M.Sc. (Informatics) – IV Semester - 2017
IT-44, IT Management

Time: 3 Hrs. Max. Marks: 75

Note: Answer five questions in all. Question no. 6 is compulsory.

Que 1a What are the models of management? Define system approach model. Why military and government agencies are most appropriate examples for system model? 7

b Discuss the impact of Information Technology on strategy and operations of an organisation. What is IT management task? Explain each one of them. 7

Que 2a Propose IT infrastructure design for a startup photography company, keeping in mind that the company cannot afford the expansive hardware and software. 10

b Which wireless technology can support customer relationship management and supply chain management? 4

Que 3 Delhi University has introduced its own online admission system; discuss the management principles the University could have adopted to achieve its objectives? Describe its overall technology framework and management system used, keeping in mind the organizational characteristics of the University. 14

Que 4a How Information Technology can help support systems of an organisation? Discuss Operation and Management support systems. Why major courier companies prefer to adopt such support systems? 14

Que 5 A waiter takes an order at a table, and then enters it online via one of the six terminals located in the restaurant dining room. The order is routed to a printer in the appropriate preparation area: the cold- item printer if it is a salad, the hot-item printer if it is a hot sandwich or the bar printer if it is a drink. A customer's meal check-listing (bill) the items ordered and the respective prices are automatically generated. This ordering system eliminates the old three-carbon-copy guest check system as well as any problems caused by a waiter's handwriting. When the kitchen runs out of a food item, the cooks send out an 'out of stock' message, which will be displayed on the dining room terminals when waiters try to order that item. This gives the waiters faster feedback, enabling them to give better service to the customers. Other system features aid management in the planning and control of their restaurant business. The system provides up-to-the-minute information on the food items ordered and breaks out percentages showing sales of each item versus total sales. This helps management plan menus according to customers' tastes. The system also compares the weekly sales totals versus food costs, allowing planning for tighter cost controls. In addition, whenever an order is voided, the reasons for the void are keyed in. This may help later in management decisions, especially if the voids consistently related to food or service. 14

Acceptance of the system by the users is exceptionally high since the waiters and waitresses were involved in the selection and design process. All potential users were asked to give their impressions and ideas about the various systems available before one was chosen.

Questions:

1. In the light of the system, describe the decisions to be made in the area of strategic planning, managerial control and operational control? What information would you require to make such decisions?

2. What would make the system a more complete MIS rather than just doing transaction processing?

Q 6 Comment on the following case study and answer the questions. 19

AMAZON.COM: A Game Changer

In 1994, with a handful of programmers and a few thousand dollars in workstations and servers, Jeff Bezos set out to change the retail world when he created Amazon.com. Shel Kaphan, Amazon's first programmer, assisted by others, including Paul Barton-Davis, used a collection of tools to create Web pages based on a database of 1 million book titles compiled from the Library of Congress and Books in Print databases. Kaphan notes that "Amazon was dependent on commercial and free database systems, as well as HTTP server software from commercial and free sources. Many of the programming tools were free software". In July 1995, Amazon opened its Web site for sales. Using heavily discounted book prices (20 to 30 percent below common retail prices); Amazon advertised heavily and became the leading celebrity of the Internet and e-commerce.

Sales and Relationships

Amazon made its initial mark selling books, and many people still think of the company in terms of books. However, almost from the start, the company has worked to expand into additional areas—striving to become a global retailer of almost anything. Some of the main events include: 1995 books, 1998 music and DVD/video, 1999 auctions, electronics, toys, zShops/MarketPlace, home improvement, software, and video games. By the end of 1999, the company had forged partnerships with several other online stores, including Ashford.com, Audible, Della.com, drugstore.com, Gear.com, Greenlight.com, HomeGrocer.com, Kozmo.com, living.com, NextCard.com, Pets.com, and Sothebys. Of course, most of those firms and Web sites later died in the dot-com crash of 2000/2001.

Amazon also established partnerships with several large retailers,

including Target, Toys 'R' Us, Babies 'R' Us, and Circuit City. Effectively, Amazon became a service organization to manage the online presence of these large retailers. However, it also uses its distribution system to deliver the products. The Circuit City arrangement was slightly different from the others—customers could pick up their items directly from their local stores. After Circuit City went under, the relationship ended. By mid-2003, the Web sales and fulfillment services amounted to 20 percent of Amazon's sales. Bezos points out that most companies realize that only a small fraction of their total sales (5 to 10 percent) will come from online systems, so it makes sense to have Amazon run those portions. In 2001, Amazon took over the Web site run by its bricks-and-mortar rival Borders. In 2000, Borders lost $18.4 million on total online sales of $27.4 million. Also in 2001, Amazon partnered with Expedia to offer travel services directly from the Amazon site. However, in this case, the Amazon portion consists of little more than an advertising link to the Expedia services. The deals in 2001 continued with a twist when Amazon licensed its search technology to AOL. AOL invested $100 million in Amazon and payed an undisclosed license fee to use the search-and-personalization service on Shop@AOL. In 2003, Amazon launched a subsidiary just to sell its Websales and fulfillment technology to other firms. Bezos noted that Amazon spends about $200 million a year on information technology (a total of $900 million to mid-2003). The purpose of the subsidiary is to help recover some of those costs—although Bezos believes they were critically necessary expenditures.

