Functional Siloing? Towards a Practical Understanding of Operational Boundaries Using Critical Systems Heuristics.

S G Parker[1] and S J Byrne[2]

Department of Management Science and Information Systems, The University of Auckland, New Zealand
E-mail: [1]stu@stuartparker.com
[2]s.byrne@auckland.ac.nz

ABSTRACT: *The paper discusses the application of Critical Systems Heuristics to the problem of functional siloing. Functional siloing refers to a situation in which the functional areas of an organisation become overly focused on local performance measures to the detriment of the organisation as a whole. The authors liken the organisational fragmentation to Ulrich's description of dysfunctional social planning. Thus, the need to align functional activities may be viewed as a question of practical reasoning. A case is presented of a New Zealand snack-foods manufacturer. It is found that where there is evidence of functional siloing, there is also significant conflict between the planning system boundaries of the functional groups, viz Ulrich's heuristics. Findings are discussed with respect to current Systems Thinking, Operations Management, and Organisational Learning literature.*

Keywords: Critical Systems Heuristics, Functional Integration, Performance Management.

INTRODUCTION

As we enter the twenty-first century, the increasing complexity of organisational environments poses significant challenges for management. The growth of the Internet and e-commerce has seen a significant shift in organisational priorities, with information technology progressing from supplementary to critical status in the span of just a few years. Never before has the capacity to master changes in the environment been such a critical factor in organisational survival.

It is interesting to observe that while the relationship between the organisation and its environment has taken on such an elevated priority for managers, it is the management of the interactions between the various functional subgroups that pose perhaps the greatest barrier to improvements in organisational performance.

FUNCTIONAL SILOING

'Functional siloing' (often referred to as functional myopia, or stove-piping) refers to a situation in which the various functional groups in the organisation - such as logistics, production, marketing and finance - focus primarily on their own immediate performance, rather than on contributing to the objectives of the organisation as a whole (Lambert et al, 1998). The term 'silo' is applied metaphorically, referring to the apparent isolation in which the functional groups exist.

Siloing is a familiar concept in the operations management literature. The lack of integration of activities across functional groups is cited as a significant obstacle to the attainment of organisational objectives (see for example, Lambert et al, 1998; Carter, 1998; Skinner, 1974).

The observable effects of siloing are innumerable, but may effectively be thought of in terms of waste- a needless expenditure of resources, due to an inability to manage across functional boundaries the trade-offs inherent in all organisational activities. These tradeoffs have been discussed at length in the operations management literature (see for example, Skinner, 1974; Garvin, 1987; Pyke, 1993)

An example of siloing is given in Lambert et al. (1998). They cite the case of a procurement manager who opts to switch to a low-cost supplier with a widely varying delivery lead-time. As deliveries of materials become increasingly erratic the production manager is forced to schedule more frequent and shorter runs, increasing total per-unit cost. Thus, while the purchasing manager is fulfilling the obligation of low-cost inputs, the effect of delivery delays on the production function is ignored.

In essence, siloing may be regarded as a fragmentation of the organisation into groups of functional specialisation. Porter (1985) encourages managers to seek out competitive advantage within each functional area. In his view, competitive advantage cannot be developed merely by looking at the firm as a whole: "to diagnose the sources of competitive advantage it is necessary to take a disaggregated view of the firm… it is only at the level of the discrete activity, rather than the firm as a whole, that competitive advantage can be truly understood." (Porter, 1995, p13).

It is important to note that while Porter insists on the development of competencies at the functional level, he also stresses the importance of the organisational context: "[managing the linkages between the functions] is a more complex organisational task than managing value activities themselves. Given the difficulty of recognising and managing linkages, the ability to do so often yields a sustainable competitive advantage." (Porter, 1985. p50).

This view closely follows one of the basic tenets of systems thinking: the concept of emergence (the whole is more than the sum of its parts). Porter identifies two levels of desirable outcomes within the organisational system- the value of optimising activities at the functional level, and the value of managing the linkages between the functional groups at the level of the organisational whole.

