

## **Causal Mapping as a Tool to Elicit Causal Ambiguity.**

### **ABSTRACT**

*By gaining an appreciation of the underlying basis for success and reducing causal ambiguity, it's argued that firm's performance can be managed better. By identifying and managing resources and associated patterns long term growth and superior performance can be achieved. However, there are few research methods available that support scholars or managers in this pursuit. This paper, which adopts a resource-based view of the firm conceptual lens and a strategy as practice perspective, aims to rectify this by exploring the use of causal mapping to identify and understand both the resources and the patterns of resources. Thus scholars will gain a better appreciation of the systemic nature of resources, and managers will be able to exploit the resources.*

**Keywords:** action research, systems research, resource based view of the firm, strategy practice

## Causal Mapping as a Tool to Elicit Causal Ambiguity

The resource based view of the firm proponents suggest that in order to generate and sustain competitive advantage, firms need to possess resources which are simultaneously valuable, rare, difficult to imitate and are not easily substitutable (VRIN criteria) (Barney 1991). While a VRIN resource maybe a single asset such as a specific piece of land, whose value can be established clearly, more typically a VRIN resource is a web or system of interrelated tangible and intangible resources<sup>1</sup> (Dierickx and Cool 1989; Lippman and Rumelt 2003). When the firm's competitive advantage relies on such a system of interconnected resources, scholars and managers may find it difficult to understand the system and thus are less able to manage and protect this competitive advantage (Ambrosini and Bowman 2010, Eden and Ackermann 2010). Thus, both constituencies experience causal ambiguity (Lippman and Rumelt 1982).

Causal ambiguity refers to situations where the causal connections between actions and performance are unclear and hence the factors responsible for performance differentials are difficult to identify (Lippman and Rumelt 1982). As such it is argued to be an isolating mechanism protecting an organisation from imitation from rivals; and a number of authors (e.g. Zollo and Winter 2002; Barney 1991; Rumelt 1984) have argued that causal ambiguity helps protect competitive advantage. They argue that if the source for success is ambiguous then other organisations are not able to easily duplicate the particular resource combination underlying it. This highlights the positive aspect of causal ambiguity. However, other authors (e.g. Ambrosini and Bowman 2005, 2010; Collis 1994; Amit and Schoemaker 1993) highlight its negative side and argue that without understanding the ambiguity, then there is little/no ability to protect current resources or manage future resource needs.

One means of bringing these two apparently contrasting views together stems upon recognising that understanding the causal ambiguity (particularly one that is detailed and complex) doesn't mean that it becomes easy to replicate and therefore simply *understanding the components and their patterns* is insufficient (Reichheld 1996). Managers wishing to capitalise on an apparently

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<sup>1</sup> We use here the broad definition of resources employed by Barney (1991). Thus a resource can be anything within the firm (assets, competence etc.), and it could be a source of sustainable competitive advantage if it is simultaneously valuable, rare, inimitable, and non-substitutable.

successful pattern will not only have to have the resources in house or develop them, but also organise them in a way whereby *the combination replicates* that of the focal organisation.

Alongside this consideration, by not understanding the pattern and thus effectively managing it, a number of problematic situations may unfold within the focal organisation. For example, where particular resources are not supported or sustained there is the real risk of loss, or where resources are not seen as being critical (in terms of their contribution to the overall pattern) they may be subsequently outsourced or divested. For instance many downsizing activities have resulted in failure because of the loss of valuable resources, notably tacit knowledge held by individuals, has been lost. Should the organisation have recognised the critical role played by these individuals one can surmise that the knowledgeable staff would have been retained. Furthermore, continuing to adopt a particular modus operandi because it has worked to date runs the real risk of strategic drift (Spender 1989). As Teece (2009: 243) has commented “because business enterprises are guided by routines that interact in highly complex ways, managers more often than not find it difficult to figure out what makes the enterprise successful. This ambiguity around causation becomes a problem when the environment changes, as causal ambiguity makes it difficult to figure out what the enterprise should do differently”. Therefore it could be argued that not to understand and protect the elements underpinning the organisation’s success dynamically runs the risk of driving the organisation onto rocky shores.

