

INFORMATION SYSTEMS

FORMATION 2 EXAMINATION - AUGUST 2017

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.

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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.** Valtex is a manufacturer and distributor of fashion clothing. After nearly 30 years of successful business, it has grown to supply hundreds of high street brands across Europe with men's, women's and children's clothing and has developed a reputation in recent years for 'fast fashion' – low cost, low quality clothing that closely follows fashion trends.

In order to deliver these fashion trends at low cost, Valtex has engaged increasingly with low cost suppliers around the world. Fifteen years ago, 80% of the clothing sold by Valtex was made in its own factories across Europe. Now it makes only 20% of what it sells – as management became increasingly aware that this clothing can be made much more cheaply in countries with lower labour costs. Increasingly, completed garments are being sourced from countries including Bangladesh and Honduras at prices below Valtex's manufacturing costs. Low labour costs have become increasingly important in the production of cheaper clothing, as the costs of raw materials for clothing production – particularly raw cotton, a traded commodity – have risen dramatically in recent years.

With declining profit margins across all types of clothing, Valtex's management has aggressively pursued a strategy of low cost leadership in an attempt to increase turnover and market share. To some extent, this has been successful – turnover has increased by over 150% in ten years. However, management's low cost focus has led to significant under-investment in specific aspects of the business, including in production machinery and Information Systems. One example of this is that the supply chain management (SCM) software currently being used is based on a system that was developed in-house over 15 years ago, and has had minimal updates since – despite the significant changes in the business and its procurement practices in that time.

Afton Smith, Director of Operations, has called a meeting to discuss the need for investment in an upgraded SCM system which, she argues, can assist Valtex in maintaining its competitive advantage in the marketplace and improve decision making at various organisational levels. Aware that many of her colleagues will be reluctant to invest in new systems in a challenging trading environment, she is suggesting that Valtex consider a cloud-based SCM system.

REQUIREMENT:

- (a)** Discuss the Director of Operation's claim that an upgraded Supply Chain Management (SCM) system can assist Valtex in maintaining competitive advantage. (In your answer, you should clearly explain what SCM systems are and their impact on competitive advantage). (14 marks)
- (b)** Discuss the possible benefits of a specifically cloud-based SCM system. (4 marks)
- (c)** Outline the extent that information from an upgraded SCM system can be integrated into the Business Intelligence environment of Valtex, to assist in decision making. (7 marks)

[Total: 25 Marks]

- 2.** Write briefing notes on any **THREE** of the following topics. In each case your note should include a summary of the main points relating to the topic.
- (a) Business models unique to internet based providers.
 - (b) Business process management in information systems change.
 - (c) Conversion strategies for enterprise-wide applications.
 - (d) XBRL for analysis of external organisations' financial statements.
 - (e) Social 'customer relationship management' (CRM) tools for an online retailer.

(Each part carries 5 marks)

[Total: 15 Marks]

SECTION B

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

- 3.** (a) Contrast Executive Support Systems with Decision Support Systems. In your answer, you should consider the purposes, users and limitations of each, and provide examples relevant to a manufacturer of retail products.

(10 marks)

- (b) Discuss how ESS and DSS might fit into the overall business intelligence environment of a manufacturer of retail products.

(6 marks)

- (c) Suggest four potential risks to the business intelligence environment.

(4 marks)

[Total: 20 Marks]

- 4.** (a) A department store chain currently generates 95% of its revenue from a substantial number of high street shops and 5% through e-commerce. As part of a strategy review, discuss four contemporary hardware trends that may affect this business going forward.

(8 marks)

- (b) As part of the same strategy review, discuss four contemporary software trends that may affect this business going forward.

(8 marks)

- (c) As part of the same strategy review, discuss the potential opportunities and threats presented by m-commerce for this department store chain.

(4 marks)

[Total: 20 Marks]

- 5.** (a) Explain the term 'customer relationship management (CRM)' systems. In your answer, you should describe the potentially different elements and functions of CRM systems that an organisation might use.

(4 marks)

- (b) Discuss the potential benefits and challenges of implementing CRM systems in a professional services firm.

(10 marks)

- (c) Explain the role of end users in developing and implementing new CRM systems in professional services firms.

