CPA IRELAND | CERTIFIED PUBLIC ACCOUNTANTS

INFORMATION SYSTEMS

FORMATION 2 EXAMINATION - APRIL 2016

NOTES:
Section A - You are required to answer Questions 1 and 2.
Section B - You are required to answer any **three** out of Questions 3 to 6.
Should you provide answers to all of Questions 3 to 6, you must draw a clearly distinguishable line through the answer not to be marked. Otherwise, only the first three answers to hand for these four questions will be marked.

TIME ALLOWED:
3 hours, plus 10 minutes to read the paper.

INSTRUCTIONS:
During the reading time you may write notes on the examination paper but you may not commence writing in your answer book. **Please read each Question carefully.**

Marks for each question are shown. The pass mark required is 50% in total over the whole paper.

Start your answer to each question on a new page.

You are reminded to pay particular attention to your communication skills and care must be taken regarding the format and literacy of your solutions. The marking system will take into account the content of your answers and the extent to which answers are supported with relevant legislation, case law or examples where appropriate.

List on the cover of each answer booklet, in the space provided, the number of each question attempted.

THE INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS IN IRELAND

INFORMATION SYSTEMS

FORMATION 2 EXAMINATION - APRIL 2016

Time Allowed: 3 hours, plus 10 minutes to read the paper.

SECTION A

Answer **BOTH** Question 1 and Question 2 in this Section.
(Both Compulsory)

1. Home Trends is a major home retail chain, with 24 stores across the island of Ireland. Home Trends was founded in 1995 by Peter Monaghan, initially as a furniture manufacturer, making high quality but competitively priced living room, dining room and bedroom furniture. The company grew quickly during the housing boom, first developing its own retail outlets to sell its products, and later developing these outlets into the home retail stores they are today: selling a much wider range of large furniture, decoration materials and homewares from other manufacturers. These smaller homewares are often design-led, following home fashion trends and are seen by Peter Monaghan as essential in driving repeat custom to the business. However, margins on these products are often low, particularly given the need for discounting as trends come and go.

It is 25 April and Home Trends' senior management team is meeting to discuss the organisation's recent attempt to implement an Enterprise Resource Planning (ERP) system. Bill Delaney, the (internal) project manager, provided the following report:

'As you know, last September we purchased ERP software from NUTU software. Since that time we have been working to implement that software, including integrating that software with our existing sales recording software after the decision was taken not to implement NUTU's sales module and its software in the stores. We also developed our own new accounts payable module to reflect our unique procurement methods, and integrated that with NUTU's software. Most of that integration work was done by the Home Trends IT staff after we reached the limit of what we had been authorised to spend on NUTU consultant support.

On Monday 11 April, we went live with our direct cutover conversion to the new ERP system. However difficulties quickly became apparent, in the slow functioning of the system, coupled with initial difficulties specific to the sales and accounts payable modules. Despite the staff briefings in advance of the implementation, the IT staff and system champions were overwhelmed with the number of queries and complaints from staff – who were reverting in many instances to working around rather than with the new system. As planned, a series of control tests were carried out during that first week. The major issues identified were:

1. *Sales – Significant differences in reconciliations between sales per the system and daily cashing up records from stores. Intermittent downtime leading stores to resort to manual sales processing.*
2. *Accounts Payable - Transactions identified as recorded through the accounts payable module by unauthorised persons, with built-in authorisation controls (including access to the authorised supplier listing) not effective.*

As a result the decision was taken on Monday 18 April to revert to our previous systems. This required the re-posting of all of the previous week's transactions into those systems, attempting to ensure that all transactions are now posted, properly authorised and not duplicated. However, given the difficulties experienced it is by no means certain that we can achieve that. Going forward, we want to examine what went wrong with this implementation, amend the new system, and aim to implement the system later this year, in September.'

Michael Barton, Head of Procurement, responded that *"the disruption as a result of this has been immense. We've been able to go back to our previous systems – and after this misadventure I just don't see any reason to try to implement ERP again. I think we should stick to what we know!"* Susan Wilson, Head of Operations, countered that *"we started this project for a reason – I still think that an integrated ERP is the way we need to go. The problem here was that we tried to convert to the new system before we were ready to do so, and I'll be honest, I think that turning one system off and one system on across the whole organisation was just too big a risk, whatever amount of money it was supposed to save!"*

REQUIREMENT:

Based on a critical evaluation of the case study on Page 1, you are asked to address the following:

(a) Giving relevant examples, discuss the possible business benefits that may have convinced the Senior Management Team of Home Trends to implement an ERP system.

(8 marks)

(b) Based on the information provided, analyse the possible challenges of ERP implementation and how these might have affected Home Trends' ERP implementation.

(8 marks)

(c) Outline three alternative conversion strategies and their potential suitability for Home Trends' second ERP implementation.

(9 marks)

[Total: 25 Marks]

2. Write briefing notes on any THREE of the following topics:

(a) Executive Support Systems in deciding to market existing products in new territories.

(b) Value chain analysis for competitive advantage.

(c) Social marketing in new markets.

(d) Supply chain planning systems in food production environments.

(e) Transaction processing systems in providing information for decision making.

(Each part carries 5 marks)

[Total: 15 Marks]

SECTION B

Answer **ANY THREE** of the four questions in this Section.

3. **(a)** Outline how *information needs* and *information systems requirements* may differ between operational, middle, and senior management.

(6 marks)

(b) Discuss the main categories of business intelligence and analytics, providing examples of the possible users of these.

(8 marks)

(c) Explain the business benefits of Enterprise-wide Knowledge Management Systems, giving examples of such systems and tools used in those systems.

(6 marks)

[Total: 20 Marks]

4. **(a)** In evaluating an organisation's Information Systems, discuss the three dimensions of those systems and the importance of considering them holistically.