With so many diverse products, and relationships, it might be tempting to keep everything separate. However, Amazon perceives advantages from showing the entire site to customers as a single, broad entity. Yes, customers click to the various stores to find individual items. But, run a search and you will quickly see that it identifies products from any division. Additionally, the company is experimenting with cross sales. In 2002, the Project Ruby test site began selling name-brand clothing and accessories. Customers who spent $50 or more on apparel received a $30 gift certificate for use anywhere else on Amazon. By 2004, 25 percent of Amazon's sales were for its partners. But, one of Amazon's major relationships took a really bad turn in 2004 when Toys 'R' Us sued Amazon and Amazon countersued. The complaint by Toys 'R' Us alleges that it had signed a ten-year exclusivity contract with Amazon and had so far paid Amazon $200 million for the right to be the exclusive supplier of toys at Amazon.com. David Schwartz, senior VP and general counsel for Toys 'R' Us stated that "We don't intend to pay for exclusivity we're not getting". Amazon's initial response was that "We believe we can have multiple sellers in the toy category, increase selection, and offer products that (Toys 'R' Us) doesn't have". The lawsuit counters that at least one product (a Monopoly game) appears

to be for sale by third-party suppliers as well as Toys 'R' Us. A month later, Amazon countersued, alleging that Toys 'R' Us experienced "chronic failure" to maintain sufficient stock to meet demand. The court documents noted that Toys 'R' Us had been out of stock on 20 percent of its most popular products. Although the dispute sounds damaging, it is conceivable that both parties are using the courts as a means to renegotiate the base contract.

Small merchants accelerated a shift to Amazon's marketplace technology. By 2007, Amazon was simply the largest marketplace on the Web. For example, John Wieber was selling $1 million a year in refurbished computers through eBay. But increased competition and eBay's rising prices convinced him to switch to direct sales through Amazon. Similar small merchants noted that although the fees on Amazon are hefty, they do not have to pay a listing fee. Plus, eBay shoppers only want to buy things at bargain-basement prices. In 2010, Target ended its contract with Amazon and launched its own Web servers. Amazon does not report sales separately for its partners such as Target, so it is difficult to determine what impact the change might have on Amazon. However, Amazon has many other sellers who offer similar products.

Digital Content

Amazon has been expanding its offerings in digital content—in many ways extending competition against Apple, but also leading the way in digital books. Although it was not the first manufacturer, Amazon is reportedly the largest seller of e-readers with the Kindle. Amazon does not report sales separately for the Kindle. Amazon also noted in 2011 that ebooks for its Kindle reader have overtaken sales of paperback books as the most popular format. The e-books had already exceeded hard-cover books the year before. For many of these reasons, Borders, a bricks-and-mortar competitor to Amazon went under in 2011.

Amazon is also working to expand sales of music. The Web site has relatively standard pricing on current songs, but often offers discounts on older albums. By 2011, Amazon was also trying to expand into video streaming. Customers who pay $79 a year to join the Prime program gain faster shipping, and also access to a library of digital movies and TV shows. Unfortunately, with limited ties to the movie studios, the offerings initially were relatively thin. However, other video streaming sites, including Netflix and Hulu, were also struggling to develop long-term contracts with studios. In September 2011, Amazon announced a deal with Fox to offer movies and TV shows owned by the studio. At the same time, Netflix announced a similar deal with the Dreamworks studio. It will take time for studios to determine strategies on streaming video services and for consumers to make choices. In late 2011,

Amazon released its own version of a tablet computer. The company continued to sell the Kindle e-book reader, but the tablet focused on audio and video, using a color LCD display screen with a touch interface. Although it lacked features available on the market-leading Applet iPad, the Kindle table carried a price that was about half that of the iPad and other competitors ($200). The obvious goal was to provide a device that encourages customers to purchase more digital content directly from Amazon.