Therefore, in order to elicit the details and get a micro understanding of sources of competitive advantage we suggest the use of causal mapping (Huff 1990). This will allow scholars to understand the system and thus get a more fine grained understanding of the nature of resources and their interaction thus revealing the basis for competitive advantage as the complexity is able to be managed (rather than reduced). In addition we examine how causal mapping can provide a powerful mechanism for assisting managers to begin to make explicit the implicit and thus be better able to recognise, protect and exploit distinctiveness and thus competitive advantage. This will also be of interest to scholars as it will become possible to determine whether there are particular patterns associated with industries or types of organization etc. In addition, by mapping out resources, we propose that managers will have a better appreciation of the totality of what is available to them, and

how they can be combined and recombined and thus capitalise on changes in the environment (acting opportunistically). This appreciation will help extend the resource based view as more prescriptive approaches can be designed and hence this will help enhance the relevance for practitioners of the RBV (Priem and Butler 2001). By providing support to scholars and managers in the identification, analysis, protection and leverage of resources, the approach proposed in this paper provides scholars and managers with a tool which should allow them to gain both a detailed understanding of systems of resources and their constituent patterns as well as provide practical insights regarding management.

A key aspect to this discussion of whether or not causal ambiguity should be unpacked is the need to understand exactly what is meant by the term causal ambiguity. King and Zeithaml (2001) suggest it has two dimensions. It is argued to be about the resource itself (characteristic ambiguity) and hence unpacking causal ambiguity here means teasing out what constitutes the resources through articulating the resource fully and exploring its components i.e. the system of interrelated and complementary factors that make up the resource. Causal ambiguity is also argued to be about the link between the resource and competitive advantage (linkage ambiguity). This demands clarity regarding the contribution each resource has to the organization's objectives and thus helps explicate how organisations might generate and nurture, via their resources, sustainable competitive advantage. Thus understanding not only the resources but also the linkages becomes a key activity, and mapping is uniquely positioned to help both surface and explore the components and their linkages.

Finally, examining causal ambiguity implies understanding the intricacies of the organisation, what people do, how physical and human resources intertwine. In short it implies understanding the details of strategizing. For this reason in this paper we adopt a strategy as practice perspective (SAP). This perspective is concerned with the micro understanding of strategy making in organisations (Johnson, Melin & Whittington 2003). Indeed it is concerned with "strategy as activity in organizations, typically the interaction of people, rather than strategy as the property of organizations" (Johnson et al, 2007:3) and strategizing is seen to comprise 'those actions, interactions and negotiations of multiple actors and the situated practices that they draw upon in accomplishing that activity' (Jarzabkowski, Balogun & Seidl 2007, 7–8). By using causal mapping to surface patterns

which can then be leveraged by managers, insights into the organization's resources and how they can be exploited to achieve the desired strategic direction can be elicited.

By suggesting a way to empirically take a micro level approach to understanding VRIN resources and their contribution towards competitive advantage and the inherent causal ambiguity that currently exists we therefore contribute to both the RBV and SAP literature. The results of studies using causal mapping will also allow us to gain insights into what is done in practice (Whittington 2003). Furthermore, the results of such studies will also allow us to contribute to the conceptual body of work through further developing mid-range theory (Merton 1968) by providing a more fine-tuned understanding of what comprises causal ambiguity (e.g. are there particular types of patterns that are more ambiguous than others?).

Thus the paper commences with exploring the reasons for suggesting mapping as a research method to study the micro and elicit causal ambiguity. Then we explore some of the difficulties associated with it. We conclude with some thoughts on future directions.

### CAUSAL MAPPING

There are already a number of authors noting 'sense-making' as being a key activity in the pursuit of competitive advantage. For example, Pandza and Thorpe (2009) note that an uncertainty-reducing process of strategic sense-making that initiates search and enables progress from causal ambiguity to eventual causal understanding will help understand how dynamic capabilities are developed (a development building on the RBV of the firm). Pandza and Thorpe (2009)'s view is echoed by Lavie (2006) who comments that causal ambiguity depends on the cognitive capacity of decision makers and on their ability to control the organisational processes that utilise said capabilities. Sense making is thus one reason for using mapping.

