moore, 1995; Benington & Moore, 2011). Second, another group of studies has examined what personal, social and political values influence public managers (Box, 2015). Alongside the major contribution of public value/s scholarship to public management is another revision of NPM, and this is the influence of complex systems approaches (Teisman & Klijn, 2008; Teisman, et al, 2009; Rhodes, et al, 2011; Haynes, 2015).

Complexity theory and public management

In a seminal issue of *Public Management Review* (PMR), published a decade ago, Teisman & Klijn, (2008) outlined the key concepts and issues resulting from the juxtaposition of complexity theory with public management. They drew attention to the multiple contexts influencing public managers, the dynamic pace of change in the policy environment, and the radical implications for our understanding of the public manager's role and task. Complex system approaches criticise the classical control ethos of new public management (NPM). This is the idea that managers can be made fully responsible for the performance of their services through the economic mantra of managing economy of input, efficiency of inputs to outputs and the effectiveness of those outputs to generate good outcomes. These classical management methods assume a high degree of system predictability and control, something that complex systems approaches argue does not exist.

Complex systems approaches assert that public managers work in unpredictable systems where individual practitioners have limited influence (Snowden and Boone, 2007). These organizational systems are contingent on the external environment, they overlap in complex ways with other public and private systems, and they are full of multiple levels and networks of human relationships and communications. These communications and resulting behaviours often – but not always - get copied and reproduced as interactive feedback. The myriad of people who experience these interactions are also capable of innovating and self-organization, and can contribute bottom up creativity and/or resistance. As (Klijn, 2008) concluded in his seminal piece for the first complexity theory special edition of PMR, complex public policy systems rather defy being manageable, and if public managers are to have any chance at all of success, they must be highly adaptable and facilitators of what opportunities for change do emerge.

The engineer turned philosopher, the late Paul Cilliers (1998, p3-4), provides us with one of the most formative definitions of social complex systems. What follows is a paraphrase and summary of his definition, a conceptual model that is returned to for a concluding analysis at the end of the paper. A complex system has many cases (like people and organizations) and elements (like places and processes). There are many dynamic interactions between these cases and elements, but their separate ability to know and respond to all the information in these interactions is limited. The interactions that occur in the system take two primary forms: reinforcing feedback and checking feedback. Reinforcing feedback is a positive acknowledgement of communication received and can result in a copying and further communication of the information. It is amplified and scaled up in the system and has greater influence. Conversely, checking feedback is a negative feedback and curtails previous responses. The possibility that interactions result in a scaling up of behaviour in a complex system illustrates the importance of different levels within the system. In public policy, we typically think of three such levels to system operation: macro (the national or continental level), the meso (the local or organizational level) and the micro (the life and cognitions of the individual citizen). While complex systems are in general acknowledged as open, without permanent boundaries (and overlapping with other systems and sub systems), they are nevertheless restricted in their openness. Much of this limitation is due to their inability to share and communicate all information equally. Dynamic flows of energy influence systems. These flows are episodic and nonlinear. Finally, all systems have a history and are, to some extent, path dependent on that history and the previous events that have shaped the system.

Values as attractors to order

For the matter of defining complex systems, we will add one other concept previously used by others, but not present in Cillier's (1998) overarching account. This is the concept of the attractor. It is important for assisting in understanding the process of system patterns over time. In complex systems theory the attractor is a mechanism that defines periods of relative stability in what otherwise will be long periods of instability and chaos (Urry, 2003). In mathematics, an attractor defines the boundaries of system change and creates the definition of the patterns and shape of system order (Stewart, 1995). In social and organizational systems, stability and order in systems can be provided by rules of operation, but also by values.

'The very large number of elements makes such systems unpredictable and lacking any finalised "order" ...They are irreversibly drawn towards various attractors that exercise a kind of gravity effect.' (Urry, 2003, p. 123)

Attractors in systems work in plurality. Therefore, the different pattern effects may work in both collaboration and competition. Some attractors come to dominate and have more influence than others (Haynes, 2012). Values in their plurality can have multiple and contradictory influences on policy systems.

