

INFORMATION SYSTEMS

FORMATION 2 EXAMINATION - APRIL 2018

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. Payper Cup is an artisanal coffee roaster based in Sligo. Established just over three years ago by Cath Simmons, Payper Cup began distributing roasted and roasted/ground beans to local cafés and restaurants. As brand recognition grew, the company opened a café, allowing members of the public to enjoy Payper Cup's coffee in the café and to purchase roasted and roasted/ground beans.

Payper Cup also developed a website to sell beans to members of the public and trade customers beyond its local area, but has not invested significantly in advertising. As a result only 5% of sales are currently made through the website. Cath has also created a Facebook page for the business which is used primarily to promote the café.

Last year, another revenue stream was added. Payper Cup created a subscription service where, for €15 per month, subscribers receive two bags of beans and tasting notes on the first Monday of each month. Customers can sign up for this service in person at the Payper Cup café, or on the company's website. However, most subscribers (around 80%) have signed up to this service via GourmetGifts.co.uk – an online marketplace for gourmet food sales and gifts. While offering the subscription through this marketplace has driven a significant increase in sales, this comes at a cost – GourmetGifts.co.uk charges 20% of retail price.

Cath has recently taken advantage of a local government initiative to provide small businesses with experienced consultants to act as mentors and to advise on strategy. Working with Graham, an experienced business advisor, Cath has been analysing the profitability of her various revenue streams. Costs fluctuate between coffee batches based on the purchase price of the beans. However, when selling individual bags to customers or distributing to cafés and restaurants, Cath is normally able to mitigate higher costs through a higher retail price. Mark-up is 100% of cost when selling to cafés and restaurants and 150% when selling to members of the public (in-store or online). The price of the subscription service is fixed at €15 per month regardless of the coffee cost, but has been set at such a level that coffee sold in this way has an effective mark-up percentage of around 200%. However, if the subscription has been set up through GourmetGifts.co.uk, the 20% of retail price due to GourmetGifts.co.uk effectively reduces the mark-up to approximately 140%. Graham believes that there is potential for significant growth in all revenue streams, but suggests that Cath consider carefully how she wishes to prioritise her efforts and resources in the short term. For this reason, he suggested that Cath investigates social commerce and social networking as a potential means of growing specific revenue streams.

Cath has engaged the services of Stephen, an advisor with extensive experience in growing small businesses, and received advice on procurement, logistics, and information systems. Stephen was concerned that it was difficult for Cath to generate some of the information on the profitability of different revenue lines, and to identify trends in sales (including volumes and achieved margin) at different times of the year. He also highlighted that Cath cannot easily use information on past sales to generate further business with existing/former customers. Stephen suggested investment in a number of specific areas, including investment in data storage and analysis capability, such as a data warehouse.

REQUIREMENT:

- (a)** Assess the possible opportunities for Payper Cup arising from social commerce and social network marketing, and discuss to what extent these may be appropriate for this organisation.
(12 marks)
- (b)** Assess the proposal to use a data warehouse, including its appropriateness for the storage of data generated from social commerce and social media, making any other suggestions you believe to be appropriate.
(8 marks)
- (c)** Outline the ethical issues that arise from engaging in social commerce and social marketing; and from storing and analysing gathered data.
(5 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)** Value chain analysis for competitive advantage.
- (b)** The competitive forces model in evaluating Information Systems investments.
- (c)** Cloud-based Customer Relationship Management (CRM) software.
- (d)** The phases of the traditional system development process as related to the deployment of Enterprise Resource Planning (ERP) software.
- (e)** The business impact of the unique features of internet technology.

