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Stimulating productivity through Quantum Groups in complex global organisations

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Abstract

This paper seeks to address the problem of decreasing productivity in complex global organisations. Referring to economic and psychosocial theory and practice we suggest that the causes of productivity slowdown fall into two interdependent groups; the difficulty of achieving effective resource allocation because of size and complexity, and the distorting factors of human beings working together in large groups. A case study drawn from recent experience in leading companies of the pharmaceutical industry illustrates the point and shows how practical solutions can be formulated. The paper concludes by suggesting that the judicious use of minimal interventions through Quantum Groups may be sufficient to yield substantial efficiency improvement by, temporarily collapsing the hierarchy and applying the market principle.



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Executive Summary

This paper seeks to address the problem of decreasing productivity in complex global organisations with particular reference to the pharmaceutical industry. The authors refer to case studies drawn from recent experience in leading companies, and explain practical solutions which have been tested and are currently being further developed. Case studies are supported by economic theory applied to complex organisations and by psychosocial theory and practice. The paper concludes by suggesting that the judicious use of minimal cultural interventions may be sufficient to correct substantial productivity slowdown arising from the inefficiencies associated with the growth of scale and complexity.

The authors explain the two basic principles of the organisation and allocation of resources in any society from an economic perspective – the hierarchical principle and the market principle. The implications of this concept for the development of complex organisations are then explored.

It is noted that neither principle dominates the other, that they coexist at any moment, and that the balance varies over time. Organizational change is described as an effort to balance these two principles, i.e. using the advantages of both to enable the organisation to adapt to evolutionary pressure. With reference to recent case studies, it is observed that complex organizations lose

efficiency when the advantages of the hierarchical principle are not sufficiently counterbalanced by use of the market principle.


It is observed that:

- Resource management mechanisms become inefficient
- Long decision paths impede cross-unit efficiency and coordination.

With reference to case studies and supporting psychosocial theory and organisational development theory, the authors further note that the problem of inefficiency in complex organisations is compounded by the distortion of information arising from unmanaged culture, for which a definition is given.

In this respect:

- Groups and individuals use power and control mechanisms defensively - to repress or invent information and protect turf. Thus the information and incentive problems arising from organisational growth are increased.



Typical organisational responses to these problems are noted to be restructuring and acquisition and merger. Both are long term, expensive in time and resources, and may have dubious measurable benefits. Possible drivers for these approaches are noted.

It is then argued that many efficiency benefits can be reaped to complement or substitute major initiatives, by introducing elements of the market principle while reducing group and individual defensiveness.

Speedy solutions through the introduction of Quantum groups are described in the form of a case study, and systemic approaches to changing those aspects of culture, which impede productivity, are similarly noted.

Q groups are based on the assumptions that committed professionals often know where problems and solutions can be found, and will decide and act upon them, if a temporary environment is provided where the resource holder is present, the hierarchy collapsed, and competition for power is neutralized.

The paper is concluded with a summary of suggested areas of focus together with practical interventions designed to improve efficiency and productivity with minimal cost in time and resource.


Industry Context

Organisations, which experience rapid expansion and growth often find that productivity does not keep pace with increased size and complexity. As organisations grow, “pull to Balkanise”, Mintzberg, (1979) along functional, divisional, divisional and geographic boundaries has increased. This tendency is a natural characteristic of successful and expanding global organisations. It is frequently exacerbated by increased specialisation (more divisions) within the firm and by acquisition and merger (added divisions/culture).

The consequence of unmanaged fragmentation is entropy, and obvious warning signals are: Increasing cycle times for cross-functional processes, resource/cost expansion, low tolerance of ambiguity, aversion to change and attribution of negative meaning to difference.

In attempts to rectify these causes of inefficiency in resource management, global pharmaceutical companies have undergone substantial changes in organisational structure and large-scale merger and acquisition.

Demands on management time and expertise have thereby increased dramatically, posing the challenge of driving continuous change whilst protecting the core science business.



The following complimentary models of organisational development suggest that productivity is more likely to be improved through discrete interventions, which address two key groups of factors; resource allocation and human dynamics, and practical interventions described.

