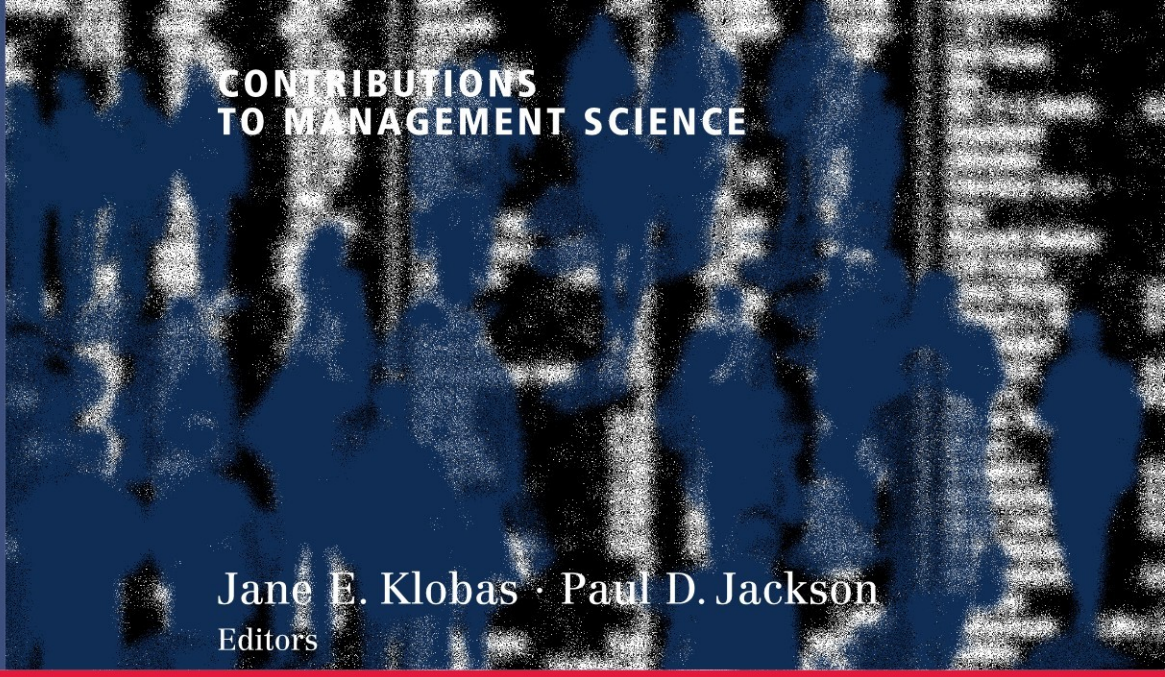

Jane E. Klobas · Paul D. Jackson
Editors

Becoming Virtual

Knowledge Management and Transformation of the Distributed Organization

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Preface

The editors and research team would like to thank the management and staff of TPC, who must remain anonymous. Without their enthusiastic involvement, openness and patience, this project would not have been possible. We hope that the outcomes are useful to them and any others wishing to understand the complexities and implications of becoming virtual.

June 2007

Jane Klobas
Paul Jackson

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Abbreviations

CoP	Community of Practice
DF	Dialogue Forum (Unit 2's electronic discussion forum)
DIP	Development Information Portal (Unit 2's intranet)
HO	Head Office
ICT	Information and Communications Technology
IS	Information Systems
IT	Information Technology
OC	Organizational Commitment
OM	Organizational Memory
OS	Outside Head Office
PP	Project Portal
SU	Social Uncertainty
TMS	Transactive Memory Systems
TPB	Theory of Planned Behavior
TPC	Unit 2's parent company ("The Parent Company")
Unit 2	The International Development Unit of TPC

Introduction

Jane Klobas and Paul Jackson

The past two decades have seen a growing diversity of organizational form as organizations use new technologies to reconfigure work, distributing it more than ever across distant locations, different time zones and even diverse organizations. Companies have been able to place their staff with customers. Production and service work can be moved to low cost countries or people's homes, or subcontracted to more qualified firms or individuals. Teams of empowered and motivated specialists can be drawn from around the world, using information and communications technologies (ICT) to communicate and share knowledge. A shirt can be designed in Italy, made in China and sold in Australia. The world is said to be increasingly "virtual", a condition in which organizational solidity is only apparent: the reality is one of high performing, dynamic networks which connect staff, enterprises, processes and expertise, where the drive to produce or compete has displaced the need for permanency and structure.

