The University of Strathclyde

Department of Computer and Information Sciences

The Information Audit: Theory Versus Practice

Volume Two

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[1] Summarised for reference only (a full table of contents is provided with the associated volume)

List of Abbreviations

ABC	Activity Based Costing
ADM	Architectural Development Method
BPM	Business Process Management
BPML	Business Process Markup Language
BPMN	Business Process Modelling Notation
BPR	Business Process Reengineering
CM	Content Management
CMMI	Capability Maturity Model Integration
COTS	Commercial of the Shelf
CSF	Critical Success Factor
DFD	Data Flow Diagram
DSS	Decision Support Systems
EA	Enterprise Architecture
IA	Information Audit
IC	Information Content
ICT	Information and Communication Technology
IDEF	Integrated Definition
III-RM	Integrated Information Infrastructure Reference Model
IM	Information Management
IR	Information Resource
IRE	Information Resource Entity
IRM	Information Resource Management

IS	Information System
ISA	Information Systems Architecture
IT	Information Technology
KM	Knowledge Management
MIS	Management Information Systems
OBS	Output Based Specification
PEST	Political, Economic, Social, Technological
RE	Requirements Engineering
SIB	Standards Information Base
SOA	Service Oriented Architecture
SSM	Soft Systems Methodology
STRIM	Systematic Technique for Role and Interaction Modeling
TAFIM	Technical Architecture Framework for Information Management
TOGAF	The Open Group Architectural Framework
TRM	Technical Reference Model
UML	Unified Modelling Language

Appendix 1: Buchanan & Gibb (1998)

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The Information Audit: An Integrated Strategic Approach

S BUCHANAN AND F GIBB

Fundamental to the development of an effective information strategy is the recognition of information as a key organisational resource. The role of the information audit is to provide a method for identifying, evaluating, and managing information resources in order to fully exploit the strategic potential of information. In consideration of this strategic role the information audit should provide strategic direction and guidelines for the management of an organisation's information resources. However, a review of existing methods concludes that none provide a comprehensive information auditing solution or completely fulfil this strategic role. Therefore a universal methodology is proposed. © **1998 Elsevier Science Ltd. All rights reserved**

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Introduction

The strategic exploitation and effective management of information and enabling technologies is increasingly recognised as critical to organisational success. The Hawley Committee [1] have highlighted the need to classify and value the information assets of an organisation while, within higher education, much attention is currently focused on information management following publication of the Joint Information Systems Committee (JISC) guidelines [2] for developing an information strategy. However, many fundamental problems persist. For example, Deloitte and Touche's latest biennial information management survey [3] reveals that information overload, organisational misunderstanding of the role of information management, inadequate locator tools, poor co-ordination of information with decision-making needs, and costs associated with paper handling, non-compliance and information loss are still significant features of the information terrain.

In response to these problems this paper discusses the strategic role of the information audit in helping to achieve the twin goals of effective information management and maximum exploitation of an organisation's information resources. We look at the requirements for an information strategy and describe a framework for the alignment of information strategy with business strategy; Next, the paper addresses the role of the information audit and reviews some popular approaches; We then propose a new integrative approach to the information audit; and finally summarise the conclusions of this study.

[1] The Hawley Committee, *Information as an asset: the board agenda*. KPMG, London, 1996.
[2] Joint Information Systems Committee, *Guidelines for developing an information strategy*. JISC, Bristol, 1995.
[3] Information management survey. Deloitte and Touche, London, 1996.

The strategic requirement

Remenyi provides considerable evidence [4] that many organisations have underestimated the strategic importance of information and associated technologies and that this has resulted in poor planning and unfulfilled potential of IT. Remenyi argues that in several cases organisations have failed to realise the strategic benefits of IT because they have mistakenly regarded IT as merely a replacement for manual and administrative functions rather than as a strategic resource. This echoes the view of Marchand and Horton:

> The firms that just survive in the information economy will be the ones that just use information resources and computer technologies only as cost-displacement and labor-saving tools. The firms that compete effectively and flourish in the information age will be the ones which use information technologies in strategic ways to manufacture new and better products, find new markets, and distribute products and services in creative ways. These will be the intelligent organizations of the future. [5]

Remenyi also highlights several management problems associated with IT initiatives:

- The culture gap between IT managers and business managers resulting in mistrust, poor working partnerships, and a lack of strategic alignment.
- A lack of procedures or a policy statement for the acquisition of IT and the creation of operational guidelines.
- A failure to measure the benefits delivered or derived from information systems.
- A failure to deliver cost effective systems and to identify, cost and allocate appropriate resources to deliver and maintain systems.
- A lack of integration between information systems resulting in substantial amounts of data duplication, unnecessary data entry and data processing.
- Failure to integrate IT investments with strategic business initiatives.

Further problems which may affect the successful implementation of IT/IS include:

- A lack of transparency in decision-making.
- A lack of a clear project sponsor and owner.
- Inheritance of projects by sponsors with new agendas and priorities.
- A lack of user involvement in *all* aspects of the system life-cycle.
- A lack of core competencies.
- Power-mongers, who have no project specific responsibilities, attempting to influence project goals.
- Multiple reporting lines where the initiative serves multiple stakeholder groups.
- Ineffective change management.

Earl [6] argues that senior managers need to take responsibility for positioning the use of IT as an enabling force in shaping business plans and initiatives. This implies the need for senior management and other users to become more aware of the opportunities and associated competitive threats presented by IT. The requirement is for a clearly defined information management function that reflects the need to shift from an emphasis on technology management to one of matching information resources to business objectives. Thus, it is no longer sufficient to be technically competent to manage IT and information systems. A multi-disciplinary

[4] Remenyi, D., *Information Management Case Studies*. Pitman, London, 1993.
[5] Marchand, D. and Horton, F.W., *Info-Trends: Profiting from your Information Resources*. John Wiley, New York, 1986.
[6] Earl, M.J. ed., *Information Management: The Organizational Dimension*. OUP, Oxford, 1996.

approach is required that combines both business and information management skills in order to effectively bridge the gap between IT and the organisation's strategic business objectives.

Remenyi proposes that what is required is a new paradigm for information management that applies basic business principles through a process of commercialisation:

> To ensure commercialisation, and therefore value for money, in the mid-1990s, firms will have to manage their *information resources* in innovative ways which will tend to reshape the business, use information and data more fully and ultimately deliver real and measurable benefits. This means "inter alia" that better costing systems and better benefit measuring and managing systems are required. (emphasis added) [7]

The change to viewing information as a resource recognises that IT does not, of its own, confer competitive advantage or other business benefits. This reflects growing awareness that emphasis must shift from the container to content and context; from means to meaning and management (see for instance, Massey,[8] Best,[9] Vickers,[10] Marchand and Horton,[11] Orna [12]). Information must be recognised as a resource that needs to be managed and accounted for like any other resource. This management philosophy was first popularised by Burk and Horton as information resource management.[13]

Information resources are those resources which facilitate the acquisition, creation, storage, processing, or provision of information that generates the knowledge or other value required to achieve the goals and objectives of the organisation. Developing an effective information strategy requires determining what and where these information resources are. This is the primary role of the information audit and is addressed later in this paper. Firstly, however, it is important to define the scope of information strategy and its relationship to business strategy.

A framework for information strategy

The alignment of information strategy with business strategy is a critical ingredient for the success of the parent organisation. The relationship between business and information strategies is shown in *Figure 1*. It should be emphasised that the distinctions made between the various components represent an ideal and that the size or attitude of an organisation to information technologies may blur boundaries, conflate roles, or simply ignore some of these building blocks.

Business strategy will typically involve four key components: mission, objectives, policy and constraints, and planning (see *Figure 2*). The mission provides a top-level, often highly generalised, statement of what the organisation wishes to be. It should be capable of being a touchstone which is immune to all but the most dramatic changes in the organisation's environment. The mission statement is often criticised as being overly simplistic, intentionally non-controversial, and worded in terms of motherhood and apple-pie. This is in part because it is intended to be placed in the public domain and must strike the right chord with the market. It will attempt to convey the values of the organisation and should be capable of persisting, even through times of rapidly changing market conditions.

The mission statement is developed through a series of objectives, only some of which may be placed in the public domain. The objectives will not necessarily have the same degree of permanence as the mission statement and will be reviewed regularly to ensure that they reflect the current

[7] *op. cit.*, Ref 4.
[8] Massey, J., Vital assets. *Information Age*, June, 1995, 25-33.
[9] Best, D. ed., *The Fourth Resource: Information and its Management*. Aslib, London, 1996.
[10] Vickers, P., Information management: Selling a concept. In *Information Management from Strategies to Action*, ed. B. Cronin. Aslib, London, 1985.
[11] *op. cit.*, Ref 5.
[12] Orna, E., *Practical information Policies: How to Manage Information Flows in Organisations*. Gower, Aldershot, 1990.
[13] Burk, C.F. and Horton, F.W., *Info-Map: A Complete Guide to Discovering Corporate Information Resources*. Prentice-Hall, Englewood Cliffs, 1988.

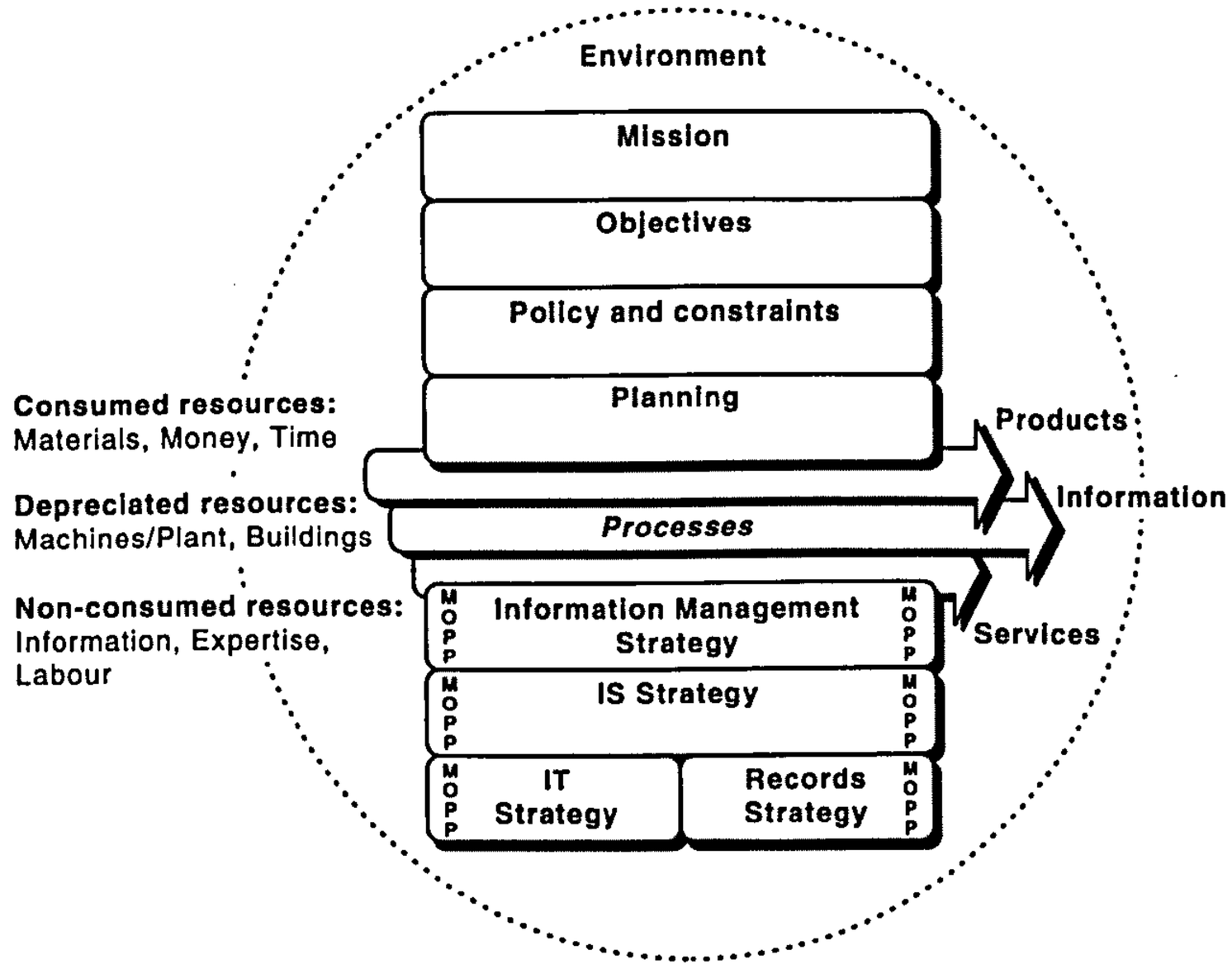

Figure 1 Business and information strategies

market conditions and perceptions regarding the best way(s) to satisfy the enterprise's mission. The objectives will also have to be interpreted within the context of the enterprise's policy on, for instance, investment, procurement and recruitment, and constraints such as the availability of capital, the regulatory regime and technologies. Policy is likely to be articulated for both public and private consumption, whilst the constraints will be divided into those which are purely for private use and those which are not. Having established the objectives, and identified the relevant policy issues and constraints, the enterprise will then develop specific plans for the realisation of the agreed objectives.

The enterprise will then have to identify, design, implement and manage the key processes which will be used to achieve its strategy. Processes can be grouped under four main headings:[14]

- Core processes (servicing external customers);
- Support processes (servicing internal customers);
- Business network processes (crossing company boundaries);
- Management processes (establishing the strategic framework for the other processes).

These processes will take inputs, transform them, and create value-added outputs which will ultimately represent the products and services offered by the enterprise. The processes must therefore be underpinned by a series of strategies which are concerned with the effective management of the resources required by each process.

The adoption of a process, rather than a functional, view of the organisation has major implications for the information manager. Many organisations now accept that while it is important to recognise functions (such as personnel, sales, finance, etc.) they can create barriers to effective information flow and encourage managers to adopt protectionist stances. A process transcends this functional view as it:

[14]Earl, M.J. and Khan, B., How new is business process redesign? *European Management Journal*, 1994, **12**(1), 21.

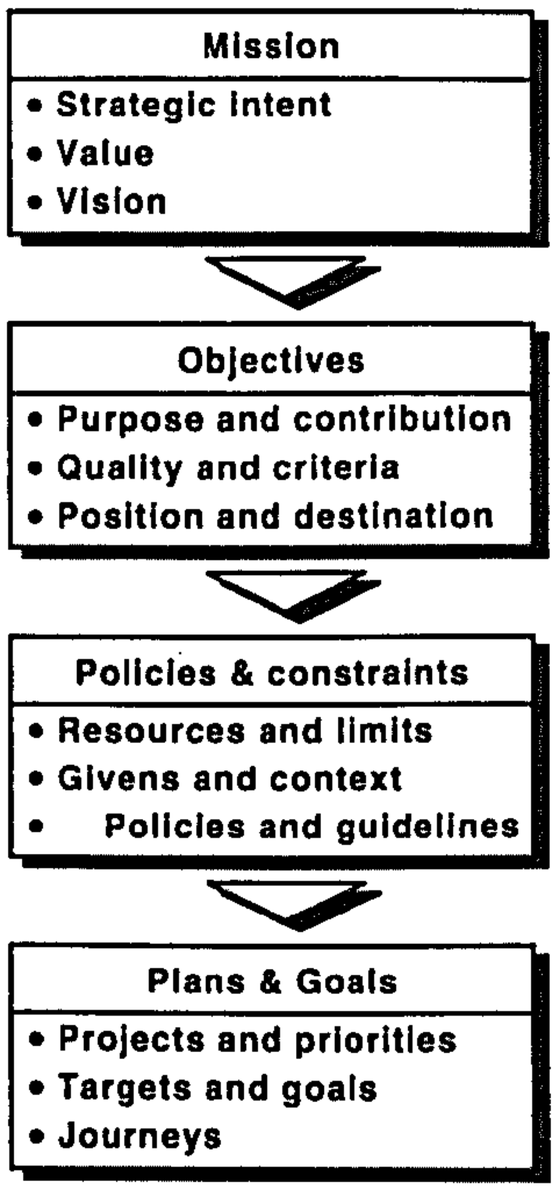

Figure 2 Mission, opportunities, policies and plans (adapted from Earl[15])

- Has customers (external or internal);
- Crosses organisational boundaries (again external or internal);
- Has inputs and outputs from many parts of the organisation;
- Is highly information and technology dependent.

Focusing on processes therefore forces the organisation to look at how information flows and how functions must co-operate in order to achieve customer satisfaction. The analysis of these flows falls within the information audit, which is discussed in the next section.

The role of the information audit

Information managers will need to call on a number of tools in order to define and implement an information strategy. One popular approach is the mapping of dynamic information processes and information flows. This approach links technical and social systems as it involves an analysis of the communications (processes and information) that take place between agents (people) in a social context (the organisation) using a variety of media and channels (technology). Information strategy is therefore concerned with managing the relationships between these components (see *Figure 3*).

Taken further, organisations can be viewed as a series of conversations.[16] Managerial work consists of many short interactions (traditionally oral) in which managers create, meet, and initiate further commitments. The core of an organisation is a network of recurrent conversations based on initiating, monitoring and co-ordinating, and the lifeblood of an organisation is these information flows. One criterion for deciding on investment in information systems therefore should be the extent to which the system plays a role in supporting these communi-

[15]Earl, M.J., *Management Strategies for Information Technology.* Prentice-Hall, London, 1989.
[16]Costello, J., The united way to better management. *Computer Weekly,* 14 March, 1991, pp. 22–23.

cative acts. The upsurge in interest in group-oriented systems can be understood within the context of this appreciation of the importance of effective information flow.

The information audit is a process for discovering, monitoring and evaluating an organisation's information flows and resources in order to implement, maintain, or improve the organisation's management of information. The information audit should not be considered as an option, but as a necessary step towards determining the value, function, and utility of information resources in order to fully exploit their strategic potential.

The exact boundaries of an information audit may be difficult to draw as it may subsume more specific audit processes or be subsumed itself by others; for example, the communications audit. A typology of audits is shown in *Figure 4*. The business audit is designed to assess the health of the organisation in terms of its current strategy, its target and potential markets, and the products and services it has available to meet those market demands. The communication audit is designed to evaluate the management style of the organisation and the methods for communicating to and with its workforce. It is concerned with the sociological and organisational aspects of information flow. The information audit then looks at the managerial aspects of information flow by evaluating the key processes, their interaction and the information resources needed to service them. The systems audit then evaluates the functionality, usability and effectiveness of specific applications, while the technology audit is principally concerned with asset management.

Traditionally, information audits have tended to be designed specifically for the individual organisation in which they are to be implemented and, consequently, their role has varied depending upon the particular circumstances and objectives of the organisation. Because of this, the role of the information audit has neither been clearly defined or universally agreed upon. For example, in its simplest form the purpose of the information audit is to:

- Identify an organisation's information resources.
- Identify an organisation's information requirements.

However, when used to its full potential the purpose of the information audit can also include:

- Identifying costs and benefits of information resources.