(8 marks)

(b) Outline the usefulness of Decision Support Systems (DSS) in large, geographically-dispersed organisations.

(5 marks)

(c) Suggest and explain two possible models to assess the value of an investment in Information Systems.

(7 marks)

[Total: 20 Marks]

5. **(a)** Outline three internet business models, giving examples of each. (6 marks)

(b) Discuss the potential benefits and challenges of implementing customer relationship management (CRM) software in an organisation which retails primarily through e-commerce channels.

(10 marks)

(c) Explain to what extent might social CRM offer further benefits to an organisation which retails primarily through e-commerce channels?

(4 marks)

[Total: 20 Marks]

6. **(a)** Outline what is meant by the term 'cloud computing'. (4 marks)

(b) Discuss the potential business benefits of cloud computing for SMEs, and the challenges they may face in the course of its implementation.

(10 marks)

(c) Analyse the ethical issues arising from two contemporary information technology trends. (6 marks)

[Total: 20 Marks]

END OF PAPER

SUGGESTED SOLUTIONS

THE INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS IN IRELAND

INFORMATION SYSTEMS

FORMATION 2 EXAMINATION - APRIL 2016

SOLUTION 1

Purpose: To examine the candidates' understanding of: the business benefits and possible challenges of implementing ERP systems, awareness of implementation methodologies and the benefits and drawbacks of conversion strategies.

Links: No major links to other topics or papers.

Options: Candidates must answer all parts of the question. Answers should not vary significantly from those given below.

Essential components: Candidates must be able to show a depth of understanding of the areas identified above (under Purpose).

(a) Enterprise systems, sometimes referred to as Enterprise Resource Planning (ERP) systems, are systems which integrate business processes in manufacturing and production, finance and accounting, sales and marketing, human resources and others as necessary into a single software system and comprehensive data repository. This can be contrasted to the traditional approach where these functions each have their own, unintegrated systems. While each business process has its own module within the software, data is stored in a centralised database and can be used by multiple business processes. When data is entered by one process (such as the accounting function) it is immediately available to other business processes.

ERP systems are suggested to increase operational efficiency by providing managers across business processes with timely, accurate and relevant information to aid in their decision making. For Home Trends, an example would be improving the availability of good quality, timely information on the sales performance of product lines to the purchasing department as well as the sales/marketing department.

Using ERP systems, firms can respond more quickly to customer requests for information or products, for example having better stock information available to point-of-sale terminals in store, or facilitating online access to this for customers.

With one system integrating ordering, manufacturing and delivery data, better information is available to create more accurate sales and production forecasts, minimising costs and the risks of stock outs – both more efficient for the business and leading to higher customer satisfaction.

With better information gathered on processes such as the manufacturing process or procurement process this can be used as a basis to analyse the performance of these processes, and ultimately identify bottlenecks, delays or other areas for improvement.

With linkages between ordering, manufacturing and delivery information, better decisions can be made about the whether to make or buy products, levels of production, timing of production and stockholding leading to cost savings and greater efficiency.

Greater sharing of information, standardisation of information and reports can assist senior managers in comparing performance across the firm, possibly identifying stores where improvement is required.

2 marks for explaining understanding of ERP, up to 3x2 marks for well-explained, relevant business benefits of ERP

(b) Home Trends purchased ERP software from NUTU, and then customised this to suit the business, including integrating this with an existing standalone sales handling system, and developing a bespoke production scheduling module, again integrated to the NUTU software. It could be argued that given this level of complexity, purchasing and modifying ERP software might not have been the best fit – perhaps consultants should have been brought in to design a bespoke piece of software.

There is little evidence in this discussion, as might have been expected, that Home Trends was aware of the link between moving across to an ERP system and the often fundamental changes in the way that businesses operate. Processes and systems often change – for example, could Home Trends have more easily changed its processes to implement NUTU's sales module than integrated their existing system? Changing processes is often a major challenge in ERP implementation - it's unclear as to the extent to which this was considered, or how this impacted on employees in this case.

Again given this complexity, rigorous testing should have been carried out to ensure that these integrations and adaptations were working effectively before the system went live, testing is not mentioned in the case study until after implementation. There is also an indication that staff engagement has been limited to 'briefings' perhaps rather than active consultation in the development stages and later training and provision of resources such as user manuals.

A major challenge of ERP implementation relates to a long implementation time – this is often due to the need to fundamentally re-evaluate business processes, identify the use of and sources of data, develop or customise software, train staff and engage in rigorous testing. There are indications here that the implementation process in Home Trends may have been rushed – perhaps indicating that adequate testing was not carried out, that employees lacked training or resources such as user manuals.

Costs are often a major challenge in implementing ERP systems. Costs might include the initial purchase costs of the software – albeit lower than the comparative cost of having a bespoke ERP developed. Customising the software is expensive whether paying for NUTU to customise the software or to do this in house – in addition to the internal costs relating to testing, and again it seems that internal customisation and the apparent lack of testing may have reflected attempts to cut costs that have impacted on the success of the conversion. ERP may introduce 'switching costs' – once applications are installed it becomes very costly to switch providers, and Home Trends will become dependent on NUTU to upgrade and maintain the software provided. Additionally, the high level of customisation here commits Home Trends to extensive work every time the NUTU software is upgraded.

Candidates could also discuss various stages/core activities in designing and implementing a new system (system analysis, system design, programming, testing, conversion and production/maintenance), identifying possible weaknesses/issues at each stage.

Up to 4x2 marks for suggesting and explaining relevant challenges

(c) Conversion is the process of changing from the old systems to the new ERP system. Home Trends had followed a direct cutover strategy – involving replacing the old system with the new one on an appointed day. This approach is possibly a low cost strategy but, as demonstrated in this case, is also very high risk (and potentially very costly if risks are realised).

