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**Theorising path dependence: how does history
come to matter in organisations, and what can
we do about it?**

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**This paper is circulated for discussion purposes only and its contents should be
considered preliminary.**

Abstract

This paper examines the concept of path dependence in organisational theory, attempting to utilise insights from a number of academic disciplines to improve our understanding of it. It examines the claims of the resource-based view of business, perhaps the organisational approach most commonly linked with path dependence, and reassesses them in the light of the framework presented here. It concludes by considering the role of history in organisations, the mechanisms through which it manifests itself in the present, and what we can do to break free from path dependence.

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Abstract

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Introduction

‘Path dependence’ is a term that has appears to have become widely-used across a wide range of academic literatures. But it is being used to mean a diverse range of possible phenomena, from a simple assertion that ‘history matters’ through to a complex mathematic theory associated with precisely defined situations. This paper examines the existing literature to consider the implications of path dependence for organisation studies, linking the approach an approach to that of an increasingly influential approach to organisational analysis based around actor-network theory. It goes on to consider the theoretical framework’s implications.

What is path dependence?

In a short article examining the origins of path dependence in economic theory, Arrow (2000) traces the concept back to the work of Veblen, Cournot and beyond, associating the idea inexplicably with that of 'positive returns'. Arrow gives an example based around Veblen's work on Germany Industrial Development (Veblen 1915) in which economic development in the UK was overtaken by Germany because obsolete technology in the UK was not replaced. To have done so would have required wholesale scrapping, whereas Germany could simply invest in newer, more efficient technologies that allowed industrial improvement to occur at a greater rate. As such, the UK was 'locked in' to inferior technologies because of the massive complementarities would have involved scrapping on a level that did not appear, in the short run at least, to be viable. A more recent example much-cited in the literature is that of David (1985), where the superiority of the QWERTY keyboard in not jamming mechanical typewriters later became irrelevant as digital keyboards replaced mechanical ones on computer keyboards, yet QWERTY remained the standard because, to the 'installed base', it was the standard technology. In economists' parlance, the 'network externality' meant that, despite the technological irrelevance of its initial reason for adoption, it remains the standard keyboard layout across the world.

A little later Arthur's work began to move the study of path dependency toward a more organisational setting; in his 1989 paper in the Economic Journal (Arthur 1989), Arthur examines the case of two new competing technologies in an industry where, because of positive feedback mechanisms, one comes to take over the industry not because it is superior, but because of one, or a series of largely contingent events that

may be only stochastically related to the 'initial conditions' of the model, an advantage over the competing technology is created leading to its widespread adoption. A case bearing some resemblance to this is that of the video recorder, in which the VHS standard became dominant over the Betamax one because of the decision of its manufacturers to rapidly license the production of video tapes using the VHS format. This, in turn, led to the wider availability of blank and pre-recorded VHS tapes compared to Betamax ones, and so, a wider adoption of the video recorders to go alongside them (Schilling 2002 p. 389). A more recent example of an installed base being exploited rather more deliberately comes in the domination of the Sony Playstation 2 in the video game market, which results from the massive range of games on offer from the console, and its compatibility with the Playstation 1 console, both of which offered network externalities through the availability of games software for the machine, and also through the expectation amongst purchasers peers that the machine has become the standard, the one to own. Path dependent purchasing habits occurs on the back of these factors; it is not the quality or capabilities of the games consoles of the competing video machines that matter in purchasing decisions, but the installed base for them.

