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ENVISIONING THE VIRTUAL WORKPLACE: CONCEPTUALISING VIRTUALISATION

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Abstract

Virtual organising is a term which commonly describes an approach to managing and configuring organisational resources beyond the spatial and legal boundaries of the firm. To better manage the process of virtualisation, three things need to be understood: how virtual the organisation wants to be, how virtual the organisation is, and how capable the organisation currently is of operating virtually. Analysis of an organisation along these three dimensions will identify the appropriateness of the present state of virtualisation and guide planning for bridging any gap between the current and desired states. In this article, we describe how data specific to these dimensions was collected in an organisation that has just initiated a conscious strategy of virtualisation. By analysing remarks made in a workshop and interviews with members of the organisation's management team, we identify a new dimension for understanding virtualisation: the mindset of the people in the organisation, and we extend the set of capabilities for virtualisation described in the literature to: leadership and vision, management capability, employee capability, virtual mindset, technology, and economics. We show how three dimensions can be used to plan to improve the process of virtualisation.

Keywords: Virtual organisation, Strategy, Capability, Measurement.

1   INTRODUCTION

As capital searches for new markets, greater efficiencies and competitive advantage, time, space and the boundaries of the firm become strategic enablers rather than operational hindrances. Mass customisation, the ability to develop and deliver exactly what a customer needs, requires intimacy with their operations and the active participation of customers and customer communities in the design of solutions. The mobilisation and leveraging of knowledge resources to create ideal solutions requires building teams of experts who are motivated, empowered and connected. These experts can be at home, in other offices, in other companies, in other countries. And the sourcing of assets required to support production and delivery is no longer sacred: complementarity of resources, configured in temporary networks, is sought, even if those resources come from competitors. The solution, the fit for the customer, is the key to success, not the historical reliability of the tried and true business process.

The 'virtualisation' of the firm is a common response to these changes. There are many forms of virtualisation, united by "a strategic approach that is singularly focused on creating, nurturing, and deploying key intellectual and knowledge assets while sourcing tangible, physical assets in a complex network of relationships" (Venkatram and Henderson 1998, p. 1). Castells (2001, p.67) describes the "networked enterprise" as "...the organizational form built around business projects resulting from the cooperation between different components of different forms, networking amongst themselves for the duration of a given business project, and reconfiguring their networks for the implementation of each project…**the network is the enterprise**". He characterizes the networked enterprise as "that specific form of enterprise whose system of means is constituted by the intersection of segments of autonomous systems of goals" (p. 171). It "makes material the culture of the informational / global economy: it transforms signals into commodities by processing knowledge" (p. 172). The key to such organizations is their responsiveness, flexibility, ability to configure knowledge and capital assets based upon emergent market needs, and their transience.

Elements of virtuality have existed long prior to the coining of the term. Outsourcing of the supply chain, sharing of work amongst distributed participants, forming consortiums, working from home: irrespective of the form, there have been instantiations of the virtual organisation or networked enterprise for many years, in some cases, centuries. What is perhaps different today is the widespread conscious characterisation of virtual organising as a firm strategy, where in order to enhance productivity and profitability, the boundaries of the office building, the working day, the company and the nation state have become porous. Further, the information technologies that enable this transformation allow a hitherto unimagined displacement of time and space.

Is it necessary to understand the process of virtual organising in order to gain benefits from it? Can it not simply be allowed to evolve? There has certainly been an emergent aspect to the virtual organisation, where the exigencies of particular tasks and circumstances dictate a distribution of resources. But if a virtual environment poses greater challenges to effective work than non-virtual, then it requires special management attention. In this article, we concern ourselves with those forms of virtual organisation that involve remote work within the broadly defined boundaries of a single firm (as distinct from a virtual firm consisting of multiple individual firms). We present a framework for envisioning the form that a particular virtual organisation may take, and for mapping progress toward the envisioned form and capabilities to virtualise. We show how this framework was used with senior management of an international engineering company to conceptualise the process of virtualisation at the company.

2   CAPABILITIES FOR THE VIRTUAL WORKPLACE

An analysis of the literature identifies several common enabling capabilities for successful implementation of the virtual workplace. We can group these into five dimensions as shown in table 1.

