DIVISION OF COMPUTER SCIENCE

Case Study - An Information Systems Strategy: Development and Evolution at the University of Hertfordshire

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Summary

This paper reviews the development of an initial Information Systems strategy for the University of Hertfordshire and evaluates, the process, the development team and the deliverables, in the light of theoretical concepts published in recent years. It recognises that although no formal methodology or model using documented tools and techniques was consciously put into practice, there is a similarity of approach to the Multiple or eclectic Methodology model proposed by Earl (1989). Ideas from a number of writers are used to evaluate the process and the resulting 'second report and detailed strategy' document. This report was communicated widely throughout the University and was well received. The evaluation is followed by a consideration of the ongoing problems of evolving the strategy. The paper concludes by proposing a set of generic lessons learnt which are summarised in relation to; managing change, developing IS strategies, and developing IS strategies for Higher Education.

This paper builds on the first six months research into IS strategy development at the University of Hertfordshire (Bennett and Hinton 1994). The research was undertaken to support teaching on MSc and final year BSc courses within the School of Information Sciences.

Background

The development of an Information Systems (IS) strategy aligned to business needs is seen as enabling flexible organisations to compete in today's global, competitive and fast changing environment. An IS strategy should focus on future business developments, as well as the management of information and technology, required to ensure successful integration with the business strategy.

In many organisations the development of an Information Systems strategy is a new strategic issue and there is often little in-house expertise available. The decisions for management are; choosing the best approach to identifying the strategy, selecting the range of issues that the strategy should address, and deciding the membership of the development team.

There is no consensus on how such a strategy should be produced, but some general principles are emerging. A number of models, methods and techniques have been documented over the past few years and an organisation may select an appropriate approach to support the development process. It is accepted that while the scope of an IS strategy may be broad, priorities will normally have to be set in order to meet financial and other organisational constraints.

Earl (1989) maintains that there is no one way of formulating an IS strategy and has proposed a Multiple or eclectic Methodology model. He suggests that the planning process will be top down, (where the nature of the method is analytical, the tools are translation methods, and the people are teams) bottom up, (where the nature of the method is evaluative, the tools are survey and audit methods, and the people are users and specialists) and inside out, (where the nature of the method is creative, the tool is environmental scanning, and the people are entrepreneurs and visionaries).

This paper builds on the first six months research into IS strategy development at the University of Hertfordshire (Bennett and Hinton 1994). The research was undertaken to support teaching in both MSc Information Management and final year BSc Computer Science courses. The previous paper included a discussion of theoretical concepts concerning the process and deliverables used in developing IS strategies and proposed common factors and critical issues seen to be influential in the development of successful strategies.

Introduction to the Case Study

Government intervention in the Higher Education (HE) sector together with social, economic and technological changes have resulted in an increasingly competitive environment. HE institutions are having to be more business oriented, operating in national and international markets. Corporate planning provides a focus for internal developments, and in the case of Universities it is a requirement of government funding-bodies. The University of Hertfordshire has maintained a corporate strategy for a number of years, and the Information Systems strategy is intended, in the future, to be an integral part of this process.

The University has a number of sites over Hertfordshire, the main locations being at Hatfield, Hertford and Watford. There are approximately 1800 academic and administrative staff and 17000 students. Its turnover is in excess of £70,000,000 p. a. The University structure is based around eight schools and central support services, including Financial Services, Management Services, Student Services, Personnel, Computer Centre, Library and Media Services and External Relations.

This paper compares the first eighteen months of the IS strategy development at the University with theoretical concepts and evaluates the deliverables. It also considers the membership of the development team set up to formulate the strategy in relation to other corporate groups. The development team is known within the University as the Information Systems Strategy Group (ISSG). The paper concludes by discussing the issues involved in evolving the strategy and proposes a set of generic lessons learnt.

Theoretical Preconceptions

The authors' research of the literature on the development of Information Systems strategy resulted in the formation of theoretical preconceptions concerning the process, the composition of the team, and the resulting deliverables. These are described below.

- **The process**

Documented models tend to focus on what the strategy study should contain, though several present frameworks within which to work and some, e.g. MIT's Strategic Alignment Model (1990), detail ways in which the model can be used. Hayward's model (1987) also provides a general framework. Other models are more prescriptive about the order in which issues should be identified, e.g.Tozer (1986), and Ward, Griffiths and Whitmore (1990). The latter model uses a scenario approach and uniquely suggests that IS strategy development is not just a one off consideration.

