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Assessing information culture—an exploratory model

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Abstract

This paper proposes a conceptual model for assessing information culture. It aims to define more specifically what is information management and to enable evaluation of an organization's information culture. Factors pertaining to both information and organizational culture are highlighted, as are participative leadership, collaboration and integration of knowledge. A metric is proposed as a practical measurement tool and a questionnaire applicable to the metric was tested in a healthcare case study example. From the research results future senior management priorities were outlined to enhance the management of such a complex service environment and to improve staff interaction and working life.

Keywords: Information; Culture; Health care; Information management

1. Introduction

There is an increasing focus on the importance of robust and accessible information in the National Health Service, which has been particularly highlighted in the White Paper *Designed to Care* (The Scottish Office, 1998). The requirement for information in the Health Service is twofold: the public requires information on service availability, service standards, service performance and healthcare initiatives; the service itself requires information to develop effective healthcare services that focus on clinical effectiveness, evidence-based healthcare, clinical audit and performance monitoring. Emphasis is also placed on the importance of working co-operatively and sharing information both within the service itself and with external bodies such as local authorities and educational establishments.

From the viewpoint of a healthcare organization responding to these requirements, the provision of a technological infrastructure to enable the free flow and sharing of information,

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whilst of clear importance, is not in itself sufficient to ensure success. What is needed is an organizational culture that is conducive to effective information management, a culture that secures the support, enthusiasm and co-operation of staff and management alike (Davenport, De Long, & Beers, 1998). If such an information culture is critical to the successful achievement of strategic aims and objectives, it must be nurtured and developed by the necessary commitment and support infrastructure (Broadbent & Weill, 1997). Information has to be sent in a way that is useful to others without compromising confidentiality and has to be packaged for all partners by all partners, involving considerable integration across organizational barriers and development of relevant relationships (Konsynski & McFarlan, 1990). This entails much more than mere information sharing. Used in the right way, computer networks can foster integration and the increased collaboration required (Webster, 1995). Thus far, this has not tended to be the case in healthcare. Recent research has revealed, for example, that General Practitioners (GPs) do not perceive much value from computerization in terms of patient care but see electronic data generation as merely serving to draw up national statistical tables on issues such as prescribing trends (Mair, 2001).

To try and address some of the broader implications of information management, a tool to measure (Deming, 1986) and develop an information culture is needed. This should provide a means whereby senior management can assess relative strengths and weaknesses surrounding the giving and receiving of information with a view to prioritising future action. Both culture and information have tended in the past to be ill-defined and difficult to quantify or qualify. The conceptual model and appropriate metric proposed in this paper seek to provide a starting point.

2. The healthcare context

The development of an information culture in healthcare is implied in the 1998 White Paper, which emphasizes the need for improved access to information both for patients, in terms of the levels of service to which they are entitled, and for members of the service itself to support better the planning and provision of appropriate and effective services.

Within the guidelines laid out in the White Paper, major strategic documents have been produced in the form of *Health Improvement Programmes* (HIPs), embodying a strategic approach to reflect the shared vision of all partners involved, Health Boards, NHS Trusts and GPs. Furthermore, there is a requirement for Healthcare Trusts to define what they mean by strategic information management. Here difficulties arise in terms of information sharing among the multiple stakeholders and participants in the healthcare process. What is more, the healthcare environment is by definition unwieldy and complex in terms of structure and culture and subject to considerable and frequent change. This raises concerns about ability to be flexible, responsive to change and innovative and in the future.

An increasing reliance is now placed on creating new knowledge and adopting lateral organizational forms (Boland & Tenkasi, 1995). It will be especially important to find creative ways for representing and integrating knowledge across the lateral units (Weick & Roberts, 1993; Galbraith, 1994). Knowledge production involves communication within and between multiple communities of specialized knowledge workers, each dealing with part of an overall organizational problem and interacting to make sense from the various patterns displayed

(Boland, Tenkasi, & Te'eni, 1994). Diversity of processes and technologies to be dealt with is such that it is not possible for one person to understand the entire organization (Brehmer, 1991; Neressian, 1992). This is certainly the case in healthcare. Moreover, information cannot be assumed to circulate freely just because the technology to support this circulation is available (Feldman & March, 1981). Eckert (1989) contends that information is implicitly treated as a commodity to be exchanged or hoarded, even if the right "medium" exists for information sharing.