(6 marks)

[Total: 20 Marks]

- 6. (a)** Discuss three organisational features that might affect an organisation's use of internet-based technologies.
(6 marks)
- (b)** Giving relevant examples, discuss the impact of internet-based technologies on business value chains.
(8 marks)
- (c)** Discuss the internet-based technologies that might be used by a company in procuring its raw materials from suppliers in business-to-business (B2B) transactions.
(6 marks)

[Total: 20 Marks]

END OF PAPER

SUGGESTED SOLUTIONS

THE INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS IN IRELAND

INFORMATION SYSTEMS

FORMATION 2 EXAMINATION - AUGUST 2017

SOLUTION 1

Tutorial Notes: -

Purpose: To examine candidates' understanding of: SCM systems; competitive advantage; cloud computing; decision making; and their ability to apply this knowledge to a given context.

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) and ability to apply this to the given context.

- (a) Supply chain management systems can assist businesses in planning their supply chains (supply chain planning) or help them execute their supply chain steps (supply chain execution).

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 such as Valtex make better decisions such as: determining how much of a specific product to manufacture/purchase 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.

Supply chain execution systems manage the flow of products through distribution centres and warehouses to ensure that products are delivered to the right locations in the most efficient manner. They track the physical status of goods, the management of materials, warehouse and transportation operations and financial information involving all parties.

Both types of SCM system may be useful to Valtex, with execution systems arguably particularly relevant given their engagement with an increasing global supply chain. While engaging in a more global supply chain may lead to lower cost production and an increased range of materials and finished goods, difficulties also arise. These include spanning greater geographic distances and time differences, giving rise to additional logistical considerations. Performance standards may vary from region to region or nation to nation. Cultural differences and different regulatory environments may impact.

SCM execution systems can use web interfaces or electronic data interchange to overcome difficulties in sharing information with external supply chain partners arising from their use of incompatible technology platforms and standards, differing languages and even time zones. Information can flow more smoothly between the disparate internal supply chain systems of these and other organisations. Examples include managers using web interfaces to access suppliers' systems to determine whether inventory and production capabilities match demand for Valtex's products. Business partners use web-based supply chain management tools to collaborate online on forecasts. Valtex's sales representatives can access suppliers' productions schedules and logistics to monitor customers' order status.

Competitive advantage refers to the suggestion that some businesses are stand-out firms, that do things better than most others in their industry. Supply chain management systems may particularly assist in helping an organisation achieve competitive advantage through low cost leadership or in building supplier intimacy.

Low-cost leadership: securing competitive advantage by keeping costs low. SCM can assist in a range of ways, including: minimising stock-holding by enabling better forecasting and replenishment; more reliable systems to avoid stock-outs; providing real-time, accurate information that facilitates monitoring and control of replenishment processes; and reducing procurement transaction processing times with increasing automation.

Strengthening supplier intimacy: securing competitive advantage by developing relationships and loyalty with suppliers. SCM can assist by: facilitating information sharing between Valtex and its customers and suppliers (for example, allowing suppliers access to production schedules and stock levels); reducing transaction processing times for both Valtex and its suppliers through increasing automation; developing relationships based on repeat business that can lead to volume and other discounts.

3 marks for definition of SCM systems, 3 marks for competitive advantage, up to 8 marks (4x2) for discussion of relevant benefits.

(b) Benefits of a specifically cloud-based SCM system include:

- Cost savings on purchasing multiple licenses, installation and maintenance – indications in the case study material that Valtex may not have funds available for substantial upfront investment
- Increased flexibility, easier to add or remove access by staff members as Valtex is in a period of change
- Benefitting from regular upgrades, patches and fixes by the software provider without the disruption of upgrading individual machines or costs associated with developing upgrades, patches and fixes in-house – again Valtex may lack funds to commit to this
- The need to build in strong access controls may improve the overall control environment – possible weak controls in the past
- Taking data and software offsite may be safer in event of a disaster – important customer information would still be easily accessible

4x1 marks for relevant points

(c) Operational and middle management make structured or semi-structured decisions, and need to be able to produce routine reports based on data extracted and summarised from Valtex's underlying information systems. This data covers customers, suppliers, competitors and other aspects of the business environment – possibly including data from Valtex's upgraded SCM. With an appropriately upgraded system, more accurate information could flow into the BI environment more quickly, assisting in faster and better quality decision making at the operational level.

Integrating SCM with the BI environment can allow middle level managers to create their own reports for performance monitoring or decision making, based on SCM system information – for example costs, lead times, reject rates. Frequent or ad-hoc reporting is facilitated through the availability of more extensive and ad hoc reports, dashboards, scorecards, drill-down, as well as forecasting and scenario analysis.

For senior management, integrating the SCM into BI would help to operationalise their strategic plan by focusing on measurable outcomes (such as lead time), and tracking key performance indicators (for example reducing the lead time). BI provides capabilities for Executive Support Systems to perform drill-down if more detailed views of the data are required (for example, to identify where lead time problems arise). Also BI and ESS help senior executives to monitor organisational performance, track activities of competitors, recognise changing market conditions and identify problems and opportunities. This ultimately enables Valtex to gain competitive advantage by responding more quickly to a changing environment.