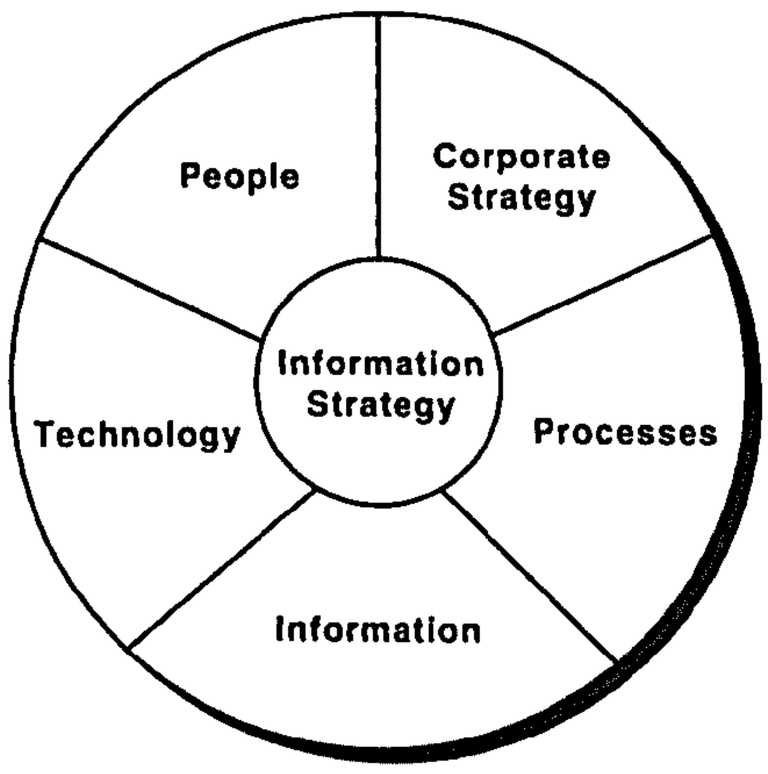

Figure 3 The co-ordinating role of information strategy

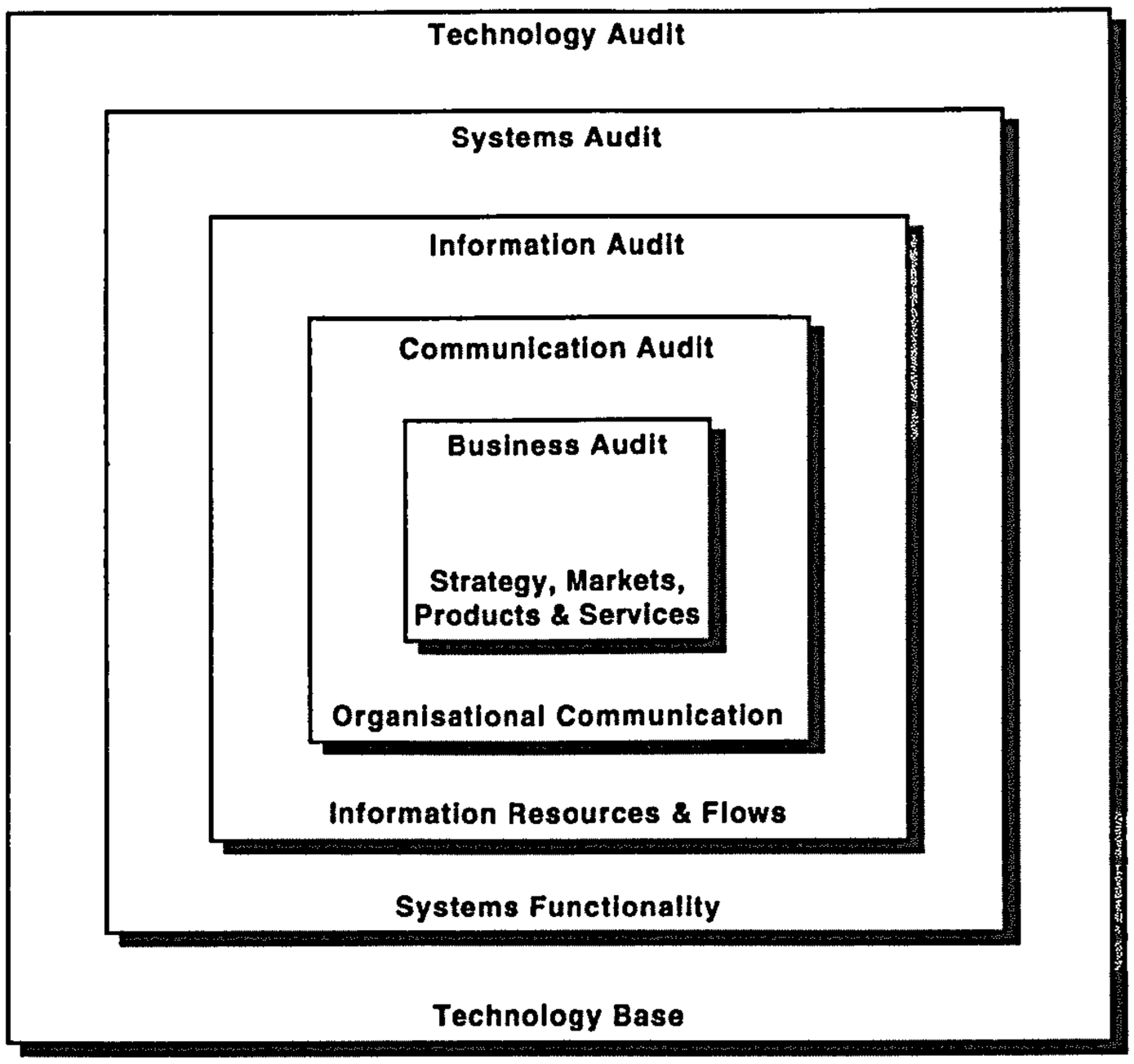

Figure 4 A Typology of audits

- Identifying opportunities to use information resources for strategic competitive advantage.
- Integrating IT investments with strategic business initiatives.
- Identifying information flows and processes.
- Developing an integrated information policy.
- Creating awareness of the importance of IRM and defining the management role.
- Monitoring and evaluating conformance with information-related standards, legislation, and policy guidelines.

Ideally, an information audit should include all of the above to provide a truly comprehensive and integrated strategic approach. This approach would as its ultimate goal, produce an integrated information strategy encompassing and providing overall direction for each of the functions defined by Earl [17] and illustrated in *Figure 5*. Note that each strategy component is complemented by its own audit approach (IM strategy: information audit; IS strategy: IS Audit; IT strategy: IT audit).

An alternative view of the same model is given in *Figure 6* which highlights some of the responsibilities which fall under each strategy.

To achieve this level of integration the information audit method should be similar in approach to Earl's multiple methodology for information system strategy formulation (see *Figure 7*).

Leg one of Earl's model matches IS investments with business needs by adopting an analytical top–down approach supported by a formal methodology and inputs from business teams. These business teams should involve representatives from relevant stakeholder groups and not be restricted to technical specialists. Leg two evaluates current information systems by conducting bottom–up surveys and internal audits to identify

[17] *op. cit*, Ref 14.

system gaps that need to be filled. As discussed above there are a number of audits that may be undertaken and typically these will be undertaken by relevant specialists. Leg three identifies opportunities afforded by IT which may yield competitive advantage or create new strategic options by a creative approach that encourages entrepreneurial managers to generate innovative solutions.

The information strategy should encompass each of these legs with the second leg expanded to become the identification and evaluation of information resources (which would include information systems). As a basic framework, the information audit should begin by identifying the business goals and activities, before identifying the related information resources, and then exploring innovative IT solutions as part of the final information strategy development stage. The end result will allow the organisation to identify where it wants to be, what it currently delivers, and what it must provide to bridge the gap between demand and capability (see *Figure 8*).

Existing information audit methods

A problem with existing information audit methodologies is that although there has been much recent debate on the subject (Barker,[20] Robertson,[21] Haynes,[22] Underwood,[23] Ellis *et al.*,[24] Gillman,[25] Gibson,[26] Bertolluci,[27] Dimond[28]) very few of the methods proposed or discussed go beyond basic frameworks which require further development. As yet, there is no single accepted methodology that is supported by statute, standard, or professional association. Although several methods exist (Riley,[29] Henderson,[30] Gillman,[31] Quinn,[32] Worlock,[33] Reynolds,[34] Barker,[35] Best[36]) many are characterised by a very definite purpose and scope which makes their universal adoption difficult. For this reason the most commonly adopted methodologies are those provided by Burk and Horton,[37] and by Orna.[38] Each of these methods is briefly reviewed below.

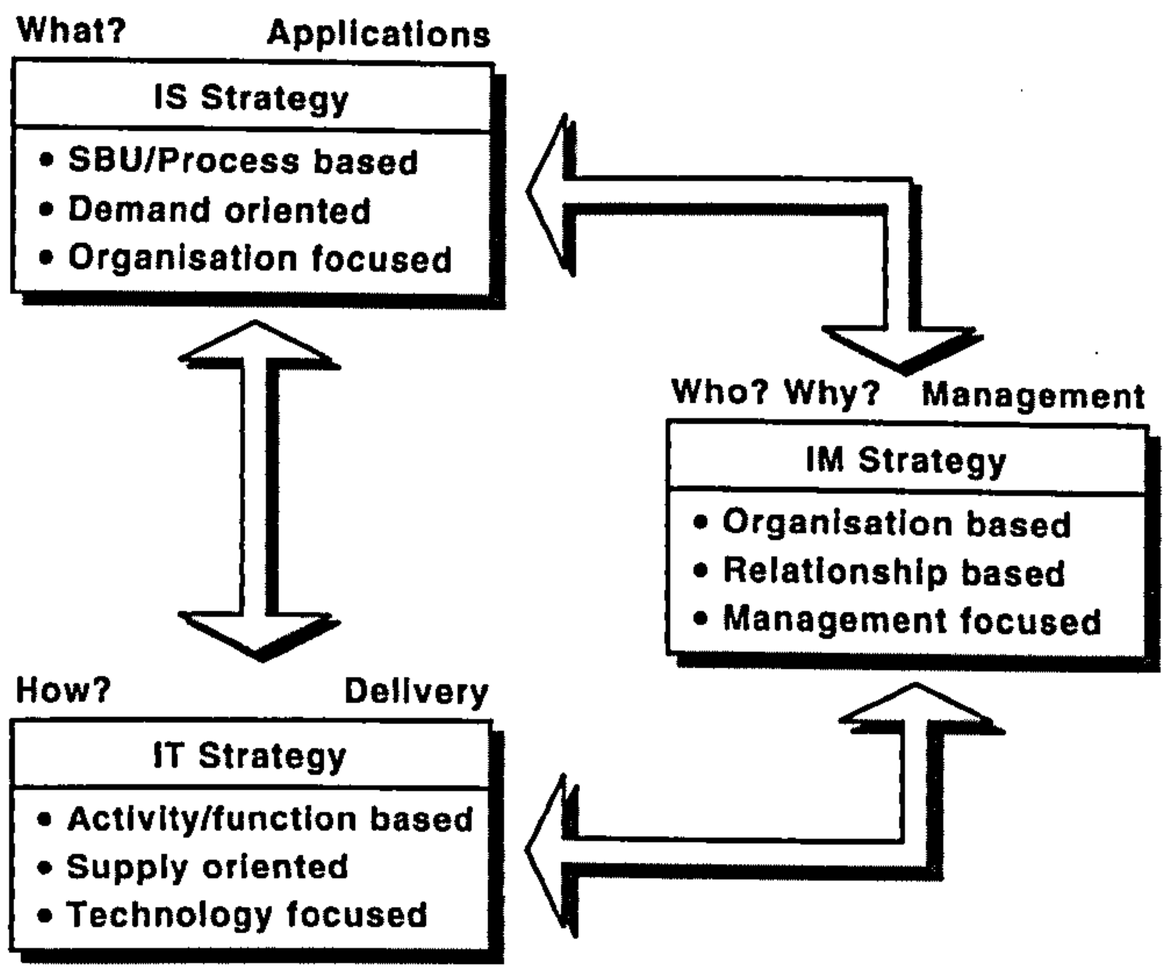

Figure 5 Interlinking information strategy components (adapted from Earl[18])

[18]*ibid.*
[19]*ibid.*
[20]Barker, R. L., Information audits: designing a methodology with reference to the R & D division of a pharmaceutical company. Department of Information Studies, Occasional Publications Series No. 8. University of Sheffield, Sheffield.
[21]Robertson, G., The information audit: a broader perspective. *Managing Information,* 1994, 1(4), 34–36.
[22]Haynes, D., Business process re-engineering and information audits. *Managing Information,* 1995, 2(6), 30–32.
[23]Underwood, P.G., Checking the net: a soft-systems approach to information auditing. *South African Journal of Library and Information Science,* 1994, 62(2), 59–64.
[24]Ellis, D., Barker, R., Potter, S. and Pridgeon, C., Information audits, communication audits, and information mapping: a review and survey. *International Journal of Information Management,* 1993, 13(2), 134–151.
[25]Gillman, P., Information audits, and what they tell about services. *TIP Applications,* 1996, 9(8), 6–10.
[26]Gibson, P., Information audits: can you afford not to? *Library Manager,* 17 April, 1996, pp. 12–13.
[27]Bertolocci, K., The information audit: An important management tool. *Managing Information,* 1996, 3(6), 34–35.
[28]Dimond, G., The evaluation of information systems: A protocol for assembling information auditing packages. *International Journal of Information Management,* 1996, 16(5), 353–368.
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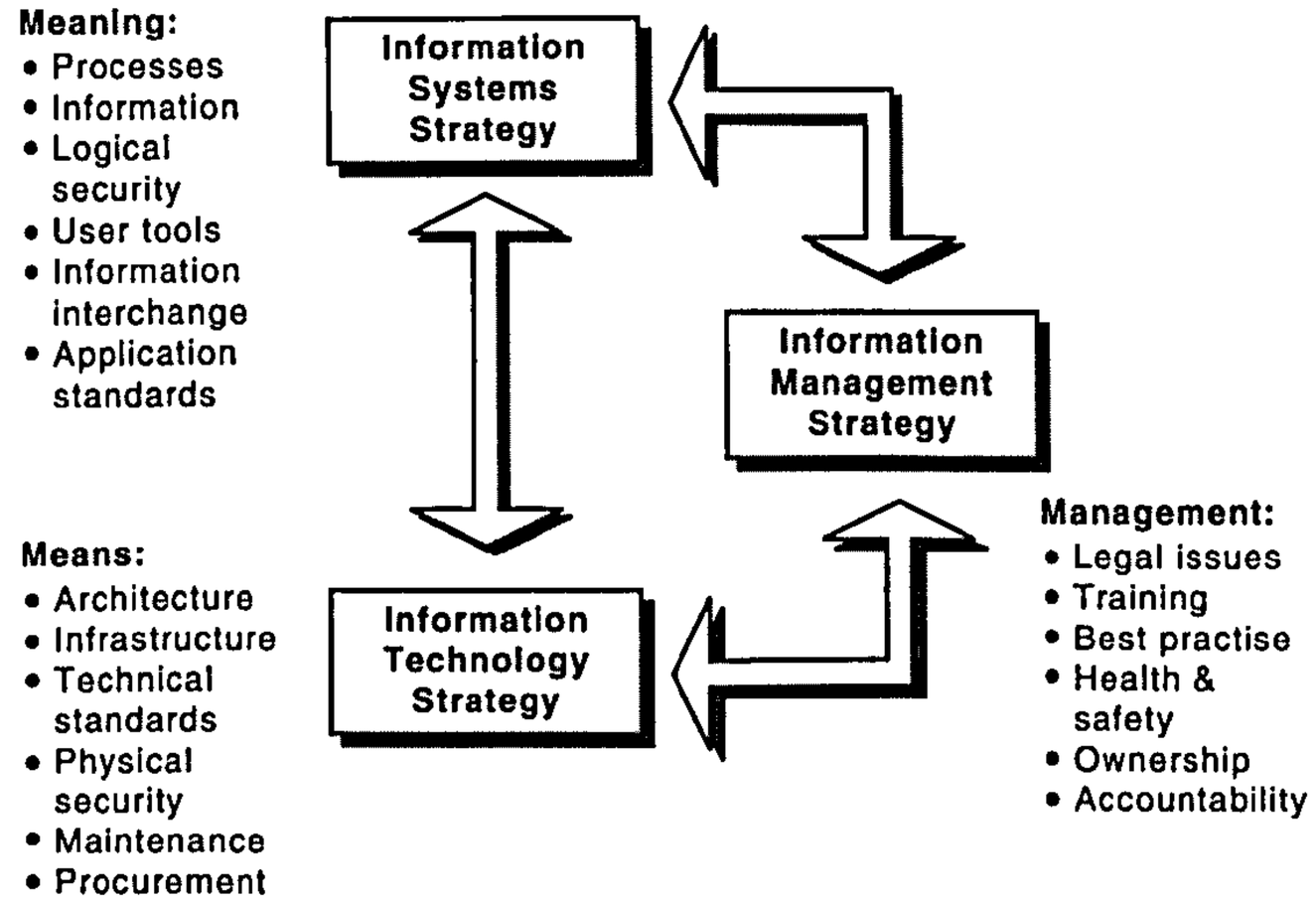

Figure 6 Information strategy agendas

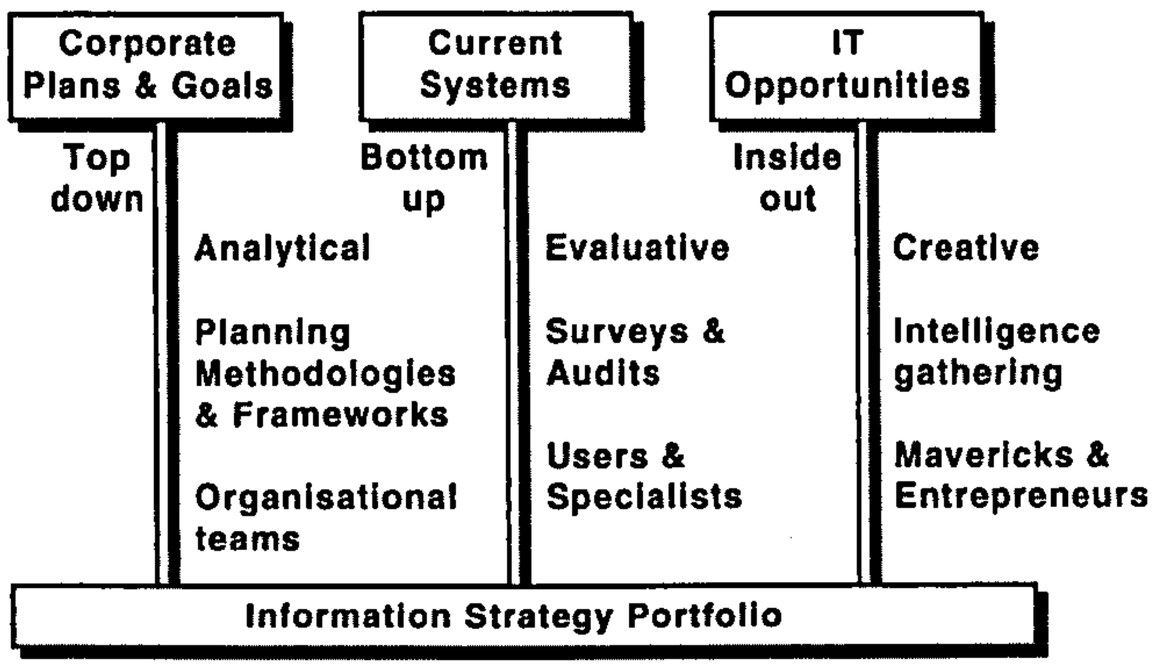

Figure 7 A multiple approach to information strategy development (adapted from Earl[19])

Horton's infomap

InfoMap, developed by Burk and Horton,[39] provides a step by step process to discover, map, and evaluate information resources. The methodology is highly structured and provides a framework for carrying out a comprehensive inventory of an organisation's information resources. There are four main stages:

- *Survey:* the organisation's existing information resource base is defined by carrying out a preliminary inventory of all information resource entities (IREs) via interviews with staff involved in using, handling, supplying, and managing information.
- *Cost/Value:* a multi-disciplinary approach drawing from accounting, business, and economics is adopted to measure the cost and assess the value/benefits of each IRE in order to relate cost and value in the form of ratios to provide an overview of costs and value across the organisation.
- *Analysis:* three information resource mapping techniques are used to relate the identified IREs to the structure, functions, and management of the organisation. Through this process the particular functions and

continued from page 36

[29]Riley, R.H., The information audit. *Bulletin of the American Society for Information Science,* 1976, **2**(5), 24–25.
[30]Henderson, H.L., Cost effective information provision and the role for the information audit. *Information Management,* 1980, **1**(4), 7–9.
[31]Gillman, P.L., An analytical approach to information management. *The Electronic Library,* 1985, **3**(1), 56–60.
[32]Quinn, A.V., The information audit: a new tool for the information manager. *Information Manager,* 1979, **1**(4), 18–19.
[33]Worlock, D.R., Implementing the information audit. *Aslib Proceedings,* 1987, **39**, 255–260.
[34]Reynolds, P.D., Management information audit. *Accountants Magazine,* 1980, **84**(884), 66–69.
[35]*op. cit,* Ref 20.