Path dependence offers a very different view of markets from neo-classical economics, presenting them not as dynamic, competitive places, but as locations in which the dominance of inferior technologies can occur through considerable consumer inertia resulting from network externalities. Economists have attempted to refute these assertions through re-examinations of Arthur's work especially Liebowitz and Margolis (1995), but the idea appears still have gained credence in a wide variety of disciplines from history (King & Nash 2001, O'Brien 1996, Scott 2001, Wilsford

1994) to policy studies (Greener 2002b, Klein 1997, Torfing 1999, 2001, Wilsford 1994) to politics (Berman 1998, Hansen 2002, Pierson 2000) and, as a feature of the resource-based view (RBV) especially, in management literature (Barney 1995, 1996, 2001b, Hunt & Morgan 1996, March & Olsen 1989, Scarbrough 1998). But these approaches appear to utilise the concept in a number of different ways, making for little room for the cross-fertilisation of ideas, or for comparative empirical work between disciplines to occur. This paper attempts to construct a multi-disciplinary approach to the study of path dependence that examines the problems with the occasionally rather loose usage of the term across the academic disciplines, but preserves many of the benefits of its pluralism.

Much of the path dependence literature can trace its roots to either Arthur and David's work, or to two sources from political science. Amongst examinations of inertia in political organisations, references to March and Olsen (1989) occur regularly, with conceptual use of 'institutional repertoires' which act as a barrier to change because organisational leaders effectively only drawing from pre-existing solutions rather than considering new ones. Dimitrakopoulos (2001), for example, considers the French, Greek and UK responses to the challenge of European Integration, and finds that 'appropriate responses are based on the basis of rules, standard operating procedures and norms linking roles and situations' (p. 408) where 'Change has proceeded by means of small, marginal steps based on existing institutional repertoires in a manner that has reproduced the historically defined weaknesses of these Parliaments' (p. 419-420). An alternative to citing March and Olsen appears to be to reference the work of North (1990), and so to note that 'Path dependency means that history matters. We cannot understand today's choices....without tracing their evolution through time'

(Berman 1998 p. 380). The literature based around March and Olsen or North's work, tends to be undeveloped theoretically, but provide detailed empirical study of the case instead. This makes it rather difficult to compare the studies for common sources of path dependence, as there is often little consistency in the usage of the term even where authors appear to be using the same sources to provide their definition of path dependence (for example, compare Berman 1998, with Hedlund 2000).

Another branch of the literature adopting a political science approach attempts to follow the work of Arthur in providing a more precise of path dependence, suggesting that its use be restricted to those very specific cases only. Goldstone (1998) provides an at-times bad-tempered examination of others' work, attempting to be extremely precise in what path dependence means, and when it can be said to have occurred. The problem with this approach is that it means that we might end up finding it extremely difficult to find a case where the concept fits; we are left with the inverse situation of the present one in which path dependence would be an empirically extremely unusual case. Mahoney (2000, 2001) takes a more moderate approach that attempts to delineate the concept from historical studies where it often appears that it is being used extremely loosely, but is still open and precise enough for the term to have a specific meaning. Mahoney defines path dependence as a case where events have broken from their previous policy path, and through a contingency or series of contingencies, lead to subsequent events being 'locked-in' through specific feedback mechanisms.. Mahoney's approach provides us with a framework for identifying path dependent sequences, but does not really develop a theoretical framework for the occurrence of path dependence as such. His word in two additional important areas, however, requires further discussion.

Mahoney's approach focuses our attention on the feedback mechanisms that hold the organisation under study within the particular path and the organisational location of the path dependency. Arrow and Arthur's work on path dependence presents it as being based entirely around positive feedback mechanisms. Self-reinforcing factors lead to lock-in from which it is extremely difficult to deviate; as a technology becomes widely adopted, a reinforcing loop between its availability and adoption leads to there being an incentive to produce it, leading to further availability and adoption in a virtuous circle. But Mahoney questions this as being the only feedback mechanism for path dependence by also suggesting that negative feedback may be equally important. This takes us one step away from the 'hard science' models of the concept, but in the rather muddier waters of organisational life makes a great deal of sense. There exist reinforcing mechanisms, based around individuals, rules and routines in organisations that *exclude* particular practices, keeping the organisation on a particular path. Negative feedback factors prevent change from occurring, and so are an important consideration in organisational path dependence. It is also worth considering that positive and negative feedback mechanisms are at least partially a matter of perspective; a positive feedback mechanism to a firm achieving market dominance might appear to a potential competitor as a negative feedback mechanism as a deterrent to entering the industry.