3 marks for the identification and discussion of different decision making levels, up to 4 marks for usefulness of SCM information

SOLUTION 2

Tutorial Notes: -

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) Possible models include:

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, gettyimages.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.

(b) Business process management (BPM) is a continuous cycle of process redesign and process monitoring.

1. Identify processes for change: decide which business processes are to be improved
2. Analyse existing processes: processes are modelled and documented, noting particular issues such as bottlenecks, labour intensive tasks and other time delays
3. Design the new process: produce a detailed specification of the new process
4. Implement the new process: implement the new process and accompanying technologies and systems, making necessary changes and revisions
5. Continuous measurement: once implemented, continue to measure the process: is it working effectively, is it still appropriate or is further change needed?

BPM may be appropriate for information systems change where the existing process is weak and needs to be replaced in its entirety: a much more significant organisational change than automation or rationalisation of procedures. It can lead to dramatic gains in productivity and efficiency. However, need for change is at a process, rather than an organisational level (that is, it is not requiring a paradigm shift). The advantages of BPM over business process redesign include the recognition of a constantly changing environment and the building in of behaviours that continually check the continuing appropriateness of the process/need for change. Possible challenges in implementing BPM include the resistance of employees to change, the costs of process redesign and risks in the design and implementation of new processes.

(c) Conversion is the process of changing from the old systems to new systems. For enterprise-wide applications, a direct cutover strategy would normally be too risky. A pilot study strategy - testing the system in a single department/location before rolling it out - may not be appropriate for an enterprise-wide application, where the success or failure of the system relates to its enterprise-wide use.

Appropriate strategies might include a parallel strategy – running the old and new systems in parallel for a period – a strategy which is low 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 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.

- (d) eXtensible Business Reporting Language (XBRL) is an XML-based markup language used to communicate financial and business data electronically. Software is used to 'tag' the data contained in financial statements with contextual information such as scale (€m, €000) date (as at 31.12.16) and nature (for example, non-current assets – freehold property). When such tagged data is read by XBRL-enabled software, it can be quickly and accurately sorted, classified and analysed.

XBRL can be useful in analysing financial statement data – for example, by investment advisors, regulators or tax authorities, because financial data tagged with XBRL saves time and cost by preventing re-keying by the analysing organisation. This also leads to improved accuracy and reliability of data and the analysis. Regardless of the native language, or systems used to produce the financial data, that data can be more easily and reliably analysed. As such, it allows greater focus on analysis (rather than data entry) potentially improving and speeding decision making by the analysing organisation.

- (e) Social CRM tools enable a business to connect 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 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.

Each part carries 5 marks
Total: 15 marks

SOLUTION 3

Tutorial Notes: -

Purpose: To examine candidates' understanding of: DSS and ESS systems; the role of these systems in a business intelligence environment; potential risks relating to this; and their ability to apply this knowledge to a given context.

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) and ability to apply this to the given context.

- (a) Contrast Executive Support Systems and Decision Support Systems. In your answer, you should consider the purposes, users and limitations of each, and provide examples relevant to a manufacturer of retail products.

DSS – A business intelligence system for non-routine decision making, which sets out to answer specified questions as part of semi-structured decision making by combining information from transaction processing systems, management information systems and some external sources. It is distinguished from TPS and MIS by the fact that such information is used as a basis for modelling, such as sensitivity analysis, multidimensional data analysis. These systems are used by 'super-user' managers or business analysts. For the manufacturer of retail products, the types of decision this system might support include decisions about how levels of production would be affected if sales were to fall; how production/deliveries should be scheduled to meet estimated demand/reduce costs etc.

ESS - 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 systems are designed to be flexible, to cope with unstructured data from a range of sources, including internal and particularly external to the organisation. They may draw on information from MIS and DSS. They are designed to be easy to use or manipulate, so that executives can see the information provided to them in a range of ways that are useful in their decision making. For example, it may be important to provide information 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 to allow the optimal decision to be made. This may be done through a portal, which uses a web interface to present integrated, personalised business content. Another approach is providing a digital dashboard, which provides, at a glance, a real-time view of key performance indicators for the business. For example, following the balanced scorecard approach, the organisation might monitor financial information alongside other indicators related to customers, internal business processes, and learning and growth. 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 managing the business, including decisions about restructuring, investment, performance and the setting of strategy.