Alternative strategies include a parallel strategy – running the old and new systems in parallel for a period – a strategy which is much lower risk, and allows for ongoing testing and amendments. However, this strategy is also relatively high cost and time-consuming (for example, transactions needing to be processed twice on the different systems – this also confusing and frustrating for staff).

A pilot study strategy involves testing the system in a single department before rolling it out to other departments. Again it is higher cost and lower risk than a direct cutover strategy; however it may not be fully appropriate for an enterprise wide application such as ERP – where the success or failure of the system is closely linked to its ability to be used across departments.

A phased approach strategy involves introducing the system in stages – for example department by department, or introducing specific modules first before integrating these with others. Again this approach is higher cost and lower risk than the direct cutover strategy, allowing for ongoing testing and amendments. It may be more suitable than pilot study for an ERP implementation.

Candidates are expected to comment on the strategy they feel is appropriate – likely to be either a parallel or phased approach strategy, or could suggest a combination of both.

3x3 marks for each strategy

SOLUTION 2

Purpose: Responses for each question are expected to include a summary of the main facts relating to the topic, and relevant to a given context.

Links: No major links to other topics or papers.

Options: Candidates should answer three of the five parts/sub-questions

Essential components: Each sub-question has an aspect that allows the student to show what they know about a broad topic. Each also provides an opportunity for candidates to show they understand the relevance of the broad topic in a specific context. In general, 5 key points are expected on each sub-question for the 5 marks. 4 of these could be general points but must be relevant.

(a) Executive Support Systems are information systems at the organisation's strategic level, designed to address unstructured decision making through advanced graphics and communications. Their purpose is to provide executives with information to help them to make their decisions (not to provide executives with ready made decisions), because such decisions normally require judgement, evaluation and insight. Such an evaluation could be made of the decision to market existing products in new territories, which will require executives to combine the information provided with their own experience, expertise, risk preferences and understanding of the organisation and its business environment in making their decision.

Such systems are designed to be flexible, to cope with unstructured data from a range of sources, including internal and particularly external to the organisation. In this context, they may draw on information from internal management information systems and decision support systems to provide information on the past performance of these existing products, or the performance of other products the organisation already sells in these new territories. The ESS may also store and present external information, such as information on the new territories (demographics, key competitors etc.). A key aspect of the provision of information through ESS is ensuring information is clearly presented - this could be provided at a summary level rather than risk information overload, yet also provide the capacity to drill down (possibly using business analytics tools) to more specific information. This may be done through a portal, which uses a web interface to present integrated, personalised business content. Another approach is to provide a digital dashboard, which provides, at a glance, a real-time view of key performance indicators for the business. Executives using this type of information, provided the information provided is accurate, reliable and provided in real-time (or in a timely fashion), may be able to make more informed and better decisions on whether and how to market existing products in new territories.

(b) The value chain model links IT solutions to business strategy. It identifies critical leverage points where a firm can use information technology most effectively to enhance its competitive positions. The value chain model views an organisation as a series or chain of basic activities that add a margin of value to a firm's products or services. These activities are categorised as primary activities and support activities.

Primary activities are most directly related to the production and distribution of the firm's products and services that create value for the customer. Primary activities include: inbound logistics, operations, outbound logistics, sales and marketing, and service. Examples of IT systems used for each of these are: automated warehousing, SCM (inbound logistics); ERP (operations); SCM, RFID tags, bar codes (outbound logistics); CRM (sales & marketing; service). Support activities make the delivery of the primary activities possible and consist of: organisation infrastructure (administration and management), human resources (employee recruiting, hiring, and training, technology (improving products and the production process), and procurement (purchasing input). IT used includes payroll software, HR applications, CAD, B2Be-commerce (procurement).

The value chain model can be used to identify areas where changes to information systems will improve business processes. They can also benchmark their business processes against their competitors or others in related industries, and identify and implement industry best practices. Value chain analysis can be used to identify where change might be particularly important: for example, to increase the availability of information, to utilise information, to speed processes, to reduce costs, or to mitigate identified risks or areas of poor performance relative to competitors.

(c) Social marketing is the use of social media to interact with customers and derive customer insights. It can include activities designed to shape perceptions of the brand, solidify customer relationships, promote particular products or offers, and can be augmented by a range of tools to assess the usefulness of such marketing. Examples might include promoting its Facebook page through advertising, paying for promoted Tweets or promoted trends on Twitter, meaning that these are displayed more prominently. Online advertisements on other sites could also be used to promote the brand's Facebook page or Twitter account – usually with users clicking on the advertisement and being taken to the relevant page. Customers can then

interact with the organisation through these applications, for example to enter competitions, comment on a product, complain, or share information with friends. This can be a low cost method of marketing in new markets.

In addition to building relationships through these mechanisms, linking with customers and others in this way can be a powerful means of generating information on these customers' preferences, buying habits that can inform future business decisions, such as the development of new products and decisions about promotions – information that is particularly valuable in a new market of which the organisation has limited experience. However, given the unstructured nature of the data gathered (for example, from Facebook pages or Twitter feeds) if an organisation wishes to turn the big data generated from these relationships into useful information, it will need to invest in business intelligence infrastructure and analytics.

(d) Supply chain planning systems enable the business to model its existing supply chain, generate demand forecasts for products, and develop optimal sourcing and manufacturing plans. Such systems can help companies make better decisions such as determining how much of a specific product to manufacture in a given period; establishing inventory levels for raw materials, intermediate products and finished goods; determining where to store finished goods; and identifying the transportation mode to use for product delivery.

In the context of food production environments these decisions are critical, not only to ensure that food spoilage is minimised, but also because there are food safety standards within the production process that must be monitored and met – for example, the length of time that specific raw meats can be stored. Complying with such standards protects the company and consumers.