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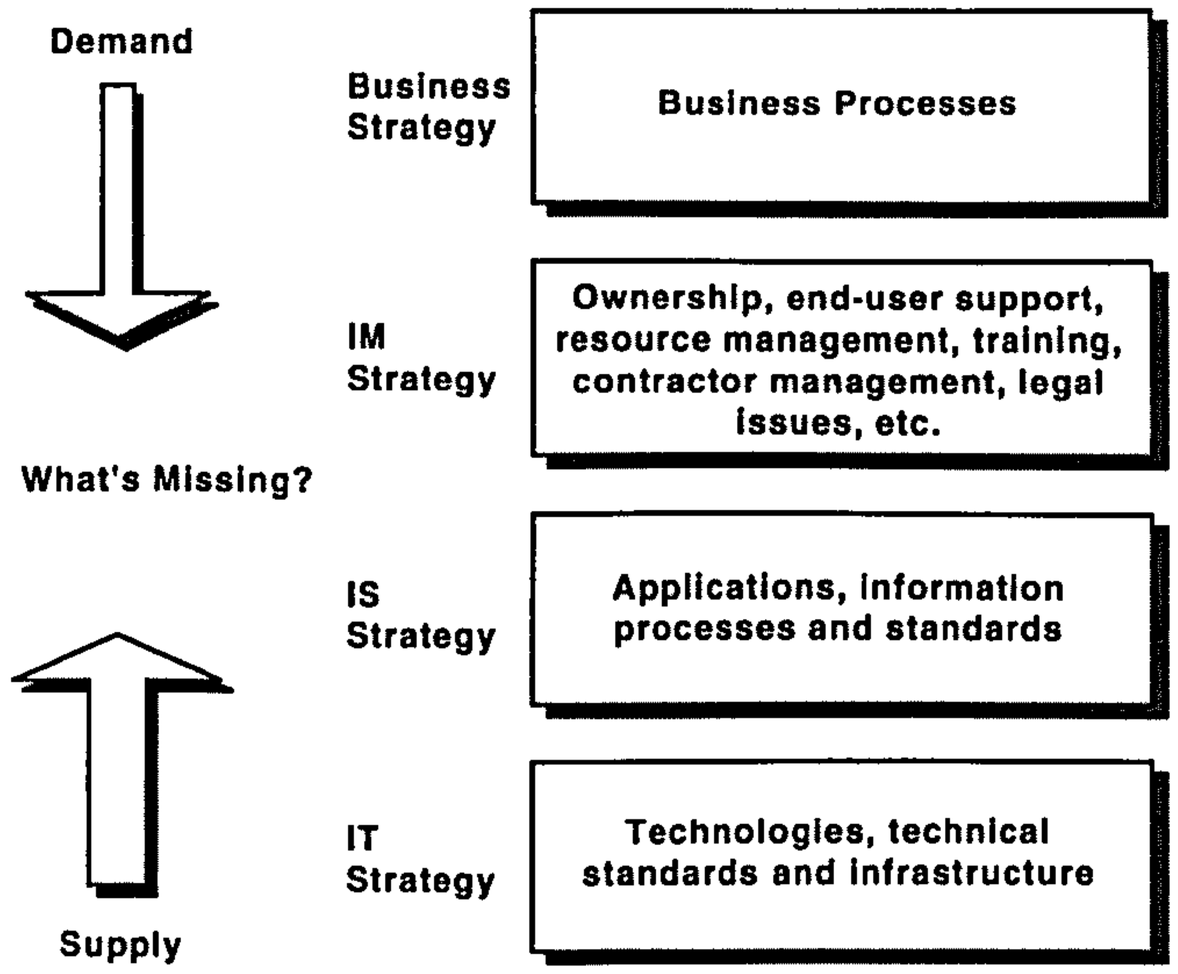

Figure 8 Bridging the gap between business needs and technological potential

configurations of IREs can be identified and related to the organisational structure in order to identify corporate resources.

- *Synthesis:* by careful selection of a set of resource criteria (nature, cost, and value of each IRE) the organisation's information resources are identified along with their strengths and weaknesses relative to the objectives of the organisation.

InfoMap is arguably the most comprehensive method available for identifying and defining an organisation's information resources. For the organisation there are a number of benefits:

- It helps to identify all formal information resources (e.g. is comprehensive rather than selective).
- It provides a measurement of the cost and value of IREs.
- It draws attention to problems and opportunities relating to current information management practices and policies.
- It creates and stimulates awareness of the importance of IRM.

However there are also a number of potential problems:

- The main purpose is discovery and awareness of information resources, not how to manage information.
- The process is time consuming and can incur considerable expense.
- Measures of cost and value are, in most instances, rough approximations.
- Attention is focused on information resources and does not include an organisational analysis.
- It provides a snapshot analysis of the organisation that will require periodic updating.

One the limitations of InfoMap identified by other commentators is the neglect of the issue of organisational context. Burk and Horton do point out the importance of context at various stages but do not provide any method or technique for its analysis. Underwood [40] argues that because InfoMap is dependent on users identifying information

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[36]Best, D., Information mapping: A technique to assist the introduction of information technology in organisations. In *Information management: From strategies to action*, ed. B. Cronin. Aslib, London, 1985, p. 79.
[37]*op. cit*, Ref 13.
[38]*op. cit*, Ref 12.
[39]*op. cit*, Ref 13.
[40]*op. cit*, Ref 23.

resources, more emphasis is placed on the discovery process than on the use of such information. This can then make analysis of the results difficult because of a lack of detailed knowledge regarding the context of information use within part(s) of the organisation.

Underwood also points out that InfoMap is dependent on there being a reasonably stable and coherent set of views about the range and value of information resources within the organisation. He argues this world view is typically found in organisations that have reached a point of evolutionary stability (or maturity) and therefore have comparatively little to gain from an information audit. However, the organisations with the most to gain from an information audit may be those experiencing instability but which ironically could be hampered by their own organisational immaturity. Underwood provides an example of this problem from a recent case study.[41]

The organisation being audited was three years old, had a highly divisionalised structure, and was going through a period of rapid growth and change. At the time of investigation the organisation was considering a central information service or resource centre to support the various divisions. The first step was to establish an information map of the organisation. The chosen methodology was InfoMap. However it was extremely difficult to establish a shared organisational view of information resources and to persuade divisions that resources available to them could also be of value elsewhere in the organisation. In the end, the results of the audit provided no common view and ultimately relied more on the judgement of the consultants.

Underwood's experience should not be considered as a serious criticism of InfoMap, but more as an example of some of the problems that can disrupt the audit process. The purpose of InfoMap is to carry out an inventory of information resources and therefore the problem lies more with the organisation than the particular method. However Underwood's experience does highlight the need in some cases for a more extensive audit process that includes more of an organisational analysis. One such method is provided by Orna's flow based approach.[42]

Orna's information flow analysis

In contrast to the bottom up approach of InfoMap, Orna's top down approach places more emphasis on the importance of organisational analysis. While InfoMap focuses on static IREs, Orna's method focuses on dynamic information flows. Also, while the end product of InfoMap is a series of maps (or tables) to provide an inventory of information resources, the end product of Orna's approach is a corporate information policy.

There are four main stages to Orna's method:

- *Initial investigation:* a top–down analysis of the organisation's objectives, structure, and culture with the knowledge gathered forming the basis of the information audit.
- *Information audit:* adopts several steps from InfoMap but goes on to identify information flows, human resources, and the distribution of IT in relation to information flow.
- *Balance sheet:* the findings of the information audit are related to the organisation's objectives to identify positive and negative relationships.

[41] *Ibid.*
[42] *op. cit,* Ref 12.

- *Policy development:* the development of a corporate information policy to provide strategic direction and management guidelines for the organisation's future use of information.

Orna's method has three main advantages over other methods of information auditing:

- A top–down organisational analysis is carried out.
- Dynamic information flows are identified.
- The end product is a corporate information policy.

However, a potential challenge with Orna's method is that it lacks the practical tools and techniques required to carry out several of the steps. For example, during the initial investigation (stage one) a crucial step is an in-depth investigation of the organisation's objectives, structure, and culture. However to carry out the initial investigation requires a number of important research skills (e.g. interview technique, qualitative data analysis, and organisational analysis tools to identify the organisation's mission, environment, structure, and culture) that can be easily underestimated in terms of their potential complexity and need for a structured, methodical approach. Further, it is highly probable that the information audit will be managed or carried out by an information professional or senior member of staff with an information background who consequently may lack one or more of these required skills. This has been highlighted by Best:[43]

> ..the skills needed, spanning as they do business, information and technology areas, are rare and not yet part of training programmes for managers in MBA and other Business School courses.

The solution of course is to have a multi-disciplinary management team and this is recommended by Orna. However, there will still remain a need to identify suitable tools and techniques to carry out several of the steps involved in the audit process. Nickerson [44] has highlighted this problem and suggests that tools and techniques are simply outside the scope of Orna's methodology. However, whether this is true or not, it does highlight a potential barrier to success that cannot be ignored.

It is apparent from this review that no single method can provide a complete information audit solution and that none fully fulfil the strategic role of the information audit. The distinguishing feature that each method has in common is that they all have a very definite purpose and scope, which inevitably acts as a trade-off with universal applicability. Perhaps the most useful and applicable method is provided by Orna but this ultimately depends on the objectives of the information audit. Therefore it is essential that the purpose and scope of the information audit are clearly defined, for only then can an appropriate methodology be selected or developed.

For the purposes of developing an information strategy, a comprehensive top-down integrated strategic approach is required. This should incorporate the appropriate tools and techniques to guide and support what is essentially a complex and multi-disciplinary approach that requires a broad range of business and research skills. Two aspects should be highlighted in this context:

(1) There is a need for a more comprehensive top–down integrated strategic approach to information auditing which enables the development of an information strategy.

[43] *op. cit*, Ref 9.
[44] Nickerson, G., Book review: Practical information polices: how to manage information flows in organisations. *Database*, 1991, **14**(6), 86.

(2) The success of this approach is critically dependent on the identification of appropriate management tools and techniques to make it work.

An integrated strategic approach to information auditing

In consideration of the limited choice of information audit methodologies it was decided that a universal model should be developed that might be of use to other organisations. The methodology is therefore presented in its entirety, identifying each and every prerequisite for the development of an effective information strategy. Organisations may find that they already possess the knowledge to satisfy some of these steps. For example, they may already have a mission statement with clearly identified objectives; if this is the case they will be able to skip the relevant steps.

There are five main stages to the methodology:

- **Promote**
- **Identify**
- **Analyse**
- **Account**
- **Synthesise**

The information audit is led by the information auditor (a senior information professional — internal or external) in association with a working group. The working group should be a representative team of senior members of the organisation selected for their information-related backgrounds.

Promote

The purpose of this stage is to promote support and co-operation for the information audit. There are three steps, the first two of which are completed by the working group while the final step is completed by the auditor:

(1) Promote the benefits of the information audit. Ideally the organisation should hold a conference or series of seminars which explains the role of the information audit and why the organisation needs one. The purpose of this step is twofold:
   - To promote support and co-operation by increasing awareness and understanding of the strategic importance of information management and highlighting the benefits to be gained from the information audit.
   - To reduce suspicion and hostility among staff members.

(2) Foster co-operation throughout the organisation. This is achieved by circulating a passport letter [45] signed by the chief executive that succinctly reiterates the issues addressed by the previous step and informs staff of the procedures to be followed during the information audit. The passport letter acts both as a medium of introduction for the auditor, and as a symbol of approval from the top executive.

(3) Carry out a preliminary survey of the organisation. The purpose of this step is to allow the auditor to make preliminary assessments of the level of awareness and value of information throughout the orga-

[45]Hamilton, S., *A Communication Audit Handbook: Helping Organisations Communicate*. Pitman, London, 1987.

nisation by a simple informal walk-around.[46] This is a vital step as it will determine the level that the information audit should be set at, e.g. depth of explanation required, level of support, and suitability of methods.

Once this stage has been completed there will exist, at the very least, greater understanding of the importance and purpose of the information audit and, hopefully, greater co-operation and support for the information audit process. The auditor will also have a valuable preliminary picture of the organisation on which to base further investigation in the next stage.

Identify

This stage begins with a top–down strategic analysis of the organisation which builds up a rich picture of the organisation's mission, environment, structure, and culture. Towards the latter part of this the organisation's information resources and information flows are identified (as part of the overall objective of identifying the strategic relationship between the organisation's mission and the identified information resources).

There are six steps. The first four are carried out in a workshop by the working group. The final two are completed by the auditor. Although the information resource identification step is the last one, in reality the information resource inventory is gradually built up during each of the preceding steps. The purpose of the final step is to finalise the inventory and to complete a more detailed survey of the information resources.

The identify stages are as follows:

(1) Identify and define the organisation's mission. A thorough understanding of the organisation's mission is essential in order to assign appropriate values and priorities to information resources, and to provide integrated strategic direction for the information audit process and resulting information strategy. There are three main steps:
- Abell's business definition framework [47] is used to define the business the organisation is in and whether or not future activities should remain extensions of the original business or become more diversified in unrelated areas.
- Synnott's interpretation of Portfolio analysis [48] is used to identify objectives and to assess how the balance of activities and resources that make up the organisation's business contribute to its strategic potential.
- For each objective the critical success factors (CSF), key tasks/activities, and related information resources are identified in a manner similar to Pellow and Wilson's CSF approach.[49]

The frameworks recommended above and below have been selected on the basis of their widespread use in business analysis. There are, however, many other frameworks which could be substituted depending on the specific remit of the information audit and the preferences of the auditor. For summaries of frameworks see, for instance.[50, 51]

(2) Identify and define the organisation's environment. The environment refers to the political, economic, social, and technological influences (PEST) that affect the organisation. It is important to understand the environment in order to fully understand informa-

[46]ibid.
[47]Abell, D.F., *Defining the business: the starting point of strategic planning.* Prentice Hall, Englewood Cliffs, NJ, 1980.
[48]Synott, W.R., *The information weapon: winning customers and markets with technology.* John Wiley and Sons, New York, 1987.
[49]Pellow, A. and Wilson, T.D., The management information requirements of heads of university departments: a critical success factors approach. *Journal of Information Science,,* 1993, **19**(6), 425–437.
[50]*op. cit,* Ref 14.
[51]Gibb, F. and Yeong, S.K., Business analysis frameworks. Strathclyde University, Glasgow, 1997. (MBA Lecture Notes).

tion needs, and to ensure that information solutions fit the specific business environment. There are two main steps:

- PEST analysis [52] is used to identify environmental influences.
- Porter's model of competitive forces [53] is used to identify the organisation's competitive position, the competitive forces affecting this position, and the role information plays in influencing these forces.

(3) Identify and define the organisation's structure. The organisation's structure will determine the flow of information and either facilitate or hinder the development of an information strategy depending on the compatibility between the strategy and the structure. There are three steps:

- The basic organisational structure is identified (this can be either a traditional functional model or a process model as recommended by Hammer and Champy.[54]
- Mintzberg's method [55] is used to determine the structure/strategy fit of the organisation.
- Preliminary information flow requirements are identified similar to Orna's flow based approach.[56]

(4) Identify and describe the organisational culture. The organisation's culture will influence the value the organisation puts on information, the way information flows, and how information is used. Therefore it is important to ensure that the organisation's culture is reflected in the development of the information strategy. There are two steps:

- Stakeholder analysis (as illustrated by Grundy [57]) is used to identify and track key stakeholder influences on the information strategy.
- Lewin's method of force field analysis [58] is used to diagnose and evaluate the enabling and restraining forces that affect the information strategy.

(5) Identify information flows. According to Orna the organisation's information flows:

> give an insight into what information is generated in the organisation, who generates it, who uses it, and how they use it. It shows who has the authoritative information on given subjects, who can be expected to know what, and who cannot be expected to know. It also reveals gaps in information provision, and shows missing links in chains of information. [59]

This step identifies the general information flows based on the findings of the previous steps and superimposes them on the organisational (or process) model.

(6) Identify the organisation's information resources. A preliminary inventory of the organisation's information resources will have been built-up during the preceding steps. The purpose of this step is to finalise the inventory and to then interview information users (by the auditor) in order to build-up a more detailed picture of each information resource relative to the activities it supports. There are two steps:

- A database is built to store detailed information on each information resource (resources may be categorised based on Burk and Horton's classification [60]).
- The working group nominates participants to be interviewed who are provided with the list of key tasks and related information resources and asked to discuss the value (on a scale of 1 to 5),

[52] Johnson, G. and Scholes, K., *Exploring Corporate Strategy: text and cases*, 3rd edn. Prentice Hall, Englewood Cliffs, NJ, 1993.
[53] Porter, M.E., *Competitive Strategy: Techniques for Analysing Industries and Competitors*. Free Press, New York, 1980.
[54] Hammer, M. and Champy, J., *Reengineering the Corporation: a Manifesto for Business Revolution*. Nicholas Brealey Publishing, London, 1994.
[55] Mintzberg, H., The structuring of organisations. In *The strategy Process: Concepts, Contexts, and Cases*, eds. J.B. Quinn, H. Mintzberg and R.M. James. Prentice Hall, New York, 1988, p. 278.
[56] *op. cit*, Ref 12.
[57] Grundy, T., *Implementing Strategic Change: a Practical Guide for Business*. Kogan Page, London, 1993.
[58] Lewin, K., Frontiers in group dynamics: concepts, method, and reality in social science; social equilibria and social change. *Human Relations*, 1947, 1(1).
[59] *op. cit*, Ref 12.
[60] Burk, C.F. and Horton, F.W., op. cit.

function, and utility (including any problems/possible improvements) for each information resource relative to the task supported.

Once the identify stage has been completed the organisation will have a comprehensive database of its information resources each of which is clearly linked to the organisation's mission, related goals, objectives, and activities. The rich picture produced by this stage will also illustrate the strategic fit between the organisation's mission (including alignment of business and information strategy), environment, structure and culture, and will highlight problematic situations and future objectives as a basis for detailed analysis in the next stage.

Analyse

The purpose of this stage is to analyse and evaluate the organisation's information resources and to formulate action plans to improve problematic situations and achieve objectives identified during the identify stage. There are four steps to the analyse stage. The first three are completed by the auditor in consultation with appropriate members of staff. The workshop resumes for the fourth step. The steps are as follows:

(1) Evaluate the information resources. Information resources are evaluated according to their strategic importance, utility, and associated problems in order to identify appropriate management strategies for each information resource. They are evaluated as follows:
   - Strategic importance is evaluated firstly by assessing each resource in relation to the task(s) it supports and the strategic relationship between the tasks, CSFs, and objectives supported, and secondly according to the arithmetic mean of the value assigned for each information resource relative to the task supported.
   - Utility identifies what each information resource should, could, and is being used for, thus identifying whether or not users are properly exploiting the full potential of the resource. Utility is evaluated firstly, by defining the information resource's utility independently of what it is being used for by the organisation, and secondly, to then use this definition to determine whether or not the information resource is being properly utilised and to identify the potential strategic value of the resource. Once these two steps have been completed McFarlan and McKenney's Strategic IT/IS grid [61] can be used to position information resources according to their existing strategic importance (mean value) and planned importance (future utility) to help identify appropriate strategies for each information resource.
   - Problems are evaluated according to the nature of the problem. For instance, is the problem one of awareness, availability, accessibility, or appropriateness? Potential solutions can then be identified with the decision as to whether or not to implement them based on balancing the strategic importance and utility of the resource against the severity of the problem and the steps required to implement the solution (explored further during the action plan stage below).