When maps are built with a group of managers from the top team and/or from the functional areas of the organisation they help in building a shared understanding of the whole recognising that individual managers are likely to only have a fractional view of the resources of the organisation (depending on where they sit in the organisation). By being able to create a map reflecting the totality of the organisation's perceived resources and their relationships, managers are provided with the

means for both appreciating the whole and therefore managing the resources more effectively. As such the technique attends to practical evaluative agency i.e. "the ability of managers to consciously adapt, use and manipulate those resources that are to hand" (Jarzabkowski 2005:32), which is the form of agency of most concern to SAP (Jarzabkowski 2005). Developing a more comprehensive depiction also helps in teasing out the different nuances and making the implicit explicit. This is important as resources can be difficult to identify or measure because they are often tacit and inimitable (Lippman and Rumelt, 2003; Doz, 1994; Dierickx and Cool, 1989) and yet unless they are understood they cannot be protected or grown. Developing the map and thus understanding both characteristic and linkage ambiguity also allows for managers to identify which are potentially their VRIN resources. This will stem from an assessment of how unique the resources and systems of resources are (particularly through teasing out nuance and revealing patterns), how they contribute towards competitive advantage and how vulnerable they are to competitive imitation.

Causal Mapping (Bryson, Ackermann, Eden & Finn 2004) supports both the ability to 'make sense' of the world and to develop a common shared language. The particular form of causal mapping (there are many, see Huff 1990) discussed in this paper originates from the work of Kelly (1955) who argued that managers make sense of their world in order to act effectively within it - understanding and acting is therefore of key importance. Mapping allows detailed representations of how managers perceive their organisation's resources and how these resources interact, and enables them to see the 'wood from the trees' (Ambrosini and Bowman 2001). The map, in essence a directed graph, allows the capture of explanations, consequences, assertions, and values in a structured hierarchical form using a set of coding formalisms that facilitates a detailed and nuanced appreciation of the underlying system. Through exploring the detailed map further (maps can comprise of 300+ nodes) understanding of each of the nodes becomes possible as meaning is derived not only from the statements but also the material linking around it – characteristic ambiguity (Eden 2004). If working with individual maps (each depicting a particular manager's point of view), the maps subsequently can be integrated together comprising a systemic and holistic model. As a result the combined map model provides not only a rich tapestry of the different views of the managers (each having gained a better understanding of his or her thinking through its creation) but also enables the building of a

common language as different views are explored alongside each other. Ambiguity residing in uncertainty regarding what the resources are and/or how the resources are connected – linkage ambiguity - can be, if not resolved, reduced.

In addition, the model thus acts as a transitional object, a device for discussion and debate as well as a means of enabling equivocality so that challenges can be made without penalty and managers' can change their mind (Ackermann and Eden 2011) allowing for a more accurate representation. The model enables resources and their consequences to be reviewed by the group generating further information as different chains of argument are postulated and new insights derived from the structure (Bryson et al 2004). This teasing out of the underlying elements may further help resolve some ambiguity. Moreover through the use of software such as Decision Explorer (Ackermann and Eden 2011) it is possible to manage the inherent complexity of the elicitation of different views (rather than resort to either working on subsets or highly aggregated representations). Models comprising 100s of contributions can be effectively explored providing a more thorough and robust consideration of the organisation's resources. In this way the model enables managers to avoid potentially missing out on powerful options as the different contributions and combinations of resources can be explored and those yielding greatest leverage towards realisation of an organization's goals chosen. In addition, as managers seek clarification on the contributions and their associations, the model can easily be adapted.

### **CAUSAL MAPPING TO SURFACE CAUSAL AMBIGUITY WITHIN FIRMS**

As noted earlier, causal ambiguity is argued to have two dimensions: characteristic and linkage ambiguity. Mapping can help reduce both forms of ambiguity. Linkage ambiguity is reduced through the activity of collectively linking the resources together, and establishing causal patterns between the resources and performance by assessing the impact of the resources. Characteristic ambiguity is minimised through added meaning resulting both from the arguments proffered when linking resources together but also the continual refining of the language used to express the resource and teasing out how the resource is accomplished (Ackermann and Eden 2011:114). For example, in

figure 1 two fragments of individual maps illustrate how an apparently common view about motivation may have quite different nuances and thus understanding the context is important (illustrating the reduction of characteristic ambiguity). This teasing out and capturing of detail is facilitated by the use of the mapping software which enables continuous revision and refinement.