Methods focus on how the alignment process should be carried out. Examples of methods are; Business Planning Workbench (Unisys 1993), Business Systems Planning Methodology (BSP, IBM 1987) and PQM (Process Quality Management) (Lincoln 1990) which developed from BSP. These particular methods start by identifying the business issues and work through to identifying the IS issues. The IS strategy is dependent on the business strategy rather than being integrated with it.

Documented process models and methods may specifically mention the use of particular tools and techniques, but these tools and techniques may also provide a toolbox which can be accessed if a more individual approach is required. Tools and techniques which have been found to facilitate problem analysis and strategy development include: SWOT analysis, STEP analysis, Five Forces model (Porter and Millar 1985), value chain analysis (Porter 1985), Critical Success Factors (Rockart 1980), applications portfolio analysis (McFarlane's grid 1984), investment strategy analysis and the scenario approach.

A survey of different process models and methods identified a number of common factors which appeared to influence the process, although no one model or method includes a complete set of these factors (Davies 1993).

Although the use of methods, tools and techniques and the resolution of all the various factors may support the development of an IS strategy, a number of critical issues are seen to be important for a

successful project at this strategic level. These include: top management support and involvement, a clear corporate vision, alignment of strategy with business strategy, and user knowledge and user involvement (Bennett and Hinton 1994).

- **The development team**

A number of different approaches to selecting the membership of an IS strategy group have been identified (Robson 1984). Each approach will have its own advantages and disadvantages. Specialist internal planning staff, the Standing Army, often lack the understanding of IS issues and external specialists are expensive. A group composed of general IS staff can get bogged down in the urgency of everyday responsibilities and frequently lack the necessary business awareness. Steering Committees or a coalition team drawn from a number of business areas, including IS and strategic planners, can provide the right mix of business and information systems knowledge, but the diversity of interests can be destructive and members may move on at inconvenient times.

A survey of strategic information systems planning in eighteen UK organisations (Flynn and Goleniewska, 1993) suggests that the process is still very much led by the IT department. The IT managers questioned felt that, while they were trying to align IS strategy with business needs, it was difficult to get management involvement and commitment to such an approach.

- **The resulting deliverables**

A number of writers, Ward (1990), Robson (1994), Earl (1989), Reponen (1993), have documented definitions relating to the term 'IS strategy' or more recently 'IS/IT strategy'. The interpretations underlying these definitions have some commonality and often provide lists of the issues to be resolved and appropriate deliverables. An organisation's IS strategy may be formally or informally documented.

Ward et al (1990) identify the following three components to an IS strategy: a Business Information Strategy, an IS Functionality Strategy and an IS/IT strategy. Robson (1994) identifies the core elements of an IS/IT strategy as: a clear statement of IS/IT objectives, an inventory and assessment of the current organisational capabilities and problems, and a concrete implementation plan identifying both long term and short term actions and resource allocations. She concludes that the IS strategic plan must acknowledge that organisational change is an almost inevitable corollary to the planning process.

Earl (1989) identifies three areas which an IS/IT strategy should address: an Information Technology (IT) strategy, an Information Systems (IS) strategy and an Information Management (IM) strategy. An IT strategy is concerned with determining technology policies. It should be driven by the IS strategy and technological developments. Earl argues that there are likely to be fewer IT strategies as technological lead times are longer than the typical business cycle. Rapid developments in technology recently have tended to invalidate this statement. In practice many organisations cannot afford the frequent changes needed to stay at the leading edge of technology. They will still upgrade on a three to five year cycle and will accept the associated problems that this brings. An IS strategy is identified with aligning business needs and evolving information systems, endeavouring to find ways of exploiting strategic advantage from these systems. This strategy will need to be reviewed whenever the business strategy changes. The IM strategy relates to the management of IS/IT service and support.

Reponen's (1993) discussion of the terminology, suggests that, while there is no fixed set of issues that an IS/IT strategy must address, the most important decision areas in an IS strategy are; strategic use of Information Technology, applications development policy, high level architecture, organisation of Information Systems function, and investment planning. These are seen as identifying the deliverables of an IS/IT strategy (Bennett and Hinton 1994).