Resource allocation in growing organisations


Transaction cost economics suggests that there are two competing principles for the allocation of resources in complex economies and organisations; the hierarchical principle and the market principle. See e.g. Williamson (1975, 1988), Coase (1988). The hierarchical principle supports centralised control and resource allocation, decision making through vertical organisation, and the market principle supports decentralized control and decision making, based on individual incentives for profit making, horizontal relationships and competition. Each principle brings different benefits. The hierarchical principal gives greater coordination and control, whereas the market principle gives flexibility and speed of action and promotes the flow of ideas. Summers (2003). Table 1 summarises the advantages of each principle

Characteristics of Market and Hierarchical Principles

	Market principle	Hierarchical principle
Information Management	<p>Low information requirements: Decentralised decision based on individuals' information</p>	<p>High information requirements Centralised decision making requires vertical communication</p>
Incentive Management	<p>Low incentive requirements Incentives and motivations of agents are aligned</p>	<p>High incentive requirements Principal needs to design appropriate incentive systems and individuals motivations</p>
Coordination	<p>High coordination costs For complex production processes requiring innovation there are very high coordination costs</p>	<p>Low coordination costs Vertical integration overcomes cost of coordination through centralised decision making command/control</p>
Control	<p>High control problems for processes requiring specific investment, relationship lock-ins and non-observable input.</p>	<p>Low control problems Vertical integration solves the problem of ownership of residual rights of control</p>

Table 1


The model is helpful when considering the dilemmas of growing organisations. In their early stages of development, organisations will operate according to the market principle. In this case, the sole entrepreneur possesses all the information required to make resource allocation decisions. As the



organisation grows in size, specialisation begins and technical and professional languages impede instant communication and information sharing. Thus resource allocation according to the market principle becomes increasingly inefficient. Corrective vertical organisation then begins with the key information holder being at top of the hierarchy, and exercising the control and coordination necessary to correct the market inefficiency arising from incomplete information possession in the silos below.

As the organisation grows further, horizontal specialisations multiply in number and type - professional, technical, divisional, regional and so on. As this happens, the hierarchical layers necessary for control and coordination increase.

However, as the hierarchical layers multiply, the upward flow of information becomes filtered, or “attenuated” ,Beer, (1998) partly because of sheer volume and partly because of the breadth of different specialisations. (Cross-discipline MBA training aimed to produce general managers capable of handling such breadth). The flow of information required for efficient resource allocation becomes vertically inefficient as well as horizontally so, and the control and coordination functions waver.




These are strengthened, either through further vertical development or a moving down the hierarchy of resource allocation. In the latter case, there is a consequent imperative to equip silo players with enough horizontally specialised information required for efficiency.

Inefficiencies in growing organisations become manifest both in the financial indicators such as return on capital employed and cost/income ratio and in the operational measurements such as cycle time and quality.

Disintegrative tension is experienced in increasingly strong opposite pulls, vertical and horizontal, as the *culture* attempts to adapt successfully.

The effectiveness of resource management functions largely depends on how clearly the functions are defined and where they are located in the organisation. In order to deal with problems of lack horizontal integration, organisations will increase hierarchy and move the resource management decision points up the chain. In order to deal with inefficient hierarchy, e.g. excessive bureaucracy, the organisation will devolve resource management functions.

Productivity slows as organisations grow in size and complexity




As noted, we suggest that the probable causes of productivity slowdown fall into two interdependent groups; the difficulty of achieving effective resource allocation because of size and complexity, and the distorting factors of human beings working together in large groups.

The following Integration Matrix, (table 2) illustrates the attempt of a complex adaptive system to evolve successfully by struggling with the problem of where, how and when to use its energy and resources.

At the early stages of development, the organisation is likely to be small, fast, and entrepreneurial. Information is shared informally and easily as the social group is small and the number of communication links required to form the network is relatively low. Easily sensing the changes in the external world, and with information shared, the organisation can allocate its resources appropriately.