(e) Transaction processing systems exist across a number of business functions, including order processing, sales records, payroll, accounts payable, and employee record keeping. This includes both production-related processes and secondary processes including the accounts function, HR etc.

TPS exist to record the routine transactions that take place in everyday operations, and as a result they contain a lot of detailed data – for example, a sale is recorded with the details of all items purchased, price, date, invoice/sale number, plus a range of customer details.

Information provided by TPS is reasonably limited in nature and is focused on the needs of operational users and operational management – for example, what were last week's sales figures, what inventory is on hand in finished goods/raw materials.

However, data from transaction processing systems and other systems are often combined in data warehouses to form the basis of business intelligence and knowledge management systems. Information from these systems is often provided in a summarised form to higher level management, for example through Executive Support Systems.

Each part carries 5 marks
[Total: 15 marks]

SOLUTION 3

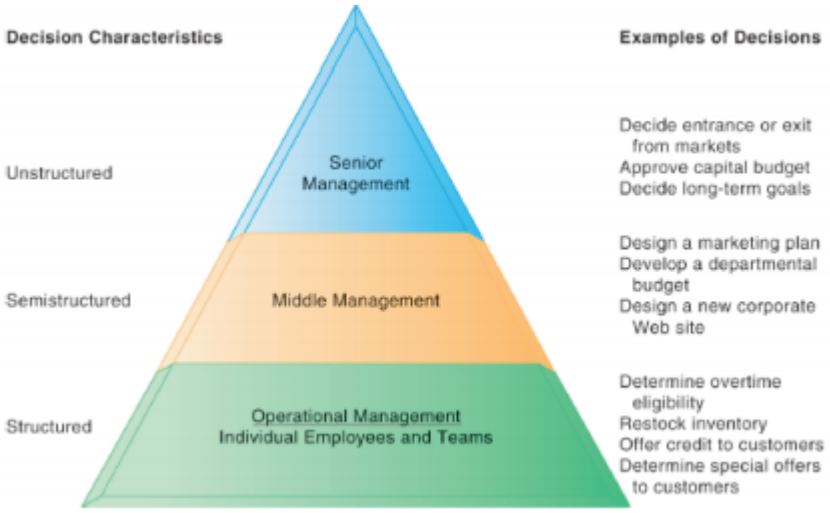
Purpose: To examine the candidates' understanding of: differing use of IS across organisational levels; differing use of BI tools; usefulness of knowledge management systems.

Links: No major links to other topics or papers.

Options: Candidates must answer all parts of the question. Answers should not vary significantly from those given below.

Essential components: Candidates must be able to show a depth of understanding of the areas identified above (under Purpose).

Candidates might sketch out or discuss three levels of management, together with their decision characteristics and examples of their decisions, as in this diagram from the Laudon & Laudon textbook:



(a) Operational managers make mostly structured decisions – repetitive and routine decisions with a definite procedure for handling them – often linked to resources, schedules and personnel decisions for specific projects. For the most part, they get their information from transaction processing systems. But, more and more, they are accessing management information systems (MIS) for a broader look at organisational performance.

Middle management's decisions may be semi-structured – a combination of structured and unstructured decisions – unstructured decisions are those where the decision maker must provide judgement, evaluation or insight to solve the problem, and where each decision is novel and non-routine, so that there is no well-understood or agreed-upon procedure for making them. These decisions affect resource allocation, short-range plans and performance of specific departments, task forces, teams, etc. They use decision support systems (DSS) that rely on historical and current data from internal information systems and external sources of data. DSS are a business intelligence tool that can crunch large amounts of data and have easy-to-use interfaces. Common spreadsheet software like Microsoft Excel can also help managers review data in two dimensions using tools like pivot tables.

Senior management make mostly unstructured decisions based on internal business information but also external industry and society changes. Decisions affect long-term, strategic goals and the firm's objectives. They use executive support systems (ESS) to enable them to focus on important performance information that affects the overall success of the organisation. Information may be provided through balanced scorecards and key performance indicators. These rely on data supplied by the organisation's enterprise applications, as well as external data.

1 mark for each decision-making group; 1 mark for explaining IS used for each

Candidates should outline the following capabilities and their suggested users:

(b) BI and BA can be beneficial to the firm in gathering, storing and analysing the organisation's own data (possibly in combination with externally-sourced data) to better understand factors that are important to their business, including customer behaviour. It can provide a basis for more informed, and hopefully better business decision making on a range of issues.

Production reports: These are pre-defined reports which are specific to the industry and to a functional area of the business, for example: customer satisfaction reports; market analysis; direct and indirect spending. Such reports may be used by operational management, and in some cases by middle management, but will primarily be used by operational staff below management.

Parameterised Reports: users enter several parameters as in a pivot table to filter data and isolate impacts of parameters. An example might be identifying how sales vary by region and date/season, which might lead to different advertising campaigns in different regions. Such reports may be used by operational management, and in some cases by middle management, but will primarily be used by operational staff below management.