Clearly, in the case of an organisation with a high degree of functional siloing managers attempt to seek out competitive advantage solely at this lower level. The coordination between the functional groups erodes and the organisation takes on the form of a set of loosely related, distinct operations - each with the assumed status of an entity unto itself (see figure 1- adapted from Porter, 1985. p37). Thus, the higher order competitive advantage is lost.

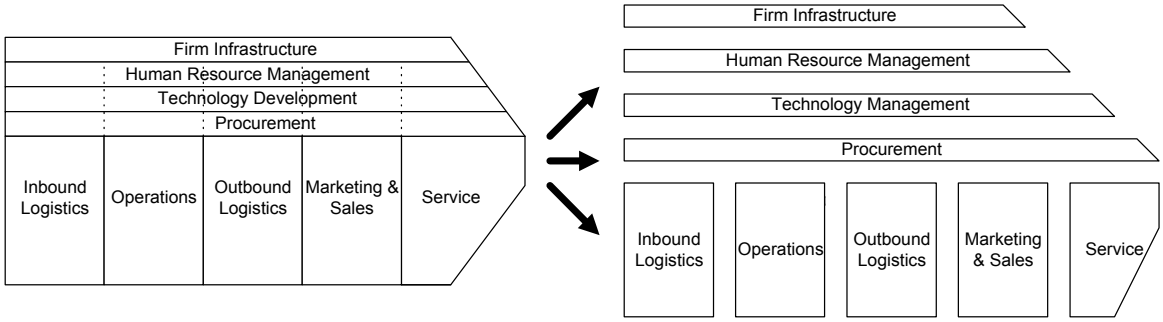

Figure 1. Fragmentation of the value chain

As undesirable as siloing may be, many regard the effective coordination of functional groups as something of a holy grail for managers - an ideal forever just beyond the grasp of one's ability. Indeed, most (if not all) organisations experience some degree of functional siloing (Carter, 1998; Quillian, 1991) and anecdotal evidence suggests that it is regarded as an unavoidable consequence of organisational complexity.

INTEGRATED PERFORMANCE MANAGEMENT

There is much published material, in a multitude of fields, about the management of the interactions between functional activity centres. Although espousing a 'total systems' orientation, this literature tends largely to attempt to configure the organisation around devising and implementing unifying performance measures. Chief among these are the theory of constraints (Goldratt & Fox, 1986; Whalers & Cox, 1994), total cost management (Lambert et al, 1998; Quillian, 1991) and the balanced scorecard (Kaplan & Norton, 1996). A detailed description of each of these is beyond the scope of this paper. Instead we look to where they are insufficient in providing managers with an effective means of integrating activities across functional boundaries.

First, they are static in their orientation (Sloper et al., 1999). The Balanced Scorecard, for example, focuses on the design of a set of performance measures, 'balanced' across the organisation and directed towards corporate strategy. Although these are regularly updated, between revisions there is little incentive for managers to look beyond their own prescribed objectives. Thus, the functional groups in many ways come to resemble the cybernetic homeostat (Dent & Ezzamel, 1995) shown in Figure 2. In such a situation, behaviour is goal-driven and reactive. Little capacity exists for adaptation to environmental change and the system is doomed to sub-optimal performance (Dent & Ezzamel, 1995).

Second, prescriptive ideologies prevent learning. Blind adherence to assumed ideals shifts focus away from the generative processes that lead to sustainable improvements in performance. The quality movement is one such example. "The term [Total Quality] is counter-productive. My work is about a transformation in management about the profound knowledge needed for transformation. Total Quality stops people from thinking" (W. Edwards Deming, cited in Senge, 1992).

Last, and perhaps most importantly, integrative management techniques fail to address the existing cognitive divisions between functional groups. Churchman (1968) and Ulrich (1983) argue that reason is dialectical. The absence of a collective design means that there is no guarantee that any action conducted within any area of the organisation is in fact for the 'greater good'. It is only through collective planning that issues such as 'the greater good' become known, as opposed to 'assumed' by those in power: the involved/experts/planners.