As the organisation grows it will specialise and can no longer rely on informal communication. The number of links required to network the whole organisation grows accordingly, $n(n-1)/2$ and the organisation attempts to solve this dilemma by introducing hierarchical coordination and control. (See Table 1). It will also tend to centralise incentive systems and information management similarly.

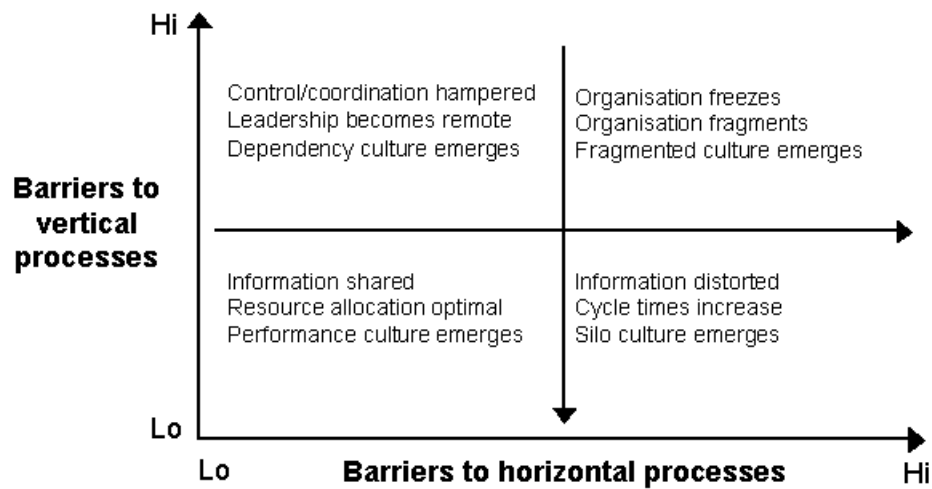


As, however vertical organisation takes hold, it becomes a force in and of itself, driven as much through the human wish to control as by the corporate need for this. Thus, information flow up and down the organisation is subject to distortion owing to human dynamics. As the organisation continues to grow in this direction the vertical processes, (i.e. chain of command, resource bargaining, information flow) come under strain, leadership becomes remote, and a fear and dependency culture emerges.


At the same time, the organisation is likely to be growing horizontally, through increased specialisation, divisionalisation and geographic spread. Here, information flows poorly across silos, and cross-functional processes become inefficient (as measured by cycle time). The natural human dynamic of turf defence takes hold and silos harden. It becomes increasingly difficult to allocate resources across barriers efficiently.

Despite efficiencies of scale in growing organisations, productivity naturally slows as it struggles with these tensions.

Integration Matrix



Restructuring and M&A as attempts to deal with productivity slowdown




In order to address productivity shortfall, restructuring, acquisition and merger initiatives are frequently undertaken. These involve realignment of processes and disruption of “people related” boundaries and routines.

They are often of dubious value.

In 1999, global merger and acquisition activity was estimated at over \$US 3 trillion. Clemente and Greenspan, (2000). The realisation of value from acquisition and merger activity has been notoriously difficult to achieve. In their seminal studies of stakeholder influence, Jensen and Ruback, (1983) concluded that no long-term shareholder value was delivered to either organisation. The real winners and losers were the executives of the respective companies. The shareholders of the target firm enjoyed only short-term gains.

Their research is often quoted to support the principal agent/theory of the primacy of managerial interest over shareholder interest (managerialism). Harbison and Pecker, (1993) similarly found that acquiring organisations usually suffered loss of value. Only limited evidence has been found to the contrary. Chatterjee and Lubatkin, (1990).



Not only do many mergers and acquisitions under-perform, but a very large number of them also fail completely. Failure rates have been estimated at between 50% and 75%. Cartwright and Cooper, (1995). Similarly, joint ventures have been found to be highly unstable, with about 25% of them failing during the first 18 months.

For substantial growth in productivity then, there may be no grand scale instant remedy. It is our experience, however, that substantial gains can be made through discrete interventions following a period of careful diagnosis.

Attempts to solve the problem of falling productivity through “checkmate in one” moves often result in unrealised synergies, as the probable significant cause of sub-optimal resource allocation resulting from pulls to organise hierarchically and marketwise, and the interdependent information distortion arising from human dynamics in large organisations remain unaddressed.