ICT offers distributed organizations the chance to become virtual organizations, organizations that use computer-based networks (in particular, the Internet) to capitalize on the advantages of actual differences in time zones, locations and contractual relationships between individuals and groups; communications, work processes and organizational culture are as natural in the distributed form as if the organization were virtually working together in a single location. Virtualization might be a deliberate and premeditated organizational response to these opportunities or an emergent phenomenon that develops *ad hoc* as individuals and groups use tools such as hand-held communication devices or wikis (tools that allow joint authorship of public and private Web pages) to support their work.

Indeed, there are many forms of virtual organization, the most effective of them "singularly focused on creating, nurturing, and deploying key intellectual and knowledge assets while sourcing tangible, physical assets in a complex network of relationships" [19:1]. The key to effective virtual

organizations is their responsiveness, flexibility and ability to configure knowledge and capital assets based upon changing needs.

Telework is a basic form of virtual work that involves working at a location other than the employer's office or plant, often at home [10; 13; 17]. Telework can meet the personal needs and preferences of employees who choose when and where they work. At the same time, employers may save office space and have access to a wider pool of talent from which to select, including people who cannot easily reach a central office. Problems experienced with telework include isolation, greater vulnerability of staff and performance measurement.

Mobile virtual work generally continues to revolve around a head office, but certain staff are given technology and resources that enable them to perform tasks that were previously performed in the office while traveling [1; 6]. Typical examples are: sales personnel who can visit customers, check inventory, raise queries and place orders while still at a customer site and then move directly to the next customer; and service and maintenance workers who install or maintain gas and electricity services and use ICT tools to download orders and locate infrastructure such as underground pipes.

Customer frontline work is the placement of staff at a customer site [7]. This enables more informed provision of client services. However, it may blur the structural lines between organizations when frontline workers develop a sense of loyalty and common purpose with the customer rather than their employer.

A *virtual team* is a team brought together with no consideration for physical location [9; 11; 12; 16]. Virtual teams may be enduring, e.g., the international sales team for a particular product, or project-based. Computer systems (usually via the Internet) provide support for communication, collaboration, knowledge sharing and storage.

The *virtual supply chain* is a materials supply system which functions on the Internet using a network of often anonymous suppliers who respond to requests for supplies via an e-business hub or other Web-enabled system [5; 14; 20]. Indeed, there are now firms that no longer produce anything, but rely on computer-mediated, just-in-time e-commerce supplies in order to service customers. In its extreme form, the firm supplies a known brand, organizes suppliers and controls the customer relationship functions, with no inventory and little direct labor.

Finally, the *virtual corporation* is one which exploits the virtual form at the inter-organizational level. It is an organizational response to market demands and opportunities and consists of transient consortia or associations of organizations, each of which provides specific capabilities to meet a specific – often sudden – requirement [8; 18; 19]. In this form, an asso-

ciation of firms or parts of firms can rapidly present a "virtual shop front" of skills and experience which no single company could acquire with sufficient speed to respond to sophisticated customer needs or large, complicated projects.

New forms of virtualization are emerging as technology develops and new social institutions evolve. Many of these new forms are forms of ICT-enabled "networked enterprise",

> 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" [4:67]

Some forms build on networks of individuals. "Networked collective intelligence" [15] is the ICT-enabled collaborative development of knowledge resources by networks of individuals. Such networks have created the online encyclopedia, Wikipedia, and the computer operating system, Linux, and added reviews and ratings to books and resources sold online by Amazon.com. NASA's Clickworkers extend the boundaries of the organization to include networked, remote individuals who volunteer to identify Mars craters.

Any organization might use one, some, or all of these forms of organizing – and, potentially, other forms yet to develop – to improve the way it works and to increase its range of opportunities. The exact form of virtuality will depend on market demands, operational needs and preferences and new technologies and will change as markets and the business environment change [2].