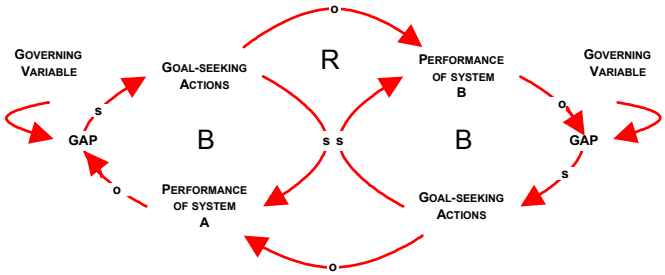

Figure 2. The cybernetic homeostat

CRITICAL SYSTEMS HEURISTICS AND FUNCTIONAL INTEGRATION

To address these issues, the present authors propose the usefulness of employing Ulrich's (1983) Critical Systems Heuristics (appendix A) in the design of planning systems within organisations.

We begin with a proposition that organisational planning is indeed 'social'. Ulrich defines planning as being 'social', when the group of affected citizens is not identical with the group of the involved planners. This has led to the majority of applications taking the form of planning endeavours within the public domain, such as judicial policy for the treatment of mentally ill offenders (Cohen & Midgley, 1994) and providing housing services for the elderly (Midgley et al, 1998). The present authors find no justification for limiting the application of Critical Systems Heuristics just to the realm of public policy.

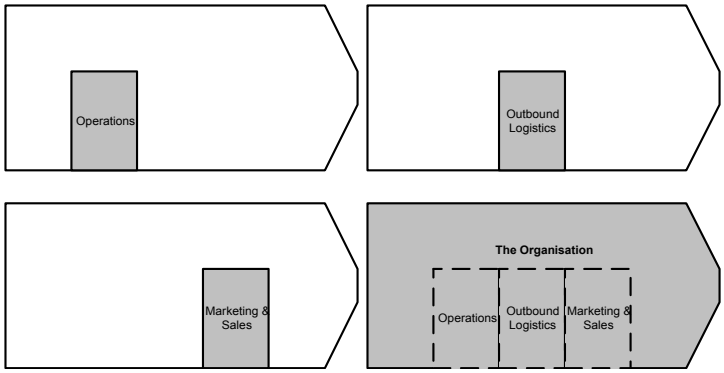

Figure 3. Functional planning systems in the organisational context

As in figure 3 above, the organisation is comprised of numerous groups of planners (functional silos), each one charged with advancing a predetermined area of organisational performance. The effects of actions taken to advance these agenda are felt throughout the organisation, so we do in fact have numerous (simultaneous) situations in which the group of affected 'citizens' is not the same as the group of the involved planners. Thus, organisational planning is indeed social in the sense intended by Ulrich.

With respect to the criticisms of current integrative management techniques described above, the present authors argue that Critical Systems Heuristics may help to overcome functional siloing for the reasons that follow.

First, it (Critical Systems Heuristics) is dynamic, rather than static in its orientation. Where popular techniques rely on the accuracy of performance ideals for the behaviour of the system, Critical Systems Heuristics demands the justification of all aspects of the system design. Thus it is the process, rather than the outcome that drives improvement.

Second, it (Critical Systems Heuristics) is heuristic rather than prescriptive in orientation. Ulrich (1982) identifies four crucial aspects of a heuristic approach. First, heuristics are used to find problem-relevant questions and knowledge, as opposed to the solution-oriented (and thus question-assuming) methods of popular 'rational' enquiry. Second, heuristics serves to teach discovery - thus, it empowers planners to find their own solutions and free themselves from those who would claim to be 'experts'. Third, heuristics serve to discover deception - thus enabling planners to escape the illusions of their own 'objectivity'. Last, heuristics are what theory is not. Thus, the outcomes of heuristically driven inquiry are practical - for use in real world applications.