These systems are distinguished by: their use in making specific decisions (DSS) versus providing oversight (ESS); use by analysts (DSS) versus by executives (ESS); their purpose as tools for modelling and analysis (DSS) versus tools for broader oversight (ESS); and the capability of ESS to deal with less structured information, including a (usually) greater amount of external information.

4 marks for explaining each system type, and 2 marks for clearly distinguishing between them.

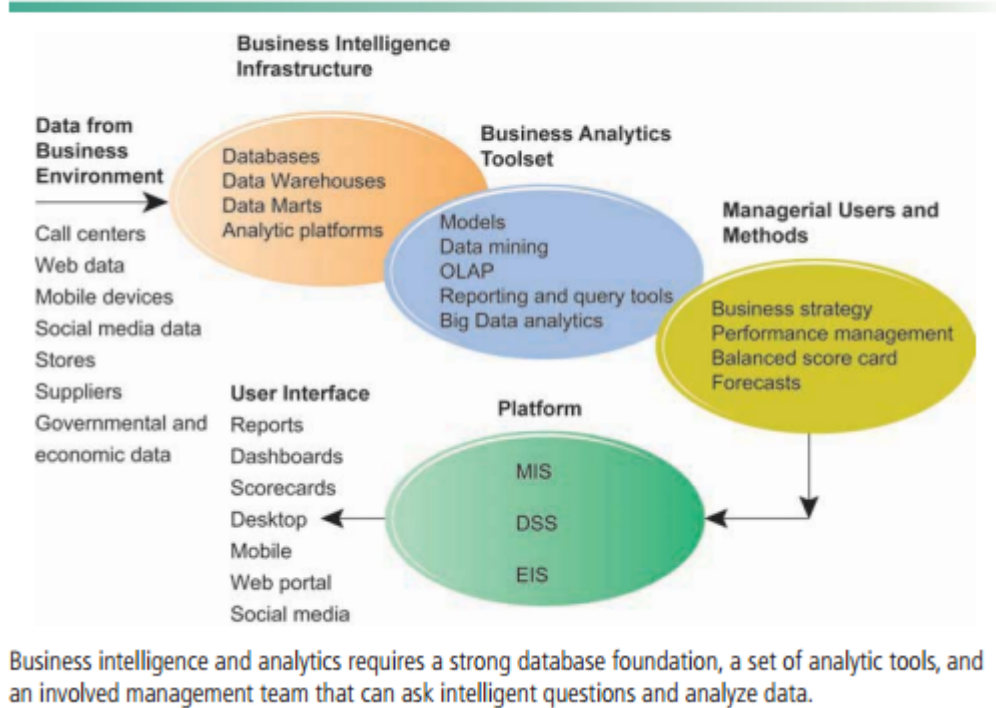
- (b) Discuss how ESS and DSS might fit into the overall business intelligence environment of a manufacturer of retail products.

There are six elements of the business intelligence environment, including:

- Data from the business environment – structured and unstructured data from a range of internal and external sources
- Business intelligence infrastructure – the databases, data warehouses etc. that capture and store such data
- Business analytics toolset – a range of software tools used to analyse organisations' captured data
- Managerial users and methods – how managers engage with and use the information provided
- Delivery platform – including DSS and ESS – results of business intelligence and analytics as delivered to managers
- User interface – managers interface with the systems e.g. data visualisation tools, or access to reports etc. on a range of devices

Laudon and Laudon's Figure 12.3 (reproduced below) may be helpful:

FIGURE 12.3 BUSINESS INTELLIGENCE AND ANALYTICS FOR DECISION SUPPORT

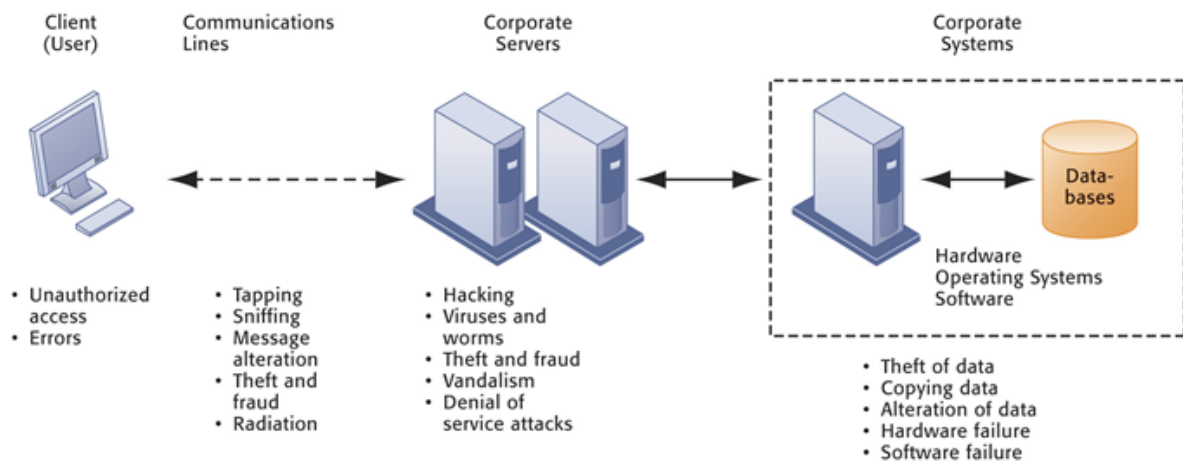


Up to 6 marks for a clear answer which links the function of ESS and DSS into a broader environment of data, storage and capture of data, analysis of data, and user interface/engagement.

(c) Suggest four potential risks to the business intelligence environment.

Information systems are vulnerable to technical, organisational, and environmental threats from internal and external sources. Laudon & Laudon summarise the technical threats to each component of a typical network in the figure below:

Key areas where systems are most vulnerable include: hardware or software failure and errors; personnel actions;



terminal access penetration; fire or electrical hazards; user errors; theft of services, data, and equipment; program changes; and telecommunications problems. Examples of specific vulnerabilities include: internet vulnerabilities (every point of entry into the Internet network is a point of vulnerability); vulnerabilities related to the use of wireless networks (radio frequency bands are easy to scan); Malicious Software: Viruses, Worms, Trojan Horses, and Spyware; Hackers and Computer Crime; Spoofing and Sniffing; and Denial of Service Attacks.

Additionally, purposeful and accidental problems, such as programming and data errors, can occur. Hardware and software can fail. The effects of an event such as a hardware malfunction, power outage, or fire can be extensive. Underinvestment, poor system design, failure to plan for disasters/contingencies are potentially significant risks.

4x1 mark for each relevant risk – a wide range of answers (beyond these described) would be acceptable.

SOLUTION 4

Tutorial Notes: -

Purpose: To examine candidates' understanding of: contemporary hardware and software trends, m-commerce; and their ability to apply this knowledge to a given context.

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) and ability to apply this to the given context.

- (a) A department store chain currently generates 95% of its revenue from a substantial number of high street shops and 5% through e-commerce. As part of a strategy review, discuss four contemporary hardware trends that may affect this business going forward.

Mobile digital platforms: These have emerged as alternatives to PCs and larger computers. Smartphones and tablets have taken on many functions previously done by larger devices, including the transmission of data, accessing the Web, displaying digital content and exchanging data with corporate systems. These devices are increasingly used for business computing as well as for consumer applications. Advantages in terms of, for example, area managers or shop floor staff having access to job-related information wherever they are – but also security concerns.

Consumerisation of IT and BYOD (bring your own device): flow of consumer trends into business IT – hardware specifically including the use of formerly personal mobile devices (but as a more general trend this includes consumer-based software and apps also, including social media). For hardware, it means the company has to consider not just providing and controlling its own devices as in the past, but also the accessibility and security of company data being available on devices it does not own/control. Advantages in terms of, for example, area managers or shop floor staff having access to job-related information wherever they are – but also security concerns.

This business will generate huge quantities of data for storage and analysis – for example, in processing customer transactions (online and in-store), in procurement, stock monitoring plus management functions. Lowering costs of storage and increasing analysis capabilities may be crucial.

The following trends are relevant:

Massive increases in storage potential and processing power: significant increases in both over time, and continuing to evolve rapidly, facilitating the use of 'big data' by increasing numbers of firms, particularly in customer-facing industries (such as retail in this example). A possible further development of this is quantum computing: emerging technology with the potential to dramatically boost processing power – developments in analytics software then allow for analysis of these large quantities of structured and unstructured data.

Virtualization: presenting a set of computing resources (including computing power or data storage) in such a way that all can be accessed in ways that are not restricted by physical configuration or geographic location. It involves running multiple operating systems and application programs on one machine and increasing the overall utilization rates of the device. For this company, it may mean having fewer servers that are more effectively utilised, saving space, energy and cost, and can lead to easier combinations of new and legacy systems (which can be common in the retail sector).

Cloud computing: 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), Platform as a Service (PaaS) and Software as a Service (SaaS). Benefits and risks depend on the form of cloud computing employed, benefits often include cost savings, risks relate to control of data and accessibility. From a hardware perspective, IaaS can lead to cost savings, reduced investment in hardware (paying for usage rather than owning servers), and keeping data offsite is a disaster contingency measure however concerns over access and security of data remain.