But distributing work across locations, time zones and other individuals and organizations involves risk, of breakdowns, interruptions, or discontinuities on one or more dimensions of time, space, work practice or culture [21]. Virtualization may bring higher rewards for staff, but also higher expectations and an extended working day [7]. Poor coordination, stalled progress, difficulties in problem resolution, miscommunication and loss of cohesion are among the challenges that may have to be overcome. It is not enough for an organization to have a vision of a virtual form, but also the capabilities to transform itself, to become virtual. In a 2007 Global Survey, the international management consulting firm, McKinsey & Company, asked companies that have invested in modern communications technologies what they would have done differently to make their investment more effective: 42% would first have strengthened their capabilities [3].

In this book, we are interested in planned strategies for virtualization. How can managers envision the new organizational form, understand their

progress and overcome the challenges they will inevitably encounter? We propose that indicators – which may themselves change over time – can be used to describe an envisioned virtual organization. A set of necessary capabilities can be identified and used to gauge the organization's capability to become virtual. These capabilities include leadership and vision, the design of virtual work and certain characteristics of employees as well as ICT.

The book is the result of a research project that planned to track a knowledge intensive organization on its journey from being distributed, with professional staff working largely alone in more than a dozen countries, to being virtual, using the Internet and new information systems to improve knowledge sharing and build culture. A research team made up of experts in knowledge management, online learning, psychology, strategy and ICT tracked an international development firm's capability for virtualization, along with its progress toward its envisioned virtual form, for eighteen months. Each expert contributed theory and methods from their own field, allowing the organization and its progress to be examined from multiple points of view. Drawing on the different fields, we developed indicators of virtuality and capability. Our tracking of capabilities suggested that only minimal change would occur, and our observations confirmed this was the case – but, in observing the organization over time, we were also able to develop a deeper understanding of the capabilities necessary for transformation.

We also gained a number of insights into the theory and practice of knowledge management in distributed and virtual organizations. These include observations about social uncertainty in distributed organizations and the place of knowledge transfer in social uncertainty, the potential incompatibility between creating strong communities of practice and achieving organizational goals for social cohesion and commitment, and the role of transactive "knowledge directories" in knowledge transfer and storage. We developed methods for mapping organizational memory and studying adoption of ICT that can be completed relatively quickly and at low cost.

This book introduces the theories and techniques used in our research in such a way that they can be applied in other organizations. We illustrate their application from our experience in the case study organization which, as a large global consulting business, can stand as proxy for many service-oriented knowledge-based firms. The methods and tools can be used by academics, managers, business students and consultants in future studies of virtualization and to examine specific aspects of knowledge management and systems for transfer of unstructured knowledge.

The first section introduces models and methods for envisioning the particular form of virtual organization that an organization might adopt to

meet its strategic needs and monitoring progress toward achieving that form. Chap. 1, *Aligning Goals, Virtuality and Capability: A Virtual Alignment Model*, considers the background to virtualization. It introduces the dimensions along which an organization may be virtual and identifies necessary capabilities for virtualization. The chapter presents a model of how strategic goals for virtualization, current state of virtuality and capabilities for virtualization can be compared. We call this the Virtual Alignment Model (VAM); it identifies where alignment has been achieved or the organization is exposed to risk, and predicts future progress toward the envisioned virtual form. Techniques for envisioning the virtual form a specific organization might take, identifying indicators of virtuality, monitoring and measuring progress toward the envisioned form and monitoring capabilities are introduced in Chap. 2, *Envisioning and Monitoring the Process of Becoming Virtual.* We describe the methodology we used to uncover the case study organization's vision of the virtual organization and develop indicators of the current state of virtuality along with "dashboards" that summarizes status and capabilities along multiple indicators. This chapter also introduces our research project with a brief introduction to the case study organization and the research methodology. Chap. 3, *The Challenge of Becoming Virtual*, describes the case study organization and its needs in more detail. It gives background material on the industry, the business context and the major protagonists. This chapter can be used by teachers as a business case study.