(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 (ESS) and Group Decision Support Systems (GDSS). In your answer, you should consider the purposes, users and limitations of each, and provide examples relevant to a multinational company. (10 marks)
- (b) Identify the possible challenges in implementing Group Decision Support Systems (GDSS) for a team of geographically dispersed managers. (4 marks)
- (c) Discuss three potential ways that Knowledge Management (KM) may add value to large firms. (6 marks)

[Total: 20 Marks]

- 4.** (a) Discuss four contemporary software trends that may be relevant to large manufacturing organisations. (8 marks)
- (b) Outline the four main types of organisational change that may result from IT innovations. Give examples of each that would be relevant to a contemporary hardware or software trend. (8 marks)
- (c) Explain the term eXtensible Business Reporting Language (XBRL) and its usefulness in communicating financial information internally within organisations. (4 marks)

[Total: 20 Marks]

- 5.** (a) Explain the term 'supply chain management' (SCM) software, distinguishing between planning systems and execution systems. (4 marks)
- (b) Discuss how SCM technology might assist an organisation in gaining competitive advantage over its rivals. (10 marks)
- (c) Outline the steps involved in business process management (BPM) and the usefulness of such an approach with respect to supply chain management. (6 marks)

[Total: 20 Marks]

- 6.** (a) Explain the term 'business intelligence' (BI) and outline the main elements of the business intelligence environment. (6 marks)
- (b) Discuss the potential benefits and challenges facing an organisation that seeks to use its business intelligence as a tool for competitive advantage. (8 marks)
- (c) Explain the term 'intellectual property' and the challenges posed by the internet in the protection of intellectual property rights. (6 marks)

[Total: 20 Marks]

END OF PAPER

INFORMATION SYSTEMS

FORMATION 2 EXAMINATION - APRIL 2018

SOLUTION 1

Tutorial Notes: -

Purpose: To examine the candidates' understanding of: social commerce and social media in a business context, data storage, ethical aspects of social media and data storage.

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) While a strong online presence has the potential to increase sales across all revenue streams, the information in the case suggests that Payper Cup's own website is currently under-used, with potential to sell more individual coffee bags and coffee subscriptions (without the GourmetGifts.co.uk charge). While the charge associated with GourmetGifts.co.uk is substantial, it also gives access to a wide range of customers who might not otherwise have engaged with Payper Cup, and without Payper Cup bearing the costs of advertising that site. In considering the opportunities arising from social commerce and social network marketing, Cath might focus on these areas. Social marketing 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. For example, Payper Cup could promote its Facebook page through advertising, pay for promoted Tweets or promoted trends on Twitter, meaning that these are displayed more prominently, and designed to increase awareness of the brand and drive traffic to the website. Online advertisements on other sites could also be used to promote the Payper Cup's Facebook page or Twitter account – usually with users clicking on the advertisement and being taken to the relevant page. Payper Cup could then use customer relationship management software to track engagement and ultimately purchases, identifying who purchased, how much they spent, what they purchased. This information could then be used to evaluate conversion rates and overall return from the particular campaign, and to provide useful information for further campaigns. Relevant costs would include the costs of advertising and purchase of software and infrastructure to analyse data generated. A particular concern might be to ensure that Payper Cup is well equipped as an organisation and that its systems are sufficiently robust to respond to the hoped-for increase in demand.

Social sign-on refers to websites allowing users to sign into their sites through social network sites, such as Facebook. This would allow Payper Cup to receive valuable social profile information from Facebook, which can then be data mined and used to target marketing, make product recommendations, or to build a relationship with the customer. While such information may be particularly useful to Payper Cup, an investment in infrastructure and tools would be necessary to gather, store, and analyse the information gathered. This could involve a significant cost which would need to be carefully weighed against alternative uses of those funds, particularly in a growing business.

Network notification creates an environment where customers can share their approval or disapproval of a product, services or a brand. Examples include encouraging customers to visit, for example, Payper Cup's Facebook page and 'like' the organisation (their approval is shared with their friends on that network). When buying or reviewing an item on the website, customers can be encouraged to share on Facebook that they have just bought/reviewed that item. Customers can follow Payper Cup on Twitter: this can also be used as a rapid means of responding to customer questions, comments and even complaints. By encouraging customers to follow the brand, brand identity can be developed, relationships built and useful content generated (where text mining is used on feedback from followers on twitter, social networks and related sites). While this also means negative feedback is more visible, some research indicates that even this may be useful in offering the organisation a chance to respond to such feedback, develop products and services and may lead to a perception of the organisation as transparent and listening to their customers. Such information can be useful to Payper Cup not solely for marketing purposes but also in making decisions about their product offering, and continuing supplier relationships. Again Payper Cup would need to think carefully about the costs of infrastructure and tools.