Green computing: practices and policies for designing, manufacturing, using and disposing of computing services and devices and systems to minimise impact on the environment. This allows businesses to reduce their total cost of ownership of hardware through more efficient use of servers, printers, storage devices and networking equipment. In turn, that reduces the impact on the environment. Could be linked to virtualisation and cloud computing above. Possible benefits include cost savings and alignment with corporate social responsibility or sustainability goals.

Efficient power saving processors: As businesses require more and more computing capacity, hardware and chip manufacturers are answering the need with multicore processors. These reduce the overall number of servers or processors, and operate more efficiently, thus reducing the total cost of ownership, including electricity costs. The motivation to reduce power consumption is migrating to netbooks, smartphones, and mobile computing devices.

4x2 marks for a relevant hardware trend, explained

- (b) As part of the same strategy review, discuss four contemporary software trends that may affect this business going forward.

Open-source software is computer software that is available in source code form: the source code and certain other rights normally reserved for copyright holders are provided under a software licence that permits users to study, change, improve and at times also to distribute the software. Open source software is very often developed in a public, collaborative manner. It is usually free and can be modified by users. Popular open source software tools include the Linux operating system and the Mozilla Firefox web browser. These might be used directly by the retailer (at a lower cost in comparison to purchased software) or could form the basis of other software or systems – for example, Linux provides the foundation for the Android operating system.

Web services and services oriented architecture: web services are software systems designed to support interoperable machine-to-machine interaction over a network. This interoperability is gained through a set of XML-based open standards that provide a common approach for defining, publishing, and using web services. This could be used by the retailer in linking disparate systems within the company, or linking its system with, for example, a major supplier to facilitate faster and cheaper procurement. Services oriented architecture (SOA) is a set of self-contained services that communicate with each other to create a working software application. Business tasks are accomplished by executing a series of these services. This could be used to build customer-facing linkages from the department store website to the bank that provides store cards, enabling customer to make payments on their cards without leaving the department store's website.

Software apps: Apps, short for applications, are very small programs that perform one particular task. They can be loaded to your hand-held computing device, including smartphones, e-book readers or tablet computers like the iPad. Some are free and others must be paid for (usually a small amount). Many are connected to the internet and can give faster, tailored access to specific web content faster than a web browser. They generally are written by third party developers following a strict set of guidelines established by the device maker. For the retailer, a developed app could be tailored to the customer's preferences, taking them to particular lines or promoting special offers, items similar to those previously searched for etc. – such direct marketing is a potential driver of sales (and loyalty).

Outsourcing: enables a firm to contract custom software development, maintenance and data management to other specialist firms. Benefits include allowing organisations to concentrate on their core competencies (selling products rather than building and maintaining software in this example) and possible cost benefits (although these are thought to reduce over time as wages increase internationally).

Cloud computing: 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), Platform as a Service (PaaS) and Software as a Service (SaaS). Benefits and risks depend on the form of cloud computing employed, benefits often include cost savings, risks relate to control of data and accessibility. From a software perspective, SaaS can lead to cost savings, reduced cost of licences, purchase (and customisation) of tested software at a much lower cost than developing in-house, access to innovative software, however concerns over access and security of data remain.

4x2 marks for a relevant software trend, explained. Credit would also be given for discussing the increasing use of specific software types, for example those that facilitate enterprise systems

- (c) As part of the same strategy review, discuss the potential opportunities and threats presented by m-commerce for this department store chain.

Potential opportunities include the use of:

- high quality apps/websites optimised for mobile device browsing: user-friendly interfaces can drive customer loyalty
- location-based services: enabling users to locate nearby stores
- financial services: allowing customers to manage their account from their mobile devices
- advertising: targeted campaigns using mobile service providers' information

Potential threats:

- easy for customers to browse instore, then compare prices and buy elsewhere
- actions of competitors: potentially losing customers to competitors who have better/already engaged with m-commerce

4x1 mark for relevant points (opportunities and threats equally valid)

SOLUTION 5

Purpose: To examine candidates' understanding of: CRM systems and the role of end users in developing and implementing systems; and their ability to apply this knowledge to a given context.

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) and ability to apply this to the given context.

- (a) Explain the term 'customer relationship management' (CRM) systems. In your answer, you should describe the potentially different elements and functions of CRM systems that an organisation might use.

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.

There are 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.).

The functions of CRM include operational or analytical functions. 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.

