

THE BCS PROFESSIONAL EXAMINATION

Professional Graduate Diploma

March 2015

EXAMINERS' REPORT

MANAGEMENT INFORMATION SYSTEMS

General comments on candidates' performance

Future candidates are advised to read each question carefully in order to understand exactly what the examiners require. If the question calls for a description, it means just that; it does not mean a list of points or a table of advantages and disadvantages.

Candidates are also advised to provide reasoned, structured answers.

Candidates are advised that no marks are gained for repetition of facts and that all parts of the question should be answered.

. The most successful candidates for this paper carefully considered the requirement of each question, planned the layout of their answer, provided diagrams where appropriate, avoided generalisations, justified points with examples, and gave comprehensive and thoughtful answers. For most questions the examiners were able to award full or almost full marks.

An indication is given below of the expected answer points for this examination. However, marks were given for additional points or for valid alternative answers, if relevant to the question.

SECTION A

A1.

A transport and logistics company has decided that it no longer requires a Head Office and its strategic aim is to become a virtual organisation.

- a) Discuss the various MIS technologies that could be used to create a virtual organisation. **(15 marks)**
- b) The company's auditors have concerns that information held by the virtual company would lack security. List and describe FIVE measures that could be adopted to ensure this information remains secure. **(10 marks)**

Answer pointers

a) Virtual organisation

This was an open-ended discussion question which provided candidates with an opportunity to display their knowledge and understanding of MIS and its use within a virtual organisation.

Possible discussion points could have included:

- Concept and definition of a virtual organisation
- Role of internet
- Video conferencing
- Email
- Remote camera operation
- Server farms
- Training
- Strategic/tactical/operational levels
- Communication/networking/bandwidth requirements
- Teleworking concepts
- Use of distributed systems/distributed databases
- Document image processing
- Social networking
- Mobile computing/4G
- End user computing
- Social/economic/environmental issues
- Use of cloud computing/ASP/outourcing
- International operation
- Legal issues
- Social isolation concerns
- Examples of virtual organisations/on-line shops, etc.
- View of the future

(Between 1 and 3 marks for each point discussed maximum 8 points. Maximum marks 15.)

b) Security measures

Five possible methods that could have been used (there are others) were:

Encryption

Encryption is used to make stored data more secure from hackers, by making it unreadable to people who do not have the key to decrypt or decode it. This method is commonly used to protect data transmitted over the internet.

Anti-Virus Software

A computer virus is a program designed to cause damage to a computer system. They are particularly dangerous because they can corrupt or damage files as they spread throughout the system.

The use of a virus scanner or anti-virus software helps to minimise the risk from viruses; this software searches the computer system for viruses and deletes them once detected. For maximum protection it is essential to purchase a reliable product that provides daily downloads of new virus definitions and then sweeps the system regularly.

Anti-Spyware Software

Spyware is software that is installed on a computer system with the purpose of gaining information about an organisation without their knowledge or consent. In some cases malicious spyware can control the computer system remotely.

The use of anti-spyware software can minimise the risk from spyware. The most effective anti-spyware software provides real-time protection by scanning all incoming network data and by blocking any spyware threats that are detected. Alternative anti-spyware software is used for the sole purpose of detecting and removing spyware that is already installed.

Firewalls

Hacking is the practice of breaking into computer systems and it is essential that preventative measures are taken. The main technique is to install a firewall to prevent unauthorised requests from hackers attempting to gain access to the network or computer systems via the internet. MIS systems are constantly communicating with the outside world, which involves connection to public networks and the associated difficulty of effectively policing access to the system.

A firewall is a combination of hardware and software that is designed to check the integrity of incoming messages and requests for service from the system.

Intrusion Detection Systems (IDS)

Intrusion detection systems (IDS) are designed to monitor the network or computer system for malicious activities. Once an incident is detected, a report is produced and sent to the network administrator for further action.