Insert figure 1 about here

Managing the complexity and resolving causal ambiguity may also be facilitated through the analysis of the model's network (Ackermann and Eden 2011). For example, resources that initially are seen as being critical to the organisation's welfare can be examined in the light of the whole model. One particular analysis that supports this examination focuses on looking at resource's position in the network and determining whether it is central to the overall network or relatively peripheral. In this way, resources that have hitherto been seen as critical (maybe from the initial conception of the organisation) can be reviewed in the light of their position in the network and possibly downgraded as their impact is no longer so significant (and vice versa). As mentioned previously this helps appreciate which resources are significant in terms of their overall effect on the system's structure (which is likely to be of interest to both managers and scholars). It also enables the organization to determine if they have the appropriate resources for the future.

Other analyses that provide insights into the overall system structure include the detection of feedback loops which illustrate dynamic behaviour. Feedback loops can either be balancing (negative) or escalating (positive) and escalating feedback loops may be virtuous or vicious. Where feedback is a virtuous positive cycle efforts can subsequently be put in place to protect the cycle. It is asserted (Eden and Ackermann, 2010) that positive feedback loops are particularly advantageous as they not only present a unique pattern but are at the same time self-sustaining. Appreciating the presence and benefits of feedback loops in strategy making will provide scholars with valuable insights into a particular pattern of resources, a means of identifying and potentially creating these distinctive patterns, and whether there is any correlation between performance and particular patterns.

Finally it is possible to detect those resources that have considerable leverage, namely those resources that contribute to a large number of the goals. These alongside those that are centrally positioned in the network helps identify priorities and in both cases the resources can be assessed to determine their relative distinctiveness (assisting with the VRIN categorisation). The analyses may also help the group of managers better understand the resources they have within their firm as they can work with the complexity of the system more effectively (rather than working on discrete elements) enabling a better exploration not only of what is already within the organisation but also in considering what future benefits might be accrued. For example, new patterns can be designed to help achieve the organisation's goals, explored in terms of their ramifications and then put into place in an effective manner (as both the logic of the new combination and also the ownership towards implementing it is established). This helps resolve the concerns voiced earlier about the difficulty in managing the complexity. The analysis also helps reveal inconsistencies in thinking. It is also possible to have a clear audit trail advantageous to both scholars and managers.

Thus mapping can assist managers in teasing out a more nuanced understanding of which resources exist in firms and whether there are dominant patterns. They can better understand where their source of advantage lies, which resources are difficult to manage and which resources are not distinctive. Furthermore it will help provide managers with a better understanding of the multiple ramifications of particular combinations of resource bundles and meet demand for mechanisms including effective reverse engineering which can significantly reduce causal ambiguity in product development (Malik and Kotabe 2009).

### **CHALLENGES IN REDUCING CAUSAL AMBIGUITY**

One of the biggest difficulties in ascertaining what is causally ambiguous is the fact that as resources and their impacts are surfaced and explored they become to appear 'obvious' to managers and so not ambiguous. Eden and Ackermann (2010) and Ackermann and Eden (2011) based on action research investigations explain that that there are times when managerial teams comment early on in the mapping process that the unfolding map is giving them a new angle but over the course of the exploration, as the map becomes more familiar, they no longer see the novelty. The changes are often

so implicit/ imperceptible that managers are unable to see it and therefore acknowledge it. Whilst this could be seen as a problem, particularly from a research methods point of view, the absorption reflects the subtle changing of minds as noted by those writing in the field, for example, Weick (1995), Langfield Smith (1992), and suggests that there is an increased chance that the enhanced understanding will affect decision making and enable better use and appreciation of the resources.

A second challenge is the application of the mapping process as adopting the mapping formalisms demands the skill be developed in order to ensure that the maps produced are amendable to the analysis and also elicit the nuance and subtlety. Scholars interested in understanding better the resources embedded in organisation thus need to develop this new form of data capture as well as be comfortable working with an action research or case study format.

A final challenge is that the resultant system depends on good selection of the team members ensuring both a comprehensive but also objective consideration of resources, their relationships and their distinctiveness. It has been found that particularly senior teams of managers can take a 'rose tinted' view of the organization's distinctive resources, and thus ensuring a realistic model of the system is captured requires careful thought on member selection. It is also the case that those further up the organization are less able to detect some of the details underpinning the resources whilst those further down risk taking for granted resources that are distinctive.