The second element that Mahoney brings to his framework is his use of what we might call both 'internal' as well as 'external' path dependence. As we saw above, the early studies of path dependence tended to locate it in network externalities, where market adoption leads in to a particular technology becoming dominant, often as a

consequence of unpredictable factors that appear unique to that industry. This is what we might term 'external' path dependence; the factor that provides market dominance occurs in the market or distribution chains that are outside the firm. As well as this, we might also usefully consider 'internal' path dependence.

The management literature that utilises the concept of path dependence most frequently is perhaps that of the resource-based view (RBV), where the concept is utilised in an entirely 'internal' manner. The resource-based view (RBV) of business suggests that it is the non-replicable knowledge, competencies or capabilities that exist within our organisation that provide competitive advantage (Barney 2001a, 2001b, 2001c, Conner & Prahalad 1996, Hunt & Morgan 1996, Scarbrough 1998). These resources are non-replicable because path dependent processes lead to the development of capabilities that cannot easily be copied. Path dependence, in these circumstances, is therefore an internal feature of a successful firm.

But the RBV carries with it a particular problem coming from studies of 'first-mover' advantages in economics. Mueller's (1997) work suggests that it appears that the firm first to market with a particular technology does hold an advantage – that network externalities are important, and that these appear to be due to two particular sources. The first possible source is that the firm has created an 'internal' form of path dependence, that it has created a product that is non-replicable through an internal configuration of resources that is non-replicable. General Motors and IBM are examples of this, but are also illustrations that such advantages have a tendency to be transitory. This relates back to one of our earlier examples, that of the UK and German economies, where the latter overtook the former because the path dependent

processes that had initially aided the UK became disadvantages when newer technologies came onto the market. Both GM and IBM experienced difficulties in retaining their pre-eminent position in their markets, and are representative of the cases of firms that became ‘too big to be innovative’ (p. 842). ‘The first mover in farm machinery, International Harvester is gone. Television’s first mover, RCA, no longer survives as an independent company....The list of firms that failed to capitalize on their first-mover advantages is undoubtedly longer than that of the successful first movers’ (p. 843). There are still advantages of being an early producer; first-movers tend to be overtaken over by second-movers, as was the case, again, with the UK and Germany. But first-movers, where they sustain their advantage, secure market dominance through a second source of path dependence, that of ‘buyer inertia’ (p. 847). As with the studies of path dependence above, the quality of the product is explicitly not the source of advantage here, but instead ‘buyer ignorance and inertia’ (p. 847). An illustrative case is that of the dominance of Campbell’s soup in the US, and Heinz soup in the UK, where both are available in both markets, but that the dominant brand was *first* available in its home market.

Mueller’s findings are important for studies of path dependence because it appears that the RBV, where path dependence is a deliberately-cultivated internal phenomenon, does not produce a sustainable solution to the problem of achieving competitive advantage; instead consumer inertia (from Mueller’s work), or achieving dominance in distribution chains (achieving an ‘installed base’, as in Arthur’s work), appear to be more significant. In other words, to achieve a sustainable advantage, ‘external’ path dependence is a better bet than ‘internal’.

We are getting more of an idea as to what path dependence is, and how we might achieve it, but still have little idea of why it occurs, or how we might break free from it. Rational choice approaches to its study, as we might expect, stress that path dependencies occur as a result of individuals within organisations calculating the costs and benefits of changing their behaviour or not, and, especially where they discount the future heavily, simply decide not to change. Alexander (2001), for example, in his study of political institutions, finds that path dependence occurs because change means significant costs at least in the short run, and that discounting effectively means that only exogenous shocks can pull an organisation from a path once it has been established. We have then, a hyper-rational view of firms that we must also, to be consistent, extend to consumers as well. But this is difficult to reconcile with Mueller's (1997) findings about 'buyer inertia', requiring that find that static buying habits are the complex result of consumer calculations than Mueller's 'ignorance and inertia'. Path dependence is, in many respects, the antithesis of choice, it is the absence of choice, or perhaps even the absence of *awareness* of choice. There are parallels here with the idea 'hegemony' and Lukes' third face of power (Greener 2003, Lukes 1970). We need to be more explicit in how organisational 'practice' is formed that is a combination of both inertia and dynamism, and to come up with a more reliable explanation of change than putting change down simply to 'exogenous shocks'.

