THE BCS PROFESSIONAL EXAMINATION Professional Graduate Diploma

April 2002

EXAMINERS' REPORT

Management Information Systems

A lot of candidates wrote very long answers to some questions, expecting that this would lead to better marks. Unfortunately, in many cases these candidates contradicted themselves within their answers, thereby losing marks. Also, the writing of lengthy answers to questions that are only worth a few marks means that less time is available for answering other, more heavily weighted questions. Candidates should always take note of the number of marks associated with a (sub-) question, and allocate their time accordingly and plan their answers.

Question 1

It has been said that current Management Information Systems (MIS) cannot adequately support the Strategic Management function of an organisation.

a) Describe the principal activities of the Strategic Management, Tactical Management and Operational Management functions within an organisation, and highlight the typical characteristics of the information needed to support each function.

(12 marks)

b) Discuss the extent to which Executive Information Systems (EIS) and Decision Support Systems (DSS) are able to support Strategic Management. (13 marks)

Answer Pointers

This is a management question, with an MIS (EIS/DSS) slant.

Part (a) is worth 12 marks, and should be relatively straightforward for the candidates. Possible definitions for the terms, and the associated information needs, include the following (which are taken from the standard texts in this subject area):

Strategic management function (2 marks): That which is responsible for defining the objectives of the organisation, the resources required to achieve those objectives, and the policies which govern the acquisition, deployment and use of resources.

Information characteristics (2 marks): external, unpredictable structure, summarised, over long time periods, etc.

Tactical Management function (2 marks): That which obtains, deploys and uses resources effectively, whilst adhering to the policies for their acquisition, deployment and use, in the pursuit of organisational objectives.

Information characteristics (2 marks): balance of internal/external, more predictable in structure, less summarised, over shorter time periods, etc.

Operational Management function (2 marks): That which assures that specific tasks are carried out efficiently and effectively.

Information Characteristics (2 marks): Detailed, predictable structure, easily accessible (relatively speaking) and internal information, short timescale (daily, weekly), etc.

Candidates might actually give slightly different answers to the above, as they may understand more about the nature of information and its use in modern organisations (e.g., that information needs are more to do with the nature of the job e.g., whether in sales or in production, and the type of industry the company is in, rather than where in the management hierarchy you sit).

TOTAL 12 marks

Part (b) is about the role of EIS and DSS in Strategic management support. Candidates should provide an overview of what an EIS is (i.e., a CBIS that allows flexible and direct easy access by managers to internal and external data, thereby enabling the effective monitoring and control of company operations) and its essential features (e.g., drill down, very user friendly input, usually based on a multidimensional database, provision of communications facilities e.g., e-mail as part of the package, etc.), and the same for a DSS (i.e., a system that uses data and models to support management decision making).

Then candidates should explain the extent to which both EIS and DSS can support Strategic Management. The answer will be different for different candidates. However, for the EIS part of the answer, I would expect them to consider the information needs relative to EIS functions. For example, they may discuss the relative failure of EIS at this level of management support, with possible supporting examples, due to its inability to provide the type of information needed at this level. Indeed, it has really become an easy to use tool for lower to middle management. For the DSS part of the answer, they may refer to the use of DSS typically being lower and middle management, although some DSS have been provided at strategic management level. Again, answers will vary depending on the candidate's reading and/or experiences.

TOTAL 13 MARKS for a sound understanding of the EIS/DSS terms, and for the argument regarding the extent of support for strategic management by both DSS and EIS

TOTAL QUESTION = 25 marks

This was a popular question, and, unfortunately, was poorly done by many candidates who failed to grasp what was truly required.

Most candidates were able to describe the typical activities of Strategic Management, Tactical Management and Operational Management, although several wrote far too much on each management level (2 to 3 pages in some cases), given that 2 marks maximum could be given for each description. Many candidates did not highlight typical characteristics of information to support each level, but provided specific examples of the information that would be needed (e.g., competitor analysis information at strategic management level). If the specific examples were sound and/or indicative of a characteristic of information, albeit indirectly, then some marks were awarded. Part (b) was poorly done in many cases. Some candidates did not know what DSS and EIS are, and could not describe any of their possible functionality. Others, whilst having a basic understanding of EIS and DSS, could not relate the systems to the Strategic Management function. In all, very few candidates gave a convincing answer as to the <u>extent of support</u> provided by EIS and DSS.

Question 2

A furniture manufacturing company is investigating the potential of using data warehousing and data mining to support its Sales & Marketing activities, and is seeking your expert advice.

Write a report to the Managing Director of the company, which:

(a) describes the essential features of data mining and data warehousing, and (14 marks)

(b) clearly shows how data mining and data warehousing facilities can work together to support the management of an organisation, with particular reference to Sales & Marketing activities.

(11 marks)

Answer Pointers

This question is about the use of data mining and data warehousing to support management in general, and Sales and Marketing in particular.