Dimension	Attributes	Authors
Leadership and vision	Clear vision and purpose of the leader Leader has attributes which motivate knowledge workers Continuously communicates and reinforces a consistent message Implements effective change management Builds an environment of high trust Empowerment of staff, limit command and control	(Pan and Scarbrough 1999) (Drucker 1999) (Pfeffer 1990) (Senge 1990) (Bal and Teo 2000)
Virtual work design	Well designed and logical Well documented and available Roles and responsibilities are defined and clear Role orientation not job description Decision criteria are clear Interdependencies are defined and clear Timelines and milestones are clear Process rather than functional orientation Self-managing teams	(Fritz, Narasimhan and Rhee 1998) (Malhotra et al. 2001) (Nemiro 2000) (Crandall and Wallace 1998)
Employee skills and characteristics	Required skills and competencies are present Training and advice are available when required to bridge the gap Measurement of employee performance is transparent and clear Incentives and rewards are present for good performance Collaboration is fostered through communities and 'mentors' Induction explicitly planned for virtual team members. Flexible, self-motivated, team player	(Nemiro 2000) (Venkatraman and Henderson 1998) (Brown and Duguid 2000) (Crandall and Wallace 1998)
Technology	Infrastructure is present Tools are available for collaboration Tools are available for supporting work processes Knowledge-based systems are available The workplace is reflected in cyberspace Real time information is available	(Alavi and Tiwana 2002) (Fritz, Narasimhan and Rhee 1998) (Yap and Bjørn-Andersen 2002) (Steel 2002) (Malhotra et al. 2001)
Economics	Well thought through and understood Clear link between economic requirements, drivers and capabilities Cost / benefit is understood Commitment to high performance rather than cost cutting	(Crandall and Wallace 1998) (Warner and Witzel 2004)

Table 1.   Enabling dimensions and capabilities

These capabilities underlie the analytical model described in this paper. However, just as strategies for virtual organising vary with the organisation and its environment, the capabilities required to execute those strategies vary. It is important to identify those capabilities that are relevant to the anticipated form of virtual workplace. An analytical approach to this is described in the following section. Its use in an organisational context is then described and evaluated.

3   ATTRIBUTES OF A MODEL FOR ENVISIONING VIRTUALISATION

Managers are required to confront, assess, decide and implement appropriate methods of virtual organising. Sometimes these processes are strategic, sometimes they are emergent. In either case, information and models are required to assist either in explicit decision making or the monitoring and evaluation of emergence. In analysing the information required for effective virtual organising, there appear to be three classes of information required: information relating to the strategic need of the organisation to virtualise in some way, information relating to the current state of virtualisation in the organisation, and information about the organisational capability for virtual organising. Each of these is discussed below, followed by a model that permits evaluation of the alignment of the organisation's goals, state and capabilities for virtualisation.

3.1   Information relating to the strategic need of the organisation to virtualise

The derivation of an appropriate strategic response to environmental or operational factors couched in terms of virtualisation will depend on the ability of management to understand the potential and relevance of virtuality to solve problems of customer service, competitiveness, efficiency, and employee satisfaction. It would be unusual if a strategic response consisted solely of actions characterised as virtualisation. When strategic responses have been articulated and collated, and the consequences have been teased out, then indicators of the nature and extent of envisioned virtualisation can be identified. For example, is virtualisation in the organisation defined in physical, temporal or structural terms, such as percentage of time spent outside the office or the percentage of tenders that involve non-permanent staff, or is it defined in psychological terms such as shared commitment to a set of common values regardless of the location at which staff members work, or is virtualisation a combination of both? Indicators – which may themselves change over time as the form of virtualisation itself changes – can be used to describe the envisioned state.