Complexity science and values

While the application of concepts from complexity science methodology to public administration has yielded some innovative approaches to understanding the challenges of public policy design and implementation, one of the epistemological problems, however, with taking scientific methods and exporting them into the applied world of social science, is the resulting value base (or apparent lack of an explicit value base).

'...the key to managing post normal challenges – where scale and complexity make for a myriad of uncertainties and knowledge gaps – is to develop a more nuanced understanding of science's limits and its unavoidable linkages with values and interests.'

(Heazle, 2010, p. 37)

Critical approaches to scientific methods in the social sciences posit the historical inevitability and importance of identifying normative influences given the subject focus of social science when compared to natural science. The 'turn to postmodernism' (Seidman, 2004) identified applied social

science as subjective at its core, because the science is engaged in by humans about humans and therefore requiring values of humanity. Many cultural and postmodern sociological approaches to scientific enquiry in the post millennium make the same point about society's use of natural science: with reference to information technology, biotech and similar 'advances' (see Fuller, 2007; 2009). Scientific method and achievement should not dehumanise and worsen the human condition. David Byrne (2011, p 38) one of the best known international scholars to promote the methodology of complexity theory in the social sciences, has stated that a structural approach to scientific knowledge must be combined with a call to action on the basis of that knowledge.

Despite this call to realism inherent in complex based approaches to public management, the fact remains that complexity theory is founded on scientific thinking that is linked to dynamic physical systems in nature like the weather system (Kauffman, 1995; Stewart, 1995), and therefore complexity based management practice may ignore normative and value based aspects of public systems. So how might the application of complexity science be linked to a normative theory that is aware of the different value given to different techniques and outcomes and able to understand value conflicts in the management of public policy? Can a complexity theory driven approach to public management practice be combined with an academic debate about what values should drive policy and practice?

A normative application of complex adaptive systems methods is possible. The work of Donella H Meadows, et al, (2009), building on her seminal work about the *Limits of Growth* (1972) project, with its holistic systems analysis of global economics and issues of sustainability, offers an example of such a workable and applicable method for combining complex systems analysis with an articulation of what optimal social and public service values could look like (and what policies and service types result). For example, reinforcing market feedback and rapid repetitive behavioural reinforcement, like the repeated and unregulated selling of mortgage securities before the Financial Crisis of 2007, can be argued to be of a negative normative value for society. Such behaviour and interactions undermined economic stability and generated widespread spirals of debt that have had proportionately worse consequences for the poor (Haynes, 2012). The more recent account of scientific uncertainty in complex and open policy systems proposed by (Heazle, 2010) places values, and value based conflict and debate, at the core of understanding the relevance of science to complex human systems. For Meadows, transformative system paradigm change was most likely when social and political values were changing. At the core of human complex systems is the relationship between values and behaviour.

Values in public policy and management

Values are beliefs and ideas that we hold in our cognitions about what is important in social and cultural life and they directly affect our behaviour and decision making processes.

‘A value is a complex and broad based assessment of an object...characterised by both cognitive and emotive elements...and because a value is part of an individual’s definition of self, it is not easily changed and it has the potential to elicit action.’ (Bozeman, 2007, p 117)

International social science research has attempted to define priority core global social values and value contradictions across many cultures (see, for example, World Values Survey, 2012, Stockholm www.worldvalues.org/).

When researching the influence of values on public managers, Molina, (2016, p 50) defines value as: ‘ a complex cognitive-emotional preference for some object, quality, or characteristic that serves as either a means to an end (instrumental value) or an end in itself (terminal value)’.

The pervasiveness of marketization and privatization in public policy and management since the 1980s has been a key value controversy. Indeed, it is at the core of the concept of NPM and its resulting influence on policy and practice (Hughes, 2012). One of the seminal responses to NPM in academia has been the Public Value Thesis (Benington & Moore, 2011). At the policy level, this response to NPM argues for more prominence to be given to how public policy and management activities benefit the collective public good (Moore, 1995). This approach has been criticized for being too dependent on a managerial rather than an interdisciplinary ‘normativity’ approach to values (Beck Jorgensen & Rutgers, 2015, p. 9). Moore’s more recent work in 2013 further developed his theory to include a more normative approach as it argues for the creation of public value. The public value approach has been developed into an operational process for mapping the complex nature of public value (Alford & Yates, 2014). This should include the influence of the diversity of actors involved in policy systems (Bryson, et al., 2016).