Part (a) requires an overview of both data mining and data warehousing

Data Warehouse.

- A separate data store that integrates and consolidates the disparate data sources within a company so that data can be used effectively for business intelligence and management support applications.
- Typically relational in nature but could be multidimensional
- Terabytes of transaction processing data integrated
- Separate from transaction processing systems to ensure best arrangement of data for management support and not to hold up operational speeds.
- Business benefits include the ability to analyse an integrated dataset in an immediate manner because of the data warehouse provision.
- E.g. the data warehouse at BP or at Federal Express

Data Mining

- The process of identifying meaningful patterns in data using automatic or semiautomatic means
- Process oriented towards either discovery of unknown insights, or verification of known insights.
- Various tasks that can be considered within data mining, including classification, summarising, clustering, statistical analysis. Various methods to carry out these techniques include: neural networks, traditional statistical analysis tools, rule induction.

7 marks for sound understanding of concept * 2 concepts = TOTAL 14 MARKS

Part (b) requires the candidates to consider how the two work together, i.e., data warehouse provides the data upon which data mining can occur. Examples showing

the relationship should be provided, particularly from a sales and marketing orientation e.g., consumer habits in crisp sales – Winter period has 50% better sales of Salt & Vinegar flavour crisps than in the summer period, consumers between the ages of 20 and 30 prefer the less standard flavour crisps to the standard ones.

TOTAL 11 MARKS TOTAL QUESTION = 25 marks

This was also a popular question, and some candidates provided excellent answers. However, a lot of candidates attempted Part (a) without truly understanding the concepts of data mining and data warehousing. This meant that Part (b), which built upon the concepts explained in Part (a), was also poor for these candidates. In addition, some candidates did not explain sufficiently each concept, given the 7 marks available for each description in Part (a). This was particularly the case with data mining, where several candidates wrote a couple of sentences at most. Some descriptions, again particularly with regard to data mining, were far too vague to be awarded more than bare passes.

In Part (b), several candidates tried to explain how data mining could be used to support management and then explained separately how data warehousing could be used to support management. However, the question requested candidates to consider how the two concepts could be used to support management <u>in</u> <u>combination</u>. As such, candidates that examined each separately missed out on discussing how they could be integrated to support management, and thereby lost marks.

Question 3

Describe, with supporting examples, the ways in which THREE of the following technologies can be used in the provision of a company's MIS:

- a) Videoconferencing;
- b) World Wide Web;
- c) Non-relational Database Management Systems;
- d) Knowledge-based Systems;
- e) Computer-Assisted Software Engineering (CASE) tools.

(25 marks)

Answer Pointers

This question requires candidates to think about IT concepts and how they have affected the provision of an MIS, either in terms of its design or development. Each candidate is expected to answer this question in their own way (although an overview of the IT technology should be part of the answer). However, some possible issues that candidates may mention include the following:

a) Videoconferencing

- Provides a mechanism for group decision making from remote sites
- Room based or desk top based (Internet-based or otherwise) candidates may discuss the facilities available, and the problems with current videoconferencing systems (e.g., delays in transmission still a problem)
- Can be linked with GDSS software to create a linked decision room effect

b) World Wide Web

- Enables access to MIS via an Internet/Intranet as a set of WWW pages
- Enables standard MIS information reports to be available 24 hours a day, 7 days a week from the Intranet/Internet
- WWW pages could provide an integrated DSS, which has model/data components in various separate locations.

c) Non-relational Database Management Systems

- Those that allow non-relational data to be stored. Examples include OO, multimedia and multidimensional database management systems, but answers could cover DBMS that support the hierarchic and network data models.
- Enable more complex objects to be stored and "manipulated" e.g., sound bytes, video-clips, bit maps (multimedia DBMS and OODBMS)
- Enables business data to be stored in a more flexible and useful way (multidimensional DBMS) and manipulated in a flexible, slice and dice manner
- All in all, non-relational DBMS such as OODBMS, enable MIS to be more closely related to business data storage and manipulation requirements

d) Knowledge-based Systems

- Provide intelligence to various MIS, e.g., make the interface more user friendly or proactive
- Provision of Expert Systems (ES) candidates may provide details of what ES can do and their structure. Candidates may also provide examples to illustrate the ES concept and its use

e) CASE tools

- Can be used in the development of MIS
- Differences between upper-and lower-case tools may be explained, and their use in development
- Candidates may show how the CASE tool can be used to model the DB requirements of an MIS, although flow diagrams may have limited scope in MIS development

Marks: 1 mark for each valid point and/or point made with an example, to a maximum of 9 marks per technology and 25 marks for question.

This question was popular, and some candidates scored highly. Several candidates, however, saw this as an opportunity to write as much as possible on a topic with little emphasis on MIS application. A lot of candidates attempted four and sometimes all five rather than just the three concepts as requested. In these cases, the best three answers were counted in the final mark calculation.