The second section of the book focuses on planning and evaluating a range of knowledge management initiatives for virtualization. Chap. 4, *Social Uncertainty in Virtual Organizations: A Preliminary Ontology of the Constituent Elements*, considers the argument for focusing on knowledge sharing as a key pillar of the virtualization process. Distributed organizations risk high social uncertainty as a result of low frequency of communication among organizational members. Adoption of technologies to improve knowledge sharing should reduce social uncertainty. This, in turn, should have other benefits for the organization because social uncertainty is believed to be associated with important aspects of organizational culture including trust, commitment and sense of belonging. In this chapter, Ivan Jensen and Paul Jackson introduce a model of social uncertainty and discuss the theoretical relationship between social uncertainty, knowledge sharing, knowledge transfer and organizational culture. In Chap. 5, *When Communities of Practice Fail: Community Ties and Organizational Commitment*, Gaela Bernini and Jane Klobas consider the risks associated with one strategy for improving the sharing of unstructured knowledge in organizations, development of Internet-mediated communities of practice. They ask if this is an appropriate strategy for an organization that wants to

strengthen organizational commitment. The chapter describes a method for comparing the strength of communities of practice with organizational commitment, reports on the relationship between the two, and concludes that communities of practice present risks to organizations to which organizational commitment is important.

New knowledge management initiatives should be aligned with the organization's structures and processes for knowledge transfer. The next two chapters introduce techniques for uncovering existing structures and processes. Chap. 6, *An Exploratory Survey of the Structure and Components of Organizational Memory* (Paul Jackson), describes a simple technique for mapping organizational memory and identifying knowledge structures. The technique is particularly appropriate when the purpose is to obtain an overview to support a broader organizational knowledge management initiative rather than uncover the detail required for building a formal knowledge management system. But it is not enough to understand the structure of organizational memory. We also need to know how it functions. Recent research on group memory suggests that memory is transactive, i.e. shared among members in a dynamic way. In Chap. 7, *The Organization as a Transactive Memory System*, Paul Jackson and Jane Klobas introduce a method for identifying and evaluating the organization's transactive memory and a model from which the types of information system that would improve transactive memory can be identified.

The last two chapters in this section consider two common issues in virtual organizations. Chap. 8, *Evaluating Adoption of Knowledge Management Initiatives* (Stefano Renzi, Jane Klobas and Paul Jackson), describes a model and method for evaluating users' attitudes to and adoption of knowledge management initiatives while Chap. 9, *Monitoring, Control and the Performance of Virtual Work*, considers the issue of control of the actions of distributed staff. In Chap. 9, Paul Jackson, Jane Klobas and Hosein Gharavi conclude that monitoring and information systems play a limited role in the power and control structures of distributed professional organizations. Management influence over knowledge worker performance and productivity should be seen as an assembly of various types of direct and indirect constraint which can be configured to achieve required results.

The final section of the book brings together the models and methods from section 1 and observations from section 2 to explain lack of transformation in the case study organization. It commences with Chap. 10, *The Challenge of Becoming Virtual (Part 2)*, a narrative description of the case study organization's pursuit of virtualization. This chapter is a continuation of the story begun in Chap. 3 and can be combined with that chapter to provide students with an extended case study. Chap. 11, *Reflections from the Frontline – Journey of a Knowledge Manager*, written by the or-

ganization's knowledge manager, Louise Kjaer, reflects on lessons from the organization's approach to virtualization. Chap. 12, *The Forensics of a Challenged Initiative* presents the results of the research team's causal analysis of virtualization in the organization. It presents explanations for the observed lack of change in the organization in terms of the capabilities identified in earlier chapters and identifies additional capabilities that appeared to be lacking. Chap. 13, *Tools and Capabilities for Becoming Virtual*, draws lessons for organizations planning to pursue knowledge management initiatives to transform distributed organizations. Among other things, we conclude that it is not sufficient to focus on developing and implementing knowledge management systems. Other key virtualization factors which, at first glance, are neither obvious nor glamorous, are nonetheless necessary for transformation to virtual organization.