## CONCLUSION

Mapping allows for the surfacing of context dependent factors (Walsh, 1988), factors that are idiosyncratic to the firm and hence it is an approach that can be used to great effect in the modelling of distinctive resources (Ackermann and Eden 2011). For example, the coding guidelines which encourage generation of nuance help translate an initially proffered contribution such as 'the ability to manage projects' to an appreciation of the distinctiveness through noting in fact it is 'the ability to manage complex bespoke state of the art projects on time and to cost' that is of value . It enables natural conversations to take place facilitating the discovery of resources (particularly through the development of the chains of argument) as well as their interactions and thus helps make explicit the implicit. Causal mapping's well-established analyses toolbox also enables the detection of patterns

revealing existing or potential distinctive *patterns* (Ackermann and Eden, 2005). In short causal mapping is helpful in surfacing and disentangling what is happening inside the organisation, through understanding what activities are taking place, how resources are connected and which resources are unique. Consequently, areas of apparent causal ambiguity can be explored with the aim of the ambiguity being minimised if not removed and thus management becomes possible. For example, when exploring their resources, an organization reviewing the position of a 'taken for granted' resource realised how valuable it was, the consequences were wide ranging. As such mapping provides a micro level approach to understanding firm performance. In SAP terms it means that it provides an avenue for addressing two of the questions suggested by Johnson, Langley, Melin and Whittington namely what is the "link between people's activities and organisational level processes?" (2007:17) and how do "people's activities underpin organisational strategies?" (2007:20). This is why we propose that causal mapping could be a useful method to conduct RBV research taking a SAP perspective.

Taking the agenda further and moving beyond an examination of the method we can envisage a range of further research projects. VRIN resources are generally seen as composed of an interrelated range of resources however it is not known whether more complex patterns are actually advantageous to organisations (in theory the more complex the pattern the lower the chance for competitors to copy the VRIN resource) and therefore research into understanding the value of complex patterns and their contribution to competitive advantage suggests an area for research.

Another question focuses on determining how often do patterns change? Research exploring the nature and frequency of pattern changes across different industries and considering this alongside the literature (e.g. about turbulent industries) might elicit insights into the veracity of speed of change and the processes underpinning it. Further it is also worth exploring whether it is possible (and desirable) to review potential causal ambiguity across different industry domains particularly when working on a shared project (for example of large joint venture projects). Finally fully embracing the SAP agenda on socio-materiality, it would be useful to understand how the process of mapping influences strategizing: does it enhance or constrain it?

## References

- Ackermann F & Eden C 2011 *Making Strategy: Mapping out Strategic Success*, Sage, London
- Ackermann F & Eden C 2010 Strategic Options Development and Analysis. In Reynolds M & Holwell S (Eds.) *Systems Approaches to Managing Change: A Practical Guide*, 139-190, London: Springer and OU Press.
- 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* 14 355-376
- Ambrosini V & Bowman C 2001 Tacit knowledge: Some suggestions for operationalisation, *Journal of Management Studies* 38 811-829.
- Ambrosini V. & Bowman C. 2005 Reducing causal ambiguity to facilitate strategic learning, *Management Learning*, 36 493-512
- Ambrosini V & Bowman C 2010 The impact of causal ambiguity on competitive advantage and rent appropriation, *British Journal of Management* 21 939-953
- Amit R & Schoemaker PJ 1993. Strategic assets and organizational rent, *Strategic Management Journal* 14 33-46.
- Barney J 1991 The Resource Based Model of the Firm: Origins, Implications, and Prospects, *Journal of Management* 17 97-98.
- Bryson J Ackermann F Eden C & Finn C 2004 *Visible Thinking: Unlocking Causal Mapping for Practical Business Results*, Chichester, Wiley.
- Collis DJ 1994 Research note: How valuable are organizational capabilities? *Strategic Management Journal* 15 143-152.