(2) Produce the detailed information flow diagram. The purpose of this step is to develop detailed information flow diagrams to illustrate

[61] McFarlan, F.W., Information technology changes the way you compete. *Harvard Business Review*, May–June, 1984.

who is using what, where and why. This is achieved by superimposing the identified information resources onto the general information flow diagrams produced earlier.

(3) Produce the preliminary report. The purpose of this step is to provide a summary account of the information audit process, findings, recommendations and general areas of concern to support and focus the formulation of action plans in the next step.

(4) Formulate action plans. The purpose of this step is to identify and define the action plan(s) required to improve problematic situations and realise objectives that have been identified by the information audit. Checkland and Schole's soft systems methodology [62] provides a practical step-by-step method to deal with complex, unstructured, or poorly defined problematic situations. This step should produce a set of recommendations for action to improve such situation(s).

Once this stage has been completed the organisation will have identified the strategic importance and utility of each of its information resources and the appropriate management strategies. The organisation will also have a set of recommendations for action to improve problematic situations. The next stage in the information audit is to cost the information resources in order to assign accurate costs to information resources and associated management strategies and action plans.

Account

The purpose of this stage is to cost the organisation's information resources in order to be able to assign accurate costs to information resources and associated services, to compare costs to value and other benefits, and to be able to perform cost analysis and cost modelling as part of the development and evaluation of an information strategy.

The costing and valuing of information resources is recognised as being a problematic area.[63] Orna[64] and Burk and Horton [65] emphasise the need to liaise with the organisation's accountants to ensure that there is consistency and comparability within the exercise. However, accounting standards have not been fully developed in this area and few organisations have attempted to include information resources as assets in their books.[66] Given the potential complexity of the exercise this stage is not represented by a rigid methodology. Instead, three approaches are highlighted which have been shown to be both innovative and of general applicability.

- Activity based costing (ABC): ABC [67] identifies the costs for information resources by measuring the causal relationship between activity cost and information resource use. ABC provides a more detailed and in-depth approach to costing than other methodologies.
- Output based specification (OBS): OBS [68] is a quality performance measurement system that also provides, where required, a mechanism to link payment to quality performance by identifying the minimum quality standards and quality indicators for each information resource (rather than the costs). ABC and OBS can be usefully combined to provide a more rigorous analysis of inputs and outputs to a process.
- Glazier's model: Glazier's model [69] is a novel approach to the

[62]Checkland, P. and Scholes, J., *Soft Systems Methodology in Action.* John Wiley and Sons Ltd, Chichester, 1990.
[63]Badenoch, D., Reid, C., Burton, P., Gibb, F. and Oppenheim, C., The value of information. In *The Value and Impact of Information,* eds. M. Feeney and M. Grieves. Bowker-Saur, East Grinstead, 1994, pp. 9–78.
[64]*op. cit,* Ref 12.
[65]Burk, C.F. and Horton, F.W., ibid.
[66]Reid, C., Is information worth it? London: British Library, 1994. (Information Policy Briefings 6).
[67]Turney, P.B.B., *Activity Based Costing: The Performance Breakthrough.* Kogan Page, London, 1996.
[68]Lateral Technologies and Solutions. Grovewood Business Centre, Strathclyde Business Park, Bellshill, ML4 3NQ, 01698-740340.
[69]Glazier, R., Measuring the value of information. *IBM Systems Journal,* 1993, **32**(1).

- measurement of information assets in order to identify opportunities to improve revenue streams, reduce production costs, and focus on customer demand (as the most tangible evidence of delivered value).

Once this stage has been completed the organisation will have identified the costs, or cost indicators, for each information resource, depending upon the choice of costing method(s). The approach adopted will depend on the particular circumstances of the organisation and the purpose and scope of the costing exercise. Each approach provides an innovative and pragmatic solution to costing information resources

Synthesise

The purpose of this stage is to report on the complete information audit process and to synthesise the findings/recommendations in order to provide integrated strategic direction for the organisation's future management of information. There are two steps to this stage. The first step is completed by the auditor with the second completed by the working group. The steps are:

(1) The information audit report. The purpose of this step is to provide a detailed and complete account of the information audit process, findings, and recommendations for analysis, review, and reference purposes.
(2) The information strategy. The purpose of this step is to provide integrated strategic direction and management guidelines for the organisation's future management of information in relation to the organisation's mission and objectives.

Conclusions

The methodology described above is based on an analysis of existing approaches and practical experience derived from the development of an information strategy within the university sector. The potential benefits of the methodology are:

- It provides a complete (in contrast to previous methods) step-by-step pragmatic solution to information auditing.
- It provides a management tool-kit that can be tailored to individual requirements.
- The relationship between the organisation's business strategy and information strategy is identified and evaluated.
- It utilises a new approach to costing information resources.
- It provides the organisation with an information resource database inventory.
- It provides integrated strategic direction and management guidelines for the organisation's future management of information.

However, there are also a number of potential barriers to successful implementation. For instance:

- The scale of the exercise and associated resource requirements may make it impractical for organisations.
- Synthesis between stages may not always be clear and unambiguous due to the multi-disciplinary nature of the exercise.

- There can be practical difficulties in modelling relationships between objectives, CSFs, tasks, and information resources, most notably because of complex many-to-many relationships.
- Although process modelling is identified as a recommended management tool the methodology could be criticised for being predominantly task-oriented and functional in nature.

As discussed above, the methodology is intended to be wide-ranging and of general applicability but it is recognised that organisations may need to make compromises, may wish to use a sub-set of the steps, or may need to enhance or tailor it to their specific requirements.

Appendix 2: Case study one workshop instructions and minutes

The following documents were created as word files and distributed to workshop participants electronically via email. For the purposes of confidentiality, the headers, which included the addressees/participants, have not been included.

Instructions for workshop 1

Members

Workshop 1 will be focusing on the following two steps:

1. Define DMEM mission
2. Model DMEM environment

The Department's mission statement defines purpose, values, and overall objectives. Environment refers to the political, economic, social, and technological (PEST) influences that affect the Department mission. It is also important to understand the Departments environment in order to fully understand information requirements, and to ensure that information solutions are appropriate. The workshop will conduct initial high level PEST analysis followed by more in-depth analysis of the competitive position of the Department.

An appropriate method to analyse the competitive position of the Department is provided by Porter (1980). According to Porter, there are five competitive forces:

- **New entrants**: the seriousness of the threat of new entrants depends upon to what extent there are barriers to entry (e.g. economies of scale, product differentiation, capital requirements, cost disadvantages, access to distribution channels, government policy).
- **Substitutes**: substitutes can place a ceiling on prices for Department services, or make inroads into the market and reduce their attractiveness.
- **Suppliers**: suppliers can exert influence to the extent that they limit the strategic freedom of the Department.
- **Buyers**: buyers are the Department's customers and stakeholders who influence the budgetary constraints and profitability of the Department.
- **Competitive rivalry**: competitive rivalry can lead to intense competition as competitors attempt to gain dominance over one another.

In preparation for workshop 1, members should ask themselves:

- What is our purpose?
- What influences our success?
- What are the key forces at work in the University environment?
- Is it likely that the forces will change, and if so how?
- What can be done to influence these forces?
- What information resources does DMEM require to influence these forces?
- Are some markets more attractive than others?

This exercise will identify the Department's competitive position, the forces affecting this position, the required strategic approach, and the enabling role of IT.

Minutes for workshop 1

Members

Workshop one consisted of two main steps:

1. Define DMEM mission
2. Model DMEM environment

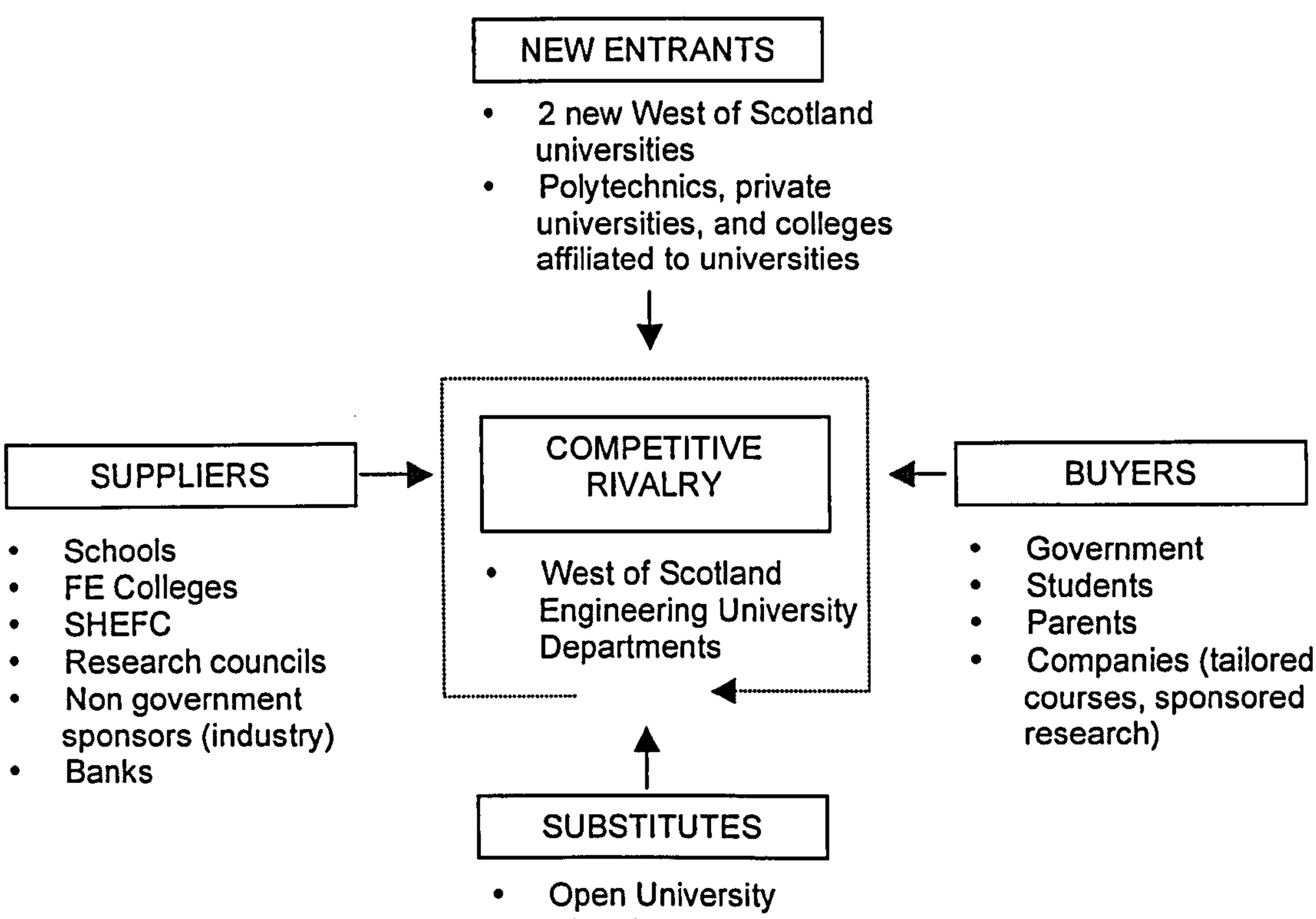
The Department's mission was defined as: *To produce high calibre graduates in design, manufacture and engineering management, through the best available standards of education, founded on a base of excellence in theory and practice of the subject, and advancement of knowledge through research.*

The key political, economic, social, and technological influences (PEST) were identified as:

- Government
- Employers
- Students
- Internet

Competitive forces were identified as illustrated in Figure 1.

Figure 1. DMEM competitive forces



Three key trends were also identified and highlighted during environmental analysis: that DMEM faced increasing competition both domestically and globally, that private funding was increasing and government funding decreasing, and that buyers (students/sponsors) were increasingly requiring flexible modes of delivery.

Instructions for workshop 2

Members

Workshop 2 will be focusing on the following two steps:

1. Model key processes
2. Prioritise process for detailed modelling and analysis

The purpose of the first step is to develop a high level process model of the Department to illustrate, quite simply, what the Department does. In contrast to the more traditional task-orientated *functional* chart the process model focuses on business *processes*. Essentially, a process is an organised series of activities that takes one or more inputs (materials, labour, information etc.) and produces a pre-specified output (product, service, knowledge etc.) as part of the Department's value chain. The process model illustrates work flows (what the Department does) and provides a method to highlight duplicated efforts and information bottlenecks caused by poor communication or co-ordination across the boundaries of conventional business functions. This task will be led by the auditor who will provide some process examples prior to whiteboard-based discussion and modelling of DMEM specific processes. Modelling will be based on Ould (1995).

The purpose of the second step is to prioritise one of the key processes for detailed modelling and analysis. It would be both impractical and unrealistic to attempt to tackle all the Department core processes at once (to do so would cause widespread disruption and would require considerable investment in terms of both time and money). Therefore each key process should be prioritised so that, in turn, each can be focused on and effectively modelled and analysed. In prioritising core processes there are three important considerations:

- **Strategic impact**: the current and potential contribution of each core process towards achieving the Department's mission and key objectives (e.g. strategic value-adding processes versus support processes).
- **Resource consumption**: the resources consumed or utilised by each core process (e.g. does the resource requirements or utilisation of resources give serious cause for concern?).
- **Required investment**: the time, cost, and management commitment required to model each core process (e.g. given a choice, start big or small?).

Each of these considerations will be discussed for each of the key processes. In preparation for workshop two, please consider the following:

- What are the key things (activities) we do?
- Does any one area give us more concern than others?

Minutes for workshop 2

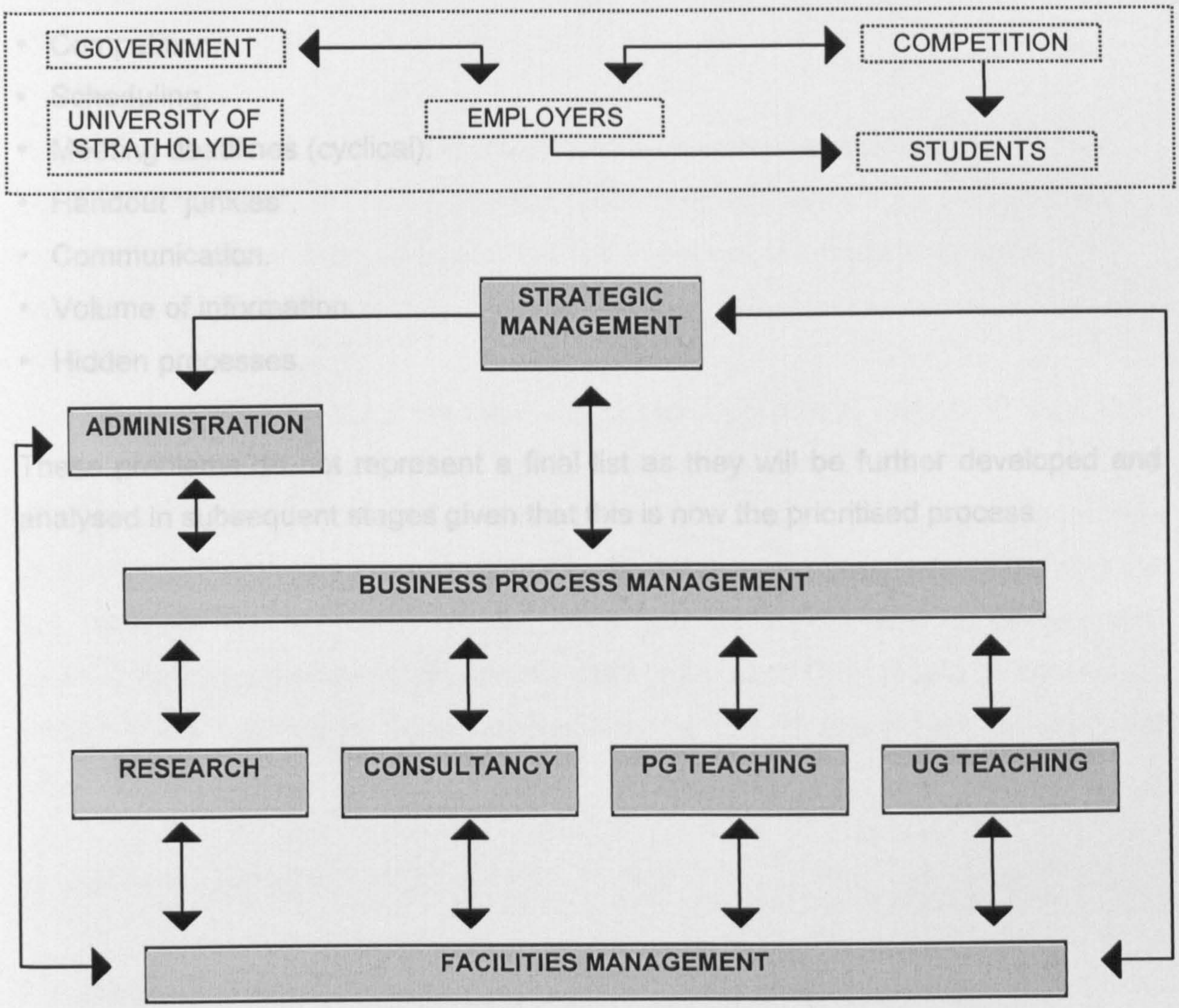
Members

Workshop 2 focused on the following two steps:

1. Model key processes
2. Prioritise process for detailed modelling and analysis

DMEM key processes are illustrated in Figure 1 (the area within the dotted line represents the Department's environment as identified during PEST analysis).

Figure 1. DMEM process model



From this high level model further more detailed *exploded* models will be developed in subsequent workshops

Prioritise processes

The prioritised process was *undergraduate teaching*. This was felt to be of high strategic importance and acknowledged as resource intensive. Participants also

identified a number of areas of concern with this process, which were noted as follows:

- Competition.
- Scheduling.
- Meeting deadlines (cyclical).
- Handout "junkies".
- Communication.
- Volume of information.
- Hidden processes.

These problems do not represent a final list as they will be further developed and analysed in subsequent stages given that this is now the prioritised process.

Instructions for workshop 3

Members

Workshop 3 will be focusing on identification of objectives, critical success factors and measures for the prioritised process (undergraduate teaching). These will be identified through whiteboard-based discussion but would benefit from some preliminary consideration.

The Department's objectives are the more detailed operational, tactical, and strategic goals of the department required to achieve it's mission. Critical success factors (CSFs) are the factors upon which each objective is fundamentally dependent for its success. CSFs provide a method to link objectives to processes by identifying the key tasks/activities for each process. They also identify priorities for development and key areas for measurement. As a general rule, each CSF should be checked to ensure that it is genuinely necessary and that the final list is sufficient to ensure the objective's success.

Minutes for workshop 3

Members

Workshop 3 focused on the identification of objectives, critical success factors and measures for the prioritised process (undergraduate teaching). The objectives for undergraduate teaching were defined as follows:

- Provide a course portfolio reflecting the dynamic requirements of stakeholders.
- Provide excellence in the delivery of teaching & learning.
- Ensure effective and efficient deployment of resources.
- Ensure effective marketing of, and recruitment to, courses.

Once the objectives were identified the next step was to identify the critical success factors (CSF) for each objective. These were identified as follows:

Provide a course portfolio reflecting the dynamic requirements of stakeholders.		
• Range of courses. • Range of levels. • Course reviews. • Student applications. • Communication.	• Student intake. • Graduate employment. • Industrial links. • Industrial placements. • Industrial projects.	• Sponsorship. • Institutional accreditation. • New course opportunities. • Course marketing.

Provide excellence in the delivery of teaching & learning.		
• Staff expertise. • Staff levels. • Staff development. • Staff/Student ratio. • Communication. • Health & Safety.	• Entry standards. • Staff motivation. • Delivery resources. • Facilities. • Student assessment.	• Professional accreditation. • Graduation rates. • Progress rates. • Graduate employment. • Student care.