Finally, the critique underlying Critical Systems Heuristics is precisely the activity necessary in freeing organisational functional groups from the constraints of their existing systems. Ulrich (1983) identifies two levels of criticism: instrumental and reflective. When reality is held up against an existing (assumed) set of norms the critique is said to serve only an instrumental purpose. This is the case in the cybernetic homeostat described above and shown in figure 2. The state of the system is held up against the governing variable (norm), yet the validity of the norm itself is assumed. When the instrumental criticism is itself placed under scrutiny we have a higher level of critique - a self-reflective criticism that takes nothing for granted. With further reference to figure 2, this kind of critique looks to the validity of the norm before considering the state of the system. Thus, the system is no longer bound by unproductive ideals – the capacity for learning is introduced (see for example, Senge 1992).

In addition to these, it is important to comment on the emancipatory nature of the heuristics. By including all (within reason) relevant stakeholders in the design of the new system the possibility (necessity) exists for freeing all of the involved from the constraints of the existing system. Thus, there is reason to believe that Critical Systems Heuristics would succeed in changing the very platform on which traditional integrative measures have failed. Our proposition is strengthened by Midgley (1995), who argues the universal necessity of emancipatory methodologies in systems interventions. In response to assertions by some authors that such a methodology is warranted only in situations of coercion, Midgley argues that coercion will not become apparent without such an exercise.

CASE STUDY

A case study is presently underway of a large New Zealand snack-foods manufacturer. The object of the study is to gain a greater understanding of the boundaries of the organisation's production, distribution and marketing planning systems using Critical Systems Heuristics as the primary basis of inquiry.

Preliminary findings suggest that there is significant merit in applying Critical Systems Heuristics in such a situation. Of particular note are the following.

Concerning question twelve: world-view, there exists a commonality between the functional groups in a belief in the validity of performance measures. There is no questioning the widely held perception that the only kind of acceptable activity is that which contributes to the attainment of the functional group's targets.

This marries uneasily with the findings surrounding question three: measure of success or improvement. These differ greatly between the functional groups, and are in some instances diametrically opposed. For example, success in the marketing group is gauged entirely in the dollar amount of sales per month. Production targets are stated in terms of per-unit costs, and distribution performance is reflected almost entirely with respect to percentage of orders filled within 72 hours. The performance of all functions is assessed in the same 4-week, 26-week and 52-week periods.

When we look at these two together, we discover the source of some unhealthy dynamics the organisation has been experiencing. An absolute belief in the pursuit of performance targets encourages marketing to offer substantial discounts at the end of the review period. This prompts customers to batch orders towards the end of the period in order to negotiate a better price, thus increasing the variation in customer order size and frequency. Distribution is faced with endemic stock-outs and oversupplies, thus more frequent and less-predictable replenishment orders are placed with production. With increasing set-up costs and shorter production runs, the production manager is forced to make product quality a lower priority. As cost pressures increase more and more substandard products leave the factory, damaging brand value and contributing again to marketing's troubles in meeting their end of month targets.

This case study is still a work in progress - part of the first author's master's thesis research. Initial findings thus far support the authors' assertion that where there is evidence of functional siloing within an organisation, there exists significant disparity between the boundaries of the functional planning systems viz Ulrich's Critical Systems Heuristics, and those suggested by accepted notions of a total systems viewpoint.

The authors accept the divergence of method in employing the heuristics in an observational as opposed to participatory sense. However, one must bear in mind that the purpose of the present thesis is to argue the merits of applying Critical Systems Heuristics in an organisational context (specifically in addressing functional siloing), thus an intervention is beyond the scope of the present study.

CONCLUSIONS

Current management literature falls short of offering practitioners an effective means for managing the linkages between functional groups. The static, reactive and non-critical nature of these techniques is insufficient when dealing with fragmented, goal-seeking (cybernetic) functional planning systems.

The present authors propose that there may be significant merit in employing Critical Systems Heuristics in such an organisational context. It is argued that the dynamic (generative), critical, and practical orientation of Critical Systems Heuristics can offer a solid foundation for integrative organisational interventions.