Psychosocial problems produced by organisational change

We have noted that significant organisational change, and specifically restructuring or merger and acquisition, when signalled and/or introduced on a large scale often produces individual and group


dysfunction. It disrupts vertical and horizontal communication processes, increases complexity, distorts the flow of information and makes the organisation less efficient.

We have argued that the critical decision-making models are those concerned with the use of resources. These are usually quantitative and are often find their location in the organisational hierarchy by circumstance of unmanaged culture, by attempt to correction coordination and control problems, or by human dynamics.

An explanation of the underlying mechanisms which drive human off-task activity during restructuring and merger and acquisition activity can be found in the interplay between the conscious and unconscious functions of human beings when dealing with the anxiety caused by change.

The dissolution of known organisational structures, roles and routines inevitably causes anxiety. A certain amount of this anxiety is felt, acknowledged and expressed by individuals and groups at a conscious level.

This is usually readily accessible and manageable. However, the deepest anxieties are repressed to the point where they are "unconscious". It is precisely this category of anxiety that by definition drives "irrational" decision-making behaviour.




There is a wealth of empirical research to support the view that post restructure, merger or acquisition, many key staff experience this form of anxiety, and that the organisational cost of failing to manage this issue is extremely high. For example;

"Stress related physiological and mental health problems (are) likely to have a negative effect on the performance of a substantial number of employees continuing up to six months, even four years after the initial transition."

Furthermore, in a recent friendly financial services company merger, an abnormally high percentage of managers of both organisations revealed mental health obsessionality scores comparable with psychoneurotic outpatients, and in a cross border European merger, 30 percent of the managers recorded hysteria scores comparable with psychoneurotic outpatients. Cartwright and Cooper (1995).

The organisational implications are information distortion, inefficient allocation and use of resources, decreased performance and effectiveness.

From a human perspective, during profound structural change the emotional fabric of organisational life is torn asunder. Fear of loss, prior to organisational change may be even greater than post change discomfort. Disruption will stimulate both paranoid and psycho-neurotic behaviours at all



levels in the organisation. Paranoia often takes the form of "winners and losers", "them and usism", "persecution and mistrust". Psycho-neurotic activity often manifests in inappropriate power, political and turf skirmishes. Underpinning these phenomena is a complex web of individual and group mechanisms, which are beyond the scope of this article.

Currently, unmanaged risks are to be found in the people and culture and are manifest in off-task behaviour driven by dynamics such as unconscious projection and the loss of good authority. The evolving art and science of successful corporate transformation is currently focused on building leadership capability, team resilience and organisational culture, where the latter is taken to include appropriate resource allocation and decision making points. Successful results-driven methodologies rely upon psychosocial approaches to support organisational development methods for diagnosis and implementation.

Stimulating productivity through minimal interventions - Q Groups

If a primary cause of low productivity is poor resource allocation, due to the inevitable pulls between hierarchical and market principles in growing organisations, together with vertical and horizontal communication becoming distorted, it follows that minimal interventions designed to free up resource allocation decision making, and to build trust and understanding hierarchically and cross-functionally will serve to stimulate productivity.




The aim of the minimal intervention described in the case study in the next section was to accelerate the adaptive response capability of a newly formed post-merger global team by bringing together all stakeholders, thus temporarily collapsing the hierarchical and cross-functional boundaries, building trust to reduce anxiety and its associated defensive routines, and providing a logical method for allocating resources to increase productivity.

Case study of the Pharmaceutical Industry

The Pharmaceutical Industry exemplifies many of the issues and processes described above. The larger global players have grown through acquisition and merger and have experienced repeated cycles of centralisation, decentralisation and matrix restructuring. Nonetheless, productivity has slowed dramatically, and the imperative for change is now strongly felt.

The industry is experiencing increased stakeholder pressure to improve performance. In the key markets, the changing regulatory environment has given rise to the growth of generics whilst eroding patents and creating stronger barriers for the approval of new drugs. Access issues in Africa and the Middle East are serving to dampen profit forecasts in the smaller markets, and a number of cross border risks, such as parallel trade continue to give cause for concern.