3. Information culture

The context for considering information culture is one in which information systems (IS) projects have tended all too often to fail or remain sub-optimized. A comprehensive survey of some of the UK's major organizations (Coopers & Lybrand, 1995), both public and private sector, revealed that as many as 60% of IS projects had experienced a major failure within the previous 2 years and 85% of IS projects had run late, over budget or failed to meet expectations. Anon (1996) suggests that a major reason for IS failure lies in the failure to address or recognize the cultural gap that exists between different stakeholders in an organization, i.e. those developing and implementing the system and those actually using it (Angell & Smithson, 1991). The author (Anon, 1996) further suggests that it is only through a *shared culture* that IS can be truly successful and that in order to achieve this success new organizational structures must be adopted with a shared cultural stance. Therefore, for the NHS to be truly successful in exploiting IT as a means of achieving an information rich service, the culture within the NHS must be addressed and unified. The culture must be a common one which views information as a critical resource for achieving both operational and strategic aims and objectives and must also be comfortable exploiting IT as an enabler of IS (Earl, 1994). The overall organizational knowledge base emerges from the process of exchange, evaluation and integration of knowledge. Like all organizational processes, this is comprised of the interactions of individuals and not their isolated behaviour (Dougherty, 1992; Purser & Tenkasi, 1992; Nonaka, 1994; Henderson, 1994; Brown, 1991).

Considering individuals and their interactions, we can think in terms of communities of knowing, such as divisions, functional areas, professional specialities, project teams and issue-based committees, which interweave with each other across various levels of the organization (Boland & Tenkasi, 1995). Individuals will find themselves as members of different communities and new knowledge will be generated as a result of an open system transformation as the communities of knowing question and revise routines and create new processes and relationships among themselves (Wiener, 1954; von Bertalanffy, 1968; Argyris & Schoen, 1978). Of course, the ability of one community of knowing to work jointly with another requires an ability to overcome the degree of incommensurability between them. This must be done without sacrificing the integrity and distinctiveness of their own perspective. This is where issues of professionalization come to the fore in the healthcare context. Furthermore, there is a role for electronic communication that can mediate and facilitate interaction between communities of knowing or hinder it. There is a crucial role to be played by IS and information management as a whole. Other concerns such as structure, culture, reward systems and leadership style all play a role in mediating interaction and communication (Boland & Tenkasi, 1995). Conceptual reorganization

to accommodate learning-in-working and innovation must therefore stretch from the level of individual communities, their practices and technology to the level of overarching organizational architecture or the community of communities (Brown & Duguid, 1991).

The term *information culture* is frequently used but without consensus as to its definition. Organizational culture is a useful starting point, not as an end in itself but as a backdrop against which organizational knowledge work is accomplished (Boland et al., 1995). Although a consensual definition of organizational culture is equally elusive, there are common attributes, namely values, assumptions and beliefs that tend to be an intrinsic part of it (Pedersen & Sorensen, 1989). It also follows that people within an organization will be a major determinant of organizational culture. Research has identified the importance of shared interpretive schemes (Bartunek, 1984; Ranson, Hinings, & Greenwood, 1980), common visions (Collins & Porras, 1991; Bennis & Nanus, 1985) or shared strategic image (Hamel & Prahalad, 1991; Bertado, 1990). What is more, people are a vital resource requiring inspired management and leadership for optimal performance (Peppard & Ward, 1999). Essentially culture defines potential and the realization of that potential is largely controlled by the people that make up the culture. Information culture could therefore be defined as:

> A culture in which the value and utility of information in achieving operational and strategic success is recognised, where information forms the basis of organizational decision making and Information Technology is readily exploited as an enabler for effective Information Systems.

4. The conceptual model (see Fig. 1)

Given the complexity of the healthcare environment and the consequent critical need for integration of participants, processes and information, it is appropriate to consider management tools to help achieve some progress towards fulfilling this need. The conceptual model proposed here is a tentative first step to integrate key elements of participants, processes and information. It measures organizational performance in terms of these elements with a view to improving organizational information culture.

Earl and Scott (1999) argue that many organizations now depend on knowledge as their principal asset for creating value. Davenport et al. (1998) define knowledge as "information combined with experience, context, interpretation and reflection" (Davenport et al., 1998). The implication is that to become a *knowledge organization* it is necessary to instil and nurture a successful information culture. Knowledge management is the systematic and active management of the ideas, information and knowledge of employees (Leidner, 1999). The knowledge management process must give equal attention to knowledge storage, distribution and integration to achieve significant organizational improvements (Alavi & Leidner, 1998). Whilst explicit knowledge is formally transmitted and externally documented (Nonaka, 1994; Brown & Duguid, 1991), tacit knowledge is all too often not integrated and therefore is of limited organizational value (Grant, 1996). Preliminary research suggests that knowledge management may require a change in organizational culture, that the values and culture of an organization have a significant impact on the learning process and extent of adaptability to change (Sata, 1989), Alavi and Leidner (1998) found overcoming organizational cultural barriers accounted for the major part of