Collaborative shopping involves creating an environment where customers can share their shopping experiences with one another by viewing products and chatting, or texting. For Payper Cup, it might be useful to link these conversations to social networking sites to allow friends to chat about Payper Cup's brand and products, for example through talking about a particular coffee, region or offer. Similarly, social search (recommendations) enables an environment where consumers can ask their friends for advice on products. This allows users to identify products and evaluate these based on the evaluations of their friends (or friends of friends). Social recommender tools can use a customer's social profile to recommend products. For Payper Cup, this might include linking to friends who have previously bought from Payper Cup: however usefulness is dependent on friends having bought from Payper Cup.

Up to 4x3 marks per suggestion, well explained with reference to module content and a clear example relevant to Payper Cup.

- (b)** A data warehouse is a database that stores current and historical data, originating from core operational transaction processing systems, and extracted from those systems into the data warehouse. This is structured data. This data is then transformed by correcting inaccurate or incomplete data and restructuring data for management reporting before being loaded into the data warehouse. Some specific forms of external information may also be added. The data warehouse makes the data available for anyone to access as needed, but it cannot be altered. A data warehouse system also provides a range of ad hoc and standardised query tools, analytical tools and graphical reporting facilities and can be linked to other analytical tools.

Data warehouses are useful for storing and facilitating analysis of organisational data – for example, enabling Payper Cup to understand information about sales, purchasing or other operational trends over a period of time. The case indicates that this is information that Cath cannot currently generate easily, and there is a case to be made for a data warehouse on this basis. If Payper Cup chooses just to engage in social marketing, a data warehouse might be sufficient.

However, if Payper Cup wishes to engage with aspects of social commerce that involve gathering data from sources such as Facebook feeds and Twitter, the data which is gathered tends to be semi-structured/unstructured and will be in huge volumes. Data warehouses are not well suited for organising and analysing big data (datasets with huge volumes, often comprised of unstructured and semi-structured data). Hadoop, on the other hand, can handle structured, semi-structured and unstructured data in large quantities. It enables parallel processing of huge amounts of data across inexpensive computers. It does this by splitting a big data problem into sub-problems, distributes them around thousands of inexpensive computer processing nodes, and then combines the result into a smaller data set that is easier to analyse. It can process a range of data including structured transactional data, loosely structured data such as Facebook and Twitter feeds, complex data such as web server log files and unstructured video and audio data. It runs on a cluster of inexpensive servers, with processors added or removed as needed.

Accordingly, whether a data warehouse is appropriate will depend on the engagement with social commerce/social marketing, the type of data that Payper Cup wants to store and analyse, and the quantity of data.

2 marks for a good definition of data warehouse, 4 marks for relevant comments on usefulness, 2 marks for a relevant alternative suggestion

- (c)** Possible answers include:

- Adhering to letter and spirit of relevant legislation
- Right to privacy of those engaging with the organisation
- Understanding of those engaging with social media as to how their data will be used/stored
- Targeting and profiling of specific demographics
- Protection of the data gathered and stored from corruption or theft
- Selling on customer data once gathered
- Reputational risks for the organisation
- Exclusion of those not engaging with social media

Up to 5 marks for relevant comments, note that this should not be limited to discussion of legal aspects

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) Value chain analysis for competitive advantage

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 the organisation has a potential competitive advantage – doing something different/better/faster/cheaper than the competition – in order to focus attention and investment on these areas. 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.

(b) The competitive forces model in evaluating Information Systems investments

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:

- Market demand for your firm's services
- Your firm's business strategy
- Your firm's IT strategy, infrastructure and cost
- Information technology assessment: where is the company's IT in relation to current trends?
- Competitor firm services: what technology services are competitors offering their customers, suppliers and employees, and compare these to your firm.
- 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 other models such as 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.

(c) Cloud-based Customer Relationship Management (CRM) software

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.).

Operational CRM includes all customer-facing applications, such as sales force automation, call centres, and marketing automation. 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.