In an important contribution to the debate, Coombs and Hull (1998) locate path dependence in three possible locations; hardware, where constraints are located in the 'sunk costs' or the form of the final product or service that the organisation produces;

the 'knowledge base' of the firm (loosely defined); and in the 'routines' of the firm in its regular operations. The 'hardware', and 'routine' cases are effectively demonstrated by Bruggeman (2002), in his study of NASA. Bruggeman demonstrates the NASA's development as an organisation has been constrained by the managerial technologies adopted in the 1960s to win the 'space race' against Russia. NASA's organisational structure, in which projects are split across several geographic centres, makes it difficult to close down facilities, with communication between facilities severely limited because of the sensitivity of the information conveyed, especially after a well-publicised disaster such as the fire in Apollo 204, or the Space Shuttle disasters. NASA's complex organisation therefore comes with a strong element of central control, so its routines, along with path dependent managerial technologies, limit its development.

The 'knowledge base' of the firm can be a constraining as well as enabling factor. The RBV suggests that path dependent knowledge will be one of the key factors in securing competitive advantage. But this need not always be the case; Garud and Karnoe (2001b) suggest in their study of 3M and the creation of the 'Post-It' note, that the prevailing knowledge base of the organisation was so heavily centred around the concept of glue that 'sticks', that it took considerable effort and time to persuade managers of the merits of the new product, as it was about glue that 'didn't stick'. The knowledge base of the organisation effectively acted as a barrier to the innovation as it went against the concept many of the technicians within the organisation felt was central to 3M's knowledge base.

The split between hardware, knowledge base and routines is an artificial one – something that Coombs and Hull admit themselves, as these three elements fit together to create what we might call organisational practice. Coombs and Hull then suggest that their KMPs (knowledge management practices - see also Hull 1999), are the solution to generating organisational change, and give us some ideas for managing to escape from path dependency based around creating variety in the organisation and its relationship with the market. Coombs and Hull (1998) admit they are providing little more than the beginnings of a framework for such an analysis; but they make important points that we will attempt to move forward the conclusion to this paper.

To summarise so far then; path dependence is defined as a process through which the activities of organisations and institutions, through defined feedback mechanisms which can either be positive or negative, become constrained. The process begins with a contingent event or events that begin a new path or direction for the organisation. Once the new path has been created, positive and negative feedback mechanisms reinforce the path. The path may be manifest in the technologies the organisation employs or its products, what the organisation ‘knows’ (often to the exclusion of other knowledge), or in its practices, which again, by their definition, preclude other practices. To progress further, we must now attempt to begin to consider why these elements should occur; to begin to theorise path dependence.

Theorising path dependence

We need, in order to progress further with our analysis, an approach which consider the relationships between both humans and non-humans organisations, and how these relationships become locked-in to a particular form. This paper now explores a

particularly promising avenue of exploration; that of actor-network theory. We choose this approach because of its use in examining knowledge management practices above (Hull 1999), its applicability in considering the role of ‘durability’ in the relationships between heterogeneous actors (Callon 1991), but also because of its increased use in the analysis of organisations in recent years (Dent 2003, Garud & Karnoe 2001a, Lee & Hassard 1999, Munro 1999).