Ensure effective and efficient deployment of resources.		
• Budgeting. • Scheduling. • Information sharing, storing, and reuse. • Resources utilisation.	• Return on investment (ROI). • Process standardisation. • Forecasting. • Staff development. • Staff levels.	• Space management.

Ensure effective marketing of, and recruitment to, courses.		
• School liaison. • Promotional events. • Department profile. • Advertising. • College liaison. • Corporate identity.	• Course information. • Feedback channels. • Industry support. • Selection procedure. • University profile. • Accessibility.	• College links. • Industrial links. • Visibility. • Industrial advisory panel. • Famous alumni. • Staff awareness.

A table is attached illustrating the relationship between CSFs and objectives.

Table 1: *Undergraduate teaching ~ objectives & critical success factors.*

Key to objectives

A Provide a course portfolio reflecting the dynamic requirements of stakeholders.

B Provide excellence in the delivery of teaching & learning.

C Ensure effective and efficient deployment of resources.

D Ensure effective marketing of, and recruitment to, courses.

	OBJECTIVES			
CRITICAL SUCCESS FACTORS	A	B	C	D
Range of courses.	X			
Range of levels.	X			
Course reviews.	X			
Student applications.	X			
Communication.	X	X	X	X
Student intake.	X			
Graduate employment.	X	X		
Industrial links.	X			X
Industrial placements.	X			
Industrial projects.	X			
Sponsorship.	X			
Institutional accreditation.	X			
New course opportunities.	X			
Course marketing.	X			
Staff expertise.		X		
Staff levels.		X	X	

Staff development.		X	X	
Staff/Student ratio.		X		
Health & Safety.		X		
Entry standards.		X		
Staff motivation.		X		
Delivery resources.		X		
Facilities.		X		
Student assessment.		X		
Professional accreditation.		X		
Graduation rates.		X		
Progress rates.		X		
Student care.		X		
Budgeting.			X	
Scheduling.			X	
Information sharing, storing, and reuse.			X	
Resources utilisation.			X	
Return on Investment (ROI).			X	
Process standardisation.			X	
Forecasting.			X	
Space management.			X	
Schools liaison.				X
Promotional events.				X
Department profile.				X
Advertising.				X
College liaison.				X
Corporate identity.				X
Course information.				X
Feedback channels.				X
Industry support.				X
Selection procedure.				X
University profile.				X
Accessibility.				X
College links.				X
Visibility.				X
Industrial advisory panel.				X
Famous alumni.				X
Staff awareness.				X

Please note that the following tasks related to the above activity are still to be completed or require further refinement:

1. **Undergraduate Teaching Objectives**: goals/targets should be identified for each objective to facilitate the identification of performance measurements.
2. **Related Critical Success Factors (CSFs):** each CSF should be checked to ensure that it is *genuinely necessary* and of *fundamental importance* to the success of the associated objective. Each CSF should also be examined to

determine whether or not it should remain a *bona fide* CSF or be subsumed by another more structured CSF. Once completed, performance measurements should be identified for each CSF.

These tasks will be completed between workshops nine and ten where there is a three-week recess to accommodate the survey component of the IA.

Instructions for workshop 4

Members

Workshop 4 will begin the process of modelling the *undergraduate teaching* process, which will be completed across a number of workshops. A step-by-step modelling process based on Ould (1995) will be followed for this exercise. The purpose of this initial modelling workshop will be to identify the key grouped activities which form the sub processes of undergraduate teaching. In preparation for this workshop could you please consider the following (for *undergraduate teaching*):

- What do we do?
- How do we do it?

Minutes for workshops 4

Members

The following undergraduate teaching sub processes were identified:

- Course Development
- Market Course
- Manage Course Applications
- Manage Student Progression
- Teach & Assess Students
- Manage Student Records
- Exam Boards
- Review Course
- Support Students
- Prepare Teaching Material
- Manage Course Operations

Please note that I have modified the *manage student records* process. This was originally *update student records*. However it could be argued that *update* is one of several tasks required in the administration of Departmental student records therefore *manage* may be more appropriate.

Instructions for workshop 5

Members

Workshop 5 will begin modelling the lifecycle for undergraduate teaching based on the identified sub processes. In preparation, please ask yourself:

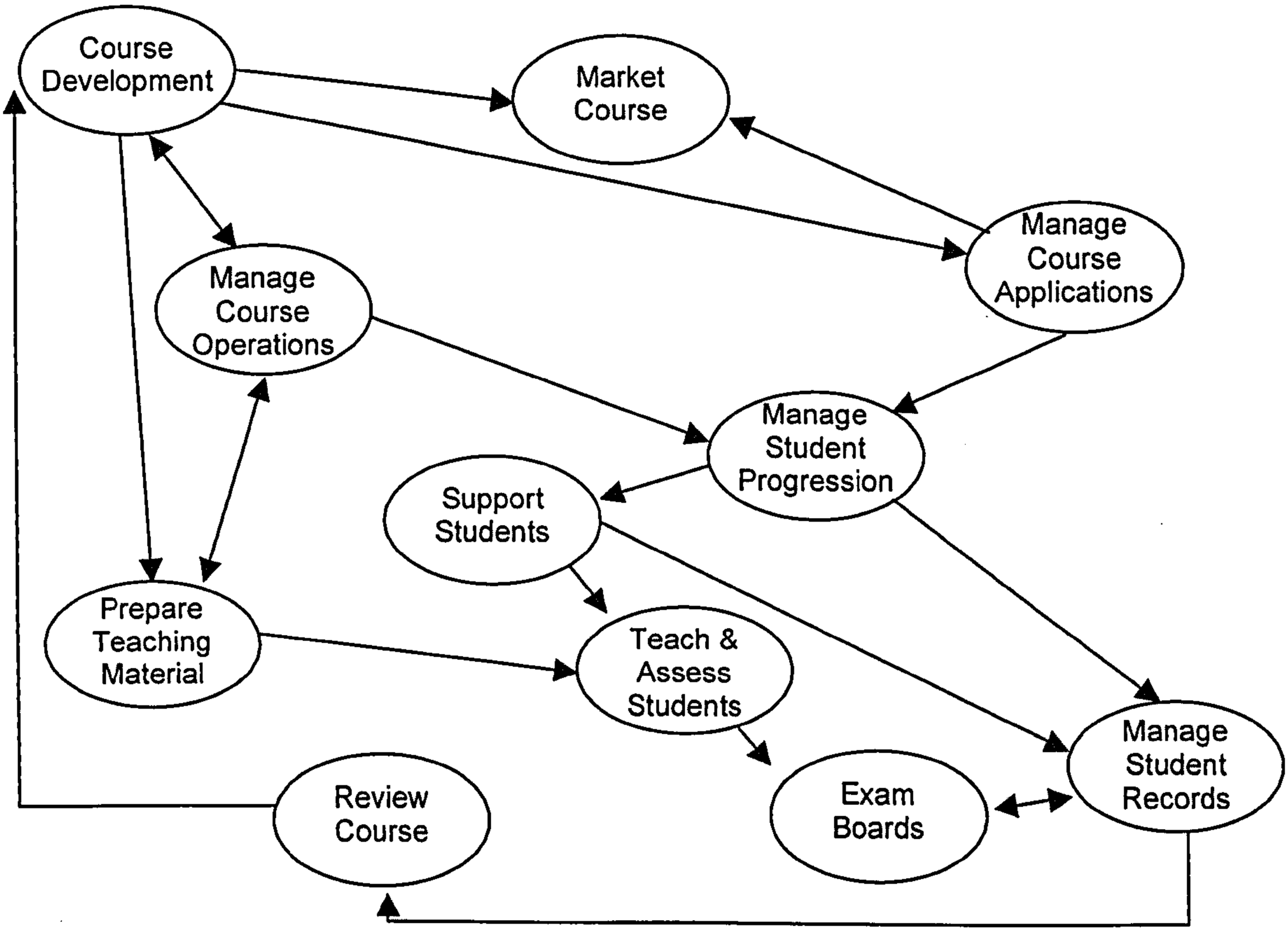
- Are all undergraduate teaching sub-processes represented?
- What is the relationship between sub-processes?
- Is there a natural order or lifecycle to undergraduate teaching?

Minutes for workshop 5

Members

The initial lifecycle model for undergraduate teaching was developed as illustrated.

Undergraduate teaching process model v1



Instructions for workshop 6

Members

Workshop 6 will continue the modelling of the undergraduate teaching process. The key activity at this workshop will be to identify the key inputs/outputs for each sub process. In preparation please ask yourself:

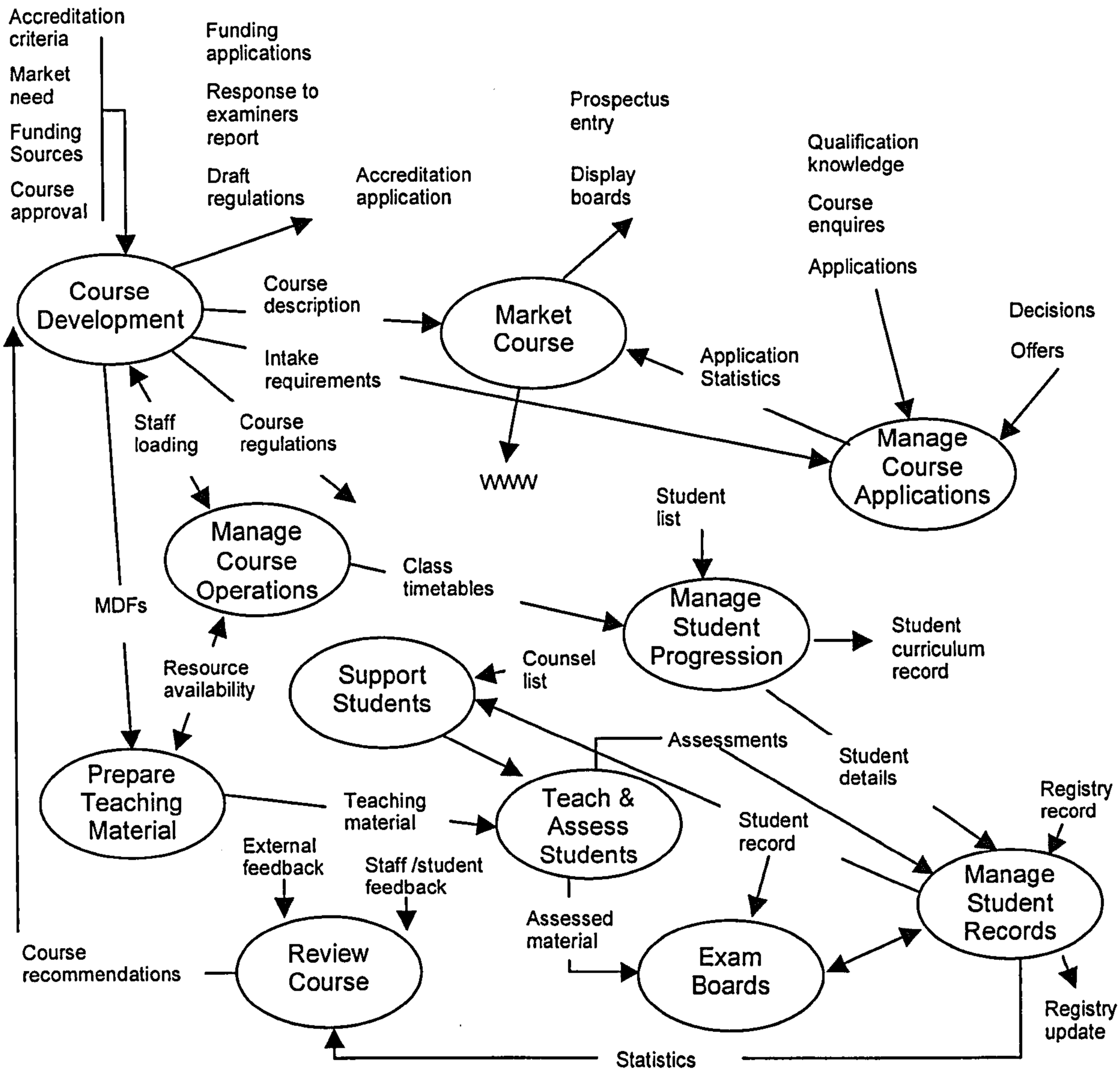
- What key information is required for this process/activity?
- What key information is produced by this process/activity?

Minutes for workshop 6

Members

Version two of the undergraduate teaching process model is illustrated below.

Undergraduate teaching process model v2



Instructions for workshop 7

Members

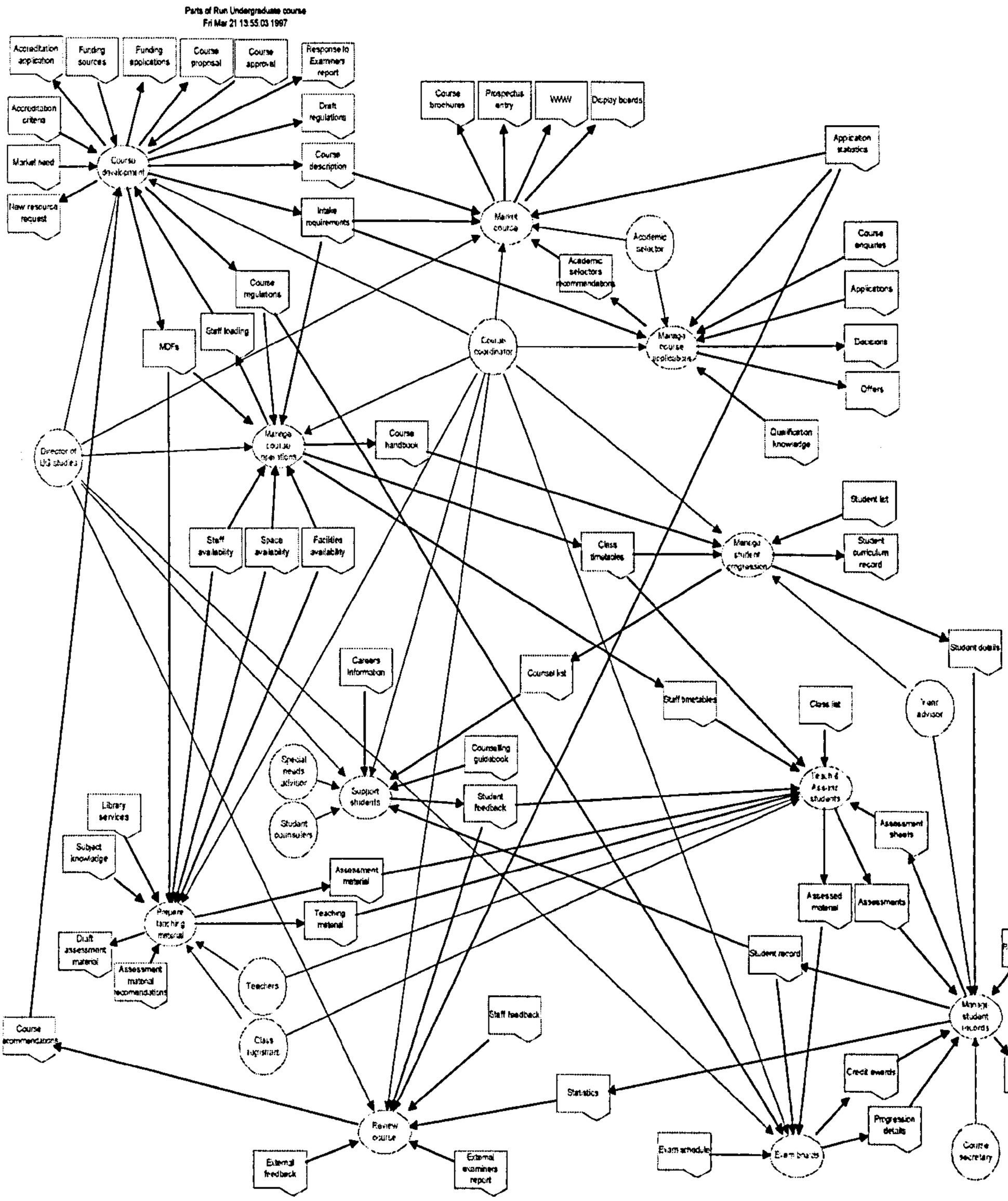
Workshop 7 will continue the modelling of the undergraduate teaching process. The key tasks at this workshop will be to: firstly, complete identification of the key inputs/outputs for each sub process; and secondly, to identify the key owners responsible for each process. In preparation, please could you review version two of the model with these tasks in mind.

Minutes for workshop 7

Members

I have enclosed a copy of the now completed undergraduate teaching model, which has been completed in the modelling application (ICL Processwise Workbench).

Undergraduate teaching process model v3



Instructions for workshop 8

Members

A more detailed description is now required for each undergraduate teaching sub process. I have allocated sub processes to members as follows:

	X[1]	X	X	X
Course design	√			
Market course				√
Recruit students			√	
Induct students			√	
Teach & assess students		√		
Manage student records			√	
Exam boards	√			
Review course	√			
Support students				√
Prepare teaching material		√		
Manage course operations		√		√

For your associated process, please could you:

1. Define the *purpose/function* of the sub process. This should be a concise statement describing exactly what the process does.
2. Identify/list the *key activities* performed as part of the sub process.
3. Identify/list any *problems/difficulties* associated with the sub process.

Minutes for workshop 8

Members

Enclosed are copies of the worksheets which provide the complete descriptions for each of the undergraduate teaching sub processes.

---

[1] Anonyms here for confidentiality

Manage student records process
1. Define the purpose/function of this process.
1. To ensure that an up-to-date overall picture of all Department undergraduate students is maintained and is consistent with Registry records. 2. Ensure records are easily accessible.
2. Identify the key activities (or sub-processes) performed as part of this process.
• Collating information from the many sources.
• Recording same timeously.
• Updating same on a regular basis.
• Checking accuracy.
• "Chasing up" if need be.
3. List any problems/difficulties associated with this process.
• Lack of software compatibility can cause problems.
• Not receiving appropriate information timeously.
• Maintaining up-to-date records.
• Collectively managing information from a number of sources/levels each with different viewpoints e.g. counsel, course, class etc.

Induct students process
1. Define the purpose/function of this process.
1. To familiarise new students with the Department and the University environment. 2. To provide students with sufficient information to proceed with study e.g. timetables, course handbook, health & safety guidelines, computer notes etc.
2. Identify the key activities (or sub-processes) performed as part of this process.
• Meeting staff.
• Issuing details of Counselling Scheme.
• Issuing information handouts.
• Registering computer users.
• Ensuring students sign Health & Safety guidelines.
• Assisting students to select classes if required.
• "Pep talks" by Year Advisors.
3. List any problems/difficulties associated with this process.
One problem - which is self imposed - is that some students never arrange to see their Counsellors (this could be overcome by the Counsellors writing to the students).
Maintaining optimum student numbers.
Contacting students.
Not all students are registered.

Manage course applications process
1. Define the purpose/function of this process.
1. To achieve course target intake numbers within established entry standards. 2. To give prospective students information on the courses in an attempt to encourage them to join the Department.
2. Identify the key activities (or sub-processes) performed as part of this process.
• Considering application forms.

• Supplying additional information, video (in the case of overseas applicants), calling home students for interview.
• Interviewing, followed by a tour of the Department.
• Making decision, sending out letter, entering details into database.
• Keeping in constant touch (if felt necessary).
• Taking part in general events e.g. YES, WISE etc.
3. List any problems/difficulties associated with this process.
• Time consuming.
• Staff availability over summer.

Course development process
1. Define the purpose/function of this process.
1. To develop a full specification of a course from market need and statement of goals, to MDFs and regulations, within identified constraints (e.g. resources). 2. To modify the design of an existing course following output of a review, or modifications to market need, or course constraints.
2. Identify the key activities (or sub-processes) performed as part of this process.
• Identify and evaluate opportunities and market.
• Define objectives.
• Propose course structure.
• Develop detailed design.
• Produce course specification and regulations.
• Approve through Dept., AAC, Board, Senate, O&R.
• Schedule preparation and implementation.
• Continuously - seek inputs from industry, Dept. staff, other collaborating or affected Depts.
3. List any problems/difficulties associated with this process.
• Takes a long time.
• Delivery not directly followed by resources. Initial delivery consumes resources until later arrival of funding.
• Obtaining industry partners.
• Staff time.
• Complex interactions with other courses.
• Uncertainty of market assessment.