Preliminary case-study findings lend support to the authors' arguments, yet the present study serves mainly to justify the context of application. Further studies employing a greater participatory orientation would serve to strengthen the findings of the present paper.

REFERENCES

Carter, Todd (1998). Picking Up the Pieces of a Logistics Program. *IIE Solutions* **30**(7), pp.20-23.

Churchman, C. West (1968). *The Systems Approach*. New York: Delacorte Press.

Cohen, Claire, and Midgley, Gerald (1994). *The North Humberside Diversion from Custody Project for Mentally Ill Offenders*, Centre for Systems Studies, The University of Hull.

Dent, Jeremy and Ezzamel, Mahmoud (1995). Organisational Control and Management Accounting. In Holloway, Jacky, Lewis, Jenny and Mallory, Geoff (Eds.), *Performance Measurement and Evaluation* (pp.86-112). London: Sage Publications.

Garvin, David A., (1987). Competing on the Eight Dimensions of Quality. *Harvard Business Review* **65**(6), pp.101-109.

Goldratt, E.M., and Fox, R.E. (1986). *The Goal: a Process of ongoing Improvement, revised edition.* North River Press, Croton-on-Hudson, NY.

Kaplan, Robert S., and Norton, David P. (1996). *The Balanced Scorecard: Translating Strategy Into Action*, Boston: Harvard Business School Press.

Lambert, Douglas M., Stock, James R., and Ellram, Lisa M. (1998). *Fundamentals of Logistics Management*, Boston: McGraw-Hill.

Midgley, Gerald (1995). *Mixing Methods: Developing Systemic Intervention*, Centre for Systems Studies, The University of Hull.

Midgley, G., Munlo, I., and Brown, M. (1998). The Theory and Practice of Boundary Critique: Developing Housing Services for Older People. *Journal of the Operational Research Society* **49**(5), pp.467 -478.

Porter, Michael E., (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*, New York: The Free Press.

Pyke, D.F., (1993). *A Note on Operations Strategy*, Amos Tuck School of Business Administration, Dartmouth College.

Quillian, Lawrence (1991). Curing 'Functional Silo Syndrome' with Logistics TCM. *CMA Magazine* **65**(5), pp.9-14.

Senge, Peter (1992). Building Learning Organisations. *Journal of Quality and Participation.* **15**(2): pp.30 -38.

Skinner, Wickham (1974). The Focused Factory. *Harvard Business Review* **52**(3), pp.113-121.

Sloper, P., Linard, K. and Paterson, D. (1999). Towards a Dynamic Feedback Framework for Public Sector Performance Management. *17th International Conference of the Systems Dynamics Society and 5th Australian & New Zealand Systems Conference.* Wellington, New Zealand.

Ulrich, Werner (1983). *Critical Heuristics of Social Planning: a New Approach to Practical Philosophy*, New York: John Wiley & Sons.

Wahlers, James L., and Cox, James F. III. (1994). Competitive factors and Performance Measurement: Applying the Theory of Constraints to Meet Customer Needs. *International Journal of Production Economics* **37**(2, 3), pp.229-240.

APPENDIX A: CRITICAL SYSTEMS HEURISTICS (ULRICH, 1983)

I. Who is/ought to be the actual client of the system?
II. What is/ought to be the actual purpose of the system's design?
III. What, judged by its consequences, is/ought to be the system's built in measure of success?
IV. Who is/ought to be the decision-taker?
V. What conditions are/ought to be controlled by the decision-taker?
VI. What conditions are not/ought not to be controlled by the decision-taker (i.e. what constitutes 'environment' to him or her)?
VII. Who is/ought to be actually involved as planner?
VIII. Who is/ought to be involved as expert? What is the source and nature of his or her expertise?
IX. Where do/ought the involved see the guarantee that their design will work?
X. Who among the uninvolved witnesses represents/ought to represent the concerns of the affected?
XI. Are the affected given/ought they be given the chance to emancipate themselves from the experts?
XII. What world-view is actually/ought to be underlying the system's design?