Actor-network theory (ANT) (for collections of work associated with the approach see Law 1986b, 1991b, Law & Hassard 1999) holds ‘durability’ (Latour 1991) as one of its central concepts. ANT examines how, through the ordering of heterogeneous networks of materials (Law 1992), actors become ‘enroled’ and ‘mobilised’ through the process of translation (Callon 1986, Dent 2003), at the end of which they (human or non be human), located at ‘obligatory passage points’ within the network (Clegg 1989) come to speak for others. Translation is the process through which things that may be entirely dissimilar are made equivalent (Law 1999 p. 8), where one actor comes to speak for another (Callon 1986, 1991)

In the context of consider path dependence, ANT offers a number of crucial insights. First, it asks why some actor-networks are more durable than others, why some combinations of the heterogeneous materials that make up networks appear to last longer than others. Second, it asks how control over networks is exerted, and examines the technologies through which networks are ordered across time, but also across space through ‘action at a distance’ (Bloomfield 1991, Law 1986a). We will deal with each question in turn.

Heterogeneity and durability

Callon (1991) considers how actor-networks become 'irreversible', an idea with some immediate appeal to a study of path dependence. Callon begins by considering the process of translation, which involves 'definition' (p. 143), the process through which one actor comes to define another. But this is not simply translation in the literary sense; translations are embodied in a range of materials from discussions to texts to skills to currencies. Where there is perfect translation, actors speak in the same way about one another, about themselves and about the mechanisms through which they are linked (p. 145), and the actors effectively become substitutable for one another. Where an actor-network exists of perfect translations, it is deemed strongly aligned, and, in principle, any actor may speak for any other. But this will not be the case in organisational life because conventions delimit who has the right to speak for another. These conventions, which may either local or general, act to limited the possible translation regimes that may exist. Where a network is strongly aligned, and there translation rules are accepted, it possess a high degree of convergence. This does not mean that such a network would be filled with homogeneous actors, but that, within the heterogeneity, everyone would know their place, and be understood by everyone else. A weakly convergent network, on the other hand, would be where actors are unsure of their own role, find it difficult to find anything in common with others (or even understand them), and do not feel others speak for them.

Within a highly convergent network, we would expect to find a high degree of path dependence (or, in Callon's terms, irreversibility). This means two things:

- a. It becomes extremely difficult to back on previous translations, to a point where that translation was one amongst others
- b. Future translations are increasingly shaped by present ones.

(Callon 1991 p. 150)

Translations become more durable as they are inscribed or embedded in resistant materials. In organisations, as managerial strategies become discussed and verbally communicated they become more widely known, but are still relatively insubstantial. When written down, a permanent record may be constructed, a record that may be digitised and circulated quickly, or stored and archived to increase its permanence. Once that strategy becomes embodied in the recruitment of those with particular skills and abilities, or through training existing staff to favour particular skills over others, it becomes increasingly permanent. As it favours certain technologies and reporting structures above others, it increases its durability, leaving less discursive space for alternative translations. Translations even become embodied in the fabric of the buildings of the organisation, in the structures that enable, but also constrain, the interactions between the actors within them. The actor-network, under such circumstances, becomes normalised, limiting the possible range of repertoires available to actors, but also constraining the future. Processes become more predictable, and susceptible to quantification. They become more path dependent.

In such a path dependent process, innovation is about Kuhn (1970) would term 'normal science', where change occurs to prolong the life of existing translations rather than to remove them (Callon 1991 p. 150). As the translation becomes more sophisticated, and less susceptible to change, those who speak for the actor-network are able to do so with increasing authority (Barnes 1986), but at the price of having

less discretion over what they can say. This is because the more stable the translation becomes, the less discretion those speaking on behalf of others have in ‘summing up’ (Law 1999) for others, or in actor-network terms, we will have a punctualized network. To be sure, managers will still hold discretion over whether to sanction those deviating from the translation or not (Munro 1999), but in a highly convergent network, the significance of such discretion will become less and less as the deviances from the normalising process become smaller.