Firewalls are used to limit access between networks and to prevent intrusion, whereas the IDS searches for attacks that originate from within the system.

*(2 marks for each measure list and described, maximum 10 marks.)
(15 + 10 = 25 marks)*

Examiners' comments

This was a popular question that was answered well. Many candidates demonstrated an in-depth knowledge of virtual organisations and discussed technologies that were appropriate. However, the weaker candidates confined their answers to any MIS technology, even though the technologies were not particularly relevant. Although the question called for a discussion, many simply listed points and lost some marks as a result.

Part b) was answered authoritatively by the stronger candidates and weaker candidates were able to pick up some marks, indicating a high level of understanding of on-line security.

A2.

A large financial organisation is considering the installation of document management systems and workflow systems. The organisation deals with many thousands of transactions each day, including those received on paper, electronically and as a result of telephone calls.

- a) Describe the main features of a document management system. **(8 marks)**
- b) Describe the main features of a workflow system. **(8 marks)**
- c) Using examples, explain how a combination of document management systems and workflow systems could improve productivity in the large organisation described above. **(9 marks)**

Answer pointers**a) Main features of a document management system:**

- Documents are managed throughout their life cycle from creation to deletion
- Documents are held as digital images
- Documents can be either scanned paper documents or documents created electronically (by word processing or other system)
- Indexes allow easy retrieval
- Several users can access the documents at the same time
- Unlike paper documents, document images can be copied electronically and stored off-site
- Document access is tracked
- Document change history is stored
- Facilitates teleworking

(1 or 2 marks per feature described, maximum 8 marks.)

b) Main features of a workflow system:

- Workflow software allows businesses to move tasks along defined paths
- Can direct tasks to those with appropriate knowledge
- Enables total workload to be assessed
- Can prioritise certain tasks
- Facilitates future automation of simpler tasks
- Can allocate work across different locations
- Can be a mechanism for payment for task completion
- Provides MIS showing average times to complete tasks

(1 or 2 marks per feature described, maximum 8 marks.)

c) Combination of DMS and Workflow

- Workflow requires DMS if paper documents are involved
- Allows complex operations involving several different documents from different sources
- Facilitates teleworking
- Facilitates a paperless office

(Two/three marks for each point explained. Examples required for the maximum 9 marks.)

(8 + 8 + 9 = 25 marks)

Examiners' comments

This was the least popular question in Section A, with few candidates gaining high marks. Generally, Part a) was answered well, with candidates demonstrating a reasonable understanding of document management systems. However, many lost marks by providing simply a list of points rather than the required description.

Part b) was answered less well, with many candidates failing to provide sufficient points or not answering in the required depth.

A significant number of candidates did not attempt Part c) and many who did repeated points already made in Part b).

A3.

A medium-sized financial services organisation is seeking a replacement MIS Manager to restore confidence in the MIS function and to lead a redevelopment of its corporate systems.

The organisation's current systems were developed about fifteen years previously, but new systems are needed to meet changing business requirements.

The MIS department has begun some redevelopments, but these have failed due to misunderstandings over who should be involved at each stage of the development process. Also, because the costs of the redevelopments exceeded the perceived benefits, the management expect the replacement MIS manager to use some form of cost benefit analysis for all future projects.

As part of the selection process for the new MIS Manager, you have been asked to make a presentation to demonstrate your suitability for the position. Prepare notes for the presentation to clearly demonstrate your understanding of the following:

- a) The role of the MIS Manager and the personal qualities required.
(8 marks)
- b) The involvement of user staff and MIS staff in all the development stages, from initial system request to post implementation review.
(8 marks)
- c) The net present value (NPV) method of cost benefit analysis, including its advantages and disadvantages.
(9 marks)

Answer pointers

a) The role of the MIS Manager and the personal qualities required.