3.2   Information relating to current state of virtualisation in the organisation

Depending upon the type of virtualisation envisaged, management can ascertain the current level of virtualisation using the indicators developed to describe the envisioned state of virtuality. Figure 1 presents a sample scale for the general virtual rubric of telecommuting. The diamond marks the envisaged state of virtuality, while the dot marks the actual state.
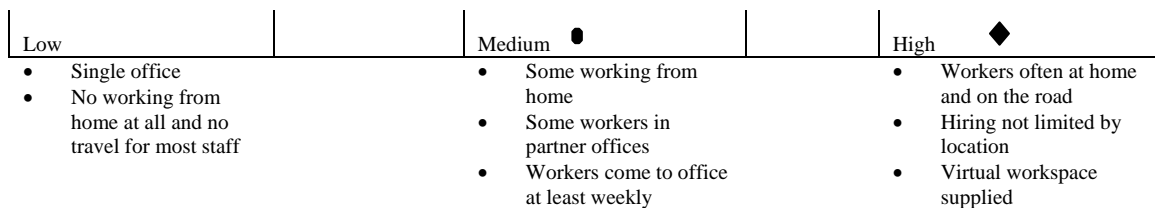
Low		Medium ●		High ◆
• Single office • No working from home at all and no travel for most staff		• Some working from home • Some workers in partner offices • Workers come to office at least weekly		• Workers often at home and on the road • Hiring not limited by location • Virtual workspace supplied

Figure 1.   Sample scale for telecommuting

3.3   Information about the organisational capability for virtual organising

Having defined the nature of the desired virtual organisation and how to measure how close the organisation is to it, we require a way of measuring capability to bridge the gap. To be effective, virtual organising requires capabilities beyond those of the non-virtual organisation. Most obviously, technology becomes a critical enabler. But the other factors described in section 2 are also critical:

leadership, business processes, employee skills, and economics. An analysis of the capability of an organisation to virtualise would ask questions such as:

- Do we have the technology to be able to communicate with distributed staff? Do staff have the skills to use it?
- Are our business processes clear enough and modular enough to allow work distribution?
- Do staff have a mindset which accepts low face-to-face communication?

3.4   A virtualisation alignment model

Information about the envisioned form of virtualisation, the current state, and capabilities for operating virtually, taken together, can be used to evaluate the organisation's progression towards the desired levels of virtual work. Table 2 demonstrates how this might be done.

Strategic need for virtuality	Current level of virtuality	Capability to operate virtually	Assessment
High	High	High	An ideal state of alignment, where the resources for operating virtually are at the service of a virtualised workforce
Low	High	High	There is possibly over-expenditure and resource committed to maintaining an unnecessary preparedness for virtual operations. Further, there is possible strategic exposure from being too virtual.
Low	Low	High	There is possibly over-expenditure and resource committed to maintaining an unnecessary preparedness for virtual operations.
High	Low	High	The strategic need for virtualisation is not being met and the infrastructure is not being sufficiently utilised. There is a job of work to do to implement virtualisation
Low	Low	Low	An ideal state of alignment, where there is low resource commitment and no superfluous virtualisation occurring.
High	Low	Low	Major effort is required to provide the necessaries for virtualisation and then transform the business to the level strategically required.
Low	High	Low	Low preparedness and low requirement, and exposure from overreach.
High	High	Low	Exposure through an ill-prepared and inefficient context for virtualisation

Table 2.   Alignment of goals, current level and capability to virtualise

Taken by itself, each of the pieces of information is of little value. An intended destination is useful, but only if one knows one's current location. And knowing where one is is of little use when one doesn't know where one needs to be. And both are interesting, but of limited worth without a map of how to get from one to the other. Thus, knowing that goals, state and capability are aligned, suggests that no specific action needs to be taken, but knowing that goals and state are high, but capability is low suggests that the organisation is exposed and needs to take action to improve capability if the organisation is to be able to continue to operate effectively with its current level of virtuality.

4   METHODOLOGY

This article describes the first step in a longitudinal research project. The project came into being when the management of the international division of a Scandinavian engineering firm realised that as the global and distributed characteristics of its operations became more pronounced, a change in

operational paradigm was required. No longer could the headquarters be assumed to be "home", as remote work was becoming everyday for many staff. Staff and management were increasingly absent from the office, but operational and cultural habits reflected an office culture. Managers delegated much of their authority when not in the office, and yet were travelling for over 100 days per year. Meetings continued to take place (with pastries supplied) in progressively empty halls. The Director of the Division declared that a mindset was required in which it didn't matter where staff were located or where they lived: "home office" would be in cyberspace. The division was in many ways already virtual, but it needed to address virtualisation as a conscious strategy or project. The research project was initiated to accompany the division's virtualisation process from conception to fruition, be a record of events and provide insight into the firm's journey.