Heterogeneous materials participate in the social, helping to shape it with increasing influence as we rely upon technology more and more. This can be seen if we remove or lose objects from a network; when computers fail modern banks grind to a halt and stock markets stop trading. To ignore the role of technologies such computers in the networks which comprise modern institutions, therefore, would be a startling omission. Order is created through combinations of actors and materials into heterogeneous networks. Once order has been created, a network of heterogeneous materials come to be presented as a translation, in which the network is made equivalent to something else, when it may not be at all (Law & Hassard 1999), and so, a multinational corporation like Nike may aspire to be translated as being equivalent to a moment of supreme athleticism. If handled carefully, this equivalence, the translation, may assume a durability that, through massive marketing expenditure, appears inevitable, but is always susceptible to collapse (Latour 1991)

The complexity of networks can also produce historical continuity. Even though they are heterogeneous, networks do not possess endless ramification. Sophisticated organisations can appear to possess a remarkable unity if they act as a single block.

Under these circumstances, the complexity of the network effectively disappears, being replaced by the action itself, and the author of that action. To return to our use of banking as an example; where the network is functioning smoothly the customer paying in a cheque would be unaware of the vast range of technologies and diversity of actors present in converting the cheque into an electronic bank deposit, and then later, into cash again. The bank itself appears to be an actor, hiding the complexity of the network which comprises it beneath simple actions such as depositing and withdrawing money. Where a network is simplified by a unified action, actor-network theorists utilise the concept of 'punctualization', which is where network patterns acquire stability, and the rules and routines they embody come to be taken for granted. Resources are mobilised more quickly, and complexity is replaced by simplification. We can therefore begin to explain the processes through which an organisation manages to move from a position of heterogeneity to where we find ourselves referring to it as a single actor, and how this approach might be able to explore how history affects the present (Greener 2002a). In order to reduce complexity, networks may come to rely upon punctualization strategies, which then create substantial continuities in behaviour (Callon 1991). These punctualizing strategies, by solidifying networks of durable materials, also create path dependence within organisations.

Studies that have utilised actor-network theory in examining organisational behaviour find that the dominant managerial technology translation drives behaviour by legitimising (or not) its behaviour in decision making (Garud & Karnoe 2001a). Mourisen and Dechow (2001) find that strategy, in order to be legitimised, must rely on routines and practices located in proven managerial technologies. This is because without locating strategy in existing practices, it cannot be articulated, and cannot

demonstrate its 'workability' for confronting new situations. Equally, management power is not a resource that a manager simply holds, but a relational phenomenon about the configuration of resources around the manager, and their relation to the dominant managerial translation (technology) (Hansen & Mouritsen 1999). This is where ANT comes into its own, presenting a model for understanding organisations that spans both 'hardware', and routines, by putting the two together, and also incorporates the 'frames' and 'managerial technologies' present in the organisational practices that define the organisational actor-network.

Action at a distance

The process through which managers may attempt to either impose a translation, or break it up, is also of relevance to us here. ANT uses the term 'action at a distance' to signify how, while remaining remote in time or space, control can be exerted over an actor-network. Law (1986a) shows how the Portuguese navy reconstructed the navigational context for their sailors in order to make it easier for envoys to move from the centre to the periphery, exercise force, and then return to the centre again. This was done through a process of removing discretion from navigators, effectively turning them into authorities rather than 'powers' (Barnes 1986), and so turning them into docile objects (Foucault 1977) in the process by constructing astrological tables and navigational devices that effectively enforced compliance.

To enforce a translation at a distance requires that we create technologies that remove discretion; this does not mean that those below managers become deskilled as such, but that their skills are so channelled in a particular way that they are unable to envisage alternatives. They are unable to consider that it could be otherwise (Law

1991a). To break through path dependence, we would logically have to do the opposite. We must allow those within organisations greater discretion, to try and achieve a greater heterogeneity of voices and to base our managerial strategy around this. Our conclusion attempt to consider how we might go about this.