- Dierickx I & Cool K 1989 Asset stock accumulation and sustainability of competitive advantage, *Management Science* 35 1504-1511.
- Doz Y 1994 Managing core competences for corporate renewal: towards a managerial theory of core competences', Working Paper INSEAD 94/23/SM.
- Eden C 2004 Analyzing cognitive maps to help structure issues or problems *European Journal of Operational Research* 159 673-686
- Eden C & Ackermann F 2010 Competences, distinctive competences, and core competences, *Research in Competence-Based Management* 5 3-33
- Huff AS 1990 *Mapping strategic thought*, Wiley, Chichester
- Johnson G Melin L & Whittington R 2003, Micro strategy and strategizing: Towards an activity-based view, *Journal of Management Studies* 40 3-22
- Johnson G Langley A Melin L & Whittington R 2007 *Strategy as Practice: Research Directions and Resources*, Cambridge University Press, Cambridge
- King AW Fowler SW & Zeithaml CP 2001 Managing organizational competencies for competitive advantage: The middle-management edge, *Academy of Management Executive* 15 95-106
- Jarzabkowski P 2005 *Strategy as Practice: An Activity-Based Approach*, Sage, London
- Jarzabkowski P Balogun J & Seidl D 2007 Strategizing: The challenges of a strategy as practice perspective, *Human Relations* 60 5 -27
- Kelly G 1955 *The Psychology of Personal Constructs*, Norton, New York
- King AW & Zeithaml CP 2001 Competencies and firm performance: examining the causal ambiguity paradox, *Strategic Management Journal* 22 75-99

- Langfield-Smith K 1992 Exploring the need for a shared map, *Journal of Management Studies* 29 349-368
- Lavie D 2006 The competitive advantage of interconnected firms: an extension of the resource based view, *Academy of Management Review* 31 638-658
- Lippman SA & Rumelt RP 2003 The payments perspective; micro-foundations of resource analysis, *Strategic Management Journal* 24 903-927
- Lippman SA & Rumelt RP 1982 Uncertain imitability: An analysis of interfirm differences in efficiency under competition, *The Bell Journal of Economics* 13 418-438
- Merton RK 1966 *Social Theory and Social Structure*, Free Press: New York
- Pandza K & Thorpe R 2009 Creative Search and Strategic Sense-making: Missing Dimensions in the Concept of Dynamic Capabilities, *British Journal of Management* 20 118-131
- Priem R & Butler J. 001. Is the resource-based 'view' a useful perspective for strategic management research? *Academy of Management Review* 26 22-40.
- Reichheld FF 1996 Learning from customer defections, *Harvard Business Review* 74 56-69
- Rumelt R P 1984 'Toward a strategic theory of the firm' in R B Lamb (ed) *Competitive Strategic Management* Prentice-Hall Englewood Cliffs 557-570
- Spender J C 1989 *Industry Recipes, an enquiry into the nature and sources of managerial judgment*, Oxford, Basil Blackwell
- Teece DJ 2009 'Dynamic capabilities and strategic management Oxford UP, Oxford
- Walsh JP 1988 Selectivity and selective perception: An investigation of managers' belief structures and information processing, *Academy of Management Journal* 31 873-896

Weick KE 1995 *Sensemaking in Organizations*, Sage, Thousand Oaks, CA

Whittington R 2003 The work of strategizing and organizing: For a practice perspective,

*Strategic Organization 1* 119-127

Zollo M & Winter SG 2002 *Deliberate learning and the evolution of dynamic capabilities*,

*Organizational Science* 13 339-351

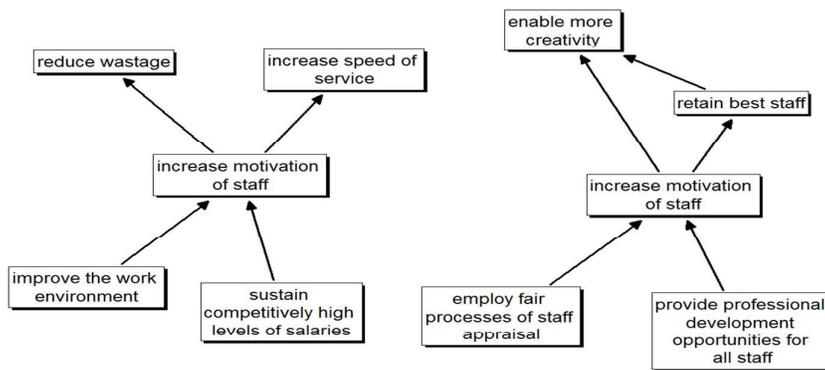


Figure 1: Different interpretations of the goal of increasing staff motivation