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Part 1
Envisioning and Planning for Virtualization

1 Aligning Goals, Virtuality and Capability: A Virtual Alignment Model[1]

Paul Jackson and Jane Klobas

1.1 Introduction

Given the many forms that a virtual organization might take, a critical first step in becoming virtual is to understand the form of virtual organization that is desired or envisaged. Once the desired form is defined, it is necessary to find out how close to, or distant from, that form the organization currently is, and to develop a strategy for moving from the current to the envisioned form. But, a strategy will only work if the organization has the capabilities necessary for transformation.

In this chapter, we demonstrate how the vision of the virtual organization, the current state of virtuality and capabilities for virtualization are inter-related. We describe a model that brings information about these three key elements together in such a way that an organization can use it to evaluate the alignment of the organization's goals, state and capabilities for virtualization and predict what might occur if alignment is not reached. We call this the Virtual Alignment Model (VAM).

1.2 Vision and Goals

In envisioning the future virtual organization, an important first consideration is the motivation for virtualization. This is a strategic question which requires consideration of the environment within which the organization is

[1] Portions of Chapters 1 and 2 are drawn from Jackson PD, Klobas JE (forthcoming) Strategies for Virtual Work. In Putnik GD, Cunha MM (eds) Encyclopedia of Networked and Virtual Organizations. IGI Press, Hershey, PA. Copyright IGI Global. Permission granted.

operating and changes to that environment, as well as internal challenges, needs and goals. Virtualizing an organization may be a strategy designed to solve problems of customer service, competitiveness, efficiency, and employee satisfaction. It may open up new markets, increase the availability of firm competencies and make the organization more responsive.

Once the drivers for virtualization have been articulated, it should be possible to begin to envision the transformed organization. Virtuality may be defined along several dimensions: physical, structural, legal, temporal and psychological.

The *physical* dimension is the most readily identified and defined. The staff of a virtual organization are usually geographically distributed from one another, but to what extent? Will the transformed organization be centered around a head office, be an international network of semi-autonomous entities, be a loose form in which individual staff in different geographical locations join together in different configurations for different projects, or some hybrid of these and other forms? If it is a head office based organization, what percentage of staff is likely to be based in head office and what percentage based outside or traveling?

The *structural* dimension may drive or follow from the physical dimension. Apart from those aspects of structure that are aligned with geographical distribution, structural considerations include the nature of staff relationships with the organization and the form of staff groupings, such as departments, teams, projects, matrix reporting and so on. To what extent will virtuality extend to the relationship between staff and the organization? What percentage of staff is likely to be permanent, what percentage on a retainer awaiting assignment to a task or project, and what percentage employed on a fixed term contractual basis? Will the organization introduce a flatter hierarchy, with greater self-management, or will work be project-based?

The *legal* dimension reflects those dimensions of structure which are influenced by regulations and legal agreements. A team-based approach is purely structural, but a team-based approach across different firms may require contracts and binding legal commitments. A full-time permanent member of staff embodies a structural arrangement with a different legal dimension to a part-time contractor. We need to ask questions such as: what is the contractual basis of the relationships between the staff and the organization, what obligations exist between partners in transient, multinational consortia bidding for large contracts, and between the different geographically distributed elements of a single organization?

The *temporal* dimension is usually associated with the physical dimension: when people are geographically distributed, they work across different time zones. But the temporal dimension can also apply to people work-

ing at different times in the same time zone: this refers not just to formal shift work, but also to the extent that the virtual organization might support different individual preferences for working at different times of day (or night) or on different days of the week, and with different rhythms.

The *psychological* dimension is often neglected in discussions of virtual work, but is an important aspect of the virtual organization. Thus, a virtual organization might be defined in psychological terms as an organization whose staff consider themselves part of one organization regardless of where and when they work or what structural or contractual relationship they have with the organization. We might say that the staff of a virtual organization share a "virtual mindset". Other aspects of the psychological dimension might include shared commitment to a set of common values and behavioral norms – for example, an organization might consider virtualization a strategy that helps maintain a policy of not giving bribes for services in any country anywhere – or a sense of belonging or commitment to the organization, or trust.

We describe a methodology for envisioning the form of virtual organization that a particular organization might seek in Chap. 2.