The analytical framework for envisioning virtualisation was applied in the first intervention of the research project, a workshop with the organisation's management team. The workshop consisted of three parts: an envisioning exercise, an exercise in defining goals and resources required, and an exercise in imagining work in a highly virtualised organisation. An additional interview was held with the Director, and served to clarify data gathered during the workshop.

Workshop participants are human beings navigating through an imperfect social space and there are many methods for breaking the ice, eliciting information and sorting the outcomes. Our first exercise was designed not just to envision the virtual organisation but also to defuse uncertainties by enticing participants to adopt and represent a particular employee role (not their own) throughout. Participants were asked to present a definition of virtualisation as seen from the role they were playing and state what it means to them by responding to such questions as "What work is done virtually to make my job different to now?". The second exercise used brainstorming to identify the outcomes sought from virtualisation. These were prioritised by vote. The required capabilities for the three most important drivers were then uncovered through group work which utilised causal cognitive mapping for each objective. Issues and barriers to the supply of these resources were also identified. Finally, participants were asked to consider a scenario (described within a fictional and futuristic vignette) in which the circumstances and consequences of virtualisation were described. For example, imagine a critical issue needs to be resolved in a fully virtualised context or that a manager never sees his staff – all interaction happens on-line. Participants were asked how they felt about the scenario and how they would cope with it in order to reveal comfort levels, fears and disquiet.

The data from all three exercises and the subsequent interviews were pooled to identify indicators of virtuality (necessary for defining strategic need for virtuality and measuring current level of virtuality) and indicators of capability for virtuality (necessary for measuring capability). The data were organised using MindManager <www.mindjet.com> a tool for visual mapping of ideas and text. Indicators of virtuality were drawn from the visions of virtuality presented by the Director and by participants in the workshop. Their own words were used to identify dimensions of virtuality, and the researchers then prepared indicators derived from these dimensions. In the case of capability, the analytical structure was pre-defined, based on the capabilities identified from the literature summarised in section 2, but new categories were added as they emerged from the analysis.

5   OUTCOMES

5.1   The workshop

Let us begin by briefly examining the usefulness of the workshop as an enabler for envisioning virtualisation, understanding the current status and identifying the required supporting capabilities. The first exercise was very successful in breaking down reservations and reducing tension. Jokes were made when staff hammed up their positions and yet many insights were generated through questions asked of these roles by other roles. For example, the "Project Manager" said: *it doesn't matter what happens with virtualisation: the role stays the same. Quality has to be ensured, the job needs to be*

done and we need good references from the clients. The "CEO" then asked the "Project Manager": *I am worried about the threat to quality. I must provide the tools and the training - do we need new policies for the local mix of people on projects?* The subsequent exercises achieved their goals of identifying drivers for virtualisation and capabilities required. The third exercise revealed misgivings which transcended operational risk, and thus elicited information about emotional and psychological issues that are important to the virtualisation process.

The participants' assessment of the workshop was positive. Management was pleased with the outcomes, the participants were satisfied that a consultative and collegial context and mechanism had been provided for an exchange of views and a crystallisation of the notion of virtualisation. Some of the resources and capabilities required by the organisation to achieve the desired state of virtualisation had been uncovered, as well as the anticipated benefits and risks to the organisation, providing material for the organisation's own future planning as well as for the research.