In addition, a volume of work has been established that looks specifically at the range of values that influence the behaviour of public managers (Stone, 2002; Beck Jorgensen & Bozeman, 2007; van der Wal, et al., 2011; Anderson, et al., 2012; Box, 2015; Molina, 2016). This literature is diverse, but includes some common themes. There is an analysis of the ‘plurality’ of public values (van der Wal,

et al., 2011), where many different values are shown to influence public managers, but some are argued to influence policy and practice more than others in any one time and place (Stone, 2002). The scale of influence and importance of some values over others is discussed in an influential paper by Beck Jorgensen & Bozeman (2007). Patterns of which values influence 'where' and 'when', is linked to the situational context. Context can be a mix of policy and professional typologies (Molina, 2015). The complex mix of which values influence over time means that values have a dynamic interaction with policy and public management (Beck Jorgensen & Vrangbeck, 2011; Beck Jorgensen & Rutgers, 2015). While the remit of Beck Jorgensen & Bozeman's (2007) categorisation is very broad, they are looking for the influence of values on public life across society. Anderson et al's (2012) quantitative project is more focused on the policy process, including a range of political, professional and administrative respondents. Stone, (2002) focused on the influence of value sub-systems on policy implementation while Molina's (2015) recent focus was on value conflict experiences for specific groups of managers and professionals in the public policy arena.

In combination, this literature places values at the core of public management practice and firmly locates management in a collaborative and contested arena of public governance. The dominant focus of NPM after 1980 influenced a preference for values like economy and efficiency over other traditional public values (Bozeman, 2007). As Box, (2015: 6) comments:

'At the level of daily organizational management, economic efficiency has become especially important, sometimes eclipsing values such as fairness and equity, social justice, constitutionalism and law, and citizen involvement in governance.'

Value conflicts

The research of Beck Jorgensen & Bozeman (2007) and Anderson, et al., (2012) to classify public values was ambitious in their broad remit to include the full possible range of values. It is important to acknowledge that in comparison to the post-structuralist conclusions of Beck Jorgensen & Bozeman's, (2007) discourse, the numerous values identified cannot be assigned to a proposed framework of influence on public managers. Anderson, et al, argue that their classification is deliberately more focused. It nevertheless includes elements that while influential on public management, are outside the scope of the role of public management. For this reason, and for the purpose of beginning to conceptualising the complex interaction of public values with systems concepts, the conceptual examples for public management proposed by Stone's (2002) and Molina (2015) are used in this paper as a vehicle for understanding value conflicts at the operational level.

There are both similarities and differences in their respective approaches. Stone's (2002) model is of four overarching value components that influence the implementation of public policy while Molina's, (2015) four sub categories of values are broader reference points for the behaviour of both public professionals and managers. Molina deals with the day-to-day issues of policy practice. Both these studies employ clusters of values in hierarchical agglomerations to understand the resulting impact on public managers.

Molina (2015) focused on the relationship of values with public management and professional roles and tasks. He used a mixed method with a framework of thirty different values derived from previous related research and literature. These were grouped into four sub value categories: ethical, professional, democratic, and human. This was on the basis of previous research classifications, such as that used by the United States National Association of Schools of Public Affairs and Administration accreditation standards. The sub-groupings were not mutually exclusive and some specific values were argued to be present and influential in more than one group. For example, accountability was argued to be an important value in both the ethical and democratic groupings. Using a simple quantitative ranking scale, where each respondent (n=100) rated an individual value regardless of its sub grouping, they found different conceptual results occurred for different public employee role types. Role types were classified as 'stewards, magistrates, and advocates'. Ethical values scored highest for magistrates and advocates, but second highest for the professionals (where professional values scored higher). Ethical values were listed as: honesty, integrity, social justice, impartiality, incorruptability, courage and accountability. Qualitative interviews were used to understand the fine grain conceptualisation of values in specific work situations for forty one respondents.