Conclusion - In praise of redundancy and dissent

History matters profoundly in organisations because it leads to the creation of durability, to a greater or lesser extent, in the heterogeneous networks of materials that comprise them. The dominant managerial technology, or translation, is a key component in providing organisational rationality. We must therefore attempt to allow alternative voices to exist within actor-networks within our organisation. This is the sub-text of a case study we have already mentioned, that of 3M, in which the ‘Post-It’ note represented a challenge to the knowledge-base of that organisation, representing a product where glue did not stick. But despite this, those attempting to push the agenda of the new product within 3M were not actively dissuaded from doing so. Managers appeared willing to listen, and resources were not all-together removed from the project simply because it appeared to be outside the usual remit of the firm’s activities. Over a considerable amount of time, advocates of the technology underpinning the ‘Post-It’ were allowed to continue to operate within the firm until both the technology and product matured, even in the face of external resistance from actors such as the Patent Office (Mouritsen & Dechow 2001). We must allow alternative knowledge bases to thrive in our organisation to create variety (Coombs & Hull 1998), and this involves the tolerance of dissenting voices.

As we saw above, strategies must harness existing managerial technologies that have been successfully used to solve other managerial problems in the past. 'Enlargement' of strategy consists of three elements; the actor that produced the mobilization for the proposed solutions; the process through which others' actions could be taken into account (partners and parts); and the technologies of managing that connected a solution to the firms' problems in a workable, or legitimate, manner (Mouritsen & Dechow 2001). Procedure is a precondition to strategy; you cannot have a strategy until you can show what you mean. As such, the wider the range of repertoires of managerial technologies we can draw upon within our organisation, the more likely it is that we will find appropriate strategies for dealing with the problem before us, rather than simply drawing from a limited range of technologies and always ending up with the same result. This does not suggest the 'flexible' organisations of which Lee and Hassard (1999) are suspicious, are the answer to avoiding the problems of path dependence, but that we require a different understanding of flexibility. It involves accepting that most organisational life is routinised, and so variety and organisational flexibility comes in cultivating groups where dissenting voices might be heard, or which do not appear to immediately meet the market requirements for our firm.

As such, resourcing technologies and practices that do not appear to have an immediate market use, and which may actually be perceived as dissenting within the organisation, is a means of providing sufficient organisational variety to prevent a particular managerial translation from dominating to the extent that we become locked-in to path dependent technologies which may be undermine us, as in the case of IBM. This allows for the 'ontological relativism' of ANT (Dent 2003), but also the essentially habitual behaviour of most organisational practice. Allowing alternative

actor-networks provides variety in our organisation, and opportunities for the grounding of alternative strategies in the technologies they create. These dissenting figures must, however, have figures capable of at least reporting to senior managers (action at a distance), and preferably moving between dissenting groups, so behaving in an ‘entrepreneurial’ way within the organisation (Callon 1998) by bridging structural holes within it. But as well as providing, as in the RBV, a source of competitive advantage, path dependencies also lead to first-movers losing their advantageous situation, as we saw above in Mueller’s work. It becomes the role of managers to design actor-networks in which dissenting technologies exist, and to be able to combine and choose between them in line with the market imperative (Coombs & Hull 1998), but to be able to simultaneously be able to retain the potential of these dissenting voices. To use the language of March and Olsen (1989), we must allow space for alternative ‘institutional repertoires’ to exist. A position of zero waste is maximally efficient, but also represents a position from which we have no space for alternatives, no room for manoeuvre.

The location of the ‘nodes’ within the actor-networks is therefore a central concern for managers. Different managerial technologies make locations within the network either ‘partners’ or ‘parts’ (Mouritsen & Dechow 2001), in the latter case contributors to the translation, in the latter, mere parts of it. Where we leave little room for dissent by locating alternative translation strategies as mere ‘parts’ we do not allow them to generate alternative strategies, and so lock ourselves into our present formations. Managers must become more aware of the non-human actors within their organisations because of their potential for ‘locking’ organisations into path dependent processes, and the corresponding loss of discretion this can cause later on. Too much reliance on

non-discretionary nodes of our organisation moves dissenting voices away from ‘obligatory passage points’, or key locations in our network for the formation of translation (Clegg 1989), so risking, once again, path dependence that might eventually come to undermine us. Only through managers behaving reflexively in allowing dissent, and having to justify the choice of one technology over another, can we make sure that path-dependent processes retain their ‘workability’ (Mouritsen & Dechow 2001).