For this question, the examiners were looking for a general understanding of the management of the MIS function, hence the answer was not prescribed. The following is an example answer that includes the key aspects of managing staff, understanding change meeting requirements, adding value to the business and other relevant points:

Management of the MIS function is not easy. The running of a medium sized MIS function can be compared with running a business, with demanding customers, difficult suppliers, career-conscious staff, and tight budgets and controls. The service provided by this business is subject to constant change, due to an almost infinite demand for new facilities against a backcloth of changed hardware, software and package releases. Added to this is the need to effect urgent business and regulatory changes, safeguard the organisation's investment in MIS and keep up-to-date with technological advances.

Faced with the constant need to reduce costs and improve efficiency, organisations are increasingly looking at the performance of the MIS function and seeking new ways of adding value to the business and improving service. Compared with other parts of the organisation, MIS is often perceived by higher management as an out-of-control black hole of expenditure.

The person with responsibility for the MIS function will need the following personal qualities:

- aptitude for leadership
- ability to influence peers, clients and suppliers
- ability to explain complex concepts clearly
- ability to determine and address clients' needs
- ability to accept a significant level of responsibility and accountability

(5 marks for the role and 3 marks for personal qualities, total 8 marks.)

b) The involvement of user staff and MIS staff in development.

Again, there was no formal answer to this question. However, candidates were expected to identify and understand the general responsibilities at each stage of MIS development. The following outlines the stages and responsibilities:

AREA	RESPONSIBILITY
General business and MIS strategy	Management/MIS management
Request for MIS work	Users
Scoping the request	MIS
Project leadership	Users or MIS
Prioritisation with other work requests	Users with MIS
Detailed definition of requirements	Users with MIS
Systems development	MIS
Systems testing	MIS
User testing	Users
System sign off	Users
User documentation	Users or MIS
Implementation	Users and MIS
Post-implementation review	User

(One mark per stage with users and MIS correctly identified, total 8 marks.)

c) NPV

The NPV method of investment appraisal compares the accumulated cash inflows and outflows for a project with future flows that are adjusted by the organisation's discounted rate. This is done by:

- Calculating the total investment for the project
- Calculating the net cash inflows (or savings in expenditure) that will be realised in each period of the project's life
- Converting all future cash flows to their present value, using the organisation's discount rate

The NPV is then the present value of the accumulated cash inflows minus the present value of the investment.

Advantages:

- No computational issues
- Correctly ranks projects
- Gives an absolute value of projects

Disadvantages:

- A difficult concept
- Does not allow for the risk of the project
- It is not directly related to the profit and loss account
- There may be intangible benefits that cannot be costed

(5 marks for a description of NPV and 4 marks for ads/disads, total 8 marks.)

(Total marks 8 + 8 + 9 = 25)

Examiners' comments

This was a popular question, with many candidates providing excellent answers.

Part a) was generally answered well, although some did not include notes on the personal qualities required.

Part b) required candidates to show their understanding of user involvement in all development stages. The evidence shows that stronger candidates itemised the various stages and provided notes describing user involvement at each stage. Weaker candidates confined their answers to generic comments about the need to involve users at all stages but failed to show any understanding. Candidates who referred to project management stages rather than development stages were not penalised.

Although some candidates provided model answers for Part c), the majority appeared to have only limited, if any, knowledge of NPV cost benefit analysis.

SECTION B

B4.

A large food retailing company has procured and implemented a new Human Resources (HR) system. The management reporting functions of the HR system are weak and senior management want to improve fixed management reporting capabilities. The following options are being considered:

Option 1: The in-house development of a fixed reporting facility (using existing DBMS software) that would import data from the HR system.

Option 2: The procurement of a compatible software package that provides a set of standardised fixed reports directly off the HR data repository.

- a) Discuss the strengths and weaknesses of the two options. State any assumptions you make about the organisation within your answer.

(13 marks)

- b) Irrespective of the strengths and weaknesses, senior management have selected option 2. There are three packages available to choose from. Explain, with the aid of examples, the process you would adopt to choose the most suitable package to purchase.