Cloud-based Customer Relationship Management (CRM) software offers a number of advantages:

- Cost savings on purchasing multiple licenses, installation and maintenance
- Increased flexibility, easier to add or remove access by staff members
- Benefitting from regular upgrades, patches and fixes by the software provider without the disruption of upgrading individual machines
- The need to build in strong access controls may improve the overall control environment
- Taking data and software offsite may be safer in event of a disaster – important customer information would still be easily accessible

These should be measured against additional risks, and the need for reliable connections and carefully drafted contracts/service level agreements with providers.

(d) The phases of the traditional system development process as related to the deployment of Enterprise Resource Planning (ERP) software

The standard system development process (as documented in Laudon & Laudon) includes:

Analysis: A team is formed to examine existing business processes and systems, as well as problems. Business processes are observed, key users are consulted. The team examine what is feasible and achievable from a financial, technical and organisational point of view. The team then presents several alternative solutions which management should choose between.

Design: This looks at how the system will meet its objectives. It consists of specifications that outline the functions identified during analysis; these should address all the managerial, organisational and technical components of the proposed solution. It may need to look at redesigning business processes, and IT infrastructure requirements based on the selected system and vendor are determined.

Programming: Customisation of selected software may be required, in respect of processing or at a minimum in developing reports as required by management. This is likely to be done by the vendor or an external consultant. Modifications may also be needed to existing systems if they are to be integrated, for example to existing standalone payroll software.

Testing: Exhaustive and thorough testing must be done to ascertain whether the system produces the right results (i.e. does what it is expected to do). Specific examples include whether integrations between modules happen as they should, whether logical access is enforced, whether audit trail is visible.

Conversion: This is process of changing from the old to the new system. There are four possible strategies: parallel strategy (run old and new in parallel for a period), direct cutover strategy (replace old with new on an appointed day), pilot study strategy (test in a single department before rolling it out to other departments) or phased approach strategy (introduce the system in stages – for example module by module).

Production and Maintenance: When the new system is installed it is reviewed to determine how well it has met its original objectives. A post-implementation audit may be conducted.

(e) The business impact of the unique features of internet technology.

Ubiquity: internet/web technology is available everywhere via desktop and mobile devices – mobile devices extend services to local areas and merchants. Marketplace extended beyond traditional boundaries, including temporal and geographic boundaries. 'Market space' created, shopping can take place anytime, anywhere. Enhanced customer convenience and reduced shopping costs.

Global reach: technology reaches across national boundaries. Commerce enabled across cultural and national boundaries seamlessly and without modifications – market space includes, potentially, billions of consumers and millions of businesses.

Universal standards: one set of technology standards (Internet Standards). Disparate computer systems can easily communicate with each other, extending reach of the market space.

Richness: video, audio and text messages are possible. Video, audio and text marketing are messages are integrated into a single market message and consumer experience – experience is more immersive and more emotive.

Interactivity: technology works through interaction with the user. Consumers engage in a dialogue that adjusts the experience to the individual, makes the consumer a co-participant – again experience is potentially richer, more immersive.

Information density: technology reduces information costs and raises quality. Information processing, storage and communication costs drop dramatically, whereas accuracy and timeliness improve. Information becomes more plentiful, and consumers can self-select their level of engagement with this.

Personalisation/customisation: technology allows personalised messages to be delivered to individuals as well as groups. Marketing messages and products can be customised, potentially leading to greater consumer satisfaction, brand affinity and repeat custom.

Social technology: technology supports content generation and social networking. New internet social and business models enable user content creation and distribution, social networks as a forum to engage with consumers and potential consumers

SOLUTION 3

Tutorial Notes: -

Purpose: To examine the candidates' understanding of: Executive Support Systems and Group Decision Support Systems, challenges of GDSS, and the business value 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).

- (a) 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.

GDSS – An interactive computer-based system for facilitating the solution of unstructured problems by a set of decision makers working together as a group in the same location or in different locations. Rather than provide information and modelling that enables an individual to make a particular decision, GDSS use hardware and software to facilitate group meetings. Hardware includes computer and networking equipment, display screens and may also include dedicated desktops under each participant's control so that their input can be shared as and when they decide to do so over the meeting network and/or on display screens. Software includes electronic meeting software that collects, documents, ranks and edits the ideas offered. Contributions are made anonymously and simultaneously by participants. Subsequently, information is stored on the ideas submitted, evaluation of these ideas and results, and can be made available to non-participants.