1.3 State of Virtuality

Once the desired form of virtual organization has been envisaged and described, it is possible to evaluate the extent to which the organization has achieved the desired form. This state of virtuality can be described or measured at any point in time and compared to the desired state. In addition, it can be compared to past states so that change can be monitored.

A number of survey instruments have been developed to measure virtuality [3; 5; 13] but these are static and proceed from a fixed notion of what virtuality is. Because we take the view that virtuality is highly fluid and contextual, we propose a contingent approach, tailored to the vision of each organization. In Chap. 2, we describe a methodology for determining what the specific indicators might be in a given organization and introduce common indicators for common dimensions of virtuality while in this chapter, we restrict discussion to how they work in monitoring virtualization.

Indicators of virtuality might be developed to reflect both vision and status on one or several dimensions. An example is given in Fig. 1.1, which provides a graphical representation of an indicator designed to demonstrate desired level of virtuality (marked by the diamond) and current level (marked by the dot). This type of indicator includes a description for

different levels of virtuality and allows the organization to compare current status with vision at a glance.

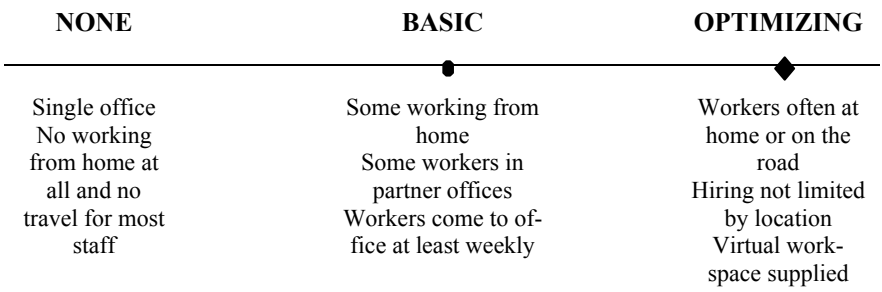

Fig. 1.1. Comparing vision (diamond) and status (dot) for the indicator, Telecommuting

A set of indicators can be combined and reported in summary form on a dashboard. Like the dashboard of a motor vehicle, a performance dashboard can be used to provide a rapid, visual overview of current status compared with a benchmark (in this case, the envisaged level of virtuality) on a set of key indicators [9].

A dashboard that summarizes current and envisioned level of virtuality would require a scale. We adapted Haywood's existing four point scale to evaluate the functioning of virtual teams [11] into a five point scale for measuring the functioning of a virtual organization. The additional point on the scale acknowledges that, in some cases, an organization may have taken no action. The points on our scale are:

- *None*. No action or no sign of virtual activity.
- *Ad hoc*. Virtual working is effective only in head office or among senior staff or both
- *Basic*. Virtual work may be cumbersome and based on non-virtual processes, nevertheless some advantages are gained. The performance of collocated and distant staff is similar, but difficulties are still faced as a result of working virtually.
- *Standardized*. Virtual work processes are considered to be normal and the benefits of operating as a virtual organization outweigh the problems.
- *Optimizing*. All staff work effectively any time any place and improvements to the organization can be gained by standard methods for organizational improvement such as business process re-engineering and the adoption of new technologies.

Anchored indicators of the kind presented in Fig. 1.1 would underlie each of the summaries in a dashboard. For example, the ratio of contract staff to permanent staff could be used to measure the indicator, *Virtual staff*. The organization might define the *Optimizing* ratio as three contract staff members for every permanent staff member. A current ratio of 2.5:1 may be considered close to this and rated as *Standardized* to indicate that the organization was operating effectively on this dimension but some improvements could be made.

1.4 Capabilities

Capabilities enable an organization to close the gap between a desired and an actual state of virtuality and operate effectively in the chosen virtual mode. To be effective, virtual organizing requires capabilities beyond those of the non-virtual organization. If these capabilities are not present, they will need to be developed. Most obviously, technology is a critical enabler. But other factors are also indispensable and must be addressed. To raise a capability to an adequate level may itself be a significant undertaking, requiring managerial, technical or operational skills. The published literature identifies five capabilities: leadership, design of work processes, employee capabilities, ICT infrastructure, and business case.