These types of clustered value systems can come into direct conflict in policy systems and cause considerable ethical and practice dilemmas for public managers. Molina (2015: 49-50) explores the value conflicts that public managers experience in practice and proposes that one key definition in the fault line of these conflicts is when 'values of bureaucracy' conflict with 'values of democracy'. Molina associates 'values of democracy' with individual rights, citizenship and participation and the 'values of bureaucracy' with the requirement for efficiency and effectiveness. These conflicts translate into numerous policy examples and management decisions. For example, a public medical committee examining the efficiency and effectiveness of a drug decides that the cost benefit is not proven for a given population size. But in contrast an individual argues to their professional practitioner, who agrees, that such a prescription is warranted on the basis of their unique individual circumstances and their lack of realistic and available options with other treatments.

Similar to Molina, but with a different emphasis, Stone (2002) proposes four overarching cluster components of public management values. These are derived from her framework of public policy goals which she argues are compatible with other approaches to classification in the literature. Stone's approach is located in the realm of policy implementation studies. She is expounding a technical model whereby political policy is passed to public managers for implementation, but value conflicts cannot be avoided. Stone's model is therefore used in this paper as another vehicle for understanding specific aspects of value conflict as manifestations of complexity within the system that public managers operate. Stone's model has four clusters of values that are agglomerated into dominant practice approaches. Firstly, there is the collective public ethos of public protection. This is the preservation of the public good. It acknowledges public and welfare benefits of the collective endeavour as organized through government and state interventions in society. At the level of detail, this can include rationale for providing services such as community safety, justice, education, health and more.

Second, there is a requirement to value the efficient use of resources. Resources are finite in time and place. Public managers are at the heart of systems that have to make collaborative decisions about what should be planned as priority action. Some actions have to be prioritised over others. When resources are committed to programmes and operations, managers are responsible for ensuring they are effective. Resources must be used in the public interest. Often this involves maintaining a strong culture of public service and commitment to public citizens. Managers need to review and evaluate services to ensure they continue to deliver appropriate public benefits.

Third, public managers are expected to deliver services that are equitable. This means treating people fairly and similarly, while taking into account their individuality and the diversity of individuals in society. This needs to be considered alongside the goal of equality. While equity focuses on whether people are treated the same by policy mechanisms and allocations, equality deals more with the outcomes of policy, in terms of income, wealth, and health. Conflicts can arise in the focus on equality over equity. It might, for example, lead to a debate about building positive discrimination into a mechanism of allocation, so that those who are systematically and institutionally structurally disadvantaged are prioritised in the policy process over others. Some will attempt to argue this is inequitable.

Fourth, public managers need to balance the public good with the liberty and dignity of the individual. For example, in situations where there is no discernible or immediate collective public benefit, high quality services may still be important and public benefits can still be articulated and argued precisely because the dignity of the individual is retained, thus preserving the overall value of humanity. Examples are, end of life care ,where there is no cure, or the rehabilitation of an offender (preferencing rehabilitation over punishment) after a serious crime has been committed. Again there may be considerable conflicts in policy processes when managers are faced with strong arguments based on the liberty and dignity of one citizen. It is the complexity of these value frameworks in complex policy systems that leads to conflicts that effect the practice of managers.

Value hierarchies

An additional component of the complexity of the interaction of values in policy systems is their hierarchical nature. As stated earlier in the paper, a feature of complex policy systems is they operate across levels, typically macro, meso, and micro.

In organizations, dominant value attractor patterns that do influence both individual and group behaviour result over time (Kontopoulos, 1998), but these resulting patterns of influence are not always logical, optimal, or desirable from a public service user perspective. Molina (2015) notes the influence of role on how specific value based decisions are made. For example, whether the primary role is as manager, professional or advocate. This results in different value hierarchies being applied in a given situation. Similarly, if a person has a generic public employment with aspects of all these roles, they will often experience role conflict within themselves and their own cognitions (Festinger, et al., 1956). The application of public values is both a personal and interconnected organizational activity. Hierarchies of public values can be defined as composed of an interconnected and dynamic range of individual, professional, organizational, and legal principles about public interests (Van Wart, 1998).