These systems are distinguished by: their use in making specific decisions, based on decision-specific information (GDSS) versus the provision of a wider range of whole company information for the purpose of oversight (ESS), their purpose as tools for oversight (ESS) versus tools for engagement (GDSS), and engagement of executives only (ESS) versus a range of staff levels dependent on the problem to be solved (GDSS).

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

- (b) Possible challenges include:

Technical issues including the availability of appropriate infrastructure, hardware, software, and reliable, high-speed internet connectivity. Financial implications of investing in these.

Geographical issues, for example different working hours, making real-time engagement difficult. Language and cultural factors may be magnified.

Managers may be reluctant to share their decision making authority with others, and this may blur lines of responsibility within the organisation. How managers are evaluated may need to change.

Issues within the group (personality clashes, dominance of the group by certain members) or how meetings are organised and conducted may impact on the quality of the decision made and the length of time taken to make the decision.

GDSS meetings may be time consuming: the suggested benefits of the decision being taken as a group should be carefully weighed against the likely time taken in negotiating a solution.

Some decisions may not be appropriate for a GDSS, for example, where there are limited possible outcomes, or where the outcome is not contested.

Either 4 x 1 mark or 2 x 2 marks depending on the detail given.

- (c)** Knowledge management refers to the set of business processes developed in an organisation to create, store, transfer and apply knowledge. Effective knowledge management increases the ability of the organisation to learn from its environment and incorporate knowledge into its business processes.

Effective knowledge management can assist in:

Reducing costs by leveraging what is known in the organisation (not reinventing the wheel) – leads to increased profitability.

Promoting organisational learning so that mistakes are not repeated – leads to improved products and/or services (competitive advantage).

Improving speed of response (for example in a call centre) as a result of better knowledge access and application.

Better relationship management through knowing customer/supplier/employee needs.

Driving innovation including through collaboration in physical and virtual teams, with knowledge workers driving the process of new knowledge creation.

Up to 2 marks for each relevant point, satisfactorily explained, up to a maximum of 6

SOLUTION 4

Tutorial Notes: -

Purpose: To examine the candidates' understanding of: contemporary software trends; types of organisational change associated with IT changes; contemporary hardware trends, XBRL internal uses.

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) Trends include (but are not limited to) the following:

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 a firm (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 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.

Software apps: Apps, short for applications, are very small programs that perform one particular task. They can be loaded to hand-held computing devices, 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 a manufacturer, these could be developed to automate specific processes relating to their manufacturing process.

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 (manufacturing 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 software types, for example those that facilitate enterprise systems

(b) Types of organisational change include:

Automation: Employees are assisted with performing tasks automatically, in order to have them completed more efficiently and effectively. For example, specially developed software apps may automate specified procedures, such as time recording or invoicing.

Rationalisation of procedures: Standard operating procedures are streamlined – often as a result of automation revealing bottlenecks, potential efficiencies or control weaknesses, or in order to align procedures with the new system. This is a deeper organisational change, and may be part of a series of continuous quality improvements in products, services and operations – for example, Six Sigma. The rise of enterprise applications such as ERP, CRM and SCM softwares are often linked to re-evaluation and change of processes, such as streamlining the procurement process to reduce the number of steps involved – for example SCM systems may change a supply model from ‘pull’ to ‘push’.

Business process reengineering or redesign (BPR): This is a more significant form of organisational change in which business processes are analysed, simplified and redesigned. BPR reorganises workflows, combining steps to cut out waste and to eliminate repetitive tasks. It requires a new vision of how the process is to be organised, and often results in the elimination of jobs. Examples of contemporary trends include mobile digital platforms/consumerisation of IT and BYOD (bring your own device): the use of personal mobile devices to give managers or shop floor staff access to job-related information wherever they are. For example, the use of such devices allows shop floor staff to carry out tasks formerly completed in the back office, such as seeing stock levels and re-ordering items (subject to appropriate controls) or updating customer details/taking customer account payments.