2 marks for CRM, 2 marks for elements/functions

- (b) Discuss the potential benefits and challenges of implementing CRM systems in a professional services firm.

Benefits of CRM systems include:

- data on client interaction (e.g. planning information, site visits, contacts, time recording, billing, client feedback) is consolidated in one place, for access by relevant staff (e.g. partner or manager level), even across different functions (e.g. in tax and audit business units)
- improved response time to client queries with easy access to information
- increased client satisfaction from more informed interactions
- reduced client churn/ improved loyalty
- greater efficiency in client service, reducing time taken on administration/responding to queries, increasing profitability
- ability to identify profitable and high lifetime value clients
- ability to respond to opportunities to deliver additional services to clients, including by different business units (e.g. advice on restructuring)

Challenges include:

- 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 – for example, the requirement for each employee to record each interaction on the CRM system so that other staff see a comprehensive record of interactions with the client
- these changes can lead to resistance (and ultimately to the failure of the CRM system) if not handled appropriately
- complex pieces of software that are expensive to purchase and implement, and often involve a lengthy implementation time
- while specific software packages for professional services firms are available, many will require some level of customisation (requiring in-house expertise or consultancy)
- the organisation becomes dependent on the provider to upgrade and maintain the software provided – risk if not updated and maintained, or if support is not available
- CRM systems may introduce 'switching costs' – once applications are installed it becomes very costly to switch providers
- 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

5 marks each for benefits and challenges – which must be relevant to the context

- (c) Explain the role of end users in developing and implementing new CRM systems in professional services firms.

The role of end users could be described as it relates to the systems development life cycle, for example:

- Systems analysis – defining the problem the new system is trying to solve through discussions with end users. What is the purpose of the CRM system in the firm – what is it trying to achieve? Identifying the needs of end users, e.g. the data that is required and not required (for example, should information on hours and billing be included in this system?), what works well/less well in the existing system? Feeding in information to the feasibility study on organisational feasibility of the proposed new system (for example, what needs to change in the organisation to facilitate this, what are the potential challenges?)
- System design – need for oversight to ensure that the system reflects end users' business priorities and information needs, not biases or misunderstandings of technical staff. For example, it may be important to end users to be able to quickly record time when answering a call, technical staff might not appreciate how much time is spent on calls
- Testing – testing with end users to identify what works and does not – for example, are hours recorded correctly, does the system run slowly?
- Conversion/implementation – need for appropriate training and preparation of manuals to allow staff who have not used or been trained in such a system (possibly many in professional services firms) to engage with the system quickly. Use of champions of change, support of senior management and other incentives to educe buy-in from staff and ensure that end users engage with the system, rather than working around it. Resource and technical support for end users over conversion/implementation period, for example, allowing paid overtime or expecting a lower utilisation rate while staff get used to the new system
- Maintenance – Review of the project with end users, possibly including formal post-implementation audit. Contribution to correcting errors, issues and otherwise fine tuning the system after implementation, for example, increasing available storage. Highlighting of lessons to be learned for future projects

Up to 6 marks for relevant points (using the SDLC as a framework is not required)

SOLUTION 6

Tutorial Notes: -

Purpose: To examine candidates' understanding of: organisational features that impact on information systems change; value chain; internet-based technologies (including relating to B2B procurement); and their ability to apply this knowledge to a given context.

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) and ability to apply this to the given context.

- (a) Discuss three organisational features that might affect an organisation's use of internet-based technologies.

Any three from:

Routines and Business Processes: Organisations develop efficient routines for producing goods and services. When used effectively, such routines can reduce costs and generate competitive advantage. However, if these routines and processes become so ingrained that they don't allow people to change their routines and processes as they should, this can have a negative effect – for example, making individuals and organisations resistant to the changes in routines and processes that internet-based technologies often require.

Organisational Politics: Each person comes into an organisation with different concerns and perspectives. These differing viewpoints lead to struggles for resources and control, and to conflict. Significant changes in information systems – like embedding internet-based technologies – often require significant organisational change and create new struggles for resource, control and conflicts. Resistance on this basis can impact significantly on the success of implementation.

Organisational Culture: organisations have bedrock, unassailable, unquestioned assumptions that define their goals and products – organisational culture encompasses this set of assumptions. These are rarely announced but are taken for granted. If assumptions are commonly shared, agreement on procedures and practices is more likely. Where proposed change – such as a move to internet-based technologies - appears to threaten underlying assumptions, that change will be resisted. When this occurs, information systems implementation is generally stalled until the organisational culture adjusts.