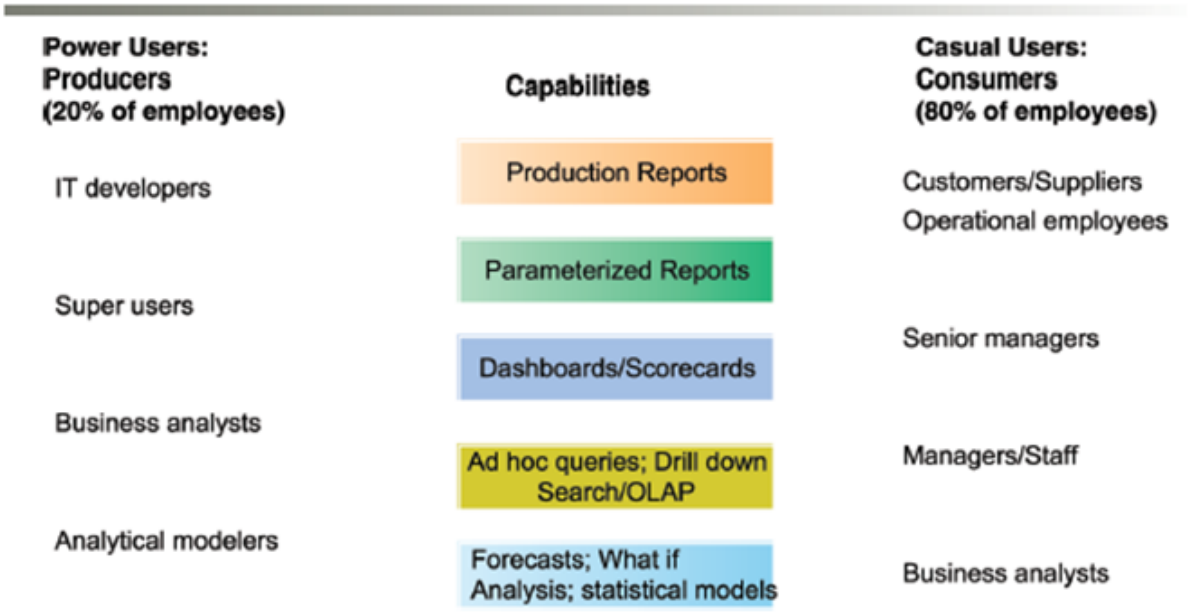
Dashboards/Scorecards: visual tools for presenting performance data defined by users. Such dashboards/scorecards could be used to give senior management an overview of the most important metrics for the business.

Ad hoc query/search/report creation: functions that allow users to create their own reports based on queries and searches, i.e. not just to run the reports predefined by the vendor or at the time of installation. These would normally be run by operational managers, middle management, operational staff and business analysts in response to their specific queries such as, for example, investigating sales in a subsection of a region to inform future marketing strategy.

Drill down: the ability to move from a high-level summary to a more detailed view. For example, to be able to see sales per region, then to drill down into sales for a particular region to see more detail such as sales per day, sales per agent etc. These may be particularly useful for senior and middle management.

Forecasts, scenarios, models: these include the ability to perform linear forecasting, what-if scenario analysis, and analyse data using standard statistical tools. Predictive analytics use statistical analysis, data mining techniques, historical data and assumptions about future conditions to predict future trends and behaviour patterns. Variables that can be measured to predict future behaviour are identified, and a collection of such predictors is combined into a predictive model for forecasting future probabilities with an acceptable level of reliability. This functionality will be primarily used by operational management and specific business analysts – but feeding the resulting information to middle or senior management.

Candidates may discuss the following diagram from the Laudon and Laudon text:



(c) Enterprise-wide knowledge management systems are general purpose firm-wide efforts to collect, store, distribute and apply digital content and knowledge. They include capabilities for: searching for information; storing both structured knowledge (explicit knowledge that exists in formal documents, as well as formal rules that organisations derive by observing experts) and semi-structured/unstructured knowledge (information in folders, messages, emails, graphics, videos, etc.); and locating employee expertise within a firm.

Enterprise content management systems help organisations to manage structured and semi-structured data, including corporate repositories of documents, reports, presentations and best practices, and in some cases external sources of information such as news feeds and research. Business benefits include structured storage, defined access rights to stored information, ease of access where authorised, and information security.

Learning management systems provide tools for management, delivery, tracking and assessment of various types of employee learning and training. Business benefits include a structured approach to managing investment in the workforce, and compliance with mandatory training requirements where applicable.

Increasingly, enterprise-wide knowledge management systems include supporting technologies such as portals, search engines, collaboration and social business tools (e-mail, instant messaging, wikis, blogs, etc.).

3 marks for business benefits, 3 marks for examples. Candidates are not expected to discuss knowledge work systems or intelligent techniques (other types of knowledge management systems) however credit may be given.

SOLUTION 4

Purpose: To examine the candidates' understanding of: the dimensions of IS, the usefulness of DSS, and models to assess the value of IS investment.

Links: No major links to other topics or papers.

Options: Candidates must answer all parts of the question. Answers should not vary significantly from those given below.

Essential components: Candidates must be able to show a depth of understanding of the areas identified above (under Purpose).

(a) The three dimensions of Information Systems are:

Organisation:

The key elements of an organisation are its people; structure; business processes; culture and politics. Information Systems provide information to different staff levels to allow them to carry out their function and to monitor others as appropriate. Authority and responsibility is organised as a hierarchy. Business processes include formal written-down rules and informal work practices related to accomplishing relevant tasks in business processes. Information systems can facilitate these processes and can be tools for improving and effecting change in these processes, while weaknesses in information systems will adversely affect these processes. Each organisation has a unique culture, a fundamental set of assumptions, values and ways of doing things that has been accepted by most of its members. Organisational politics may be a part of this, and is often based in conflicts as to how the company should be run and resources and rewards distributed. Information systems have a role to play in facilitating positive effects and mitigating negative effects of organisational culture and politics.

Management:

Management's job is to make sense out of the many situations faced by organisations, make decisions and formulate action plans to solve organisational problems. They assess business challenges in the environment, set the organisational strategy for responding to these challenges, and allocate human and financial resources to coordinate the work and achieve success. Information systems have a role in providing relevant, timely and accurate information for decision making, and in facilitating monitoring and control.