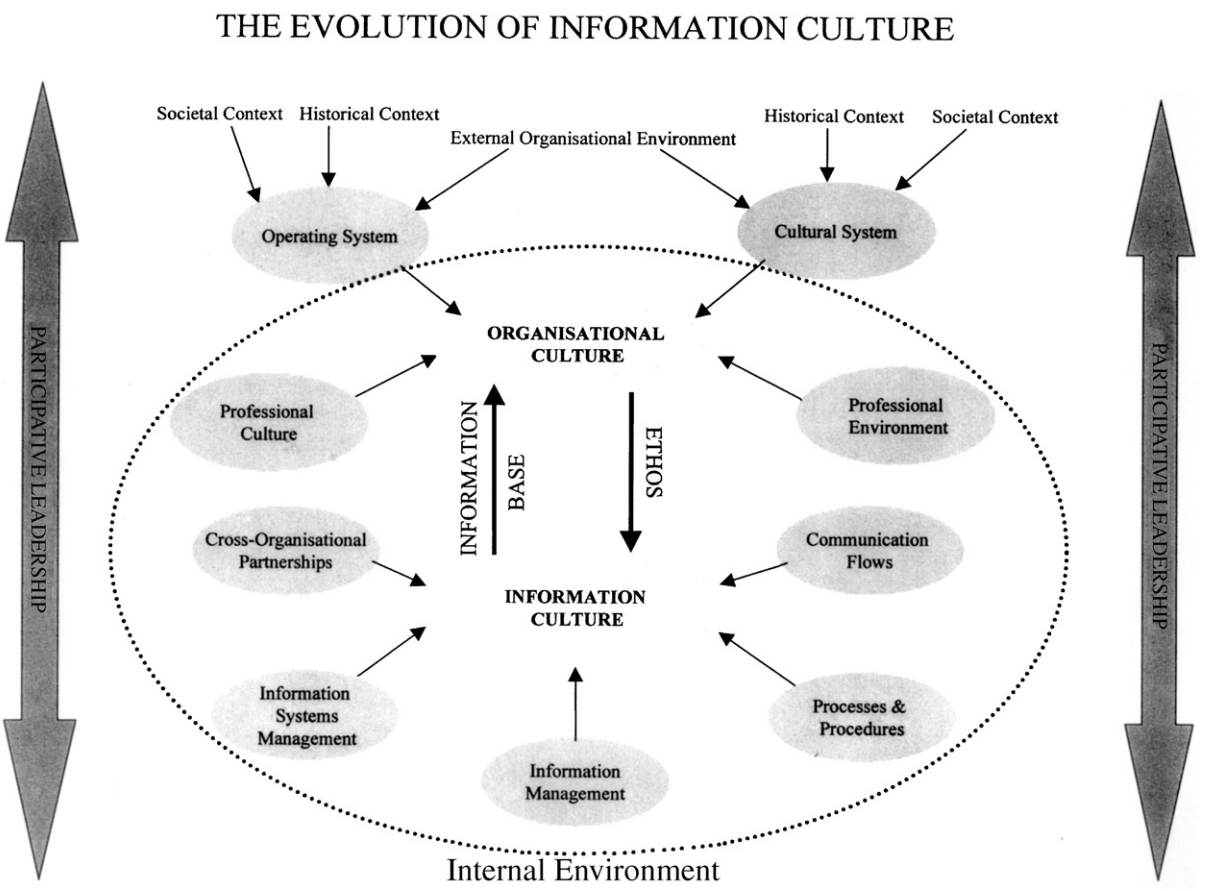

Fig. 1. Evolution of information culture.

successful knowledge management initiatives, whilst Skyrme and Amidon (1997) found corporate culture and changing people's behaviour the major challenges to continuing knowledge management. Junnakar and Brown (1997) have also suggested that knowledge managers interested in the role of IT as an enabler of knowledge management should not merely focus on connecting people with information but on developing an organizational environment conducive to tacit knowledge sharing. The synthesis of information culture and organizational culture would therefore appear to be an integral part of the process of becoming a knowledge organization. It could be argued that to become a knowledge organization it is not only necessary to fulfil the requirements of an information culture but to instil a culture of organizational learning, which in turn is dependent on the internal capacity of an organization to improve or maintain its performance based on experience. According to Agarwal, Krudys, and Tanniru (1997), organizational learning is often viewed as a metaphor for individual learning.

The conceptual model devised depicts the evolution and components of an information culture. The organization first recognizes the need to adopt an information culture, then communicates the ethos and demonstrates commitment by restructuring to reflect the components of an

information culture. The process is dynamic and continues until the philosophy and practice of an information culture become the norm, i.e. "the way we do things around here" (Pedersen & Sorensen, 1989). At this stage the information culture is no longer distinguishable from the organizational culture and the organization has evolved into one in which the availability and use of information are inherent in everyday activities. It is therefore appropriate that the model involve elements of both organizational and information culture. These elements are now briefly outlined.

4.1. Organizational culture

Schein (1985) defines organizational culture in terms of shared, taken-for-granted, implicit assumptions, whilst Burack (1991) defines culture as an organization's customary way of doing things with the philosophies and assumptions underlying these. Hofstede (1980, 1991) refers to national culture as collective programming of the mind that distinguishes one group of people from another. Alongside research examining organizational effectiveness through the use of appropriate technology and structure is emerging research aimed at determining the contribution of organizational culture to organizational effectiveness. There have been difficulties in measuring and categorising organizational cultures with an underlying implication that cultures evolve and are therefore beyond the control of organizational decision makers.