(12 marks)

Answer pointers

This question is about package application versus in-house development of systems, and the process by which a particular package is selected above other candidate packages.

For Part a), candidates need to identify the comparative merits and weaknesses of both options for the given company setting.

For Option 1 - the in-house development of the Management Reporting System (MRS) - the following advantages may be highlighted:

- In-house software can be developed to match the exact needs of the business, rather than having to customise packaged software (if this is possible) or having to work around the limitations of the package (if the level of customisation required is not possible).
- If there are slack human resources in the IT department with the requisite expertise (there should have some DBMS expertise in the organisation, as the DBMS is already available in the organisation), then these people can implement the HR MRS without little additional cost outlay. The package procurement option requires potentially significant costs either upfront (e.g., to purchase the package (if the package is to be bought) and the human costs of tailoring the package if this is possible and necessary) and/or on a reoccurring basis (e.g., to pay the annual license fee (if leased), to provide version updates and technical support, etc.).
- Developing in-house can serve to provide worthwhile work activities and experience for these employees.
- Any training in MRS use, and subsequent support and maintenance, may be provided by those that were involved in the development of the MRS, thereby enabling quality support by people who are very knowledgeable about the reporting system.

- If developed within an existing DBMS environment then this may mean that the data it holds could be more easily integrated with other data sources that are also implemented within the same DBMS environment; potential for greater data integration for management support?

However, there are several disadvantages of this option, such as:

- The development time may be slower, as the team are developing all the fixed reports from scratch, and they may also have other higher priority tasks to complete first and be very overworked.
- Actual report functionality may not be available to (senior) management as quickly as with the packaged solution. This could impact final user and top management's support of the project; something that could have significant ramifications for the future sponsorship of the development.

Option 2 – the use of packaged software - has several advantages, such as:

- Unless there is significant tailoring to do (and which is possible), current IT staff can generally concentrate on their existing duties. This may be extremely beneficial where existing IT workforce is overloaded with other important work commitments.
- This may be a much quicker solution. With Option 1, there may be a significant delay to the implementation of the MRS as it may take some time to develop the system in-house. Top management support is less likely to be impacted with Option 2: indeed, it may be enhanced as they see visible positive results sooner.
- There may be some ability to customise the reports to the specific needs of the business: this may be relatively easy to do when there is a useful menu-based interface, for instance, taking little time and effort on the part of staff.
- There may be some additional reports provided as part of the package that were not requested but are found to be very useful once analysed.

Disadvantages may include:

- The provision of additional functionality that is not needed by the current company, which may confuse the user, and/or the inability to support the exact requirements of the company.
- The inevitable dependency on another company to provide such an important facility may not be favourable in the eyes of management.

(2 marks per salient point described (advantage and/or disadvantage of either option), to a total maximum of 13 marks.) Note that there is no double counting, so an advantage of option which is also given as a disadvantage of the other option will only be counted once, unless further detail is provided

Part b) is about the procurement process, and specifically the recommended process for choosing between software packages. It is about process so answers that just list a possible set of criteria for evaluation are unsatisfactory on their own; how they are employed, etc. is what is principally required.

An effective process for eliciting the most appropriate software package will probably resemble something similar to the following:

1. Attempt to elicit the fundamental and desirable functional and non-functional requirements for the packaged software, typically through fact finding from key stakeholders in the organisation. Collate these into mandatory and desirable lists.

2. There may be other mandatory and desirable criteria that need to be considered, such as vendor reputation, cost, stability of vendor, etc. Add these to the lists.
3. For each of the three software packages, assess them as far as possible against the mandatory requirements first. Information regarding a package may be gained via some form of discussion with the vendor, or via documentary evidence on the Internet, or via demonstration/available trial versions of the software. If any of the mandatory requirements are not present, then it is not a viable solution – if all packages are not viable, then one may need to go back and review the list/expectations!)
4. If one only fulfils the mandatory requirements, then select this one.
5. If more than one package satisfies the mandatory requirements, then weight the desirable requirements. The 'surviving' packages need to be assessed against the desirable criteria. A weighted score is calculated via summing the weights * scores on each individual criterion for a given package. This is done for each package in turn. The package that has the highest overall weighted score is the one to choose.