Reponen's definition of IS strategy (1993) highlights a number of issues which identify important strategic visionary elements, rather than just medium term tactical planning. These include the need for learning and training, the consideration of areas for business process redesign and the use of IT

for generating new business opportunities. He recognises that as part of the development process, 'interactive learning' will take place which will affect the group members' understanding of the problem environment.

In conclusion, an IS or IS/IT strategy identifies the direction of information and technological developments. This will help an organisation to avoid the danger of getting lost, by providing a set of formalised benchmarks, so that the progress on the journey can be monitored. An IS strategy should be strategic, identifying long term direction and will need to be reviewed every year or so. Typically in practice, it will include a mixture of short-term essential tactical issues, medium term business needs and longer term visionary investment.

Evaluation

- **The process**

Contrary to the authors' expectations as described above, the University has not consciously followed any formal process model or method in developing it's strategy, although there is the acceptance of the need to take an evolutionary approach. None of the tools or techniques identified have been used as part of the formal deliberations of the group. However to aid the process, a number of strategy documents from other organisations were reviewed and the best ideas developed. This activity would seem to be an example of 'creative swiping' (Peters 1988). Recommendations of a number of government reports were also considered.

With hindsight, an approach which paralleled Earls's Multiple Methodology model was identified. This model was seen as providing a structure or framework for thinking about, the problem areas, the issues involved, and the deliverables. It was used as a basis for evaluating the process.

Evidence of the 'bottom up' method was seen in the documentation and evaluation of current systems, via surveys and audits. Examples of the 'inside out' method were generated in group and sub group brainstorming sessions. These included creative ideas for the use of multimedia and networking. There was little evidence of the 'top down' method, the formal analysis of business information needs. For this reason a pilot 'business needs analysis' was undertaken by the authors in parallel to the ISSG's deliberations.

This pilot study to analyse information needs involved senior staff in the School of Information Sciences. It was based on the Process Quality Management method (PQM). This process identified information needs, but the authors recognised a need to develop the final stages, to help to provide a clearer picture of systems and priorities. Such a development would enable business managers to input their ideas and needs into the strategic process more effectively and therefore feel more committed to the process. It is planned to undertake a follow up study 'a year on' which will evaluate the usefulness of the exercise and the lessons learnt.

- **The critical issues**

There was little obvious involvement of the University's Senior Executive Management (SEM) after the initial sponsorship of the project. This may cause problems in the implementation stages, as the management group may not be fully committed to the vision and strategy, and thus the necessary resources may not be made available.

The IS strategy vision statement is clear and specific (ISSG 1994). However there is the danger that it will be seen as unattainable as resources are limited. Staff may see higher priorities for the available resources. It will need to be reviewed to ensure that it continues to reflect both the corporate mission statement and external changes. For example, the corporate mission has already been reviewed since the ISSG started its work.

The IS strategy developed, has reflected the corporate vision and its aims make specific links to relevant corporate aims and objectives. In this sense every effort has been made to align the strategy

to the corporate strategy. However the strategy has not influenced the corporate strategy. Using Buller's terminology (1988), the alignment is 'one way'. The IS strategy at present appears to support 'cost leadership' rather than 'product or service differentiation' (Porter 1985).

The University's user population has a wide range of knowledge and expertise. A priority is seen as ensuring that all users have a minimum level of expertise. This will be at the expense of resourcing those at the leading edge. Schools, whose subject areas directly encompass technology, could in the medium term, be competitively disadvantaged.

Every effort has been made to communicate and involve staff and students in the IS strategy development. Both the interim strategy document and the second report have been widely circulated (200 copies at the last count) and open presentations/meetings have been held for staff on all the main sites. A number of service groups and divisions have discussed the strategy within the context of their normal programme of information dissemination. A competition, based on the strategy document, has been held in an attempt to encourage further staff involvement.

As a result of this dissemination exercise a number of questions and concerns have been raised and feedback to the ISSG has been generated. These were summarised by category and the most commonly occurring issues are given in appendix 1. It became evident that some individuals and groups had problems in understanding the message of the report due to the use of terminology, even though, those involved in writing the report had anticipated a problem and had provided a glossary of terms.

Members of the group recognised that the implementation of the strategy was about changing the organisation's present culture to become an 'informatics' culture. Staff and students should all be able to handle information and be technically aware. Training staff to use systems and technology to facilitate their work was identified as a major concern and a training needs analysis is being undertaken.

A summary of the strengths and weaknesses of the University's approach is given in the appendix 2.