Exam boards process
1. Define the purpose/function of this process.
1. To make recommendations on the award of credits from assessment results. 2. To make recommendations about student's progress, including final awards. 3. To comment on the performance of classes or courses.
2. Identify the key activities (or sub-processes) performed as part of this process.
1. Collection and submission of marks and assessments.
2. Pre-exam board meetings.
3. Review of exam schedule and checking of entries.
4. External examiners assessment.
5. Review of special cases.
6. Exam Board meeting.
3. List any problems/difficulties associated with this process.
1. Time scale and scheduling of marks returns.

2. Accuracy of schedules.
3. Gathering consistent information about cases.
4. Lack of consistency in recording unusual cases.

Review course process
1. Define the purpose/function of this process.
1. To make recommendations for course changes and improvements, based on: student feedback, teaching feedback, graduate feedback, performance statistics, identified problems, external examiner feedback, employer feedback.
2. Identify the key activities (or sub-processes) performed as part of this process.
1. Form Review group.
2. Collect & collate feedback.
3. Assess competition.
4. Review problems and proposals for change.
5. Agree approach i.e. course adjustment or redesign.
6. Make recommendations and submit to appropriate committee.
7. Record actions.
3. List any problems/difficulties associated with this process.
1. No regular pattern - tends to be responsive.
2. Gathering all facts and views.
3. Complexity of interaction with other issues/constraints.

Teach & Assess students process
1. Define the purpose/function of this process.
To deliver learning material and assess students on the basis of this.
2. Identify the key activities (or sub-processes) performed as part of this process.
• Deliver lectures.
• Give out lecture notes.
• Give out assessment material.
• Accept assessment material.
• Mark assessments.
• Feed mark to class registrar / Secretary / Registry.
• Report problems to appropriate staff/units/departments.
• Respond to student problems.
3. List any problems/difficulties associated with this process.
• Timetable clashes / Double booking.
• Late assessment hand-ins.

Prepare teaching material process
1. Define the purpose/function of this process.
To prepare the learning material as required by the MDF/course requirements.
2. Identify the key activities (or sub-processes) performed as part of this process.
• Study subject area.
• Collection of material.
• Preparation of case material.

• Prepare lecture notes & send to photocopying.
• Prepare assignments.
• Organise labs/tutorials.
• Request the use of resources.
• Keeping up-to-date on subject area.
3. List any problems/difficulties associated with this process.
• Guaranteeing quality.
• Agreeing teaching/assessment approaches.
• Late notes.
• Not enough resources.
• Not enough time.

Manage course operations process
1. Define the purpose/function of this process.
To manage the regular day-to-day aspects of running the course ensuring that tasks are not neglected and that all are carried out in the most effective way with the given resources.
2. Identify the key activities (or sub-processes) performed as part of this process.
• Analyse resource availability.
• Match resources with requirements.
• Allocate staff to classes (and maintain table of staff loading).
• Allocate other resources to classes.
• Monitor resource allocation and use.
• Update resource allocation on a regular and "as-need" basis.
• Make new resource requests.
• Prepare, print and distribute course handbook.
• Prepare, print and distribute class timetables.
3. List any problems/difficulties associated with this process.
Not enough resources (facilities, space, staff).
Complexity of timetabling.
Reliance on University Centre and Computer Centre.
Late arrival of critical information e.g. student numbers.
Information flow e.g. sharing problems.
Satisfying the staff.

Support students process
1. Define the purpose/function of this process.
To ensure that students have all reasonable help and support, academically and personally, throughout the duration of their course.
2. Identify the key activities (or sub-processes) performed as part of this process.
• Staff/Student committees.
• Counselling scheme.
• Feedback forms.
• Special needs support.
• Referral to appropriate authority for specialist help (e.g. medical, financial etc.).
• Provide best facilities possible (esp. computing!).
• Provide information.
• Arrange extra curricular visits.
• Provide/arrange careers guidance and support.

• Provide links to student societies.
• Appeals advice.
• Additional or remedial teaching.
• Assist in arranging summer jobs/placements.
3. List any problems/difficulties associated with this process.
• Increasing special needs among students.
• Staff loading.
• Financial constraints.
• Technical constraints.
• Information flow.
• Not always obvious where to go for help.

Market course process
1. Define the purpose/function of this process.
To raise the profile of our courses and to reach potential students with the appropriate information in such a way that we will attract the optimum number and quality of students to our courses.
2. Identify the key activities (or sub-processes) performed as part of this process.
• Identify appropriate vehicles for information (e.g. prospectus, WWW, course brochures, display boards etc.)
• Prepare information for publication in those vehicles.
• Arrange for publication.
• Distribute published material.
• Arrange and publicise open days.
• Arrange promotional visits where appropriate.
• Arrange seminars for careers, guidance, teachers etc.
• Arrange half-day information seminars for school pupils and their parents.
• Man University Open day information sessions.
• Analyse feedback (e.g. intake figures, student comments, IAP comments etc.).
• Make staff aware of processes and resources.
• Liaise with companies.
3. List any problems/difficulties associated with this process.
• Legal constraints.
• Shortage of resources.
• Difficulty in finding appropriate dedicated staff to take responsibility for recruitment.
• University agreements e.g. restrictions on advertising.
• Reliance on University Centre (e.g. Schools Liaison, Registry).
• Coordination of marketing activities at the various levels e.g. Course/Department/Faculty.
• Cost of advertising.
• Competition.
• Perception

Workshops will resume in three weeks after I have discussed the life cycle model in more detail with selected members of DMEM staff.

Instructions for recess activity

During the recess, please could you complete the following two related tasks:

1. Undergraduate Teaching Objectives: goals/targets should be identified for each objective to facilitate the identification of performance measurements.
2. Related Critical Success Factors (CSFs): each CSF should be checked to ensure that it is *genuinely necessary* and of *fundamental importance* to the success of the associated objective. Each CSF should also be examined to determine whether or not it should remain a *bona fide* CSF or be subsumed by another more structured CSF. Once completed (ideally approximately 6-8 CSFs for each objective) performance measurements should be identified for each CSF.

Worksheets are attached below.

Provide a course portfolio reflecting the dynamic requirements of stakeholders.
Goals/targets (*please identify*):

Provide excellence in the delivery of teaching & learning.
Goals/targets (*please identify*):

Ensure effective and efficient deployment of resources.
Goals/targets (*please identify*):

Ensure effective marketing of, and recruitment to, courses.
Goals/targets (*please identify*):

Provide a course portfolio reflecting the dynamic requirements of stakeholders.	
CSF	**Measure (*please identify*)**
• Range of courses. • Range of levels. • Course reviews. • Student applications. • Communication. • Student intake. • Graduate employment. • Industrial links. • Industrial placements. • Industrial projects. • Sponsorship. • Institutional accreditation. • New course opportunities. • Course marketing.	•

Provide excellence in the delivery of teaching & learning.	
CSF	**Measure (*please identify*)**
• Staff expertise. • Staff levels. • Staff development. • Staff/Student ratio. • Communication. • Health & Safety. • Entry standards. • Staff motivation. • Delivery resources. • Facilities. • Student assessment. • Professional accreditation. • Graduation rates. • Progress rates. • Graduate employment. • Student care.	•

Ensure effective and efficient deployment of resources.	
CSF	**Measure (*please identify*)**
• Budgeting. • Scheduling. • Information sharing, storing, and reuse. • Resources utilisation. • Return on investment (ROI). • Process standardisation. • Forecasting. • Staff development. • Staff levels. • Space management.	•

Ensure effective marketing of, and recruitment to, courses.	
CSF	**Measure (*please identify*)**
• School liaison. • Promotional events. • Department profile. • Advertising. • College liaison. • Corporate identity. • Course information. • Feedback channels. • Industry support. • Selection procedure. • University profile. • Accessibility. • College links. • Industrial links. • Visibility. • Industrial advisory panel. • Famous alumni. • Staff awareness.	•

Instructions for workshop 9

Members

Workshops 9 will focus on identification and evaluation of information problems. This will be conducted as a whiteboard-based discussion. There are no pre-workshop tasks, but as always, prior consideration is encouraged. Particular focus will be paid to information related problems but please also consider:

- Potential cycle time reductions.
- Quality improvements.
- System performance.
- Achievement of strategic objectives.

Minutes for workshop 9

Members

The following are the key information problems that have been identified:

- Complex and disparate information systems (Registry/Department/Courses).
- Duplicated effort, unnecessary data entry, and inefficient data processing e.g. high error rates (curriculum records, credit awards), multiple formats/systems (student records), time consuming maintenance (staff timetable/loading schedule), limited analysis capability (application nos., student performance, Registry MIS), delivery delays (application statistics report, class list).
- No formal policy statement, procedures, or operational guidelines for the management of information resources e.g. updating, security, file management, procurement, utilisation, DMEM WWW, quality etc.
- Paper culture (partly due to Registry/Department relationship e.g. student records).

- Lack of standardisation including several ad hoc or informal processes e.g. resource availability, market knowledge, competitive analysis etc.
- Knowledge gaps e.g. market knowledge, graduate knowledge, available resources.

Instructions for workshop 10

Members

Workshop 10 will utilise force field analysis to highlight the positive or negative impact each critical success factor has on its associated objective. Objective are positioned on a scale of 0-100% according to group *estimates* of current achievement of the objective. Related CSFs are then identified as either strengths or weaknesses based on consideration of the key problems identified in workshop 9 and general group discussion. CSFs are then positioned on the scale according to their relative strength or weakness. Finally, each *weak* CSF is then be discussed to determine:

- Why it is a weakness (refer to the identified key problems).
- How important an influence it is on the objective (identify priority's).
- What action is required.

This will be conducted as a whiteboard-led exercise.

Minutes for workshop 10

Members

Please find the completed force field analysis worksheets for each of the undergraduate teaching objectives and associated CSFs.

Provide a course portfolio taking account of the dynamic and diverse requirements of stakeholders.

Current Position (estimate)

0% 100%

STRENGTHS	WEAKNESS
Funding →	← Graduate Knowledge
Industrial Links →	← Market Knowledge
Course Relevance →	
Course Range & Level →	
Professional Accreditation →	

Maintain excellence in the delivery of teaching & learning.

Current Position(estimate)

0% 100%

STRENGTHS	WEAKNESS
Staff Expertise →	← Staff Develop.
Student Assessment →	← Quality Management
Student Feedback →	← Staff Availability
Space Availability →	← Student Capability
	← Facilities

Ensure effective marketing of, and recruitment, to courses.

Current Position (estimate)

0% 100%

STRENGTHS	WEAKNESS
Availability of Course Information →	← Market Knowledge
Staff Involvement →	← Course Promotion
Schools/Colleges Liaison →	← Entry Stds.
Industrial Links →	← Recruitment
Selection Procedure →	

Ensure effective and efficient deployment of resources.	
Current Position (estimate) 0% 100%	
STRENGTHS	**WEAKNESS**
Scheduling →	← Budgeting
Space Availability →	← Sharing
	← Monitoring
	← Forecasting
	← Standardisation
	← Staff Development
	← Staff Availability
	← Facilities Availability

Instructions for workshop 11

Members

Workshop 11 will consist of a walkthrough of the draft IA report with particular attention to the set of key recommendations. A copy of the draft report has been left in your respective pigeonholes. Please could you review this document prior to workshop 11, which is the final workshop.

Minutes for workshop 11

Members

Findings of the draft report were accepted. The key recommendations were agreed as follows:

- **Information Policy**: DMEM should establish an information policy to cover: data management, procurement, security, procedures, utilisation, WWW standards, IT training/basic skills etc. This should include policy review cycles and should align with overarching IRD policy. A priority should be the establishment of an information policy for market knowledge and graduate knowledge (two existing significant knowledge gaps within DMEM).
- **Process Improvement Projects**: Further project(s) should be established to explore possible process improvements for undergraduate teaching and to model the other *key* processes.
- **Relational Database Management System**: systems analysis should be undertaken to rationalise and manage the identified disparate database and information systems. A RDMS is a possible solution to several of the highlighted information problems (e.g. duplicated effort, unnecessary data entry, and inefficient data processing).

- **Intranet/Content Management**: again, it was recommended that systems analysis be undertaken. An intranet/content management would address problems of resource availability, staff availability, knowledge sharing, communication, and the existing paper culture (a DMEM intranet would make information available electronically).

Appendix 3: Case study one information survey briefing paper

The following documents were created as word files and distributed to workshop participants via internal mail. For the purposes of confidentiality, the headers, which included the addressees/participants, have not been included.

Information Survey Briefing Paper

Through the process of information audit, DMEM is currently identifying and modelling key processes and information flow within the department.

Your participation is required to discuss and evaluate the preliminary findings of the working group, and to identify the Department's information resources and information needs in order to maintain or improve the Department's management of information.

Essentially there are two steps/meetings:

1. Evaluate and discuss the process model (1 hour meeting).
2. Identify and evaluate information resources and flows (2 hour meeting).

These are outlined in more detail below.

Meeting One: Evaluate and discuss the process model

In contrast to traditional task-oriented functional charts the process model focuses on the Department's key processes to illustrate, quite simply, *what the Department does*.

Process modelling illustrates work flows and provides a method to highlight information bottlenecks and duplicated efforts caused by poor communication or co-ordination across the boundaries of conventional functions.

The enclosed process model[1] illustrates the life-cycle of the *undergraduate teaching* process. There are three classes of objects illustrated (see key on diagram):

[1] Participants were provided with a copy of the complete process model (see Figure 5.6, page 218)

- **Processes**: a process is *an organised series of associated activities* that takes one or more inputs (materials, labour, information etc.) and produces a pre-specified output (product, service, knowledge etc.) as part of the Department's value chain.
- **Objects**: the *key inputs or outputs* of each process (see above). For the purposes of this exercise the objects represent the key information types (or groupings) for each process.
- **Roles**: the members of *staff who own or perform* the related process.

It is important to note that the model focuses on *key* processes, objects, and roles associated with undergraduate teaching. Further exploded models would identify specific activities which are the sub-processes of each identified process. For the moment these individual activities are listed as part of the enclosed process description(s).

TASK TO BE COMPLETED

The purpose of this meeting is to discuss/refine the model. For example:

- Are there key inputs/outputs missing from any of the identified processes?
- Are there any key processes missing?
- Is it clear what each process does, and do you agree with the process descriptions?
- Do you disagree with any part of the model, and if so, what?

These issues will be discussed during the first meeting but it would be highly productive if participants could consider them beforehand and bring their findings to the meeting. Process descriptions are enclosed with space for comment[2]. Those processes associated with your role (as illustrated on the process model) are the ones which will be discussed in detail; however this discussion can extend to others if appropriate or desired.

---

[2] Selected examples provided.

Meeting two: Identify and evaluate information resources and flows.

Essentially information resources are those resources which facilitate the acquisition, creation, storage, processing, or dissemination of information that generates the knowledge or other value required to achieve the goals and objectives of the Department.

The identification of information resources reveals what information is required and generated by the Department, who generates it, who uses it, and how they use it. Once these resources have been identified the resulting information flow diagrams illustrate information use, highlighting gaps in information provision, and missing links in chains of information.

TASK TO BE COMPLETED

Enclosed are information survey worksheets for each process. Each worksheet list the types of information which have been identified as the key inputs or outputs of the process. The purpose of this step is to identify the specific information resources associated with each of the headings by their proper or descriptive names. Please complete these for the processes which you are associated with (meeting one will provide you with this list) but feel free to complete others if you feel you can contribute. No further detail is required as this will be discussed at the meetings (issues to be discussed are included along with space for comment at the back of the information survey worksheets).

MEETING ONE: PROCESS DESCRIPTIONS

The following tables describe each of the identified undergraduate teaching processes. Please include your own comments if you wish to add or further refine any of the following details.

MANAGE COURSE OPERATIONS PROCESS
Purpose/function of this process.
To manage the regular day-to-day aspects of running the course ensuring that tasks are not neglected and that all are carried out in the most effective way with the given resources.
Comment:
Key activities (or sub-processes) performed as part of this process.
• Analyse resource availability.
• Match resources with requirements.
• Allocate staff to classes (and maintain table of staff loading).
• Allocate other resources to classes.
• Monitor resource allocation and use.
• Update resource allocation on a regular and "as-need" basis.
• Make new resource requests.
• Prepare, print and distribute course handbook.
• Prepare, print and distribute class timetables.
Comment:
Problems/difficulties associated with this process.
Not enough resources (facilities, space, staff).
Complexity of timetabling.
Reliance on University Centre and Computer Centre.
Late arrival of critical information e.g. student numbers.
Information flow e.g. sharing problems.
Satisfying the staff.
Comment:

MARKET COURSE PROCESS
Purpose/function of this process.
To raise the profile of our courses and to reach potential students with the appropriate information in such a way that we will attract the optimum number and quality of students to our courses.
Comment:
Key activities (or sub-processes) performed as part of this process.
• Identify appropriate vehicles for information (e.g. prospectus, WWW, brochures, boards etc.)
• Prepare information for publication in those vehicles.
• Arrange for publication.
• Distribute published material.
• Arrange and publicise open days.
• Arrange promotional visits where appropriate.
• Arrange seminars for careers, guidance, teachers etc.
• Arrange half-day information seminars for school pupils and their parents.
• Man University Open day information sessions.
• Analyse feedback (e.g. intake figures, student comments, IAP comments etc.).
• Make staff aware of processes and resources.
• Liaise with companies.
Comment:
Problems/difficulties associated with this process.
• Legal constraints.
• Shortage of resources.
• Difficulty in finding appropriate dedicated staff to take responsibility for recruitment.
• University agreements e.g. restrictions on advertising.
• Reliance on University Centre (e.g. Schools Liaison, Registry).
• Coordination of marketing activities at the various levels e.g. Course/Department/Faculty.
• Cost of advertising.
• Competition.
Comment:

EXAM BOARDS PROCESS
Purpose/function of this process.
1. To make recommendations on the award of credits from assessment results.
2. To make recommendations about student's progress, including final awards.
3. To comment on the performance of classes or courses.
Comment:
Key activities (or sub-processes) performed as part of this process.
1. Collection and submission of marks and assessments.
2. Pre-exam board meetings.
3. Review of exam schedule and checking of entries.
4. External examiners assessment.
5. Review of special cases.
6. Exam Board meeting.
Comment:
Problems/difficulties associated with this process.
1. Time scale and scheduling of marks returns.
2. Accuracy of schedules.
3. Gathering consistent information about cases.
4. Lack of consistency in recording unusual cases.
Comment:

SUPPORT STUDENTS PROCESS
Purpose/function of this process.
To ensure that students have all reasonable help and support, academically and personally, throughout the duration of their course.
Comment:
Key activities (or sub-processes) performed as part of this process.

• Staff/Student committees.
• Counselling scheme.
• Feedback forms.
• Special needs support.
• Referral to appropriate authority for specialist help (e.g. medical, financial etc.).
• Provide best facilities possible (esp. computing!).
• Provide information.
• Arrange extra curricular visits.
• Provide/arrange careers guidance and support.
• Provide links to student societies.
• Appeals advice.
• Additional or remedial teaching.
• Assist in arranging summer jobs/placements.
Comment:
Problems/difficulties associated with this process.
• Increasing special needs among students.
• Staff loading.
• Financial constraints.
• Technical constraints.
• Information flow.
• Not always obvious where to go for help.
Comment:

MEETING TWO: INFORMATION WORKSHEETS

The following *types of information* have been identified as the key inputs/outputs for each respective process[3]. Please identify the specific information resources associated with each of these headings (by their proper or descriptive names).