Candidates are expected to show the process, with the aid of suitable supporting examples.

*(marks for a decent process - 8 marks, plus 4 marks
for supportive examples = 12 marks)*

(TOTAL Q4 = 13 + 12 = 25 Marks)

Examiners' comments

This was a popular question.

A stronger performance was typically displayed by candidates on Part a) than on Part (b) of the question.

Part a) was generally well attempted, with the best answers providing convincing discussions of relevant strengths and weaknesses with respect to the two options. There is evidence that some candidates believed that an 'insourcing versus outsourcing systems development' answer was appropriate, and therefore lost marks where the answer did not match the specific context and requirements of the current question (for example, many answers failed to pick up on the fact that Option 2 relates to software products that are compatible with the HR system). Several candidates failed to read the question properly, focusing on the replacement of the entire HR system (instead of the implementation of better fixed management reporting facilities) or considering the required reporting facilities to be for senior management use only. Some candidates argued as to which of the two options should be chosen as part of their answer (this was not asked for in the question).

Overall, Part b) was poorly answered. Frequently, candidates did not provide a rigorous and comprehensive process for package selection, instead electing to describe a set of factors to consider, not how to take them into account in the final decision making. At best, one or two marks could be gained in these circumstances.

Q5

- a) For EACH of the following Strategic Information Systems Planning (SISP) techniques, explain how it works and assess its ability to identify the most important MIS developments for an organisation.
- i) SWOT analysis. (8 marks)
- ii) Value Chain Analysis (VCA). (8 marks)
- b) Explain, with the aid of suitable examples, the role of a digital dashboard in supporting management control activities. (9 marks)

Answer pointers

This question is about Strategic IS Planning (SISP) and the role of IT (particularly digital dashboard facilities) to support management control activities.

Part a) requires candidates to provide overviews of two well-known strategic planning/SISP techniques and how well they enable the identification of the most suitable MIS developments for an organisation. For SWOT analysis, candidates may include the following in their answer:

- SWOT stands for Strengths, Weaknesses, Opportunities and Threats.
- Strengths and weaknesses are internally-focussed issues, whereas opportunities and threats are externally-focussed.
- SWOT analysis can be done at different levels of view; company level, project level or IT/MIS level.
- At company level, organisations enumerate the strengths and weaknesses, opportunities and threats, surrounding their business operations. They may include aspects of IT within their assessment (e.g., identify the weakness of current reporting to support top management information needs, or that all major competitors have a web presence which the current company does not yet possess and which therefore poses a threat to that company's ability to attract new/retain existing customers).
- When looking for development opportunities, the organisation is looking for ways in which it can capitalise on strengths, reduce weaknesses, counter threats and exploit opportunities. Sometimes pairing strengths and opportunities can, at business level, lead to projects that enable competitive advantage to be achieved. These may be MIS-related projects. Other pairings are possible too.
- With respect to MIS, the SISP team are looking for ways in which MIS can be used to capitalise on strengths, reduce weaknesses, counter threats and exploit opportunities. This may lead to the proposal of several MIS projects. These are clearly all important as they align with the SWOT of the business: however, there is little knowledge just from the SWOT as to the priority of each resultant proposal (a limitation of SWOT, perhaps?).