Technology:

Technology includes computer hardware, computer software, data management technology (software governing the organisation on data on physical software media) and networking and communications technology (consisting of both physical devices and software, linking various pieces of hardware and transferring data from one physical location to the other). Networks including the internet, intranets (internal corporate networks) and extranets (private intranets extended to authorised users outside the organisation) may be used. These, together with the people required to run and manage them, make up the firm's information technology infrastructure. This supports the information systems of the organisation.

Candidates should discuss the importance of considering these three dimensions: as individually critical for the Information System and as inter-related to each other. Candidates could provide examples of such inter-relations, perhaps highlighting how weakness in one dimension may be compensated for in another.

2 marks each for explaining the three dimensions, and 2 marks for the importance of considering all

(b) Decision-support systems (DSS) are used at the tactical (middle) management level of a firm as a business intelligence delivery platform, with the ability to support semi-structured decision making. They support management decisions when these decisions are unique, rapidly changing, and not specified easily in advance. They have analytical modelling and data analysis capabilities and often draw on information from external as well as internal sources such as transaction processing systems & management information systems. A DSS may present information graphically and may include an expert system or artificial intelligence. It may be aimed at middle management or some other group of knowledge workers – particularly those who want to create their own reports, use more sophisticated analytics or models to find patterns in data, to model alternative scenarios or test specific hypotheses.

Examples of their use in geographically dispersed SMEs might include gathering and presenting: comparative sales figures between territories; projected revenue figures modelling assumptions about new product sales; implications of projected changes on production schedules; expected outcomes of different decision alternatives, given past experience.

3 marks for explanation; 2 for examples

(c) The total cost of ownership (TCO) model focusses on the direct and indirect costs of owning technology. It includes the cost of acquiring and installing hardware and software, as well as ongoing administration and maintenance costs, upgrades, technical support, and costs of housing and powering the technology, as well as costs relating to maintaining network connections. It should also include such items such as employee training, ongoing technical support and lost productivity if hardware or software failures cause the system to be unavailable for processing end user tasks. Crucially, this model seeks to identify the true, total cost of ownership of an IS investment so that this can be compared to the expected (or actual, if applied retrospectively) benefits of the investment, such as increases in productivity and efficiency. These may be more difficult to predict than costs.

The competitive forces model suggests six factors that can be used to address the question of how much an organisation should spend on its IT infrastructure. These include:

a. Market demand for your firm's services
b. Your firm's business strategy
c. Your firm's IT strategy, infrastructure and cost
d. Information technology assessment: where is the company's IT in relation to current trends?
e. Competitor firm services: what technology services are competitors offering their customers, suppliers and employees, and compare these to your firm.
f. Competitor firm IT infrastructure investments: benchmark IT expenditures against competitor firms

Completing such an assessment may be time consuming and costly, and it may not be possible to adequately answer all of the questions posed: for example, it may be particularly difficult to identify how much your competitors spend on IT, or to get a picture of what competitor firms offer their employees. However when compared to total cost of ownership it acknowledges that the appropriate level of IT infrastructure investment is a function not only of internal matters but also environmental factors, and a source of potential competitive advantage.

2 x 3 marks for possible models, 1 mark for analysis of these. Candidates who discuss how to assess value without referring to these models will receive some credit.

SOLUTION 5

Purpose: To examine the candidates' understanding of: common internet business models; benefits and challenges of CRM and social CRM.

Links: No major links to other topics or papers.

Options: Candidates must answer all parts of the question. Answers should not vary significantly from those given below.

Essential components: Candidates must be able to show a depth of understanding of the areas identified above (under Purpose).

(a) The candidate may identify any three of the following seven Internet business models.

E-tailer: sells physical products directly to consumers or individual businesses. Examples include Amazon, various others.

Transaction broker: saves users money and time by processing online sale transactions and generates a fee each time. Examples include Expedia.

Market creator: provides a digital environment where buyers and sellers meet, search for and display products, and establish prices for those products. Can serve consumers or B2B e-commerce, generating revenue from transaction fees. Examples include eBay, Priceline.com, Etsy.

Content provider: creates revenue by providing digital content, such as digital news, music, photos, or video over the Web. The customer may pay to access the content, or revenue may be generated by selling advertising space. Examples include iTunes, getyyimages.com, timesonline.com.

Community provider: provides an online meeting place where people with similar interests can communicate and find useful information. Examples include Facebook, Google+, Twitter.

Portal: provides an initial point of entry to the Web along with specialised content and other services. Examples include Google and Bing.

Service provider: provides web 2.0 applications such as photo sharing and user-generated content as services. Other services may include online data storage and back-up. Examples include Dropbox, Google Apps.

3x2 marks each model. Credit will be given for discussion of e-commerce revenue models, including advertising, sales subscription, free/freemium, transaction fee and affiliate revenue models.

(b) CRM systems capture and integrate customer data from all parts of the organisation. They consolidate the data, analyse it and distribute the results to the various systems and customer touch points across the enterprise. Well-designed CRM systems provide a single enterprise view of customers that is useful for improving sales and customer services.

Candidates may discuss the three elements of CRM: sales, marketing and service. CRM include aspects linked to sales (including sales force automation – helping staff increase their productivity by focussing sales efforts on the most profitable customers), service (providing information and tools to increase the efficiency of call centres, help desks and support), and marketing (supporting direct marketing by providing capabilities for capturing prospect and customer data, scheduling and tracking direct marketing etc.).

Candidates may also discuss the functions of CRM as operational or analytical. Operational CRM includes all customer-facing applications, such as sales force automation, call centres, and marketing automation. The analytical CRM uses data from the operational CRM, customer touch points and other sources, this is organised into data warehouses and used for data analysis including data mining and OLAP. This analysis provides managers with information to identify buying patterns, create segments for targeted marketing and pinpoint profitable and unprofitable customers.