Organisational Environments: Organisations must adapt to changes in their environment, such as new technologies, new products, changing public tastes, legislative changes, etc. Organisations can also shape and even change their environment through the use of information technology and systems. An example is the radical change caused by the introduction of a “disruptive technology” to the marketplace. For many businesses, the move to internet-based technologies by their competitors and customers is an example of such a disruptive change.

Organisational Structure: The type of information systems used in organisations often reflects the type of organisational structure. For example, in large bureaucratic organisations there may be parallel systems operated by different departments, while small, entrepreneurial businesses may have more ad hoc systems that have been implemented in a rush. The extent of control, distribution of control and strength of the existing structure are all factors that can promote or inhibit the likely success of information systems changes, such as the move to internet-based technologies.

3x2 marks each for each feature identified and explained

- (b) Giving relevant examples, discuss the impact of internet-based technologies on business value chains.

The value chain model depicts the series or chain of basic activities that add a margin of value to a firm's products or services. It highlights primary activities (those most directly related to the production and distribution of the firm's products and services, which create value for the customer) and support activities (those that make primary activities possible).

Primary activities include:

Inbound logistics: receiving and storing materials for distribution to production. Possible IBT usage: automated warehousing systems are crucial for efficient stock management (for example, in reducing spoilage) and good customer service through accurate inventory levels.

Operations: transforming inputs into outputs. Possible IBT usage: cloud-based production planning applications.

Sales and marketing: promoting and selling the firm's products. Possible IBT usage: online sales and marketing applications (if selling to individuals), internet-based EDI systems (if selling to retailers), cloud-based CRM.

Service: maintenance and repair of goods and services. Possible IBT usage very dependent on the goods and services involved, in this example may include customer service fora, social media.

Outbound logistics: storing and distributing finished products. Possible IBT usage: cloud-based automated shipment scheduling systems and online parcel tracking.

Support Activities include:

Administration and Management: organisational infrastructure associated with managing the organisation as a whole. Possible IBT usage: range of cloud-based or internet-enabled decision-support systems providing timely and reliable information to management.

Human resources: employee recruiting, training and hiring across all primary and support activities. Possible IBT usage: cloud-based HR applications, workforce planning systems; off-site confidential storage of employee data.

Technology: improving products and the production process. Possible IBT usage: cloud-based or internet-enabled computer-aided design systems; decision support systems to monitor the efficiency of various processes and activities.

Procurement: purchasing inputs. Possible IBT usage: cloud-based SCM, internet-enabled EDI systems.

4 marks for identifying the value chain activities, 4 marks for relevant examples of use of internet-based technologies.

- (c) Discuss the internet-based technologies that might be used by a company in procuring its raw materials from suppliers (business-to-business (B2B) transactions).

Business-to-business (B2B) e-commerce is increasingly facilitated by internet-enabled mechanisms. Suggested benefits of transacting in this way include reduced human intervention in procurement (leading to cost savings and possibly greater accuracy); reduced administrative overhead relating to procurement (further cost savings); optimised stock holding levels; and stronger supplier relationships.

Technologies include:

Electronic data interchange (EDI): the direct computer-to-computer exchange between two organisations of standard business transactions such as orders, shipment instructions or payments. Transactions are automatically transmitted from one information system to another through a network, eliminating the printing and handling of paper copies at one end and the inputting of data at the other. Major industries usually have EDI standards that define the structure and information fields of electronic documents for that industry. In addition, EDI can be used as a system for continuous replenishment, giving suppliers online access to selected parts of the purchasing firm's production and delivery schedules to automatically ship materials and goods. EDI can be mediated through a private network, however web-enabled EDI is becoming much more common as an increasingly low-cost and flexible alternative.

Internet technology can be used to create extranets or electronic marketplaces for linking to other businesses for purchase transactions. These could include the use of private industrial networks or private exchanges, where a large firm uses a secure website to link to key suppliers and other partners. The site is controlled by the purchasing firm and allows for the secure sharing of detailed information on product design and development, marketing, production scheduling, inventory management and unstructured communication. An example is VW group supply.

Alternatively, net marketplaces (or e-hubs) provide a single, digital marketplace based on net technology for many different buyers and sellers, either owned and operated as independent intermediaries or industry operated. Participants in net marketplaces can establish prices through online negotiations, auctions, requests for quotations or fixed prices. Some net market places support contractual purchasing based on long term relationships with designated suppliers – Exostar is an example of an industry-owned (aviation) net marketplace that supports this. Others, particularly independently owned third-party net marketplaces, connect buyers and suppliers for spot purchasing based on immediate needs.

3x2 marks for discussion of relevant technologies