(1 mark for each salient point regarding the SISP technique, up to 6 marks, plus up to 4 marks on assessment of how well the technique allows the most suitable MIS to be identified, to a combined maximum total of 8 marks)

For VCA analysis, candidates may include the following in their answer:

- The goal of VCA is to maximise value creation whilst minimising costs.
- It is an approach to examining the business and the activities that take place within the 'production' of a product or service, and how these activities create value for the business.
- Both primary and supporting business activities are analysed. Primary activities are those concerned with creating and delivering a product/service, whilst supporting activities are those not directly involved in production but may increase the effectiveness or efficiency of the primary activities.
- Primary activities include inbound logistics, operations, outbound logistics, marketing and sales, and services.
- Supporting activities include procurement, human resource management, technology development and firm infrastructure.
- Candidates may present the VCA framework in the form of a suitable diagram.
- MIS opportunities may be identified at the juncture between primary activities, or within either a primary or support activity, based on the analysis presented. For instance, an MIS for enabling customer information to be available when the customer requires after sales support may be considered important to increase the effectiveness/'value' of the 'services' primary activity. Or there may be a lack of information passing between inbound logistics and operations, leading to the proposal for a better supply chain support system.
- The concept of VCA can apply to whole supply chains and distribution networks. Porter terms this larger, interconnected system of value chains the 'value system'. A value system includes the value chains of a firm's supplier (and, in turn, all their suppliers), the firm itself, the firm's distribution channels and the firm's buyers. Again, the juncture between supply chains may serve to identify MIS opportunities, which could improve effectiveness of important parts of the value system. Like SWOT, there is little information to aid the prioritising of identified projects.

(1 mark for each salient point regarding the SISP technique, up to 6 marks, plus up to 4 marks on assessment of how well the technique allows the most suitable MIS to be identified, to a combined maximum total of 8 marks)

For Part b), candidates need to know what a (digital) dashboard is, and then relate it to the management control activity.

A definition of a (digital) dashboard may be given, such as the following:

A dashboard is a visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance. (based on Few, 2006)

Candidates may also describe some key attributes of a (digital) dashboard, such as:

- The ability to provide high-level summaries, including exceptions, to communicate at a glance what is happening, but not usually why it is happening (which requires further investigation and underlying detail).

- The ability to display information concisely, clearly, and intuitively. Information should not take up too much space, so that the entire collection of information fits on a single screen. Graphical representations can help to ensure this is possible.
- The ability to customise information on a dashboard to the requirements of a given person, group, or function.

Candidates may then go on to discuss management control as a concept, in that it includes monitoring organisational situations to see if any change is needed, and then ensuring that that change is effectively actioned. Candidates should then relate management control aspects to the dashboard concept, highlighting in particular its role in monitoring company operations for situations requiring change, and enabling drill down to understand the potential causes of the situation. This may subsequently lead to changes being recommended by the manager. Examples of dashboards being used to monitor and understand situations may be given, which will probably explicitly refer to the use of dials, maps and RAG (R-Red, A-Amber, G-Green) status in highlighting poor, borderline and satisfactory performances (respective) to management.

(4 marks for a sound understanding of a dashboard, plus 2 marks for overall understanding of management control, plus up to 4 marks for how a dashboard can be used within management control activities with examples, to a combined maximum total of 9 marks)

(TOTAL Q5 = 8 + 8 + 9 = 25 Marks)

Examiners' comments

The theoretical overviews required of both SWOT and VCA in Part a) were generally well attempted. However, there is evidence that many candidates failed to link their description of the SISP technique to the identification of MIS projects, let alone perform any assessment as to its ability to identify the most important MIS projects. They lost valuable marks because of these omissions.

In Part b), most candidates had at least a basic understanding of the digital dashboard concept, providing some description of how it might look and what it might feature, and how it might be tailored to the particular needs of a target user. There is evidence that some candidates equated a digital dashboard to an Executive Information System (EIS) and/or a Decision Support System (DSS), which is incorrect; whilst the former is often embraced within these MIS subtypes, they are not equivalent. A lot of candidates failed to demonstrate any implicit or explicit understanding of management control within their answer, with some seeing management control as an identical concept to planning. Many candidates did not support their answers with suitable examples, and several did not attempt to show how the digital dashboard aids management control activities.