Strategy becomes the process of innovating from existing managerial technologies rather than coming up with entirely new ones. Achieving change is utilising variety within organisations, which is, in turn, only possible if we allow variety to exist in the first place. If we do not have variety, managers may effectively be constrained by a lack of managerial technologies from which to draw; they risk becoming authorities when they no longer hold discretionary power (Barnes 1986). The formation of new strategy becomes the process of finding new combinations of existing ideas and their presentation as solutions – all the time resisting the temptation to revert back to a previous idea because of the security and relative surety that offers. Once organisational strategy has been decided, the dominant managerial translations ‘enrol’ (Callon 1986) new networks of heterogeneous materials in their name. But finding new ideas requires a range of voices within our organisations to exist, a pluralism notably absent from even the firms that claim to be the most flexible. But pluralism comes with the potential benefit of making an organisation more secure, more able to find an appropriate answer to changing demands placed upon it (Callon 1991 p. 150)

Equally, literature based around the RBV we must take greater account of 'external' path dependencies. We saw in Mueller's work that the most durable (in terms of enduring consumer success) products tend to be based on networks *outside* the organisation. This does not mean that there is no merit to attempting path dependence based around a resource-based advantage, but that to ignore the possibilities that lie outside the organisation is a significant omission. Instead, achieving path dependent advantage through supply chains, or through 'achieving' consumer inertia are the most durable forms, raising competition policy issues for government, and serious questions about the economics-based model of consumer behaviour. This is clearly an area for further research, but two of Klein's (2001) examples of corporate behaviour provide us with a starting point. First, in her description of 'The Global Teen', who is the 'ultimate product.. and who must exist as a demographic in the minds of consumers worldwide or the entire exercise of global marketing collapses' (Klein 2001 p. 120, Miller 1995). As a consequence of this, in order to create the habitual, instinctive behaviour required, advertising is not creative and innovative, but instead a 'mind-numbingly repetitive affair'. Through the theoretical lens of this paper, global brands are attempting to create the consumer inertia identified by Mueller as instilling path dependence. By doing so, in actor-network terms, they are attempting to secure the punctualization of consumer buying habits, effectively breaking down the mass of consumers into a single actor. Klein's (2001 p. 133) second example of external path dependence is based around the competitive strategy of Wal-Mart, who 'blanket' stores in areas they are entering, in order to reduce transportation and shipping costs and also in order to develop such a presence that advertising is barely necessary. But they also achieve such buying power that they are able to sell at a *retail* price, through specially negotiated deals with suppliers, that may well be lower than smaller

competitors can afford to buy at *wholesale* (Ortega 1998). In other words, they have so comprehensively exploited their supply chains, their network externalities, that they are able to drive out competition, and through their ‘price wars’ strategy, achieve path dependence through this strategy instead. In contrast to the ‘Global Teen’ branding strategy, the punctualization strategy is now implemented by the seller, driving out competition so that we can only buy from a single actor, whose local retail apparatus acts on behalf of its global organisation. These two approaches, attempting to achieve buyer inertia and to so dominate supply chains that consumers effectively have no choice but to buy through particular outlets, are almost ‘ideal type’ examples of establishing external path dependence.

Theorising path dependence, and linking the findings from this paper to specific organisational contexts, enables us to both delimit the concept more fully than has been the case in much of the existing literature, but also to show its potential as a basis for reconsidering organisational strategy in both the ‘internal’ and ‘external’ environments. This paper presents a staging-post from which further work in organisational studies might usefully build to explore its concepts and applicability according to specific industrial situations. That path dependence is an important phenomena for examining organisations appears relatively uncontentious, demonstrated by the growth of the widespread use of the concept. We must now attempt to be rather more careful what we mean when we use the term, and consider in more depth its implications for our organisations.

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