- **Leadership** fosters a sense of collaboration, direction, cohesion and purpose, all of which are at risk in the face of the disjointedness and discontinuity which can be associated with virtual work. In the case of virtual knowledge workers, leaders have certain attributes which attract them and gain their commitment. Trust and empowerment will create the "volunteer" environment and sense of accountability with which knowledge workers flourish, while authoritarian, command and control styles will generally fail to generate the dynamics of knowledge creation. The development of a new organizational form requires effective and transparent change management. The leader [1; 4; 8; 15–17]:
  - has attributes which motivate and inspire knowledge workers
  - continuously communicates and reinforces a consistent message
  - makes the transformation meaningful
  - implements effective change management
  - builds a committed and effective management team
  - builds an environment of high trust
  - empowers staff and limits the extent of the command and control management style

- **Design of work processes**. Virtual work process design usually requires particular attention due to the difficulties of separation in time and space between staff and managers. Clear process definition, well defined interfaces at points of handover or dependency, clear roles, responsibilities, outputs and definitions of quality and completeness all gain greater importance, not only to reduce the incidence of problems, but also to gain the greatest leverage from work distribution. Virtual work should therefore [7; 10; 12; 14]:
  - be well designed and logical so that anomalies and exceptions are minimized
  - be well documented and the documentation available to all participants
  - allocate clearly defined roles and responsibilities
  - be role orientated with regard to business process, not based on person-related job description
  - have clear decision criteria and escalation procedures
  - clearly define task interdependencies and handover points
  - define timelines and milestones, quality criteria and so on
  - be process-driven rather than functionally orientated
  - use self-managing teams and matrix flexibility
- **Employee capabilities**. The capabilities required by virtual staff include competencies in technology and the ability to work alone and unsupervised, be autonomous and flexible, self-starting and self-reliant. Specific aspects of employee capability include:
  - a high level of the required skills and competencies
  - the availability of training and advice when required to bridge any gap between competence and task requirements
  - transparent and reasonable measurement of employee performance
  - fostering of collaboration through communities and mentors
  - induction which is explicitly planned for virtual work
  - being a team player
- **ICT**. The technology tools made available to staff to operate in virtual mode must provide the relevant functionality and have the necessary attributes to support effective virtual work. Aspects such as functionality, performance, reliability and usability of both the underlying infrastructure and the specific computer applications are important. Technology requirements are that [2; 10; 12; 18; 21]:
  - an adequately performing and functional infrastructure is present
  - software and communication tools are available for collaboration
  - tools are available for supporting work processes

- knowledge-based systems are available to build knowledge over distance as part of workflow
- the workplace is reflected in the functionality of the technology
- real time information is available irrespective of location

- **Business case**. Most businesses are resource constrained and competition between departments and groups means that a sound financial or material advantage must usually be demonstrated for a proposed course of action. The business case for virtualization needs to show that sufficient economic capability is present and there will be a return on investment of some kind, either in cost savings, improved customer service, shortened cycle times and so on. The business case for virtualization should [7; 20]:
  - be well thought through and understood
  - result in a clear allocation of sufficient resources
  - demonstrate a link between economic requirements, business drivers and capabilities
  - demonstrate that the costs and benefits are understood
  - demonstrate commitment to high performance rather than cost cutting
  - contain careful project planning, milestones and schedules

1.5 The Virtual Alignment Model (VAM)

Information about the envisioned form of virtualization, the current state, and capabilities for operating virtually, taken together, can be used to evaluate the organization's progress toward the desired levels of virtual work and the need for action. Table 1.1 demonstrates how this might be done using what we call the Virtual Alignment Model (VAM). Knowing that vision, state and capabilities are aligned suggests that no specific action needs to be taken, but any discrepancy suggests that the organization may be exposed and need to take action to improve capability or reduce the cost of capability which they do not need.

The VAM is a simple method for estimating the degree of action which is required by the company. The model emphasizes firstly that there must be alignment between how virtual an organization wishes to be and how virtual it is. In order to ascertain this, a problem statement or a vision is required; for example, "our salespeople spend too much time in the office – they must get out among the customers more". To then assess the gap between vision and reality, some basic measures are required, for example, what percentage of the week do the salespeople spend in the office? A