Please also assign a value on a scale of 1 to 5 to each information resource according to its relative strategic importance or contribution to the process. For example:

5: the information resource is *critical* to this process.

4: the information resource provides *significant benefits or adds value* to this process.

3: the information resource *contributes directly to this process but is not essential.*

2: the information resource *provides indirect or minor support* to this process.

1: the information resource is *not presently used or has no perceived benefits* to this process.

Further questions that you might consider are:

- Where is each of these information resources obtained from?
- Who is responsible for managing each information resource?
- What function/purpose does each information resource have?
- Do you experience any problems with any of these information resources?
- For each information resource, is there one thing which could be done to improve its use?

[3] Selected examples provided.

MANAGE COURSE OPERATIONS PROCESS

Course handbook	Class timetables	Staff timetables

Operational problems	Staff availability	Space availability

Facilities availability	Resource request (internal)	Allocated resources

New resources request (external)		MDFs		Staff loading	

Intake requirements					

MARKET COURSE PROCESS

Intake requirements		Course description		Course enquiries	

Market surveys		Course brochures		Prospectus entry	

WWW		Display boards		Intake figures	

EXAM BOARDS PROCESS

Exam schedule		Credit awards		Progression details	

Assessed materials		Student record		Course regulations	

SUPPORT STUDENTS PROCESS

Careers information		Facilities availability		Space availability	

Staff availability		Special needs		Counsel list	

Support details		Student feedback		Student record	

Special resources					

NOTES:

Appendix 4: Case study one information resource inventory sheet

ID:	PROCESS DISCUSSED:	DATE:
PARTICIPANT:	ROLE:	

IR NAME:	TYPE:	CATEGORY:
PHYSICAL LOCATION:	MANAGER:	OPERATIONAL CONTACT:
SOURCE:	DESTINATION:	
PROCESS SUPPORTED:	STRATEGIC IMPORTANCE:	
FUNCTION:		
DESCRIPTION OF CONTENTS:		
PRIMARY INPUTS:	PRIMARY OUTPUTS:	
STORAGE/COMMUNICATION MEDIA:		
PROBLEMS:		
SUGGESTION FOR IMPROVEMENT:		
COMMENTS:		

Appendix 5: Case study two interview notes

Note. For the purposes of confidentiality participant names have been removed; however roles have been left to provide context.

Grant Administration Group (3)

What do you do?

Administration of the grants process, from pre-application guidelines through to decisions, and concluding with post evaluation. As follows:

1. Funding allocated to budgets (national level)
2. Schemes/Funds setup
3. Guidelines & Application Forms created/updated
4. Applications received
5. Applications processed
6. Decision made
7. Funded projects monitored (staged dependent upon payment process and the specified intervals) [1]
8. Final post evaluation

[1]monitoring of project activity for lottery funded organisations (more detailed requirements than SE): compliance to grant conditions, spend against budget, partnership agreements etc. Grants Admin are the default group for measurement/tracking of compliance, but more qualitative measurement is left to the respective Art Streams. An issue highlighted was that, in many cases, it was extremely difficult to identify what the organisation was funded to do.

Grant Admin are currently midway through a change management programme based on the recommendations of Delloite & Touche. Main objectives were described as to:

- Become more transparent and accountable
- Reduce time to process applications
- Streamline evaluation and approval processes
- Improve communication between stakeholders

What information do you use, and need, in your job?

The application process (applications received, applications processed, decision made) is the main source and generator of information. Each application contains several attachments, providing key company information concerning the applicant (repeated for repeat applications). Officer assessments are then attached, which are reviewed to confirm assessments have been properly handled and documented. An issue highlighted was that these assessments vary considerably (from

1-2 sentences to 1-2 pages). Assessments are then passed on to an SAC Committee for a decision (there is an intention to allow officers to make the decisions in the future, with SAC committees focused more on policy).

Monitoring funded projects was described as difficult for the following reasons:

- Organisations do not readily provide the necessary information (even under threat of withheld funds [the threat typically comes too late])
- Organisations lack the skills to measure themselves, particularly objectively
- Organisations are uncomfortable with the process of being evaluated

Guidelines for reporting progress/compliance are provided with the letter of offer, which include the main headings for the final report (to be completed by the funded organisation). Completed reports (typically 6-20 pages + attachments), are distributed by Grant Admin to the relevant departments but very little feedback is received (they feel there is too much detail). Grant Admin admit to being unsure if these reports are going to the correct individuals, and are unsure of how they are filed (all as hard copy).

What information do you produce?

- Assessment Reports
- List of Applicants for consideration
- List of decisions made
- List of monitored projects and current status
- Monitoring reports for SAC Committee (Summary)
- Progress Reports (Full)

Are there any barriers to obtaining and sharing this information?

A significant gap concerning the monitoring of funded bodies was the lack of organisational information (eg. Overall health, performance, budget, leadership etc. which would provide early indicators of problems/risks), and the timeliness of communication. A comment made at this point, was that SAC needed to be much clearer about the information they required from organisations.

Another issue was the lack of collective cross-art stream analysis of evaluations – a significant problem when requests for information/statistics are made by the Scottish Executive (typically met after 2-3 days manual searching, retrieval, and compilation). This gap also makes it impossible to do any trend analysis.

One individual in Grant Admin has the role of monitoring compliance of high risk/investment lottery projects. Estimated that, due to the problems listed above, 25% are not fully assessed.

What systems/Applications do you use?

- MS Office: Word, Excel, Powerpoint
- GMS/LMS

Is there any functionality you would like?

Functionality issues were raised with both GMS & LMS.

GMS/LMS was described as a financial system with extremely limited capability to manage projects, applicant details etc., and to meet user requests for statistical analysis. The interface between MS Word and GMS is problematic and prone to hanging (MS Word) when cutting and pasting between systems (parts of the Officers Assessment Report [Word] are copied to the Acknowledgement letter which is generated within GMS/LMS).

LMS consists of four components: assessment, conditions, scores, application, which have to be completed to generate an Officers Report (for each Lottery application). This is described as a four step, complex, and error prone process, which takes an experienced user approx. 30 mins to complete. System often hangs.

Because of these problems staff frequently develop workarounds because "we are forced to work according to the system, rather than how we should be doing things".

It was recognised that a user group was required to review the functionality of all systems.

Further, lesser functionality desired:

- View of current workload by Artform officer
- View by multiple criteria eg. Live applications by Visual Arts & Crafts.
- Reminder/Forward Planner feature for payments due – that automatically linked to MS Outlook, or generated a letter (there is a Diary function but it does not seem to work).
- Ability to scan & store documents

How might your job be made easier from an information perspective?

Want more self-sufficiency, with:

- Tailored access to information
- Access to a single contacts list
- Internet access (for: best practice, government guidelines, civil service fact sheets etc.)
- Electronic Diaries
- More automation of administrative processes
- More user friendly GMS/LMS

HR Group (3)

What do you do?

- HR Policy
- Pay Appraisals
- Maintenance of Records[1]
- Staff training
- Maintain Learning Resources room
- Advise staff on operational & policy issues[2]
- Submission of staff plans/proposals to Scottish Executive

[1] A manual hard-copy process (they are currently migrating to the new EmPower system). Reports/documents are loosely grouped as follows:

1. Staff: personal details, appraisal records etc.
2. Policy: UK & SE policy guidelines for recruitment, leave etc.
3. Manuals: guidelines for staff.

[2] SAC subscribe to the Gee System (an employment Law Database). Also part of an information sharing group: Non Departmental Government Bodies.

What information do you use, and need, in your job?

Main information managed as follows:

- Application Records: held for each successful job applicant (unsuccessful applicants held for 6 months). Include attachments. All held as manual hard copy.
- Staff Training: requests made via email or in person, template filled in, desktop IT courses available on CD ROMs. No individual training records kept – group lists maintained instead.
- Staff Records: Annual Leave, Time off in Lieu, Sick Leave, Appraisals (plan is to move all records onto new system but not sure when – stated that Appraisal records are too long to type into system)

What information do you produce?

- SAC HR Policy
- Job Descriptions

- Job Contracts
- Guidelines for Overtime and Leave.
- Staff handbook
- Learning Resources material Catalog
- Various statistical reports: toil, recruitment, sickness, annual leave
- Staff Directory (with ITS) – acknowledged as out of date (would also like photographs)

Are there any barriers to obtaining, and sharing this information?

Raised a number of issues:

- Feel there is no control over information flow – are either bombarded or excluded.
- Feel they receive far too much email both internally (org. changes, resignations, issues, policy questions, leave requests etc.) and externally (recruitment agencies).
- Lack basic corporate information such as why the mission statement changed; and have no input to management planning such as the training program.

As an example, information is stored as follows:

MS WORD	MS EXCEL	MS POWERPOINT	MS OUTLOOK
Employment Contracts	Salary details	HR Presentations	Email
Job Descriptions	Toil Analysis	HR Org Chart	Calendar
Application Forms	Staff movements		Contacts
Policy Documents			
Training Forms			
Leave Forms			

- HR not historically involved in senior management meetings (although there is an intention to involve them in the future). Consequently feel uninformed (were not aware that minutes of meetings are posted to the public folder).
- HR does not "fit well" within finance. Information flow downward and of financial content.
- Two buildings a problem as people reluctant to travel back and forth.
- Manual paper processes time consuming. Filing system done by individual personal preference.
- Records have not been cleaned out/updated since approx. 1993 (as an example: old, no longer applicable job descriptions are still filed with their replacements).
- Contact lists kept individually (some by card index, some using Outlook)

What systems/applications do you use?

- MS Office suite: Word, Excel, Powerpoint, Outlook
- MS EmPower: Recruitment, Training, and Personnel modules.
- MS Internet Explorer: all have desktop access. Introduced May 02 as HR system (supported by MS Great Planes). No interfaces (could link to SAGE but not desired by Finance – so updates completed manually). All SAC preferences (job grades, departments, division, equal opps codes etc.) have been entered and are waiting to be tested. Plan is to be up and running by Autumn 2002.
- SHL (Saville Holdsworth Ltd) Graduate Decision Maker: desktop app. for analysing key skills and producing a personal specification for more senior posts.
- SHL Occupational Personality Questionnaire: desktop personality test.
- SHL Customer Contact Decision Maker: desktop app. for analysing key skills and producing a personal specification for less senior posts.
- Training Packages: various on CD ROM, Video etc
- Digital Camera: yet to use/load SW.

Is there any functionality you would like?

- Intranet site with HR section: news, FAQ, Downloadable Forms, Policy, Current Vacancies & Job Descriptions, HR Contact Details etc.
- Central access to SAC information/documents. Improved structure of public folders with better search capability. Less folders and more faith in version control.
- More interesting internet site – particularly job vacancies.
- Ability to receive online job applications (but not sure if MS Empower has any existing functionality).
- A more streamlined SAC brochure (current one creates problems when trying to send electronically due to file size).

How might your job be made easier from an information perspective?

- Intranet
- Less information/more useful information
- Less email

Head of Arts & International

What do you do?

- Corporate Management
- Policy Development
- Financial Management of the Arts Groups (6)
- External Relationships: International, Creative Industries, New Media, Scottish Opera.

What information do you use, and need, in your job?

Corporate Management

Information provision/reporting is lacking and very informal, word of mouth dominates among management. At an individual level, press, Internet, and personal contacts are heavily relied upon. Would like to see:

- A management plan (operational targets, measures & indicators)
- Advance notification of key staff events (recruitment, appointments, re-orgs.)
- Collective discussion and decision making
- Incentives to manage budgets

An example report was shown to illustrate the lack of executive reporting. The report (Lottery Applications broken down by Artform & Lead Officer between 1st June 2001 and 31st May 2002) was requested by senior management and was compiled manually over approx. 3-5 days from disparate Art Unit sources. The report was provided as a tabular list, unbound, 58 pages long, with no cover page, no executive summary, and no groupings or preliminary analysis.

Policy

There is extremely limited access to research, or awareness of were to source research from. There is no internal SAC index or source guide for accessing statistical information and reports. Staff must search from scratch and seem to be very much on their own. The research role is implicit within job descriptions, and is conducted at the individual or unit level, but staff are neither trained statisticians or information specialists. Research is conducted on an ad hoc basis with no standard approach or consolidation of activity.

There is no holistic "Arts in Scotland" view as no information is held on organisations other than those funded by SAC, overlooking the entire commercial/non-funded sector which would provide a valuable source of additional information, and provide context for funding. There is also limited information

regarding audience preferences. Every four years MORI are commissioned to conduct an Access & Participation Survey but several issues were highlighted: the 4 year cycle is too long – should be every 12 months, the 200 participants are too few, and the survey fails to adequately consider and relate to other national statistics (eg. the relationship between MORI audience reading stats. and national book sales figures).

Requests from the Scottish Executive or MSPs are handled with some difficulty. As an example, it was stated that if SAC were asked how overall spend related to England, they would not be able to provide the information as it is not readily accessible. The overall capability of SAC to respond to requests from external bodies was described as very poor. It is felt that a statistician, or access to one, is urgently required.

Financial Management of the Arts Groups

There is no financial reporting, it is neither formally tracked nor regularly reported on to the senior management team. Would like to see financial tracking introduced (monthly with quarterly formal summary and analysis). Was not sure how it is currently done within individual units.

There are too many funding schemes (123) and SAC has no knowledge of the success of funded events. SAC has had some success setting measures for individual projects (for ROI) and tracking those measures at a high level, but it would be extremely difficult to attempt to do this across an arts sector or geographic region as it would involve an individual collecting completed Audit Forms from each of the Arts Units and compiling them (this type of task is done by the statistics officer – if requested). Because of this disparity problem, reports or even simple lists, such as a list of the Lead Officers for the core funded organisations, can take up to two weeks to compile.

Note. Organisations complete an Audit Form as part of the funding process, which obliges them to provide information on allocation of funds and spend, and the audience figures. This is returned to the relevant Arts Unit and kept as paper copy. No reports are produced.

External Relationships

International information was provided via a helpdesk shared with the British Council but this relationship has changed as the council has become more UK focused (with a perceived reduced Scottish focus). Networks of personal contact were deemed critical (eg. The 27 cultural attaches resident in Edinburgh). There is limited knowledge of what Scottish Arts Organisations are doing internationally – SAC was under informed on a recent trip to China and went without any reports or background information.

What information do you supply to colleagues?

None formally provided.

Are there any barriers to obtaining and sharing this information?

- SAC is not good at writing things down. There is a "conversational culture".
- Management is by art stream agenda rather than corporate direction, resulting in poor information sharing across streams.
- There is limited knowledge of what information is held within the organisation, as it is not communicated or made readily available.
- There is extremely limited management reporting to the senior management team, with most information shared verbally.
- SAC staff are extremely mobile and often difficult to locate. There is a pool of mobile phones but it still remains difficult to contact staff.
- No "evidence" can be provided to backup SAC claims of success: National research is extremely limited, funded organisations are poorly measured, and Local Authority figures can be up to 3 years old when published and do not match SAC classifications.
- There are no reliable National Statistics available and no comparable International Statistics have been sourced.
- The bulletin board is not used effectively. Felt to be uninformative with poor content and editing.

What systems/applications do you use?

General desktop. GMS not used but information supplied from GMS via Finance.

Is there any functionality you would like?

- There is no central file management, and no standards.
- There is no intranet.

How might your job be made easier from an information perspective?

1. Corporate approach to the management of information:
    - Standard processes
    - Self Access

- Art stream specialists on call for interpretation if required
- Formal and recorded meetings – particularly regarding decision making

2. A strategic research program to generate national reports.
    - Audience Preferences
    - Audience Participation
    - National & International Statistics

Head of Strategic Development

What do you do?

1. Corporate Policy Development
2. Staff Development & Management
3. Processing of Funds
4. Establishment & Maintenance of Strategic Partnerships
5. Support & Monitoring of Key Arts Organisations

Procedures have been defined for 2,3,5. None exist for 1, and 4 is described as "work in progress".

What information do you use, and need, in your job?

A severe lack of information to guide and measure corporate strategy/policy was immediately flagged, particularly with regard to the following:

- Audience Preferences
- Audience Participation
- Geographical Spread of the Arts
- Quality of the Arts

What information do you produce?

- Develop corporate policy & strategy.
- Assist with funding decisions between competitive groups.
- Research (on an informal basis).
- Corporate policy directives: Social Inclusion, Arts & Disability, Cultural Diversity, Geographical Spread, Education & Outreach.

Although research was cited, no reports or circulars are distributed. The example provided was Minutes of external meetings (fund holders, stakeholders etc.), which are recorded as file notes, completed on a word processor and circulated as a memo, but again on an ad hoc basis.

With regard to policy directives, it was felt that SAC awareness and understanding was probably limited, and almost certainly inconsistent across the organisation. On occasion colleagues have been directed to information on the Internet to support policy implementation, but the overall process remains informal and ad hoc. There is a need for greater dissemination of information, particularly to

increase awareness and understanding of policy directives (why they are important and how they can be addressed).

Externally, the meeting of policy directives are linked to funding but are not explicit enough and are extremely difficult to measure within the funded organisations (there is no benchmark data and no targets have been set in many instances).

What are the key barriers to obtaining this information?

Audience preferences

Nothing of substance is currently available. The perceived need is for a national survey of audience preferences (the Henley Centre in England was cited as an example). This research would act as a key "driver" for policy formulation, with audience participation figures (see next point) providing a key ROI measure.

Audience Participation

SAC commission a report every four years (Attendance Participation and Attitudes Towards the Arts in Scotland). The information provided has limited analytical use – the need is for more detail (who, when, what they thought etc.).

Part of the funding process does require funded arts organisations to monitor their audiences but this is not a strictly formal process that is 100% adhered to. More regular, sophisticated and qualitative information is required (supported by a standard feedback mechanism).

Geographical Spread of the Arts

This information is currently provided by COSLA as an annual report detailing per capita local authority spend on the arts. Annual provision is acceptable but the information is of limited use as it lacks any market segmentation capability, and consequently, cannot be analysed by region/constituency, arts stream, or policy directive.

Quality of the Arts

SAC are currently undertaking a review of core funded organisations, assessing them on artistic, strategic, and managerial capability. Quality of work would be looked at under "artistic", but how to

measure quality is not clear, with SAC lacking information on how to conduct this review, and the benchmark measures required to draw conclusions.

Funded Project Classifications

Currently it is extremely difficult to nationally measure how far policy directives are being addressed as projects are commonly tagged as either Music or Drama etc with directives hidden within. As an example: the entire budget spend in 2001-2002 specifically for social inclusion was £480k, but this did not include "hidden" projects such as the Scottish Opera Easterhouse project, which fell under Music funding. The need is for funded projects to be dually referenced (by Arts Stream and Policy Directive) to accurately measure success in addressing policy directives. Cross-referencing would also be extremely useful for obtaining more useful information from local councils in order to look at geographical spread of the arts etc.

What systems/applications do you use?

General desktop. GMS not used but information supplied from GMS via Finance.

Is there any functionality you would like?

- Mapping/analytical SW for statistical presentation of research data to support the "evidence based approach". However, it was emphasised that this tool would have to be extremely intuitive to use, given current staff skills.
- Contacts Db. Useful add-ons would be particular skills of artists etc.
- Grants Db – maintenance of recipient details.
- Staff Db
- Survey Data Db – allowing detailed market analysis/segmentation.

How might your job be made easier from an information perspective?

An "evidence based approach" to policy development was deemed as the single most important, which would be enable by the previously specified new functionality. Also suggested a staff room for informal information sharing.

Systems Support Group (2)

What do you do?

- Core Infrastructure Management
- Purchase/Deploy packaged applications
- IT Procurement
- IT support
- Network Administration
- Business Continuity Planning

What information do you use, and need, in your job?

- Fault logs: receive approx. 12 pd (80% via email, rest by telephone or "in the corridor"). Information almost always insufficient to adequately assess or prioritise the fault without follow up.
- ICT manuals: in the main OK apart from GMS & website, neither of which are documented.
- Staff Accounts: these need to be updated when staff move or change duties, and when new staff are appointed. ITS developed a questionnaire and gave it to Personnel to be completed by managers – but it is not used. Updates are typically requested on the day.
- System updates: a spreadsheet has just been developed for logging changes. There is also a need to maintain user and system profiles, currently not done due to resource constraints.