Bloor and Dawson (1994) comment that organizational culture is generally accepted to be historically and socially constructed, holistic and difficult to change. The conceptual model presented in this paper adopts Bloor and Dawson's approach that organizational culture is determined by the dynamic interaction of a number of factors, as follows:

- *Operating and cultural system*—the operating system refers to the organizational infrastructure, in terms of both technology and personnel; the cultural system refers to the shared values and beliefs of the people in the organization.
- *Historical context*—this refers to the founder of the organization's vision and values and to past infrastructures and influences. For an NHS organization the historical context will inevitably be quite substantial with the public perceiving the Service very much as theirs and respective Governments as guardians rather than owners.
- *Societal context*—this refers to the expectations, norms and values of the society in which an organization finds itself. In healthcare there is bound to arise the conflict between competition and value for money and the need to provide a standard level of healthcare regardless of ability to pay.
- *External organizational environment*—this refers to both the "business" of the organization and the market in which it operates. In the case of a public healthcare organization the overall strategic framework will reflect the particular priorities of the political party in power.
- *Professional culture and environment*—a large influence on an organization's culture emanates from the professional sub-cultures that operate within it. Patterson, Payn, and West (1996) and Chatman and Barsade (1995) have referred to individual level cultures that interact either harmoniously or disharmoniously with organizational culture. Professionals have access to two sets of cultural values, those of their profession and those of the organization. Whilst

sub-cultures can exist in harmony in an organizational culture, change will tend to exert different pressures: if change is such that the organization itself is perceived to be under threat, sub-cultures will tend to be ignored in favour of the need for organizational cohesion. If, however, there is no perceived threat to organizational survival, sub-cultures are more likely to close ranks and revert to a strong identification with their profession. In other words, professionals can be an asset to an organization in times of stability but a potential threat in times of organizational or professional change.

4.2. Information culture

By considering the user as a contributor of information to the knowledge management system, we can regard information as having a certain value to the user as an individual asset and a certain degree of value as a corporate asset. Certain individuals will share knowledge willingly, others will hoard knowledge, others will be indifferent and will therefore share randomly and others still will engage in selective sharing (Leidner, 1999). Furthermore, certain types of knowledge will have a greater value. Explicit knowledge such as a corporate training manual is not going to be perceived as a valuable individual asset. On the other hand, tacit knowledge such as lessons learned from a particular project is the type of knowledge with the greatest potential for being perceived as an individual asset. These perceptions of the value of tacit knowledge to the individual and to the organization are factors that will influence information culture.

This part of the model illustrates the components, which it is suggested, are necessary for an information culture to flourish and they are:

- *Communication flows*—the importance of effective organizational communication cannot be overstated (Rockart, Earl, & Ross, 1996). It is, however, a complex two-way process that is subject to a number of potential distorting influences. The presence and effective use of vertical and horizontal flows suggest an organization in which employees are well informed and feel valued. Effective downward flows communicate managerial decisions whilst upward flows represent employees' ability to provide feedback and participate in decision-making. Effective horizontal flows relate to the co-ordination of activities and information sharing. Both formal and informal communication flows are important.
- *Cross-organizational partnerships*—this relates to organizational synergy and how different functions and departments work together. Functional departmentalization, whilst economical, tends to encourage concentration on departmental goals rather than on those of the organization as a whole. Departmental integration and interdepartmental collaboration tend to reduce rivalry and empire building. Orr (1990) makes reference to communal, collaborative working with the consequence that individual learning becomes inseparable from collective learning. This is a particularly important issue in the healthcare context with its need for consistent collaboration between clinicians and managers.
- *Internal environment*—arguably the greatest influence on organizational culture is people. An information culture requires co-operative working practices and open access to relevant information where applicable. An atmosphere of trust is vital, as is the human resource function that plays a critical role in the shaping of organizational culture and therefore also of information culture.

- *Information systems management*—the IS strategy needs to be closely linked to the business strategy (Earl, 1989) with IT as the enabler of computerized IS. Implementation is a key element and user acceptance a critical success factor. The design of IS/IT affects how organizational members interact, providing an important part of the physical and symbolic environment for interaction, along with other concerns such as task, technology, structure, culture, reward systems and leadership style (Boland et al., 1995).
- *Information management*—the implementation of technology to enable the free flow of information does not in itself constitute an information culture. The enthusiasm, support and co-operation of key personnel are indispensable elements of a successful information culture. Information politics also need to be managed, information overload avoided and a common organizational terminology adopted (Markus, 1983). The importance of common linguistic understanding is an intrinsic part of the ability to behave as community members (Brown, Collins, & Duguid, 1989). Relevant and valuable information can only be derived from robust data and effective data management is also a key component of an information culture. The quality of information is only as good as the data on which it is based. The phrase '*data rich, information poor*' (Forte, 1994) is often used to describe organizations failing to maximize value from their information initiatives. Data ownership is also important and information and data should be viewed as a corporate resource. An information culture does not require the utopean view of universal accessibility to all information. Some information will always require specialist skills and knowledge. The key, however, is that all employees are able to access that information which is necessary for the successful execution of their daily tasks.
- *Processes and procedures*—the concise and clear documentation of key policies, processes and procedures within an organization are an indicator of culture. Such documentation should be limited to critical success areas and not be overly bureaucratic. Particularly important for an information culture are clear guidelines and documentation for IS management, information and data management. Information and IS management ensure the provision of a service with information as the product. As such, adequate control procedures should be in place to ensure consistency, quality and continuity of both operation and service.