- **The development team**

The ISSG was composed of nineteen senior and middle managers representing all parts of the University, some having an evident interest in information systems and/or IT, others representing their schools or section's interests. The Vice Chancellor influenced the initial membership of the group and could be viewed as the sponsor. There was little previous experience of developing IS strategies, and knowledge of business/technical techniques and methods was limited. There seemed to be a great deal of 're-inventing wheels', but this could be seen as a necessary 'evil' in order to gain commitment, motivation and understanding. The group suffered from the common problem that many members had other key objectives to meet, and consequently, work on the strategy often had to take second place.

Subgroups were used to move issues through development phases, and most members of the group were involved in one of these. The work done by these groups was well received. Subjects studied by the subgroups were; administrative and management systems (identification of common data requirements and standards); learning and research implications (school administration, teaching, research, student learning and funding); and staff and student issues. Although each working group initially included both administrative and academic representatives, the groups tended to evolve to consist of either administrators or academics. One or two key people emerged in each group who, while trying to involve others, tended to work independently in order to keep the momentum going.

It was felt in retrospect, that the different subgroups had had equal consideration, although at any one time, one subgroup's work may have seemed predominant. This tended to be due to the availability of staff and organisational priorities. The membership grew (which was seen by some members as a problem but was also seen as a positive sign of the growing understanding of the importance of the strategy) but this did not affect the group's ability to agree issues and work effectively.

The membership of the Information Systems Strategy Group was compared with other decision making groups in the University. The interrelationships identified, were then compared with those associated with the Information Systems decision making process within a division of a large pharmaceutical company. This organisation has been involved in IS/IT strategy planning since the late 1980s (Matthews 1994).

The initial analysis of the ISSG considered the overlap with the membership of Academic Board (and the Senior Executive Management subgroup), and the Computer Centre User Group (CCUG). This is shown diagrammatically in appendix 3, figure 1. This analysis suggested a need to clarify the roles and membership of the ISSG and the CCUG. Interviews with a number of members of the ISSG also highlighted an overlap (appendix 3, figure 2) with another key University Group, the Learning Resources Committee (recently renamed, Teaching and Learning Committee). It has been suggested that this group is a more appropriate forum for discussing information needs and technological support for teaching and learning. However this could result in the ISSG only considering a subset of the University's information needs.

In comparison, the process in the pharmaceutical company is already tightly integrated with the normal business planning cycle, and membership and the roles of the different groups are clearly defined (appendix 3, figure 3).

- **The deliverables**

The deliverables presented in the second report covered a large number of the decision areas identified in academic papers. These are shown in appendix 4 which also lists the decision areas which have not been covered. Earl's IT, IS and IM categories are used below, to provide an evaluation.

The IT strategy has been well developed. A new backbone network superstructure has been proposed to provide more effective sharing of resources and improved communications. A survey of current IT (hardware and software) across the institution covering both academic and administrative areas has been completed and provides information on the current access to equipment and software. A pilot survey has been undertaken by a Head of Division which identified, access to equipment, current and future use of hardware and software by students and staff, and their levels of experience in using technology.

The Information Systems strategy is less advanced. The application portfolio has been prioritised for replacement and development. Priorities have been based primarily on the need to replace existing systems which are using inflexible technologies. As in the past, these will be developed and implemented by the 'owning' central support service and Management Information Services, with some end user involvement. There is little integration of the present systems but it is a strategic aim that this will be addressed.

The Information Management aspects of the strategy have had only limited discussion. The setting up of a corporate group to develop an overall strategy is a formal attempt to manage the resource and the first step in Information Management. There needs to be more co-ordination of the total IS/IT service and support for the University on a day-to-day basis. This should ensure that technology is not seen just in terms of supporting either teaching or administration. Management information systems should not be viewed as 'belonging' to a central service with little consideration of Schools' requirements or involvement. Future issues which will need to be addressed include; financing services and future developments, the ownership of the data, and the development of corporate standards and codes of practice.

Feedback from students studying IS/IT strategy development, confirms that a comprehensive range of issues have been addressed and that the report was well presented. The number of recommendations in the report was of concern and it was felt that these would need to be prioritised. More specifically, it was felt that there should have been more external customer focus and less emphasis on technical details. The consideration of external links has been identified as missing from both the university's

and other organisation's strategic thinking (Flynn and Goleniewska 1993). It is recommended that the University reviews its value chain (Porter 1985) as part of future developments.