5.2 The virtualisation alignment model

5.2.1 The envisioned form of virtualisation and the strategic need to virtualise

During the workshop, information about the strategic need to virtualise emerged in two forms: the envisioned form of virtualisation and the drivers of virtualisation. The participants were introduced to the envisioned form of virtualisation by the divisional director. He expressed it in terms of the "global network organisation", which had the following characteristics:

There would be an increase in the dispersal and distribution of all permanent, contract and retainer staff. In this environment, a coherent and consistent view of the organisation would be maintained, manifested in shared methods, values and work practices. This way of working would be facilitated by information and communications tools, such as the Internet, VOIP and Intranets. New forms of workflow and management would evolve to meet new needs, and the organisation would continue to be an attractive place to work and participate. Virtualisation needed to be cost effective however, and might even be a new form of service offering to clients.

This emergent definition of virtualisation in the organisation, whilst containing the usual criteria of virtuality such as dispersal, remote work and the use of ICT, was characterised by a significant new indicator, that of mindset: that the staff had to discard the notion that travel, odd working hours and office absence were somehow anomalies. Indicators of virtuality therefore go beyond those descriptive and structural indicators provided in the literature (Haywood 2003; Warner and Hertzel 2004) to include psychological and cultural indicators.

With this definition in mind, the following drivers of virtualisation were identified by participants:
- To be more flexible and responsive to the market in terms of competence, countries and clients
- To broaden a sense of belonging to the organisation and increase the stock of shared values and goals
- To attract and retain the best people wherever they are

These can be taken as the business objectives of virtualisation: if these are not achieved, then virtualisation will not have achieved its purpose.

Together, the vision and objectives provide indicators of virtualisation in the organisation. The final set of indicators that emerged from the workshop incorporates participants' observations from each of the three exercises and appears in table 3.

5.2.2 Current level of virtuality

A single workshop such as this cannot supply objective data for measuring the current state of virtuality, especially as the vision is still in nascent form. Measurement requires a more positivistic

certitude, where surveys and observations of the state of the organisation are appropriate. However, a frame of reference (table 3) was established within which such instruments can be developed and an initial impression of the state of virtualisation along key dimensions was obtained from participants' responses to the workshop exercises.

Descriptive	Psychological and cultural
Dispersal of staff[a] ▪ Days out of the office/total days ▪ Proportion of staff outside Head Office (HO) ▪ % of time spent travelling ▪ Proportion of staff whose communication patterns demonstrate they are 'connected' to a community of colleagues in the organisation	*Coherent and consistent view of the organisation, sense of belonging, shared values and goals* ▪ We act in accordance with the company's expressed corporate values[b] ▪ There is a good cooperative spirit in our Division[b] ▪ I feel a part of (the company) culture ▪ I like to do things the (company) way ▪ I work to meet (the company's) quality demands ▪ I know what is going on in (the company) ▪ I get quick replies to my questions ▪ Sense of belonging and corporate identity
ICT ▪ Installed ICT to support virtual work ▪ Number of staff using each specific functionality of installed IT (e.g. forums, VoIP, repository)	
Workflow and management ▪ Procedures explicitly incorporate staff outside HO ▪ Management practices explicitly include staff both inside and outside HO	*Attractive place to work and participate* ▪ I feel a strong loyalty to (the company) ▪ I have the contacts I need to be appointed to my next project for (the company) ▪ The administrative framework is in place to ensure fair handling of my appointment ▪ I have the skills I need to represent (the company) effectively to clients ▪ I am pleased with the contribution I am making to (the company) ▪ This (the company) is a good place for me to work[b]
Cost effective ▪ Square metrage of office space per employee	
Offer new services to clients ▪ Number of clients to whom virtual organisation solutions are provided	
Objectives ▪ Perceived ability to be more flexible and responsive to the market in terms of competence, countries and clients ▪ Perceived ability to attract and retain the best people wherever they are	*ICT and information* ▪ Technology accessibility ▪ Technology acceptance ▪ Access to information needed to the job ▪ Knowledge management
	Virtual mindset ▪ Doing things virtually is 'business as usual
[a]Includes contractors, retainers, and others not on permanent staff. [b]Items adapted from the company's existing climate survey	

Table 3. Indicators of envisioned level and current state of virtuality

The impression conveyed by the participants was that the organisation already operates in a relatively high virtual mode, indeed this was stated explicitly at times. Managers travel for about 100 days per year, most projects are overseas, employees have been hired without being seen, administrative employees answer their e-mails at weekends and 'frontline' staff are working increasingly at the coalface as part of customer teams. However, the use of ICT to support collaboration and communication is low, due in part to remoteness, but also to restrictions imposed by the corporate IT strategy. Further, the mindset of staff has not internalised virtualisation as the status quo. We suggest that this is because the phenomenon has not been framed as an operational concept or *modus operandi* but remains something separate or "added on to" current operations.