4.3. Leadership

Underpinning the whole conceptual model is effective leadership. Senior management are responsible for strategic direction and their actions will have a strong influence on the overall organizational culture. Constant emphasis of organizational objectives and values, both orally and physically demonstrated, will shape employees' understanding of what is expected of them.

The adoption of an information culture requires senior management support with an emphasis on co-ordinated leadership rather than merely imposition from the top down. Bearing in mind the close links between organizational culture and information culture, the leadership style needs to reflect those links. The emphasis on co-ordination and participation reflects earlier points made with respect to communities of knowing and integration of the different communities in order to share information. The essence of knowledge management is the preparedness to share implicit information rather than it being merely an individual asset. To move away from empire building and information hoarding, a collaborative, participative leadership style must emerge at all levels of organizational activity. Vertical and horizontal interaction between different groupings can

thus produce the beginnings of a knowledge management system. An information culture cannot simply be imposed from the top, as this would not gain employee acceptance. The support of middle managers who ultimately have significant influence on the employees for whom they are responsible must be actively sought and harnessed. Ideally participative leadership based on vertical and horizontal consultation should be the norm. Whilst the initial impetus and drive can emanate from any level, this activity must ultimately engage senior management support if it is to permeate the entire organization and not remain a mere sub-culture with limited influence.

5. Research methodology

The conceptual model and its underlying concepts were based on the premise that an information culture does not exist in a vacuum but instead requires the organizational culture to be well enough developed so that an information culture can be nurtured. The conceptual model provides the components which, it is suggested, comprise an information culture. A metric then had to be devised as a practical measurement tool and a comprehensive questionnaire was designed to elicit information appropriate for application to the metric. The following components were identified as critical and those on which an assessment of information culture could be based:

- communication,
- cross-departmental partnerships,
- appreciation of information value,
- information systems management,
- internal environment,
- Information management,
- professionalization.

By allocating a score of 100, indicating the perfect position, and scoring the organizational position in relation to each component, an assessment can be made of the information culture within that organization.

A questionnaire (see Appendix A for details) was designed to assess the organizational position against each element of the metric and comprised 55 statements each targeted at a particular component and grouped into 7 logical sections to be intuitive to the respondents. It was important to give the questionnaire a logical flow asking people's ideas and opinions on a range of organizational and informational issues. The final questionnaire groupings were as follows:

- strategy and objectives,
- information,
- environment,
- professional associations,
- information systems,
- relationships,
- communications.

Commenting on strategy and objectives first gave indications as to vertical communication, senior management involvement and leadership style. This is important when assessing corporate culture. The groupings on information and IS were designed to measure some aspects of information culture, whilst environmental questions measured aspects of organizational culture. The groupings of relationships and professional associations measured important aspects of collaboration, sharing of knowledge, interaction between different communities of knowing and the potential existence of sub-cultures within the overall organizational culture. Finally, communications measured ways of communicating and variety of communication, inevitably linked to relationships, environment and both organizational and information culture.

The questionnaire was distributed to staff at the headquarters of an organization with the aim of targeting culture at the epicentre of strategic operations, which is likely to be the primary influence on the organization as a whole. It would have been ultimately desirable to target all offices for a truly representative view but this was not practicable, given the time restrictions for the project. Sixty-five questionnaires were issued and the final response rate was 72%.

As a questionnaire was not sufficient to gain all the information required for assessment against the metric, interviews were also undertaken with key personnel to fill in the gaps, to furnish further qualitative information and to provide an overall picture of the organization's progress in responding to the recommendations of its Information Management and Technology Strategy (C International Consulting Ltd. 1996—IM&T Strategy 1996–2000, case study specific document). The key personnel involved were the IM and T Manager, the Data Manager and Data Protection Officer, the Senior Health Information Analyst and the IT Manager.

6. Research findings

The findings represent a combination of the results of the questionnaires and the interviews. Unfortunately, these findings have had to be considerably abbreviated and edited at the request of the case study organization, which was undergoing a period of considerable change at the time of the research.

6.1. Communications

The aim was to determine the effectiveness of communication flows, given that they constitute a critical success factor for an information culture. Downward communication from senior management to employees was perceived to be effective, aided by the relatively flat reporting structure.

As to the existence of feedback mechanisms, there was once again a positive response, indicating that the majority of respondents felt part of the decision-making process within their departments and that their contributions were valued.