These factors, together with the escalating cost of bringing a new drug to market drive an urgent requirement for effective new drug discovery and development. The culmination of this pressure creates the business imperative for improved operational performance from the engines of the industry, the research laboratories.

The industry has produced a vigorous response to these challenges through consolidation and through a new focus on performance. Recent acquisitions have, in part, been driven by the requirement to enhance the drug development pipeline. As explained, however, net productivity may not consequently increase.

The problem of slowed productivity owing to poor resource allocation can be illustrated for a specific firm, which has operations throughout the world, and has undergone two major acquisitions and mergers in the last three years.

Study - Phase 1

In late 2002, an initial study was undertaken to interview and questionnaire the senior management cadre of the research and development division. The top 15 managers, based throughout Europe,

the United States and Asia/Pacific were interviewed, and results noted. A short description of the study is given, followed by the minimal interventions subsequently deployed.

The team comprised the major laboratory heads, (divisional heads) responsible for coordination of resources in each country. They had been formed as a worldwide group, post merger and acquisition, and post (matrix) reorganisation. They worked in partnership with world-wide (line) heads responsible for specific functions and therapeutic areas.

Findings – Phase 1

The organisation was reliant on complex cross-functional and cross-border processes and individuals reported frustration with the resource allocation processes. They were similarly disenchanted with large and complex change programmes, which they felt were of dubious value.

We discovered a universally strong understanding of and “buy in” to the organisational goals and vision. Individuals were enthusiastic in their wish to achieve the required results, and all felt that the organisation was serious in its intent to deliver. All respondents were proud to work for the firm and aware of the need to “leverage the positives of scale in a global organisation”.

However, as a group, the divisional heads reported concerns about the lack of management processes in place to help them optimise their efforts to help the firm deliver the required results.

These were summarised as:

- Lack of fungibility of resources
- Lack of meeting and decision making forums /processes to promote and drive ideas for productivity improvement
- Lack of a top-level vehicle for discussing coordinated inter-divisional resource allocation and business improvement.
- Time spent at the senior management team was largely spent on operational issues.
- There was not yet a shared and objective business framework for inter-divisional project portfolio management and decision-making. An examples was given where a divisional head was unable to convince a global head to free up the minimal resources to enable the divisional to deliver its goals. One divisional head reported an example where it took six months and fifteen signatures to move a very small resource from one line to another.
- There was a wide variance in understanding the detailed accountability and responsibility for resource allocation decision-making between lines and divisions. An example was found where a worldwide head on cost and clinical grounds overruled the judgement of a local team empowered to make the decision.




- At the inter-divisional level resource bargaining lacked the framework of agreed format and standards against which suggestions could be objectively compared. Turf interests were thought to be filling the management vacuum.

The challenge thus was to enable the senior management team to operate as a cross-functional top team tasked to drive productivity improvement collectively. Sustained adaptive capability through continuous improvement requires rapid resource transfer.

While there was an appetite amongst divisional heads to discuss strategic and tactical operational business improvement, bottom-up productivity initiatives tended to founder for lack of due management process and objective consideration and comparison. The resource allocation mechanisms were unclear.

At the intra-divisional level, cross discipline product portfolio management was not practiced. The world wide head / divisional head interface worked well where there was clarity in the detail of resource bargaining, and this seemed to be achieved where individuals had the necessary training, support or breadth of world-view. There was however a wide variability of professional business management skills, knowledge and aptitude at divisional head and world wide head level.



The divisional heads had not yet been led and managed in such a way as to ensure that they were 'global leaders first.'

Having completed this initial study, we formed the conclusion that a key component of efficiency in this complex global organisation was the effectiveness of resource allocation, and that there were be a number of psychosocial factors driving distortion of the information required for improvement.

Study - Phase 2

As a follow-up to the phase 1 study, a further study was undertaken with one of the newly formed world-wide (line) groups, one of the Development functions. The Development function had direct line responsibility into each of the laboratories.