Public managers may experience conflicts as individuals or within a team environment. Vink, et al, (2015) describe these value conflicts as 'moral conflicts' that influence decision making on the front line of public policy. The experience of these conflicts may result in a later change in values hierarchies and how they are applied by managers. The whole application of values is dynamic not static. Over time, some values rise in the hierarchy, being considered as more important than others, while others fall and are considered less important, but still have some influence. For example, should recognition of individual liberty in situations, where religious culture has a strong influence

on neighbourhoods, overrule gender discrimination, as in the case of patriarchy in religious neighbourhoods? In the main, policy is deciding in western societies that in the hierarchy of public values, gender equality and reducing gender discrimination is more important than preserving ideas of patriarchy in religious culture, this when these values come into direct conflict in the public sphere through manifestations of gender oppressive behaviour. But these value based tensions can take many years to evolve and be challenging to work out in operational policy areas.

The concept of value hierarchies shows the conflicting nature of values, in that they are founded on different logics and beliefs. Some values exert more influence than others in relation to the context of a specific situation and the resulting operational decision. Value hierarchies are not singular but multiple, for example they may be defined and imposed by organizations, professional groups and individuals and not necessarily in the same hierarchical order, or relating to the same patterning of comparable situations . The similarity of situations for managers, as they try to match circumstances to a value reference framework, is likely to be informed by 'patterning', an important concept in complex systems analysis (Snowden & Boone, 2007). Here the manager tries to systematically compare the similarity and difference of past and present cases.

At the micro level, managers refer to cognitive hierarchies of values in their own work. This includes cognitive reference to their own personal history, as well as training and professional experience. An example of such a hierarchy is presented in table 1. Managers will reference in their decision-making the values that they consider to be important in the context of organizational hierarchies of priorities as defined in their organization strategies and performance policies (Haynes, 2015). It is often in these organizational practices that they find implicit values to drive their operations. They will also be affected by their personal history and current personal situations, as demonstrated in table 1. For example, the value of public protection will manifest itself as behaviour to protect the most vulnerable in society. Or in a personal situation, will be reflected in reciprocal obligations as a duty of care to close family members.

Table 1 Organization and personal values that influence the public manager

Public Manager – professional employment		Personal – individual life choices	
Value	Behavioural Example	Value	Behavioural Example
Public protection	Protection of vulnerable from harm, abuse and exploitation	Duty of care in family and close relationships as a reciprocal obligation	Frequent communications Financial support
Individual liberty	Importance of dignity and choice for service user, including rights to diversity of culture and religion	Relationship interdependence	Respect for partner’s and family members personal space
Efficient use of resources	Deploy resources to give the maximum collective benefit	Best use of resources in partner relationships	Plan and prioritise household expenditures, in collaboration
Effectiveness of Interventions	Conceptualize longer term outcomes such as quality of life and how these relate to outputs like health treatments	Cooperation and sharing in lifestyle planning	Forward planning in close relationships, such as investments for housing, education and retirement

The application of values is a cognitive process. The manager uses their limited cognitive ability to process complex information. The cognitive is itself a complex system. Kahneman (2012) has proposed that the cognitive has two main sub systems. System one is fast and reactive, drawing on personal and historical feelings and emotions, while system two is slow and more rational, as it reflects on available similar past patterns and all available reference points of information.

Here there is an important link between personal identity, personal values and how they find cognitive affirmation, or not, in a work place organization (Herriot and Scott-Jackson, 2002). This has some similarities with Paarlberg & Perry's (2007) research findings about the primacy of personal values in organizational settings, and the dynamic feedback between personal and employment values and identities. Paarlberg & Perry, (2007) found that individuals own personal values were much more significant an influence on their behaviour as an employee than any subsequent attempt by the organization to enforce and influence its own corporate values upon its employees. If employers wanted to change the values of their work force, the best management method appeared to be through the mediation of middle managers, and in the main looking to make explicit connections between employees' existing social and cultural values and the workplace.