As for horizontal communication, however, responses indicated that departments were unaware of each other's objectives and internal communications within departments were also an area for potential improvement.

6.2. Cross-organizational partnerships

A lack of horizontal communication flows is not surprising, given the particular organizational structure involved in this case, consisting of a functionally departmentalized structure with no formal horizontal connections. On balance, however, responses suggested a willingness to be open and supportive of other departments, implying that although the formal structure is not ideal for co-operative cross-organizational working, staff attitudes would not be a barrier to successful implementation of such partnerships. Interdepartmental working relationships suggested as necessary for a successful information culture do not consist of ad hoc teams assembled for specific tasks but rather of individuals from separate departments who come together for a specific task or project. Neither a strict functional departmentalized structure nor a completely networked structure is conducive to an information culture, but a mixture of both. It is important to have horizontal work practices if a culture of information sharing and co-operation is to be nurtured with staff still ultimately feeling that they belong to a particular department.

6.3. Confidentiality

It was important to assess whether the issue of confidentiality created a barrier to the transfer of information. Whilst certain information, such as patient records, carries some confidentiality, the sharing of information in the healthcare environment is often hampered by a perceived need for confidentiality, which may well not be a real need. Responses were evenly distributed across both department and occupational categories and suggested that, whilst confidentiality is an issue, it does not constitute a barrier to information sharing within the organization. Interviews conducted with those involved in initiatives with outside bodies indicated, however, that the issue of confidentiality posed a threat to the effectiveness of those partnerships. It was suggested that guidelines are needed as to what does and what does not constitute confidential information. Although individuals may not be specifically named, they can still be identified from classifications of geographical location and specified age bands.

6.4. Professions

The case organization had a significant professional employee base, with 55% of respondents indicating membership of a professional association. This suggests that professional culture and environment significantly influence the organization as a whole. What is important to discover is whether the aims and objectives of the professions conflict with those of the organization. As to compatibility of aims and objectives, responses were evenly divided and similarly with regard to organizational willingness to adapt to new ideas and developments emanating from the professions.

In any event, if the organization is to engender a common culture, it must be aware of the potential influence of professional sub-cultures within the organization and the external influences to which they are subject and from which they gain their cultural influences.

6.5. Information

Findings from the research indicated that the organization's employees recognized and appreciated the importance of information and its contribution to effective decision-making with 96% of respondents agreeing that information should be the basis for informed decision-making at all levels of an organization.

Effective data management is also an important component of an information culture. Good data management requires that quality issues are communicated clearly to recipients so that they are aware of the robustness and reliability of the information on which they are basing their decisions (Wang, Yang, Pipino, & Strong, 1998). Assuring quality of data is difficult when the data relied upon comes from a variety of secondary sources. It is therefore important that any problems arising from this are clearly communicated and known to all relevant people. Access to all relevant required information is a commonly reported problem within organizations (Davenport, Eccles, & Prusak, 1992) but can be remedied by effective communication and proactive information management practices. The process of drawing up the IM and T Strategy highlighted the need for a central register for all available information and a Data Management Plan was compiled in 1996 along with a high-level data inventory.

6.6. Information systems

The IM and T Strategy indicated a requirement for integrated and transparent IS to ensure user accessibility of data and information. Users should also be confident and competent in their use of IS allowing them access to critical information. On balance users had confidence in the organizational IS and were reasonably confident in their use.

Much emphasis is placed upon the provision of adequate training but it could be argued that the emphasis should be placed on actions taken immediately after training. Unless a user regularly uses a system, skills are quickly lost and confidence to experiment with a system is a critical success factor for acquiring a high level of skill. This approach must however be underpinned by a sufficiently robust basic level of training.

Finally, there need to be clear guidelines in the form of policies and procedures for all IS. There is no substitute whatever for clear documentation that is accessible, helpful and user friendly.

6.7. Internal environment

An appropriate and conducive internal environment is crucial to the development of an information culture, which requires employees to pool information to achieve organizational objectives, supported by open and transparent working relationships and practices. An atmosphere of trust is indispensable to co-operative working. This requires an environment in which employees feel secure in their value to both the organization and their colleagues.

It must be borne in mind that this research was carried out at a time of major change with entire departments being relocated and considerable uncertainty being experienced by staff. Morale was not particularly high as a consequence and reporting of detailed findings would therefore be unrepresentative of the norm.

7. Results of the metric scoring

By allocating a score out of 100 for each component, an assessment of information culture could be gained (see Methodology section for details of the 7 different components). Fifty-five statements were grouped into categories and individually scored according to a Lickert scale ranging from 1 = strongly agree to 5 = strongly disagree. The total score for individual questions was calculated and each question allocated to one of five groups. Question scores were then aggregated to obtain a category score. Not all categories had an equal number of questions, so categories had to be proportionally increased to reflect this.

7.1. Communication

The score reflected the existence of effective vertical communication channels. If horizontal channels were utilized, this score would undoubtedly rise considerably.