In summary the strategy is seen as focusing on technology rather than information or management issues. As the strategy developed, the importance of management issues and in particular, the importance of organisational culture became recognised by the group. The strength of the University's IS strategy objectives is the specific documented links which have been made to the corporate strategy.

Evolution

The concept of logical incrementation (Quinn 1980) proposes that moves towards a vision should be made in incremental steps. Strategic planners should constantly be aware of the wider 'picture' and ensure that decisions and solutions are accepted and implemented. The effects of these changes would then need to be understood and taken into account. Mintzberg (1988) refers to the 'art of crafting strategy', that is evolving the strategy to fit the environment. This section attempts to predict the next steps in the development of the strategy and makes recommendations.

How will the evolution of the strategy proceed? The Information Systems strategy group was set up as a 'standing group' and it is anticipated that further status reports will be produced at agreed intervals. Members of the group have experienced the process of 'interactive learning' (Reponen 1993) and feel that their growing knowledge will influence future IS strategy development work. The use of the report provides a framework for on-going analysis and should help to keep the ISSG focused.

The training needs analysis being undertaken by consultants will provide an external view of the priorities, providing useful feedback to the group. It may also provide the necessary help in 'sustaining the momentum' Burnes (1993) for potential users. There is some evidence from concerns expressed at the various open meetings, that a 'planning blight' or 'hiatus' is occurring. Although the IS strategy has been accepted, many operational and tactical decisions are still in the pipeline.

There is the danger of 'strategy drift' (Johnson 1989). For example, central services continually replacing and enhancing existing systems, rather than developing new systems to meet changing business needs. Formal plans make it difficult to evolve towards a vision. Different planning strategies are evident in the University's deliverables, the 'MIS' subgroup have produced a detailed implementation plan as part of the strategy document, whereas the 'Teaching and Learning' sub group have produced a framework.

IS/IT strategy needs to move from being a 'one way' alignment as discussed earlier to being fully 'integrated' with the business strategy (Buller 1988). In the perfect organisation all strategies should be integrated, thus supporting the organisation's aims. Therefore, it will be necessary to continuously review and integrate individual plans to ensure movement in the right direction.

Generic Lessons Learnt

In evaluating this case study a number of general lessons are proposed which are summarised under the headings below.

- **Managing change**

Many of the factors and critical issues identified are common to any change process. These relate to the nine elements that Burnes (1993) states as necessary for managing change successfully and are applicable to any organisation developing an IS strategy. Strategy development will need to be managed and development time be made available. Change can be seen as an on-going cycle in which the elapsed time is also an essential part of the learning process.

- **Developing IS strategies**

The University has used the term Information Systems strategy to cover Information Technology, Information Systems and Information Management issues. In other cases the development of an IS strategy has been limited to discussion of the technical infrastructure and application support. The use of terminology should be explicitly defined so that sensible comparison can be made.

Developing and implementing an IS strategy should be seen as a 'soft problem' where there is a need for a framework within which to evolve (Bennett and Hinton 1994, Tagg 1994). Hard plans, generally associated with hard problems, are seen as unhelpful to evolution and can cause 'strategic drift' (Johnson 1989). A need for strategic thinking is required so that a vision is maintained (Tagg 1994).

Interactions with other decision making groups need to be identified and the roles of the different groups clarified. However it is important that a group has the responsibility for maintaining an overall integrated IS strategy. A function of this group is to address the issue of ownership of data and information. This issue will always be difficult to resolve and diplomacy will be needed.

- **Developing IS strategies for HE**

Opinions differ as to whether or not there are major differences in developing IS strategies for Higher Education as compared to other organisations. The authors believe that there are many similarities but that there is a difficulty inherent in developing strategies in Higher Education. This stems from the fact that Higher Education's core business is 'teaching and learning' in many disparate subjects. This involves many teachers and students, with different expectations, knowledge bases, skills, abilities and requirements from IS/IT, who all give and receive information in diverse ways.
The divide between academic and administrative, staff and systems, seen in Higher Education would seem to have similarities to the historical divides in the Health Service. It is anticipated that HE will follow the Health Service towards a more integrated service provision and become more business focused.