Individual values and beliefs from time to time will come into conflict with organizational values. Similar to Maslow's (1943) 'hierarchy of needs', we can identify an individual's hierarchy of values, and at the root of this is physical survival. People will quickly defer collective aspirations in order to ensure their physical survival and that of their immediate family. An employee with a short temporary contract, experiencing low pay or facing redundancy will be more preoccupied with their own and family's survival than that of their employer. Even a long term serving public professional will defer the care and commitment they put into a public organization when their own or family health and care is fundamentally challenged. They will inevitably be less able to demonstrate an explicit and behavioural level of commitment to the values of the organization and its strategies, at that point in time.

It cannot be assumed that values will influence behaviour via a singular process of rational consideration of alternative courses of action (Arthur, 2015). A 'value action' gap may be evident where the expectation of what behaviour will result from a given value does not happen (Blake, 1999). One reason for this is the difficulty in clarifying a simple expression of values. When people try to assess complexity of circumstances they have a tendency to fragment the detail into stages

and sections of decision-making that they feel are easier to judge, but this does not necessarily make them any better at assessing the whole situation before them. The reason for this is that they are likely to weigh one part of the situation wrongly, when compared with the others. This is the so-called 'subadditivity' problem. (Fox & Tversky, 2000).

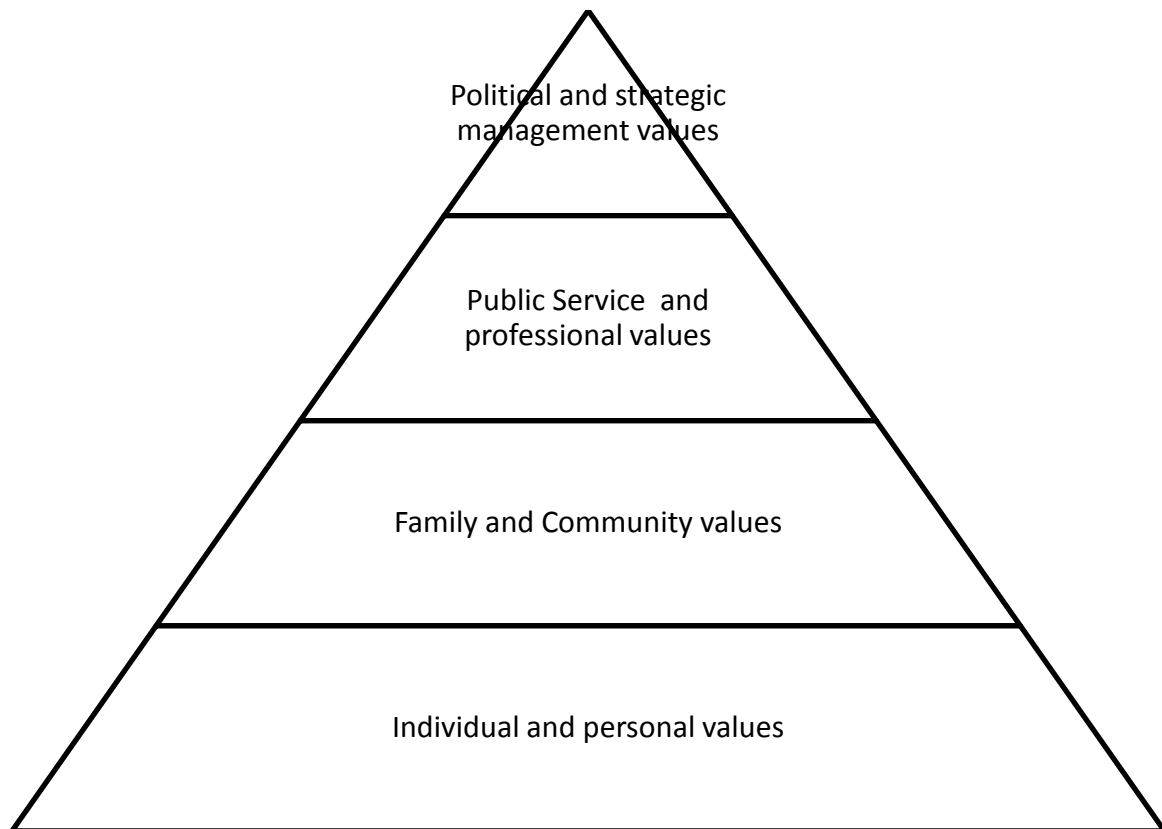
Similarly, the application of values to cognitive decision making is in part determined by personal historical influences and biases that are not immediately obvious or conscious when decisions are being made. It is important therefore that the education and training of public managers does what it can to address this: 'using behavioural science to direct people towards better choices' (Lunn, 2014: 9). It is also important to place these individual cognitive complexities in the wider arena of a complex systems approach to public policy and management. What is needed for public policy is a systems model of management practice that incorporates an understanding of the values influencing policy developments. This allows public managers to make sense of change alongside their own professional values, training, and personal values perspective. In diverse, modern societies that are evolving towards increasing complexity, values and beliefs are similarly complex and mirror these social evolutions.