Part (a) was generally well done, although many candidates focused only on Internetbased videoconferencing.

Part (b) had some very good answers, but many candidates thought the World Wide Web and the Internet are one of the same, which is not true.

Very few candidates attempted Part (c) seriously, but when they did they gained some excellent marks. Some candidates focused on one type of non-relational DBMS, such as OODBMS or multi-dimensional DBMS, rather than providing an overview of several types. Both approaches to the answer were acceptable. Part (d) was not well done, overall. Candidates confused knowledge-based systems with knowledge workers. Some candidates described a knowledge-based system as a data repository of past situations and experiences/solutions, and whilst this was not the view of the term that the examiner had expected, it nevertheless was accepted and marked on merit.

Part (e) (CASE tools) was generally understood, but some answers were simply too vague about the concept and its use within MIS to be awarded anything more than a few marks.

Question 4

You are required to provide the framework for an end-user MIS.

a) Identify and discuss five pre-requisites of a successful end-user MIS. (15 marks)

b). Explain how the success of the end-user MIS could be measured a year after implementation.

(10 marks)

Answer Pointers

Part A. The expected pre-requisites are listed below. Candidates were expected to expand/provide examples for each of these points:

- Agreed boundaries between end-user and corporate MIS computing/any agreed general requirements.
- Use of common software/desktop setup. The need for the whole organisation to have a common computing platform.
- Shared resources. The need for shared programs, data, files, standards, naming conventions, networks etc.
- Data ownership. Data ownership and availability to be agreed all participants. This should include a possible need for an initial data analysis to include the identification of both standing and transactional data.
- Training.

Three marks given for each point identified and described with a maximum of fifteen marks.

Part B. Four measures of the success of end-user MIS were expected:

- User, management and customer surveys
- Degree of data duplication
- Consistency and timeliness of data
- Productivity improvements (Business and IS)

Each measure, including a reasoned explanation, attracted 2.5 marks. Maximum of ten marks.

This question sought to address the thorny issue of end-user computing and to reveal the candidate's understanding. In general, the question was not answered well with some candidates not really understanding what end-user computing was or, if they did, they demonstrated scant appreciation of the issues involved. Not many candidates attempted this question.

Question 5

Following two mergers, the organisation for which you work now has three legacy order processing systems that work reliably. In their current form these order systems cannot be linked to the Internet.

The Board of Directors is concerned that business will be lost to competitors with Internet order systems.

Write a report to identify THREE options that could provide the Internet ordering facility and discuss the advantages and disadvantages of each option. (25 marks)

Answer Pointers

Candidates did not answer this question very well, particularly the use of middleware. Although some candidates did not explicitly suggest a package solution, marks were given where reference was made to an outsourcing or ERP company where a common (package) solution would be implemented. The three options expected were:

- Replace with a package (8 marks)
- Develop a bespoke system (8 marks)
- Use middleware/messaging system to link the three systems (9 marks)

Package Solution

Advantages/disadvantages of packaged software

Advantages	Disadvantages
Lower cost than bespoke solution	Package may be inflexible, limited, have
	unnecessary features and be inappropriate
	for the business
Because development and testing have	May lack the level of sophistication
already been performed, the system can	required
be available in a short timescale	
Generally easy to use, fully tested and	May not be possible to integrate with other
used by other organisations	MIS, resulting in data duplication
Fewer in-house resources needed for	Costs of migrating existing data to the
support	package
Suitable for regulatory/legal purposes such	
as payroll, accounts etc. where the	
package has to comply	

(One mark for each point raised plus a further mark for a reasoned explanation, maximum 8 marks)

Bespoke software

Advantages	Disadvantages
Designed specifically for the organisations	High cost with a likelihood of over-running
requirements	estimates of cost and timescale
Bespoke software would have no wasted	Despite the best intentions, the system
or unnecessary facilities	may not be what the end-user requires
Will be designed to integrate with the	Will require extensive testing
organisation's existing MIS	
Reduced requirement for data migration	High dependence on in-house staff

(One mark for each point raised plus a further mark for a reasoned explanation, maximum 8 marks)

For the middleware/messaging system the following table applies:

Advantages	Disadvantages
Retains existing functionality of legacy	Maintenance overhead (three systems)
systems	
Enables other mergers to take place easily	Legacy restraints could limit future
	development
Enables gradual change/elimination of old systems	Heavy network traffic
No training required	Requires the development of
	interfaces/adaptors
Successfully used in many organisations	Cost layering
Rapid solution	Short term solution

(One mark for each point raised plus a further mark for a reasoned explanation, maximum 9 marks)

There was some evidence of candidates running out of time for this question and they missed the opportunity to collect marks by persisting with an essay format. In order to gain those essential extra marks, future candidates would be advised to consider using bullet points if they are running out of time towards the end of an examination.