Paradigm shift: In paradigm shift, the very nature of the business is rethought, new business models are defined, and the structure of the organisation may be completely reorganised. Whole new products or services that didn't exist before are created. This can cause major disruption and extreme change. Examples include massive increases in storage potential and processing power for increasingly huge quantities of data generated by a business. May be linked to developments including ‘big data’ or 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. This may lead businesses to identify new ways of doing business linked to their identified core competencies or consumer preferences.

4x2 marks for identifying and describing the change with valid examples (a wide range of possible examples would be acceptable)

(c) Explain the term eXtensible Business Reporting Language (XBRL) and its usefulness in communicating financial information internally within organisations. (4 marks)

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 31.12.17) 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 internally to businesses which have global operations and where businesses have subsidiaries or divisions which use different operating and financial systems. By using XBRL to tag the financial data of these different divisions/subsidiaries/locations then regardless of the native language, or systems used to produce the financial data, that data can be more easily and reliably consolidated and analysed. Sending financial data tagged with XBRL saves time and cost by preventing re-keying, also leading to improved accuracy and reliability of data. As such, it allows managers to focus on analysis- potentially improving and speeding decision making. It may also alleviate some of the difficulties in operating older or proprietary systems in different parts of the organisation.

2 marks explaining XBRL, 2 for usefulness internal to business

SOLUTION 5

Tutorial Notes: -

Purpose: To examine the candidates' understanding of: supply chain management software; the potential for SCM software to lead to competitive advantage; and business process management.

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) Supply chain management software is classified as either software to help businesses plan their supply chains (supply chain planning) or software to 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 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.

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.

2 x 2 marks

- (b) SCM can add value by reducing supply chain costs, 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.

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

In the context of competitive advantage, these benefits may be linked to strategic objectives including operational excellence; new products, services, and business models; customer and supplier intimacy; improved decision making; competitive advantage; and survival.

The value chain model might be used to identify areas where changes to information systems (in this case SCM software) 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. Taking the suggested benefits of SCM, value chain analysis can be used to identify where such benefits 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.

6 marks for discussing possible benefits of SCM, 4 marks for discussing competitive advantage.

(c) Business process management 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?

It may be appropriate where the existing process is weak and needs to be replaced in its entirety – it leads to 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 business process management 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.

3 marks for explaining the steps in business process management and 3 marks for explaining its usefulness in the context of supply chain management.

SOLUTION 6

Tutorial Notes: -

Purpose: To examine the candidates' understanding of: business intelligence, business intelligence environment, business intelligence and competitive advantage, intellectual property rights and the internet.

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) Business intelligence is a vendor defined term used to describe the infrastructure for warehousing, integrating, reporting and analysing data that comes from the business environment, including big data. The infrastructure collects, stores, cleans, and makes relevant information available to managers, and may include databases, data warehouses, data marts, Hadoop and analytic platforms.

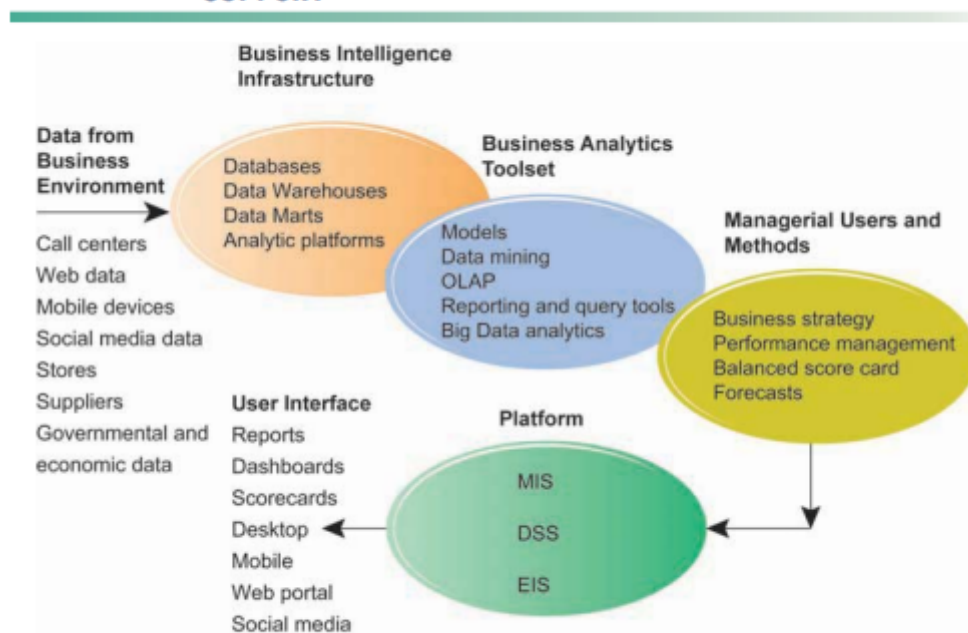
There are six elements of the business intelligence environment, including:

- 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:

2 marks for term business intelligence, 4 marks for business intelligence environment

FIGURE 12.3 BUSINESS INTELLIGENCE AND ANALYTICS FOR DECISION SUPPORT



Business intelligence and analytics requires a strong database foundation, a set of analytic tools, and an involved management team that can ask intelligent questions and analyze data.

- (b) Competitive advantage is derived from doing things better than competitors, including charging less, offering superior products, and delivering better engagement with customers and suppliers. Apple, Wal-Mart and UPS are prime examples of how companies use information systems and technologies to separate themselves from their competition.

Business intelligence 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 key processes and customer behaviour. It can provide a basis for more informed, and hopefully better business decision making on a range of issues. By providing better information on business processes, and tools for modelling, organisations can explore ways to improve their business processes, perhaps making these more efficient as a way to reduce costs. Better information, stored and analysed in a considered and structured way, can lead to better decision making. By providing better information on customer and business line profitability, companies can target marketing to customers (to secure repeat custom or encourage customers to book more with them at each transaction) and develop their business line offerings based on customer preferences. Decisions on new business lines could be informed by analysis of data on existing lines, and evaluated on the basis of scenario modelling.

However business intelligence infrastructure and business analytics tools normally require a considerable investment and ongoing cost for the business. The infrastructure and systems bought will only lead to benefits being achieved if the data being fed into these systems is clean, reliable and relevant. Similarly, benefits will only be seen if the management team is involved, and capable of asking intelligent questions and analysing the data they receive. Management and broader users need to receive information from these tools in an appropriate way, for example through an integrated delivery platform that integrates a range of information and brings it to the manager's desktop or mobile platform in a reliable, timely and easy to use way. Care needs to be taken to ensure security of data, from corruption, loss and theft. There may also be ethical considerations associated with holding and processing certain types of data.

4 marks each for benefits and challenges

- (c) Intellectual property is a result of someone's effort at creating a product of value based on their experiences, knowledge, and education. It is intangible property created by individuals or corporations which is subject to a variety of properties. These include copyright, patents and trade secrets. Copyright is a legal term which describes the rights given to authors/creators of certain categories of work. A patent confers upon its holder, for a limited period, and in a specific location, the right to exclude others from exploiting (making, using, selling, importing) the patented invention, except with the consent of the owner of the patent. A trade secret is a specific set of information (data, design, process, formula) which is not generally known and by which its owner or licensee can derive economic advantage over its competitors.

The Internet poses severe challenges to intellectual property rights and the protection of those rights. Copyright laws and intellectual property rights still apply, however digital media are particularly impacted upon by their ease of replication, ease of copying and re-distribution, and ease of alteration. It is often difficult to establish uniqueness – this is particularly so with software programs. The proliferation of technologies that enable widespread digital copying, combined with file-sharing software and peer-to-peer networks that are easily accessible via high-speed Internet connections, have led to increased concerns about distribution of unauthorised copies of copyrighted media. In particular, the movie and music industries continue to search for technical and regulatory solutions to combat digital piracy – while others have developed different business models to secure payment for access (e.g. Spotify, Netflix).

3 marks for explaining intellectual property, 3 marks for challenges