Figure 1 proposes a hierarchical value reference point for public managers for understanding how values begin to combine dynamically in complex policy systems. The first influence on a manager is their own personal history much of which gives a quick and emotional response to the circumstances they face. This is what Kahneman (2012) refers to as 'system one'. The next influence on the manager is family and community values. Again, much of the influence here is historical and influenced by community, neighbourhood and perhaps religious stories and sub cultures. Also influential are the managerial and professional values assimilated during study, training and supervision. Finally, managers are subjected to the short-term arguments and ideas of their seniors and politicians often made explicit in political manifestos and organizational mission statements. Like the seminal 'hierarchy of needs' (Maslow, 1943), situational context has much to do with where a manager focuses on in this hierarchy during a particular public policy decision.

Although the source of immediate policy values is external to the individual, personal history has sown seeds within the individual's cognitive system that will inform future system interaction and feedback. The manager's cognitive process becomes an interactive part of the feedback system. Having the insight to understand how this operates becomes a major element in the manager's portfolio of skills. In the context of complex public organizations, public managers need awareness

of their own biases. They also need reflective space and peer support in the organization to make more informed 'system two' decisions (Kahneman, 2012). This requires support for the right forms of cooperative practice, such as mentoring and coaching.

Figure 1. Hierarchical and multiple value influences: public policy and management



Applying complexity theory concepts to understand the matrix of value influences

How can we make sense of the overall matrix and minutiae of multiple values influencing the public policy process and the managers working within it? For the purpose of summarizing the contribution that complexity theory offers to this explanation of the influence of public values, we return to the definition of a complex system based on Cilliers (1998), as summarized earlier in this paper.

A policy system has many cases: these include policy actors and organizations. The public value frame of reference of each of these cases is different. Each individual public manager has their own personal history and (despite a shared professional training and experience) each will have a unique influence in their value frame of reference. Different aspects of these values will be shared across the social and policy world with others and some patterns of similarity will result. Given the importance of these value components as the minutiae, we can think of values as elements of the system, as one key building block that contributes to defining the overall system itself. Several of the studies mentioned in this paper are important in identifying the minutiae and diversity of these value elements as plentiful components in the system (Beck Jorgensen & Bozeman, 2007; Anderson, et al., 2012). Values are important building blocks in a complex policy system.

These values get expressed by cases in their communications and behaviours. Therefore, cases share in their own unique combined ways complex dynamic interactions that take place across the policy system. No pattern of these complex interactions will ever be identically repeated, but similar patterns can be observed by research and summarized as typologies at higher levels in the system (Stone, 2002; Molina, 2015). The influence of values is never predictable in the detail, but at the higher organizational and national levels, models of forecasts are possible. In complexity theory, such pattern based forecasts are probabilistic in that, like weather forecasting, there is always possibilities of them being wrong. The inherent weakness in these models of value patterns is that they are based on partial and limited information. Similarly, the managers' own process of working with values is always based on a restricted viewpoint as they have limited information to guide their own reference to values.