Conclusion

The similarity to the approach described by Earl in his Multiple Methodology model has been recognised in the development of the University's strategy. In general there has been a lack of formal use of management methods, tools and techniques in the process. Where these were used in the pilot PQM study they were shown to give new insights into the overall business problem. It has been noted that organisations will frequently reject formal approaches as being too restrictive and inflexible.

The members of the development group, the ISSG, have worked well together. The group's relationship with other decision making groups in the University has been generally effective. However there is the need to clarify its role in relation to the Computer Centre User Group. It will be necessary to ensure that the strategy development is not devolved to a number of different groups. . The lack of top management involvement may become an issue as the strategy is implemented

The range of issues covered by 'the second report and detailed strategy' was wide and from the authors' literature research included material seen as crucial. However, the strategy still tends to focus on Information Technology rather than on Information Systems or Information Management. Efforts have been made to align the IS strategy to the Business Strategy but a number of issues have been identified which will need to be resolved before full integration is possible. Staff have been involved, interest has been generated and feedback has been positive.

Evolution of the strategy will take place aided by the continuing work of the ISSG. The second report is seen as providing a useful framework for on-going developments. The acceptance of the constant need for change and redefining of the strategy, has been noted. Consequently, individual plans will need to be continuously reviewed and integrated to limit 'strategic drift'.

Lessons important for the development and implementation of an IS strategy can be gained from a knowledge of the nine elements seen as essential for managing any sort of change (Burnes 1993). The need for management competencies in addition to professional and technical competencies will be required to facilitate the implementation of the strategy. Lessons learnt from observing the development of an IS strategy include the noticeable change in emphasis from that of a 'hard problem' associated with writing an IS strategy to the acceptance of that of a 'soft problem' of changing an organisation's culture.

Many similarities in developing IS strategies can be observed when researching organisations but there appears to be an additional difficulty in Higher Education. This arises from the University's core business, involving many teachers and students, who all give and receive information in different ways.

The authors will continue to observe the evolving strategy with interest.

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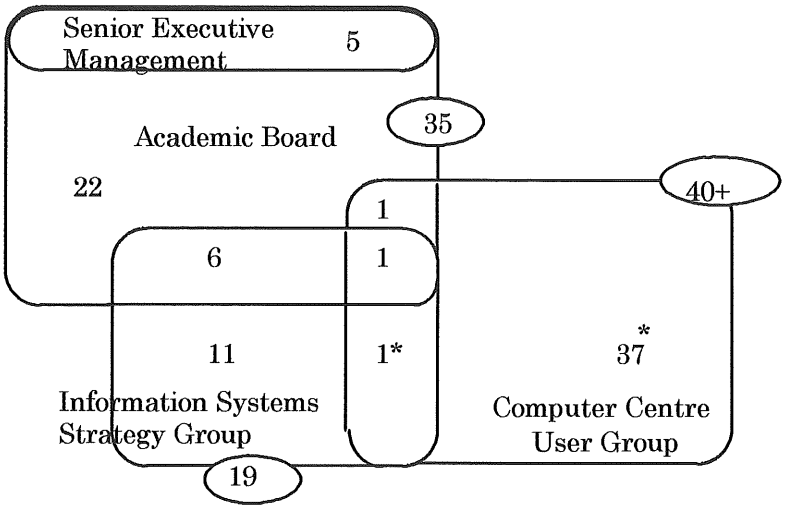
Appendix 1: Feedback Issues

Category	Issues
people	training, confidentiality of data, job security
network technology	general access to systems, access from home, disaster recovery
networking culture	standardisation issues, provision of helpdesk support
management and administrative systems	timing and prioritising of application developments, standardisation of hardware, the selection and implementation of new administrative systems.
teaching, learning and research plan	support availability for academic staff developing software, convincing staff on usefulness of IT
resources	available money, planning blight and general hiatus while decisions awaited, urgent maintenance

Appendix 2: Strengths and Weaknesses of the University's Approach

Strengths	Weaknesses
linked to corporate strategy	academic administrative divide
good analysis of current technology	no business needs analysis
identification of the need for training	limited top management involvement
good cross section of interest groups	external emphasis required
corporate initiative	communication could be improved
acceptance of the need to evolve strategy	little consideration of business re engineering issues
acceptance of need to manage change	inflexible existing administrative systems
identification of cultural issues	need to match information systems and business structure
strong network infrastructure	