The variation in levels of virtuality across different characteristics of the virtual organisation suggested that a 'dashboard' approach to measuring virtualisation is required. The respective characteristics of virtuality are necessary, but individually insufficient, indicators of the state of virtuality. An

understanding of the state of virtuality will recognise the various levels of each of the indicators and may not necessarily be the simple overall "High" or "Low" suggested by table 2.

5.2.3 *Capability to operate virtually*

We identified two interpretations of capability for virtualisation: capability to be virtual, i.e. to operate at a given level of virtuality, and capability to virtualise, i.e. to participate in and manage the process of achieving the desired level of virtuality. While the literature does not make this distinction, the difference was clear to the managers who pointed out to us that virtualisation was akin to a project 'in itself'.

The discussion also suggested that management competency should be regarded as a separate dimension from leadership, employee competency, business process and technology. Further, other factors such as personal preference and pre-disposition for working virtually and psychological preparedness for virtual work should be taken into account in addition to competency, for both managers and employees.

In analysing the outputs of the workshop, it became clear that several dimensions of capability to operate virtually were also indicative of the current level of virtuality. So for example, availability of ICT is a required capability, but the use of this capability is also an indicator of how virtual operations are. The extent to which business processes are designed for operating virtually is both a measure of virtuality and a capability for operating virtually. Virtual mindset plays a similar role; staff need to think of the organisation in virtual terms for it to be a virtual organisation, while thinking of the organisation in virtual terms enables the organisation to be and to become virtual.

The final set of categories identified is: leadership and vision, management ability (incorporating preference and pre-disposition as well as skills), employee ability, virtual mindset, technology, business processes and economics.

5.2.4 *Alignment of goals, state and capability for virtualisation*

On the basis of this initial analysis, we concluded that the organisation has a high strategic need for virtuality with a current level of virtuality characterised by high dispersal of staff, simple but underused ICT, low levels of virtuality on other descriptive measures, and presently unknown levels of virtuality on the psychological and cultural measures. Capability to operate virtually is low on several key indices, particularly information technology, business processes and virtual mindset, while some other capabilities are not yet being tracked and are currently unknown. According to the model presented in table 2, the organisation is exposed because it has high virtuality in terms of dispersal of staff, but is not yet sufficiently prepared to cope with the degree of virtualisation that its business demands. This exposure is, however, not as great as it might otherwise be, because the management team is working consciously towards defining its virtuality goals and drivers and identifying and improving the required capabilities.

The linkages between state of virtuality and capability are worth examining. Although geographical dispersal is high in this organisation, the virtuality indicators of 'virtual mindset' and ICT use, for example, are low. These need to be raised to increase the overall level of virtuality. From these desired states, we can derive the capabilities required for high virtual mindset (which include certain leadership and management skills and certain types of self-motivated, autonomous employee) and ICT use (which include secure remote access, collaborative technologies, knowledge bases, electronic procedures, translation of all such information into English, and groupware). In a recent IT planning seminar, the director managed to push collaborative tools and support for the mobile worker to become the number one priority, demonstrating the link between capability and achievement of virtual organisation.

6   DISCUSSION

This case confirms the value of a collaborative workshop for senior managers as a method for envisioning the virtual organisation. Such a workshop can be designed to reveal information that is critical to three dimensions of strategic planning: the goal, the current state and the capabilities required to bridge the gap. This information is useful for envisioning and future planning and the workshop itself can integrate and motivate staff. The workshop revealed new information about the virtualisation which extends what is currently known from the literature describes, for example:

- That virtualisation is a means to increase identity, strengthen work practices and common values; it can be seen as a tool of culture, not just as a risk to culture as suggested by the literature
- That virtual mindset is a critical measure of state of virtuality
- That mindset, ICT, and business processes are measures both of virtuality and of the capability to virtualise.