The group comprised 18 people, including representatives from other lines and general purpose functions. The group was interviewed individually and opinion was sought concerning the perceived challenges to the group delivering its productivity goals. There were three principal areas which the team wished to address; clarity of goals; fast, effective resource allocation; and trust, understanding and team cohesiveness.



Quantum groups:

In consultation with the team, a two-day event plan was designed to address these issues, and to help- the team remove potential blockages to effective performance as it moved forward with its agenda for change. We have termed the approach used, “Quantum Groups”, to indicate both the paradigm changing nature of the event and the potential results achieved from minimal intervention.



AIMS

To establish a strong platform from which the team can drive the required organisational changes, and outputs; specifically:

- To achieve clarity
- To build trust
- To achieve alignment
- To build enthusiasm for team purpose
- To make resource allocation decisions

OBJECTIVES

To define the boundaries, inputs and outputs of the team

To crystallise the purpose of the team

To understand individual and group dynamics

To identify and remove productivity barriers, by

Identifying and agreeing quick wins

Work streaming items requiring a systematic approach

METHODOLOGY

- Pre-event questionnaire – team role preferences
- Participative discussion
- Experiential learning
- Mini lectures
- Subject facilitation
- Group facilitation
- Sub groups
- Humorous/Play task to illustrate link team dynamics and task achievement
- Barrier identification and removal
- Invited speakers/participants

The conditions which under which this event took place included these factors.

Participants:

- Had a good understanding of their own business



- Had a strong imperative for measurable, immediate improvement
- Were frustrated by too many change initiatives
- Felt impeded by unnecessary complexity and bureaucracy
- Knew their own business well, and understood where value could be added
- Wanted to keep focus on the real work
- Were keen to “cut the crap” and get on with real change
- Controlled significant resources

The pre-event interviews revealed that at a functional level, they usually knew how things could be improved, and could identify many of the barriers to progress. They had found that barriers were often made difficult to remove by organisational complexity and inefficient communication and decision-making processes.

The Q Group Event

Prior to the event, participants had participated in the construction of the agenda and had completed an online questionnaire, which tested team role preference.

Then, during the event, the first exercise was a “warm up” designed to promote group formation and cohesion. This was essentially a “pairing” exercise, based on the principle that trust is built by establishing very small groups and building from that base.

This was quickly followed by an exercise, designed to clarify the system in focus.

Here it was important to spend time helping the group express what it was that they were required to deliver as a group, above and beyond that which they were required to deliver as representatives of their respective functions. Thus the required outputs of the group as a team, as distinct from the outputs required from their constituency teams were discussed and clarified, as were the key processes, which drove these results.

- The group was then given an introduction and briefing to barrier identification and barrier removal. Attention was drawn to the principle that pharmaceutical companies often find many technical and professional barriers, fewer process barriers and even fewer culture barriers to productivity. The difficulty in overcoming these problems increase in the same respective order, i.e., cultural barriers are the most difficult to remove. We defined the relevant aspects of culture as the resource management and decision-making systems, the espoused values, and the attitudes and behaviours driven by the basic assumptions and psychosocial dynamics of the organisation.

The next session comprised a demonstration of root cause analysis techniques followed by division of the team into syndicate groups who were then asked to brainstorm and complete their own diagrams showing root causes clustered by theme. Specific barriers, which were noted, included;



- Acceptance of mediocrity
- Poor performance management
- Dependency culture
- Excessive inclusiveness
- Poor cross-functional team work
- Unclear resource allocation
- Narrowly focused scientific silos

In order to promote experiential learning, to further develop team cohesion and to invite reflection on quantum improvement, the “group as a whole” was convened and tasked to integrate its ideas into one diagram. The naturally inefficient process was interrupted and improvement called for. It was noted that not all members were required to be involved in the exercise of constructing the diagram, but that this posed a challenge for the leader who wished to be inclusive. Two thirds of the group said that they would have felt comfortable not to have been included in this part of the exercise, and that they would have been equally content to take a break and do other things. The leader accepted that this was typical of the culture which had developed in the organisation, and changed the rules, encouraging a few willing volunteers to complete the exercise efficiently, while others observed.