Appendix 3: Membership Interrelationships



* membership is very fluid people attend from time to time

Figure 1 **Relationship of Membership of Academic Board, ISSG and Computer Centre User Group**

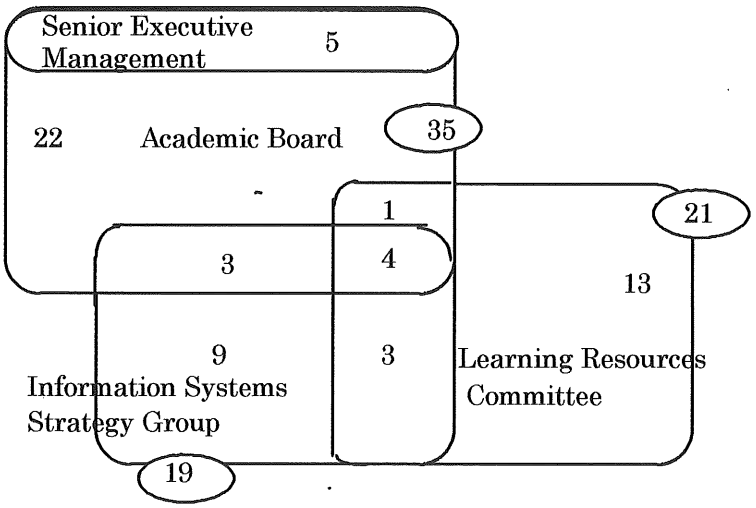


Figure 2 **Relationship of Membership of Academic Board, ISSG and Learning Resources Committee**

Appendix 3: Membership Interrelationships

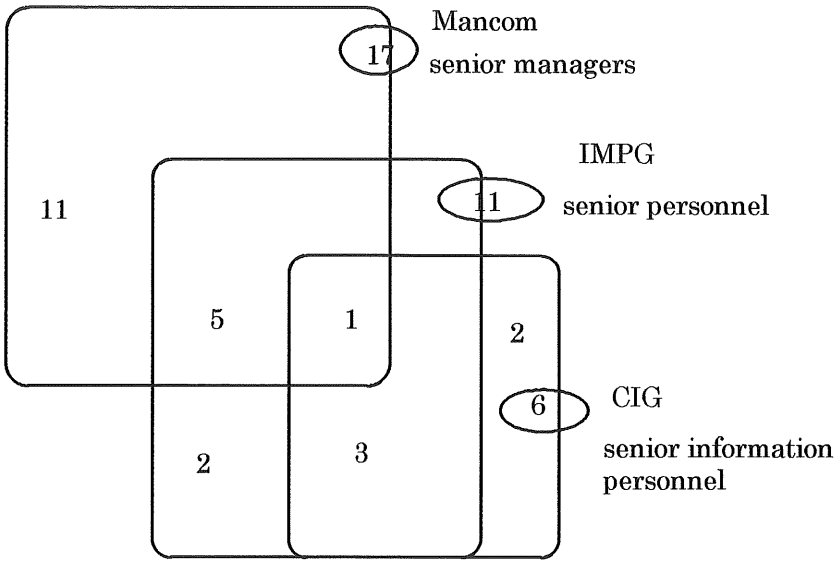


Figure 3 **Pharmaceutical Company IS/IT Strategy formulation committees and their human overlap**

Appendix 4: Deliverables

Deliverables identified:

- an information technology inventory was prepared, and pilot questionnaires developed and used to identify 'where we are now'
- a high level network architecture was developed and presented for approval
- the need for corporate standards and codes of conduct was identified
- an analysis of existing administrative application and priorities for system replacement and developments were identified
- the members agreed that the group was involved in a learning process and that in the future new expertise and knowledge would be reflected in new ideas and priorities
- the group identified the need for the strategy to evolve and develop to reflect environment and business changes
- the need to identify areas of possible future competitive advantage for the delivery of teaching and learning and ensure that expertise in these areas was co-ordinated
- the importance of ensuring that all staff had appropriate IS and IT training was reflected in the decision to fund an external organisation to undertake a IS/IT training needs analysis; this will be linked to the University's 'Investors in People' programme

Deliverables not identified as within the remit of the group or not developed included:

- the provision of information systems services and support
- the financing of information systems and technology
- the creative development of information systems to support administration and management decisions and the alignment of information systems to business strategy
- there was only limited consideration of the external value chain, customer and suppliers and the effects on the internal business needs