Benefits of CRM systems include: increased customer satisfaction, more efficient call centres, lower direct marketing costs, increased marketing effectiveness, access to customer feedback for new product development, reduced sales costs, the ability to identify profitable and high lifetime value customers, reduced customer churn/improved customer loyalty, improved response time to customer queries and market opportunities.

Challenges include that these are complex pieces of software that are expensive to purchase and implement, and often involve a lengthy implementation time. This may include extensive customisation. CRM software is often linked not only to technological changes, but also to fundamental changes in the way that businesses operate. Employees must accept new job functions and responsibilities, and learn how to perform a new set of work activities, which may lead to resistance to the change if not handled appropriately. CRM systems may introduce 'switching costs' – once applications are installed it becomes very costly to switch providers, and the organisation becomes dependent on the provider to upgrade and maintain the software provided. CRM systems require a very clear understanding of exactly how data is used in the organisation and how it would be used in the CRM system. Some data cleansing work may be required.

Candidates should refer to the specific e-commerce context in discussing the benefits and challenges, for example: the particular usefulness of CRM in e-commerce activities to reduce high customer churn; e-commerce concept which is largely self-service but relies on efficient and effective support through call centres etc.; significant potential for highly personalised direct marketing in this context.

3 marks for explanation, 2 for generic benefits, 2 for generic challenges, 3 for engagement with e-commerce context

(c) Social CRM tools enable a business to connect to customer conversations and relationships from social networking sites to CRM processes, for example SAP, Salesforce and Oracle CRM products feature technology to monitor, track and analyse social media activity in Facebook, LinkedIn, YouTube Twitter and other sites. Employees who interact with customers via social networking sites are often able to provide customer service functions much faster and at lower cost than via phone or email. Social CRM can be combined with social media analytics to test and optimise marketing campaigns, or to aim social media campaigns directly to existing or known potential customers.

Customers increasingly expect organisations to use these channels to respond – however there is a possible reputational effect of customer complaints being so publicly visible – particularly if these are not responded to in an appropriate or timely way.

2x2 marks

SOLUTION 6

Purpose: To examine the candidates' understanding of: cloud computing, benefits and challenges of cloud computing; and ethical issues related to contemporary IS trends.

Links: No major links to other topics or papers.

Options: Candidates must answer all parts of the question. Answers should not vary significantly from those given below.

Essential components: Candidates must be able to show a depth of understanding of the areas identified above (under Purpose).

(a) Cloud computing is a model of computing in which computer processing, storage, software and other services are provided as a pool of virtualised resources over a network, primarily the internet. 'Clouds' of computing can then be accessed on an as-needed basis from any connected device and location. There are three main categories of cloud computing:

Infrastructure as a Service (IaaS): customers use processing, storage, networking and other computing resources from cloud service providers to run their information systems.

Platform as a Service (PaaS): customers use infrastructure and programming tools supported by the cloud service provider to develop their own applications.

Software as a Service (SaaS): customers use software hosted by the vendor on the vendor's cloud infrastructure and delivered over a network. Customers access the applications via a web browser with the data and software maintained on the providers' remote servers.

Candidates may also refer to the use of private/public clouds or typical components of a cloud computing platform, with credit given for these answers. 4x1 marks

(b) Benefits of IAAS include: saving a large initial investment in servers (this also moving costs from fixed to variable) and an overall potential cost reduction. Greater flexibility in capacity where data storing/processing peaks at certain times of the year or due to other events (if you were buying infrastructure it would have to cope with your maximum even if not required for 11 months of the year, where payment for cloud might more closely reflect usage). Challenges include the commitment to ongoing (variable) costs, later switching costs, concerns relating to the security of data in transmission and storage, integration with existing technologies and systems, and the risk of potential outages/ connection issues relating to the provider and network.

Benefits of PAAS include the ability to develop own applications at a lower cost than without the infrastructure and programming tools supported by the cloud service provider. Benefits would vary depending on the application created, but at a general level developing own applications can lead to acquisition of better, relevant data, production of more useful information, more efficient data gathering, communication etc. Challenges relate to potential outages/ connection issues, in addition to security of data in transmission and storage and integration with existing technologies and systems, costs including costs of acquisition, ongoing costs and switching costs.

SaaS benefits include minimising a range of costs including the costs of multiple licenses, installation and maintenance. The organisation may benefit from regular upgrades, patches and fixes by the software provider without the disruption of upgrading individual machines, while taking data and software offsite may be safer in event of a disaster – important customer information would still be easily accessible. Concerns might include: security of data in transmission and storage; integration with existing technologies and systems; and potential outages/ connection issues relating to the provider and network.

Generally speaking, the main advantages for SMEs are:

- **On-demand self-service:** they can obtain computing capabilities such as server or network storage on their own
- **Ubiquitous network access:** They can use standard network and Internet devices, such as mobile platforms, to access cloud-based services
- **Location independent resource pooling:** Computing resources are pooled to serve multiple users, with different virtual resources dynamically assigned according to user demand. The user generally doesn't know where the resources are located
- **Rapid elasticity:** computing resources can be rapidly provisioned, increased or decreased to meet changing user demand
- **Measured service:** charges for computing resources are based on the amount actually used

Candidates may discuss the benefits/challenges for cloud computing generally for SMEs (credit given), or may discuss the possible benefits/challenges of each type of cloud computing. 2 marks for each relevant point up to a maximum of 10 marks.

(c) Candidates are free to select from a number of contemporary trends including:

- Cloud computing
- Big Data
- Business intelligence
- Mobile platforms
- Social business
- Collaboration

Ethical issues raised should be appropriate to the trend chosen, but at a general level these might include:

- Protection of the right to privacy
- Protection of third party/company data from loss, corruption or theft (may include, but not limited to, compliance with the Data Protection Act)
- Sustainability and environmental concerns
- Protection of vulnerable individuals, social concerns
- Fact and perception of independence
- Conflicts between acting in company's interest and self-interest.