All learnings are noted and a debriefing on the team performance given.

Q Group

Having identified possible root causes for action, the group was convened in a circle, and an open discussion facilitated with individuals asked to suggest where progress could be made. The group was relaxed and open, and it was clear about its purpose. A great deal of pent-up energy was released, with obvious quick wins being identified quickly. These usually came with the question, “Why have we not done this before ?”

With all resource holders in the group, (vertically and horizontally) decisions were made quickly, and where approval needed to be given, and could be given within the group, this was agreed and recorded.

The speed of transactions was very high and an unusually large number of actions were identified. The energy and enthusiasm in the group was extremely high and the group left the session with a feeling of outstanding accomplishment.

Some progress was also made on identifying areas, which would require more systematic barrier removal, and these were generally outside the immediate resource control of the team. These items were carefully noted and categorised for integration into work streams organised under the auspices of a major change programme.

Improvements

In previous similar groups task generation was accelerated by changing from “seated” to “milling” format at the mid point of the session. In this format, people wander around freely, and make agreements with whomever they chose, checking for approval as they go. The atmosphere is high energy - similar to an open outcry stock exchange.

Each participant has a contract pad, on which he will write specific actions to be completed by himself and others in the room, by a particular date. Where agreements include others, they are given a copy of the note. The action may only be recorded if it is qualified by the “three ws”, Who, What and When and checked for empowerment.

All agreed actions are recorded electronically for display and checked. All items are affirmed discarded or streamed. Affirmed items are recorded as minute for individual action, and where more systematic barrier removal is required, items are streamed for barrier removal teams.

Conclusion

Without major reorganisation, many benefits had been gained by the temporary introduction of the market principle into a complex organisation. We conclude that where individuals possess in-depth organisational knowledge and are incentivised, temporarily collapsing the hierarchy and neutralising competition for divisional power through group event management can yield real efficiency improvement. Fast effective decisions can be made and quick wins identified, with actions for more systematic barrier removal streamed into appropriately equipped teams.

The implications for the modification of resource allocation mechanisms in complex global corporates are not yet clear, and this area is worthy of further investigation. It seems that the human factors, which distort common purpose and information flow, are considerable, and it suggested that these are taken fully into account through appropriate vertical and cross-functional team integrating activities.

The precise frequency and location Q group interventions is yet to be determined, but the early indications are that the combination of improvement methodology and human systems management will provide a useful additional tool in the management options available to stimulate productivity improvement.

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Table 1

Integration Matrix

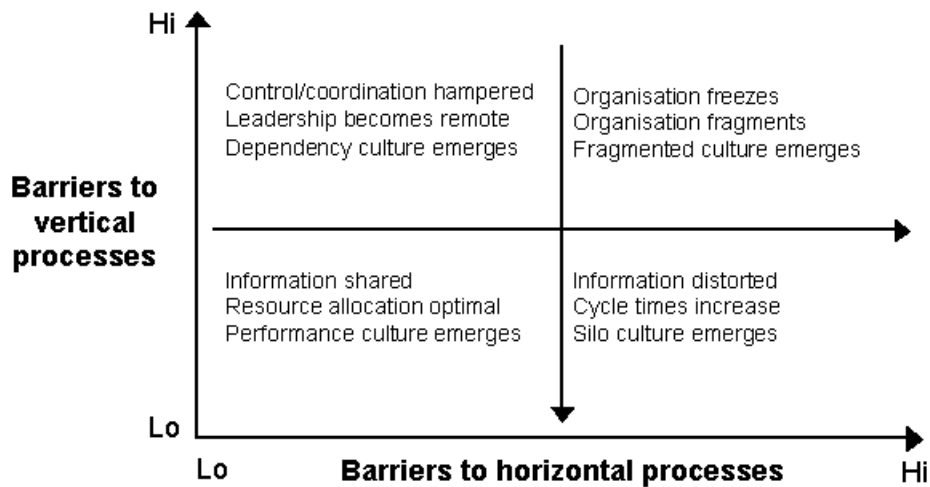


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