What information do you produce?

- Provide an ICT induction pack for new staff.
- Provide general advice and some support documentation.
- Previously provided an ITS newsletter but was stopped Feb 01 due to other commitments.

Are there any barriers to obtaining and sharing this information?

A significant issue was highlighted concerning File structuring, security groupings and administration. Currently access is structured by Location/Department/User, but this has restricted file sharing between users across departments etc. and has led to workarounds, with files duplicated on disparate file directories creating versioning problems (if not lost entirely). Within departments (16) there are no standard file systems, common naming conventions etc.

Another issue was how staff catalogue grants applications – there is no numbering system that ITS is aware of.

Staff are also frustrated by the amount of email which is distributed to share information & documents (many as attachments which are then filed locally).

What systems/applications do you use?

All either as maintainer and/or user.

Is there any functionality you would like?

None specific to system support. ITS recognise the need to develop user profiles, particularly:

- Information groups & audience
- Access needs
- Security privileges
- Guidelines for information generation, distribution and retrieval.

Another perceived requirement is to divide information by operational and strategic as a decision has been made by SAC that all staff should have open access to all operational information – so a distinction and boundary needs drawn between confidential information. There is currently a public folder but there is no system to notify staff of updates and information is not fully structured, or a definitive source etc.

How might your job be made easier from an information perspective?

1. More time for planning with all relevant parties involved.
2. A company-wide perspective of requirements.
3. Much more detailed information regarding: Business requirements/Functional requirements, Server File Structures & Security Profiles.

ITS plan to shortly kick-off a "Modernising Government Task Force" within SAC to drive 3.

(Acting) Head of Funding & Resources

What do you do?

Funding was described as looking after the financial well being of SAC and is the main responsibility of the interviewee. Four key processes (in cyclical order) were identified:

1. Budget Planning/Setting
2. Cash Requests
3. Preparation and provision of Management reports
4. Preparation of Statutory Accounts

Resources were described as property management, covering such items as: Buildings, Reception, Mail Delivery, Heating, and Security etc. Most of the following (with minor exception) are also applicable to Resources.

What information do you use, and need, in your job?

Budget Planning/Setting:

1. Scottish Executive give an indication of budget via email (followed by letter)
2. HODs of SAC departments request funds via email or memo (individual requests – not done as a team)
3. Ed Cubbitt & Graham Berry discuss 1&2 at corporate level, arriving at departmental allocations
4. Budget produced and distributed. Hard copy (part WP, part spreadsheet)

Cash Requests:

1. Funds and payment details identified (monthly basis drawn from both GMS/LMS [grants] & PS Financials [supplies/operational etc.])
2. Funds drawn/distributed (monthly basis). Hard Copy list of payments made/cheques drawn is generated by GMS/LMS for grant payments (including total expenditure by Arts Department for month)
3. System updates made (to PS Financials for balance sheet)

Preparation and provision of Management Reports

1. Updates made for monthly outgoings
2. Report distributed (Monthly Management Accounts report*)

*This report is distributed middle of the following month, generated by MS Excel, and circulated hardcopy to HODs. Content is tabular, B&W, and text only (no use of graphics). The report is by individual department, both monthly and cumulative – however HODs are only provided with figures for their respective department (no corporate overview). No management meeting is held (although the reports are used for the bi-monthly Business, and Audit Committee meetings attended by the Chairman and Council representatives – but no HODs attend).

What information do you produce?

Preparation of Statutory Accounts

1. Balance sheet managed day-to-day using PS Financials (Income & Expenditure) – described as a summary purchase ledger.
2. Annual Financial Reporting (2) to Scottish Executive, Scottish Parliament, and one for Westminster (two separate reports for individual funding sources: Scottish Executive Funds, Lottery Funds respectively).

Are there any barriers to obtaining and sharing this information?

In general none but it was flagged that one issue was the lack of corporate focus among HODs.

What systems/applications do you use?

- PS Financials (Petersborough Software): introduced Oct 01, solely for use by Finance (network access restricted to group), windows based, no interfaces, described as the ledger system
- Albacs: used for electronic cash payments (an option for customers/suppliers), sole user is Ed Cubbitt, no interfaces (PS & GMS/LMS create list of creditors to be payed, Ed checks list then processes/authorises fund transfers)
- SAGE Payroll: payroll module
- Desktop: MS Word, Excel, Powerpoint, Access, Outlook, Internet Explorer, and Netscape (but no internet link)
- GMS/LMS: grant mgmt system*

*OK with GMS/LMS as a user with no issues or requests for new functionality. Felt that many of the problems experienced by others were due to a lack of training, and lack of appreciation that it was a grant mgmt system designed for a specific purpose (although he did accept that his needs were probably met more than others [particularly HODs] because they are purely financial [Balance Sheet], and met in a more straightforward fashion).

Is their any applications or functionality you require?

- Desktop Internet Access: for accessing Government Policy Directives (to follow up memos with further info.), and updates etc; currency converters/live rates; company details for sourcing purchases etc. (have considered online procurement but feel they are too small – stationary the only possibility).
- Online Electronic Remittance: currently considering E-Connect (Albany/BOS application) to combine with Albacs to produce electronic remittance advice (email) to replace postal system.
- More colour printers – currently only have one.

Also mentioned the need for one database for everything – but was unsure for what information. Mentioned:

- Customer details
- Contact lists
- Payment details (but was concerned about this being in "one" db)

Summarised as a contact details problem – due to the fact that Departments continue to maintain their own lists (described as a cultural problem).

How might your job be made easier from an information perspective?

No real problems. Mentioned need for regular and accurate information – but only example provided was for staff to provide *Declaration of Interests* in a more timely fashion.

Head of Finance

Note. This interview focused on the Grants Management System/Lottery Management System (GMS). One more general question was asked at end of interview.

GMS Background

GMS is a customised MS SQL Server application that was purchased for £20000 from Dark Systems 1994/95 (this was a discounted price as SAC was the pilot site for the developer). The ongoing maintenance contract is £15000 which includes 4 site visits by the developer. Application enhancements or additional visits are charged at £300 per day. Current version is MS SQL 7.

The application handles approximately 3000 grant applications per year. 7000 applications are stored on the system, including 25000 attached MS Word documents (3-5 attachments per application). There are also 9000 contact details stored on the application. Current size is 500 MB. No archiving is done, or is planned to be done, as it is felt as unnecessary (there has been no degradation of performance and there is adequate storage still available.

Some modification of SQL query lines is done inhouse to modify reports but in general, requests are made to Dark Systems (Grants Admin accept user change requests, which are logged, vetted and prioritised before submission to Dark Systems. There are currently 10 requests in the pipeline.).

Approximately 60 members of staff have access to GMS from their desktops and can directly view and generate reports. Staff training (including guidebooks) was first offered on a voluntary basis in November 1998 and although initially postponed, was run February 1999. New starters are offered training as part of their induction. Some staff have not attended as the service is optional. No records have been kept.

GMS Functionality

There are seven key features of the application: Grants, Applications, Reports, Contracts, Tracks, Utilities, Help.

Grants

Grants is the core function of the application with all other features developed around this. This feature records and manages the entire grant application process. Features include the capability for Grant applications to be queried by the following SAC Allocations:

1. Local Authority Area

2. MSP Constituency
3. Budget (Lottery/Voted, Schemes/Art Forms)
4. Artforms
5. NCS objectives
6. Ethnic Minority, Disabled

The above statistical reports are provided by request only. The quality of information held for Allocations 5 and 6 was described as questionable due to the subjective interpretation of applications by Artform Officers, who input the data. The example provided was the Ethnic Minority and Disabled field which also has a "Broad Objectives" option as an alternative, and which has become the default in many instances. In another instance, it is difficult to fully analyse geographical spread of the arts as the default is the organisations home address and does not allow for touring companies (eg. Scottish Opera).

Applicants

Holds applicant details (Organisation) with links to Contacts, which hold individual staff details.

Reports

Reports is a container for generated documents classified as:

- Grants: attachments to the grant process (1. Application, 2. Assessment, 3. Conditions, 4. Officer Report Summary, 5. Offer Letter)
- Meetings: compiled reports for committee meetings (list of applicants for consideration, budget update etc.)*
- Reports: 15 finance centric reports.

* Each application is put forward to committee for decision. One application can be between 10-50+ pages with committee members receiving several at one time. Estimated that 250000 pages of reports are distributed to committees per annum.

Contacts

Currently out of date (many from 1994-5) and only 10% include email addresses. This feature is not used (most staff maintain their own lists). Plan is to remove local lists from staff/Artform PCs in conjunction with updating of records as part of Data Protection obligations (mailshot project to all contacts about to begin – approx. 16-20k).

Tracks

Maintains a contact history for an application. Not operational for LMS.

Analysis

Main source of statistical reports. Reports can be sorted by the following criteria: Application/Awards, Time period, Min/Max, Application Type, Programme, Meeting, Artform, Local Authority, MPS Constituency, Social Inclusion Partnership Area.

Help

Not provided due to cost (Dark Systems want £25000). Hoping to source a copy from another public sector organisation (Biotechnology & Biological Sciences Research Council) at lower cost and then modifying to SAC needs.

GMS Problems

- Budget: feeling is that not enough investment has been made in the application (although this is also regarded as a plus) – but later it was also mentioned that the application was perhaps under-utilised. A replacement budget has been proposed.
- Unmet user requests: felt that many requests were too high (no examples given). Format of reports has been criticised but formal feedback has not been provided when requested by Finance Grants (cited as an ongoing problem). There does not appear to be any user group.
- Dark Systems a one-man operation.
- Only one expert/informed staff member in SAC (interviewee).
- Legacy data gaps corrupting reports.

Future GMS Plans

- Initial discussions with Dark Systems have confirmed online capability.
- MapInfo graphical mapping SW (single licence) has been purchased to provide geographical spread analysis (by area, district, sector) to meet increasing MSP requests. Data generated by SQL query then graphically mapped. Currently being tested.
- Not involved in E-Shop or GIFTS discussions. Was unaware of CRM proposal by D&T.

How might your job be made easier from an information perspective?

Improve Internal Communications was prioritised for the following reasons:

- SAC operated on a need to know basis – organisational information is not freely available.
- Although the manager of the main SAC application, he has not seen the D&T report (he was consulted by D&T), and does not know/understand what is driving the proposal for E-Shop or CRM in general.
- No one is responsible for internal communication.
- There has been no staff briefing for four months (should be monthly) – the reason given is that staff are too busy.

Head of IT Services

Note. This interview focused on IT Services (ITS) strategy.

A. ITS Overview

What is the ITS Mission?

ITS Mission Statement is to "deliver an efficient, reliable and valued ITS service". ITS objectives are outlined in the *SAC ITS Strategy 2000-2003* document (Section 4) but are not explicitly linked to SAC corporate objectives.

ITS projects are grouped under three classifications: Security, Information Strategy, and Functionality Brief.

Security

Security is being upgraded to provision for an extranet to support multi-zoning and secure access for users; and to provide a secure infrastructure as preparation for meeting eGIF (web standards) and ERDM Government requirements (Electronic Record Document Management by 2004). A number of initiatives are underway as part of this project: Firewall, Proxy Server (MS ISA), desktop Internet access, IP updates (to increase fault tolerance & introduce personal addresses). A major upgrade of the server backbone is also underway to provide greater business continuity.

Information Strategy

This project is seen as a follow on to the Information Audit to develop detailed user profiles and information requirements to guide systems development. It is proposed that a new member of staff is recruited to fulfil this task.

Functionality

This is a future planned project. ITS do not have a clear business requirements brief from SAC to guide selection of appropriate solutions. Previous commissioned reports have also failed to fully define requirements. The purpose of this project would be to fully define requirements and develop a functional specification for RFT.

What is the current and planned ITS architecture?

Current IT Architecture

In summary: MS NT4, Netware (retiring), MS SQL 7, MS Windows, MS Word/Excel/PowerPoint/Outlook 97, Netscape, InoculateIT, SAGE, Rebus PS Financials, EmPower (HR).

SAC website has been heavily criticised for poor design, limited content (although it does contain 500 pages), and no online channels (eg. Grants applications). The site was developed in 1997 by Scotland Online who retain the contract. A recent update using Java script caused runtime errors in Netscape and has reduced SAC confidence in the developer. A complete redesign of the website is envisaged.

There are several issues concerning GMS, which is the primary application supporting the SAC's core process (Grant Management):

- The system has been developed and is maintained by a sole operator based in Newcastle who retains access & security privileges, which have resulted in some routine administrative changes having to be made via the developer (an example cited was passwords, which have been hard coded by the developer and cannot be changed by SAC ITS [who cannot recompile code either])
- The developer has supplied no Technical or User documentation. ITS conducted a disaster recovery exercise where they completely recovered/rebuilt GMS. During this exercise problems were identified with file locations and macros, which required developer assistance to resolve, in lieu of documentation.
- GMS integration/compatibility with other systems (GMS is MS SQL 7 with a VB interface, which as a package should present few integration problems – it is the design [or knowledge relating to the design] of the Db which is of concern to ITS). Related to this are issues of upgrade and ongoing maintenance.
- GMS working group was disbanded. Originally setup to provide user feedback to further develop system functionality - disbanded due to a lack of productivity and frustration among members.

Planned IT Architecture

SAC was directed by the Scottish Executive to play a major part in the development of a "national cultural portal" but it was felt by SAC that this should not be part of their remit. This responsibility has

now been transferred to the Scottish Library Information Centre (SLIC) who are part of SLAINTE, and who have demonstrated some experience with their cataloguing system/search engine for Scottish Libraries. As part of this project a fifteen-person steering committee has been established, which has two SAC members.

SAC ITS are currently focusing on the provision of a generic backbone infrastructure (soon to be completed) but are greatly concerned by a lack of clear guidelines for systems development. They have not defined future system requirements as they lack the necessary company-wide input and detailed requirements brief to adequately specify an appropriate solution(s). However SAC has already proposed two solutions to ITS:

- E-Shop (Onyx): recommended by Deloitte & Touche as a CRM solution. ITS have attended a workshop but still feel they have too little information about the functionality of this application, and are concerned about the integration and staffing issues it will introduce. A further concern is the E-Shop reliance on GMS as a Db, which is currently not providing adequate information to users and consequently, might only provide another layer, adding complexity but little functionality.
- GIFTS (Buzzacott): suggested by SAC Grants Administration as a replacement Grants Management System, offering greater support and an intuitive Windows Interface.

Neither solution has been fully reviewed, primarily due to a lack of clearly defined business and information requirements, which would make any selection premature. ITS feel they must:

- Understand and define the link between IT and SAC organisational communication needs.
- Identify and pool information & knowledge within SAC, particularly knowledge held "on the person rather than the system".
- Define a process for recording, tracking and managing all documents electronically

A major difficulty for ITS was managing operational and development work at the same time, and lack of in-house skills to manage the requirements gathering and solution selection process.

PEST ANALYSIS

- Political: ITS do not feel heavily influenced by Government Policy as directives are typically one-off statements that are generic and easily translated by individual departments. Consequently, ITS are influenced more by the individual translation of policy directives. Main directives are the web guidelines within eGIF, and ERDM which is part of the Government directive to provide core services online by 2005, beginning with electronic record

management by 2004 (although SAC have directed ITS to complete this by April, 2003 – much to their concern)

- Economic: There is an operational budget and a development budget for the new systems infrastructure.
- Social: ITS have limited knowledge of SAC IT skill levels or preferences. It is felt that few have used the Internet, mainly due to lack of provision (access limited to kiosks). However training has never been provided and no Training Needs Analysis has been conducted.
- Technology: Major influence is to be online and browser based.

Appendix 6: Case study two information use survey

1. In which area do you work? (insert "X" in box)

Directors Office	☐	Funding & Resources	☐
External Relations	☐	Arts Development	☐
Strategic Development	☐		

2. What are your primary responsibilities? (insert "X" in box)

Advising	☐	Managing Finances	☐
Office mgmt/admin/supp	☐	Advocating	☐
Funding for the arts	☐	Shaping strategy/policy	☐
Administrating grants	☐	Researching	☐
Managing HR	☐	Corporate strategy	☐
Information systems	☐	Auditing	☐
Publishing	☐	Marketing	☐
Co-ordination role	☐	Monitoring grants	☐

3. What other important activities are associated with your role? (insert "X" in box)

Advising	☐	Managing Finances	☐
Office mgmt/admin/supp	☐	Advocating	☐
Funding for the arts	☐	Shaping strategy/policy	☐
Administrating grants	☐	Researching	☐
Managing HR	☐	Corporate strategy	☐
Information systems	☐	Auditing	☐
Publishing	☐	Marketing	☐
Co-ordination role	☐	Monitoring grants	☐

4. What is the average number of hours (per day) that you spend on the following? (insert .5/1/1.5 etc.)

Handling paper	☐	Using a computer	☐
Talking to people	☐		

Appendix 6: Case study two information use survey

8. What is the frequency (F) with which you *recieve* information via the following and how useful (U) is it? (1 = low, 5 = high)

	F	U		F	U
Email			Telephone		
Post			Meetings		
Fax			Public folders		
News media			Staff briefings		
Away-days			Magazines/journals		
Internet					

9. What is the frequency (F) with which you *send* information via the following and how useful (U) is it? (1 = low, 5 = high)

	F	U		F	U
Email			Telephone		
Post			Meetings		
Fax			Public folders		
News media			Staff briefings		
Away-days			Magazines/journals		
Internet					

10. What is the level of difficulty experienced when receiving or sending information via the following? (1 = low, 5 = high)

Email		Telephone	
Post		Meetings	
Fax		Public folders	
News media		Staff briefings	
Away-days		Magazines/journals	
Internet			

Appendix 6: Case study two information use survey

11. Which of the following would you highlight as key barriers to using and sharing information? (insert "X")

Information innacurate/ out of date	☐	Poor internal communication	☐
Problems negotiating public folders	☐	People not sharing readily	☐
Information not accessible	☐	Lack of downward communication	☐
Lack of accountability	☐	Poor filing systems	☐
Lack of clarity	☐	Lack of meetings/ briefings	☐
Lack of time	☐		

12. How useful are the following systems for sharing information? (1 = not, 5 = very)

Email	☐	Meetings	☐
Telephone	☐	Internal public folders	☐
GMS	☐	Post	☐
MS outlook	☐	Written documents	☐
Internet	☐	Notice/bulletin boards	☐
Staff briefings	☐	Away days	☐
Fax	☐	News/Broadcast media	☐
Magazines/journals	☐		

13. With regard to IT access, what is your current (C) and future (F) access requirements? (1 = low, 5 = high)

	C	F		C	F
At the desktop	☐	☐	Remote: home	☐	☐
Remote: UK	☐	☐	Remote: International	☐	☐
Remote: mobile	☐	☐			

Appendix 6: Case study two information use survey

14. To what extent do you agree or disagree with the following statements regarding SAC information?
(1 = strongly disagree, 5 = strongly agree [insert "X"])

SAC information is:	**1**	**2**	**3**	**4**	**5**
Focused on relevant materials					
Readily identifiable in terms of author					
Of the quality I look for in my work					
Friendly from a user's standpoint					
Geared to my requirements					
Adaptable to future changes in technology					
Can be easily customized to meet my needs					
Effectively organized for my needs					
Readily shared throughout the council					
Available to anyone regardless of ICT skills					
Provided automatically to match my needs					
Available online/appropriate training materials					
Easily accessible through my PC					

15. How aware are you of the council's information policies and procedures for the following:
(1 = not aware, 5 = very aware)

	1	**2**	**3**	**4**	**5**
Monitoring of ICT use					
Copyright issues, including software licensing					
Data protection and privacy issues					
Health and safety aspects of ICT					
Acceptable use of Internet, email etc.					

THANKYOU - YOUR COOPERATION IS MUCH APPRECIATED

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