7.2. Cross-organizational partnerships

Respondents did indicate a willingness to share information with other departments when appropriate to do so. Good interdepartmental relationships would appear to exist though not on a formal basis. If formal mechanisms were put in place a much higher score would probably ensure.

7.3. Information value

The appreciation of information value scored quite highly. Agreement with the principles (that quality information is vital to achieving organizational strategic aims, that all decisions should be informed ones and should be targeted at achieving strategic objectives) scored impressively highly.

7.4. Information systems management

The component score reflected an aggregate of scores from the questionnaires and the structured interviews. On balance the approach to IS management was fairly robust, the main area for attention being training procedures which were perhaps sometimes too general.

7.5. Internal environment

The score was quite high in spite of current organizational changes with personnel consequently feeling undervalued.

7.6. Information management

The aggregate score was good though it must be remembered that information management comprises several distinct activities. The score for data management highlighted data management as an area in need of attention. The score for *empowered users* represented the finding that on

balance users were confident that the IS in place were adequate for their needs. They were also confident in their use of IS.

7.7. *Professionalization*

The survey suggested that for some professionals organizational objectives sometimes conflicted with those of their profession. There is a need to be aware of professional sub-cultures which exist and understand their interaction and influence on the organizational culture as a whole. However, given the predominance of healthcare associations, one would expect a number of mutual objectives to exist.

8. Conclusion

The vision for the NHS is that of a modern, dependable, patient-centred Health Service which provides quality services supported by evidence-based practices. Robust information is a critical success factor if this vision is to be realized. Furthermore, the importance of working co-operatively with all relevant parties cannot be over-emphasized when services are being planned and designed, with a culture of openness and information sharing ensuring more informed decision-making.

The model proposed in this paper aims to encapsulate the essential elements of an information culture along with assessment criteria to highlight those organizational areas that need improving. Leadership is arguably the largest determinant of an organization's culture and therefore underpins the entire model. Participative leadership is necessary to capture the support of the whole organization and nurture an integrated information culture.

For the most part, the case organization was shown to be in a reasonably healthy position with respect to its information culture. The analysis showed it to be aware of the value of information and its role and to be confident in the use of IS. There was a significant professional employee base, with the objectives of those professions coming to some extent into conflict with organizational objectives. A significant technological infrastructure existed which appeared to have avoided the danger of technology driven implementation. The needs analysis and procurement procedures in place ensure that the IS implemented are relevant to business requirements.

Effective vertical information flows appeared to be in place though horizontal communications, referring to both intra- and interdepartmental communications, needed to be more in evidence. There was a functionally departmentalized structure which is not conducive to such horizontal flows. The analysis did, however, reveal a willingness to be open and supportive of other departments and to share information when appropriate to do so. This suggests that employees would be receptive to the introduction of formal interdepartmental working relationships.

Maybe all that is needed is for senior management to demonstrate commitment to an information culture with some minor restructuring to allow for formal interdepartmental working. It is also necessary to ensure the availability of adequate resources for support services. These actions would certainly produce a significant improvement to the metric scores recorded.

9. Discussion

The adoption of IT in an organization and the subsequent ability to transfer and access information quickly and efficiently are not sufficient to ensure success. As Davenport et al. (1992) observe, the culture within an organization must be conducive to participative information management. In other words, the technological infrastructure to enable the free flow of information can be in place, but without the co-operation of the managers and staff who are required to undertake the actual information sharing, such initiatives will fail. Success also requires the recognition of both the cultural gaps which exist between the various stakeholders within an organization (Anon, 1996) and the information politics at play.

There has to be the right balance between formality and informality where information management is concerned. In this particular case organization staff views and post hoc reviews were often undertaken through informal discussion whilst informally "walking the building". This has its advantages, often an informal enquiry will elicit a more truthful response, however, because it is not formal, there is no compulsion to act on any issues. A formal review process allows personnel to think about and prepare their responses in advance. It is a critical process which provides the mechanism for identifying areas in need of improvement and for ongoing monitoring and evaluation. Similarly, there are no formal quality procedures for the information provided. Information is a product and should be treated as such. The incorporation of Total Quality Management techniques such as Servqual (Zeithaml, Parasuraman, & Berry, 1990) and Quality Function Deployment (Ramaswamy, 1996) would help ensure that quality was built into the beginning of the information process, thereby ensuring confidence in the finished product (the information). The purpose of these techniques is to establish and prioritize requirements and correlate them to final provision. Information requirements could be clarified and ranked and compared to existing and potential information provision, incorporating the use of IS/IT. This might well also boost motivation and job satisfaction by improving staff morale and frustration experienced trying to access relevant required information at the time it is needed.