Individuals will be prone to the reinforcing and checking feedback received from those in their immediate local system. That is their peers, own managers and political influences. In this way, the system that policy managers inhabit is only partially open to the influence of other values in any one time and place and never equally open to all influences. The relative degree of openness of policy systems to political democracy and political influence is without question one key 'structural

coupling' between sub systems of influence (Luhmann, 1996). One article, for example, argues the positive contribution that open deliberative democracy can make to resolving value conflicts in some policy system environments (Dryzek & Braithwaite, 2000).

The dynamic flow of energy in human systems is generated by physical life itself and the propensity of actors to feel and act. In this sense, although beyond the scope of this particular paper, we cannot rule out the energy of emotional affect and subjective feeling and its interaction with public values. This is an area for future research.

Cilliers (1998) also mentions the importance of historical influence on the system. One of the partial determinants of the dynamic influence of values on public policy is through the history of actors, organizations, and states. The total value influence in any one time and space is always subject to some historical influence from the values that have come to influence policy before, and there is no 'year zero' for any policy creation. Much of the public values scholarship discussed in this paper identifies aspects of these histories (Bozeman, 2007; Beck Jorgensen & Bozeman, 2007; Beck Jorgensen & Vrangbeck, 2011; Anderson, et al., 2012).

Finally, we return to the concept of attractors. The marketization of society and public policy has seen an increasing influence of economic values and rules of operation that relate to monetary value (Sandel, 2013). These monetary attractors are by no means exclusive in their ability to control and determine the future patterns of public policy, but they have in recent years dominated policy systems and risen to the top of the value hierarchy and therefore influenced specific policy decisions (Kontopoulos, 1998). Alternatively, the complex interaction of different values has the potential to create unstable systems where the primary values are unclear. Indeed, in the words of (Eppel, et al, 2011: 49), 'When there are a lot of attractor patterns operating, the system appears more chaotic'. This leads to the potential for value conflicts, where there is explicit or implicit disagreement about what the social hierarchy of operational values should be.

Conclusion

Values and their interaction with public policy are an important topic for the application of complexity theory to public management. It has long been argued that reflection, understanding and development of organizational culture, in terms of facilitating constructive organizational values and communication, is a key skill for managers in any organization, especially within complex

organizations (Stacey, 2011). There are ethical issues about developing organizational culture but it is inevitably part of the general management sphere of operation. In private organizations, employees need to be able to feel an affinity with the service and products on offer, so they really do believe in the value of what they are selling and delivering. There are problems for all organizations if their employees feel a cognitive dissonance (Festinger, et al., 1956) about what the organization is doing, and it will affect their motivation and performance at work. What drives public service quality is the macro public value of the contribution that service makes. This has a complex relationship with the plurality of public values.

If an organization reinforces collective values and makes explicit the link between core service values and successful outcomes and the ethical benefits, employees will arguable be less likely to retreat to forms of individualism and seek individual rewards, especially where they can explicitly share in the rewards of the organization and the public good. For this reason, public management education needs to enable managers to locate their own values alongside those of their organization and society and to begin to determine how these value hierarchies influence their own management behaviour and decision-making.

There are dangers if the scientific objectification of complexity theory preferences hard material patterns and mechanisms while ignoring the values of actors and the culture of public organizations. This can undermine the further use and development of complexity approaches to management in public services. Value influences add a layer of dynamic complexity, in addition to the complexity of communications, rules, processes and resource flows.

Failure to include this values framework in the debate about how best to manage complex systems will leave managers prone to moral failure, such as that identified in the Staffordshire Hospital Inquiry in England (Francis, 2013). This inquiry concluded that the value of care was forgotten due to a mechanical focus on performance management. Being clearer about the impact of values, and working through debates about complex hierarchies of values and their influence on organizational behaviour, is a constructive development in contemporary management practice.

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