Up to 3 marks each for the discussion of relevant ethical issues in respect of an identified trend

Examiner's Comments April 2016

General Comments

Overall, 67% of students that attempted the paper, passed it. This included some excellent papers which engaged very well with the technical content of the syllabus – demonstrating their knowledge and applying this effectively to the contexts given. In contrast, students who failed this paper generally did so because they did not demonstrate technical knowledge of the paper's content, or demonstrated a very basic level of knowledge that did not allow them to respond to given contexts, or to discuss that content in an appropriate level of detail.

I would continue to encourage students to consider exam technique and timing, to avoid overly long responses for few marks, or overly brief responses for many marks. In particular I would urge caution in the use of bullet points or comparison tables (some students using columns of bullet points to contrast benefits and challenges in Question 5b) which seem to encourage students to give brief, unexplained points. Students should also take care to read the instructions of the paper, not answering more questions than required, and within questions where the number of responses is specified (for example, Q5a), giving ONLY that number of responses at an appropriate level of detail.

Question 1

All students attempted this question, with an average mark of 15.46 (62%). As a general point it is worth clearly re-stating that in case study questions, students should expect to draw on the material provided in the case to respond to the questions posed – this application is central to the aims of this subject.

Part a

Responses to this question were mixed. Better answers explained their understanding of ERP and demonstrated clear understanding of the syllabus content with strong links to the case material. Weaker answers often failed to demonstrate understanding of what an ERP is, and often provided only vague comments on the benefits of sharing share information. Some students provided generic benefits of ERP which were not linked to the case - in doing this, they missed some obvious benefits and gave others that were less relevant - and did not score as highly for these generic points.

Part b

This part was generally well answered, with most students able to suggest and explain a number of challenges. Again there was a distinction in the marks between better responses that made points relevant to the case study and ERP and weaker responses that discussed more generic challenges.

Part c

Again this was generally well answered, with most students able to discuss three alternative possible strategies. A particular issue for a number of students arose in distinguishing between pilot and phased approaches. Some students lacked detail, giving a brief description of the conversion method but nothing on the merits/drawbacks or the appropriateness for Home Trends – curtailing their marks.

Question 2

All but one student attempted this question, with an average mark of 8.17 (54%).

These questions provided an opportunity for students to demonstrate their technical knowledge on their choice of topics. Responses were mixed, even within papers, with many students struggling particularly with value chain analysis and social marketing. Many students chose to answer the question on social marketing yet discussed little more than advertising on Facebook – such very general answers scored few marks. Many students took the approach of describing the topic (for example, supply chain planning systems) but did not discuss it in context (for example, in food production environments) and this did curtail marks for some students.

Question 3

76% of students attempted this question, with an average mark of 10 (50%). However, within this, there were groups of very strong and very weak answers.

Part a

This section was generally well answered with most candidates scoring well.

Part b

Again responses to this were very mixed – some excellent responses here demonstrated good technical knowledge of the main categories and clearly identified the possible users of these. Others struggled to identify these categories, or occasionally, if named, to discuss these in good detail or to suggest users, indicating a lack of depth in understanding.

Part c
While some students gave good responses, many did not demonstrate a clear understanding of knowledge management systems, and this was particularly apparent in the lack of examples or ability to discuss benefits beyond fairly generic points on the benefits of sharing information in a business.

Question 4
43% of students attempted this question, with an average mark of 7.23 (36%) – this low average a result of a significant number of students' very low marks, these students often completing only some parts of the question.

Part a
Most students attempting this question were aware of the three dimensions and made some attempt to discuss these – varying levels of detail accounted for much of the difference in marks in this question. Few discussed the importance of considering these holistically, capping their marks.

Part b
Some students scored very well here, demonstrating clear knowledge and applying this effectively to the context given. Others left this question blank or showed very little understanding of DSS.

Part c
Very few students were able to respond to this question appropriately – many leaving it blank. Others discussed methods such as NPV and IRR, which are more typically used to assess investments with future cash flows (and students did not attempt to demonstrate how these could be applied in this scenario), although some credit was given for these responses.

Question 5
76% of students attempted this question, with an average mark of 10.44 (52%).

Part a
Most students scored well in this part of the question, demonstrating a good level of knowledge. In addition to the suggested solution, credit was given where students discussed B2B, B2C and C2C e-commerce.

Part b
Some excellent answers here, however some students demonstrated little understanding (or misunderstanding) of CRM and their discussions of benefits and challenges included irrelevant or very general points. Some students' marks were curtailed by a lack of detail (especially those students who used bullets or tables) or a failure to link their answer to the context.

Part c
Very few students discussed social CRM beyond the use of an organisational Facebook site – and even then did not engage with the potential benefits or risks of what was being suggested. A number of students suggested uses of social media that might be considered unethical.

Question 6
All students attempted this question, with an average mark of 9.7 (48%).

Part a
The vast majority of students provided a good answer to this question, although some lacked detail. Credit was given for discussing SaaS/PaaS/IaaS, and private/public clouds – although some students struggled to accurately describe public clouds.

Part b
This question was generally well answered with most students able to identify relevant business benefits and challenges. Weaker answers fell back on generic benefits and challenges, while stronger answers engaged with the context of small businesses – tending to give more relevant points. Students would be well advised to consider that benefits and challenges will differ between the type of cloud computing implemented (SaaS/PaaS/IaaS) and this may help them to explain these.

Part c
Engagement with this part of the question was poor and often demonstrated a lack of awareness of ethics in the context of Information Systems – despite specific flagging of this in the learning outcomes and syllabus. The vast majority of responses focussed on compliance with the Data Protection Acts (described in various levels of detail). However, this legal compliance is only one aspect of ethical considerations and broader discussions were expected.