A major issue affecting integration and information sharing is the fragmentation of the Health Service itself with Health Boards and Trusts at varying stages of technological advancement and no commonly adopted approach. The Scottish Office Department of Health provides the overall strategic direction in Scotland but the decision rests with individual Boards and Trusts as to how this is achieved. It is difficult to determine the best single way forward as each healthcare entity has different priorities and by implication a different culture. If the vision for the NHSiS is to be realized, the culture within the NHSiS must be unified to provide a common direction by means of a centralized body providing a common co-ordinated approach and a standard level of service, thereby discouraging the development of Boards and Trusts as entirely independent entities. Infrastructures and services cannot, however, be identical and would need to be tailored to suit the population of the area, but this should be done taking account of the requirements of the Service as a whole. It remains to be seen what effect the Scottish Parliament will have on the Service. The NHSiS needs to restructure and provide an appropriate environment in which an information culture can flourish. Astute participative management practices have to be adopted that take account of different cultural perspectives and information politics whilst enlisting the support of staff to help achieve successful change.

The model proposed here represents a tentative first pioneering step to help senior managers assess an organization's position with respect to its information culture and thereafter monitor any improvement efforts.

A model such as this one potentially has a contribution to make to the clinical governance agenda, officially defined as "A framework through which NHS organizations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish" (The New NHS, 1997). Clinical governance has also been likened to a quality system in terms of being a structured framework linked to the corporate agenda with corporate accountability for corporate performance. Whichever view is favoured, there is no doubt that a positive, effective information culture aligned to the culture of the organization is going to be an essential vehicle for future improvement efforts.

Appendix A. Information culture questionnaire

On a five-point scale "strongly agree", "agree", "unsure", "disagree", "strongly disagree", respond to the following statements:

1. *Strategy and objectives*

1. I understand the medium/long-term objectives of the organization.
2. I am aware of the values the organization would like to develop.
3. The objectives of my department are clear.
4. I am involved in setting and agreeing objectives within my department.
5. My immediate manager is interested in my ideas and encourages constructive comment.
6. I understand how my job contributes to the achievement of the organization's aims and objectives.

2. *Information*

7. Information should be the basis for informed decision-making at all levels of an organization.
8. Information is the basis for informed decision-making at all levels of the organization.
9. All decisions should be business driven and targeted at achieving stated strategic aims and objectives.
10. All the organization's decisions are business driven and targeted at achieving stated aims and objectives.
11. I understand the importance of evidence-based healthcare.
12. Good quality information (accurate, current, appropriate, accessible, timely) is critical to achieving the organization's aims and objectives.
13. I am confident that the information on which I base my decisions is always of suitable quality for its purpose.
14. I have access to all the information I require to make decisions effectively.
15. I am aware of the key information held by the organization.

On a scale of "always", "more often than not", "occasionally", "rarely", "never":

16. I collate the required information on which to base my decisions *myself.*
17. I approach the *Information Team* for the information I require to make decisions effectively.
18. I collate the information I require by accessing *external information providers* directly.

On the original scale of "strongly agree" to "strongly disagree":

3. *Environment*
19. I feel that my efforts and contributions are valued by the organization.
20. The organization is interested in my personal development.
21. My immediate manager encourages my personal development.
22. I am highly motivated at work.
23. There is a positive atmosphere within the organization.
24. There is a positive atmosphere within my department.
25. I am supported and encouraged in my work by my colleagues.
26. I feel part of a team working together to achieve the organization's objectives.

4. *Professional associations*
27. Are you a member of a professional association? *Yes/No*
28. I maintain strong links with my association.
29. My links consist mainly of attending social events and conferences.
30. I keep abreast of the current issues and developments in my profession through my association.
31. The values and objectives of my profession are always compatible with those of the organization.
32. The organization is receptive to new ideas and developments that are occurring in my profession.
33. My immediate manager is receptive to new ideas and developments emanating from my profession.
34. I keep abreast of the current issues and developments in my profession through trade journals.

5. *Information systems*
35. I am aware that there is an Information Management and Technology strategy for the organization. *Agree/Disagree*
36. The organization's IM and T strategy adequately meets my information needs.
37. The information systems in the organization adequately meet my needs.
38. I am confident using all the information systems to which I have access.
39. I have desktop access to the Internet. *Yes/No*
40. I am aware of the information resources which can be accessed through the library.
41. The resources available within the library adequately meet my needs.
42. The organization's key policies, processes and procedures for information systems are clearly documented.
43. I know where to access these policies, processes and procedures. *Agree/Disagree*

6. *Relationships*
44. As a department/team we work well together and support each other.
45. As a department/team we have positive relationships with other departments/teams.
46. As a department/team we make decisions independently.
47. We are encouraged to involve all relevant parties when making a decision which impacts on or influences other departments.
48. As a department/team we are always happy to support/provide other departments with relevant information held by us.

On the scale of "always" to "never":
49. Data confidentiality prevents me from sharing information with other departments/teams.

On the original scale of "strongly agree" to "strongly disagree":
7. *Communications*
50. I am aware of the aims and objectives of other departments within the organization.
51. We meet formally with other departments to exchange information and ideas on a regular basis.
52. Internal communications within my department are good.
53. My immediate manager ensures that I am aware of all relevant issues.
54. I often hear about important issues first on the grapevine.
55. Organizational issues are communicated clearly.

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