The workshop also revealed that there are several indicators of virtuality, each of which requires different capabilities. There would appear to be two processes necessary to deal with this mix of states and capabilities.

- Action is required to increase *virtuality* in certain dimensions. To do this, new *capabilities* are required.
- It is necessary to develop *capabilities* in certain dimensions in order to sustain effective operations and organisational identity

The framework presented in this paper can be used to order the data gathered about the desired form of virtualisation, the current state, and capability to virtualise. Table 4 demonstrates how this will be done in the research project that began with the workshop. As the project progresses, the table will become enriched with items from the literature and from the research project, which give more precise guidance for future planning.

Strategic need for virtuality	Current level of virtuality	Capability to operate virtually
Data gathering and analysis		
Indicators are those listed in table 3	Indicators are those listed in table 3	• Leadership and vision • Management ability • Staff ability • Virtual mindset • Technology • Business processes • Economics
Assessment		
"Our need to virtualise is high/medium/low and virtuality for us means …"	"Our current level of virtuality is assessed on a differentiated dashboard as ..."	"We need to perform the following actions to improve capabilities and then raise our scores on the 'virtuality dashboard' "
Action		
Confirm the virtualisation vision ——►	Take low dashboard scores and identify matching capabilities ——►	Assess capabilities and initiate sub-projects to raise as required

Table 4. Virtualisation planning template

The next phase of this research will examine the capabilities and their relationship to the indicators of virtuality in more detail. Specifically, we will measure and map the organisation in terms of both level and capability for virtuality. In addition, we will – throughout the research project – monitor the vision for virtualisation. While the workshop provided a top down view of these dimensions, the research project will measure these dimensions from the points of view of all levels of staff, both Head Office-based and those based outside of Head Office. As the organisation and its environment change, we

expect the vision for virtualisation, and thus the indicators of virtualisation to change. These changes will be incorporated in the research as it progresses.

7   CONCLUSIONS

This paper has shown that it is possible to envision virtualisation in an organisation through standard techniques such as a management workshop. We have presented a framework for recording the vision and mapping progress toward it, as well as identifying and recording the capabilities needed to move from the current state of virtualisation to a desired future state. Using the framework to envision virtualisation in one organisation, we have identified drivers of virtualisation that are not commonly recorded in the literature. In addition to the commonly described drivers of addressing changes in markets and industry structure, we can add the driver of maintenance of organisational culture. This is a significant addition because the literature generally assumes that culture is at risk from virtualisation, and does not consider that culture may be the explicitly stated object of a virtualisation strategy. We have also been able to expand the list of capabilities required for effective virtualisation to include management characteristics and skills and a 'virtual mindset'. This research has also enabled us to distinguish between the capabilities required for the virtualisation process and for the 'state' of being a virtual organisation, but it has also shown that some aspects of the state of virtuality also act as capabilities for operating virtually. These include ICT, business processes and virtual mindset.

The framework presented here has proved useful for organising the baseline data required for studying – and managing – the process of virtualisation. The framework is both descriptive and analytical. It enables description of the organisation at a point in time. It can be used to assess the extent of alignment between the envisioned form of virtualisation, the current state of virtualisation, and the capabilities of moving from current to envisioned state. Of course, the process of virtualisation is dynamic; as the organisational state of virtualisation changes, as its markets change, and as it changes in response to other internal and external changes, the vision of virtualisation will change. The framework therefore provides a tool for capturing vision, state and capabilities at a given point in time. Used to record these dimensions at a series of intervals, we propose that this framework can be used to map changes in an organisation as its understanding of virtualisation, its need for virtualisation, its desired form of virtualisation, and its actual form of virtualisation evolve over time.

Our research will continue to map the case organisation at six monthly intervals against this framework. We would welcome use of the framework by other researchers in other organisations with other virtualisation drivers, strategies, goals and capabilities. A greater pool of data will provide researchers and managers with a much better understanding of the virtual organisation and the process of virtualisation.

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