Information Technology

In the first years, Amazojn intentionally kept its Web site systems separate from its order fulfilment system. The separation was partly due to the fact that the programmers did not have the technical ability to connect them, and partly because the company wanted to improve security by keeping the order systems off the Web. By 1997, Amazon's sales had reached $148 million for the year. The big book database was being run on Digital Alpha servers. Applications were still custom written in house. By early 2000, the company had over 100 separate database instances running on a variety of servers—handling terabytes of data. In 2000, Amazon decided to overhaul its entire system. The company spent $200 million on new applications, including analysis software from E.piphany, logistics from Manugistics, and a new DBMS from Oracle. The company also signed deals with SAS for data mining and analysis. But, one of its biggest deals was with Excelon for business-to-business integration systems. The system enables suppliers to communicate in real time, even if they do not have sophisticated IT departments. It provides a direct connection to Amazon's ERP system either through programming connections or through a Web browser. About the same time, Amazon inked a deal with HP to supply new servers and IT services. The new systems ran the open-source Linux operating system. Already by the third quarter of 2001, Amazon was able to reduce its IT costs by 24 percent from the same quarter in 2000. By 2004, the supply chain system at Amazon was a critical factor in its success. Jeffrey Wilke, Senior VP of worldwide operations, observed that "When we think about how we're going to grow our company, we focus on price, selection, and availability. All three depend critically on the supply chain". Almost the entire system was built from scratch, customized to Amazon's needs. When a customer places an order, the system immediately connects to the distribution centers, determines the best way to ship the product, and provides the details to the customer in under two minutes. The entire process is automatic.

Dr. Russell Allgor moved from Bayer Chemical to Amazon and built an 800,000- equation computer model of the company's sprawling operation. When implemented, the goal of the model was to help accomplish almost everything from scheduling Christmas overtime to

rerouting trucks in a nowstorm. Allgor's preliminary work focused on one of Amazon's most vexing problems: How to keep inventory at a minimum, while ensuring that when someone orders several products, they can be shipped in a single box, preferably from the warehouse — the company had six — that is nearest the customer. Dr. Allgor's analysis is simple, but heretical to Amazon veterans. Amazon should increase its holdings of best sellers and stop holding slow-selling titles. It would still sell these titles but order them after the customer does. Lyn Blake, a vice president who previously ran Amazon's book department and now oversees company relations with manufacturers, disagrees with this perspective. "I worry about the customer's perspective if we suddenly have a lot of items that are not available for quick delivery." Amazon's merchant and MarketPlace systems are powerful tools that enable smaller stores to sell their products through Amazon's system. Amazon continually works to improve the connections on those systems. This system caused problems in 2001— the main issue was that the data on the merchant Web sites was being updated only once every eight hours. The merchant's link to Amazon's main database servers, and internal applications transfer the data onto the displayed page as requested. As customers purchased items, the inventory quantities were altered in the main servers, but the current totals were not transferred to the display pages until several hours later. Consequently, customers would be told that an item was in stock, even it had sold out several hours ago. To solve the problem, Amazon installed Excelon's ObjectStore database in 2002. The system functions as a cache management server, reducing the update times from eight hours down to two minutes. Paul Kotas, engineering director for the Merchants@Group noted that "with the growth of this business, we needed a zero-latency solution".

In 2003, Amazon added a simple object access protocol (SOAP) gateway so that retailers could easily build automated connections to the system. Data is passed as XML documents and automatically converted to Amazon's format.

One of the most successful technologies introduced by Amazon is the affinity list. When someone purchases an item, system makes recommendations based on similar items purchased by other customers. The system uses basic data mining and statistical tools to quickly run correlations and display the suggested products. Kaphan notes that "There was always a vision to make the service as useful as possible to each user and to take advantage of the ability of the computer to help analyze a lot of data to show people things they were most likely to be interested in". The system also remembers every purchase made by a customer. So, the Amazon programmers created the Instant Order Update feature, that reminds customers if they have already purchased an item in their cart. Bezo notes that "Customers

lead busy lives and cannot always remember if they've already purchased a particular item." He also observed that "When we launched Instant Order Update, we were able to measure with statistical significance that the feature slightly reduced sales. Good for customers? Definitely. Good for shareowners? Yes, in the long run". Capital expenditures for software and Web site development are not cheap: $176 million, $146 million, and $128 million for 2010, 2009, and 2008 respectively (2010 Annual Report). But, in comparison, in 2010, net income tax provisions were $352 million.

New Services

Amazon requires huge data centers and high-speed Internet connections to run its systems. Through vast economies of scale, Amazon is able to achieve incredibly low prices for data storage and bandwidth. Around 2005, the company decided that it could leverage those low costs into a new business selling Internet-based services. The company offers an online data storage service called S3. For a monthly fee of about 15 cents per gigabyte stored plus 15 cents per gigabyte of data transferred, any person or company can transfer and store data on Amazon servers. Through a similar service (EC2), any company can use the company's Web servers to deliver digital content to customers. The company essentially serves as a Web host, but instead of paying fixed costs, you pay 10 cents per virtual server
per hour plus bandwidth costs. Amazon's network can handle bursts up to 1 gigabit per second.

The system creates virtual servers, running the Linux kernel, and you can run any software you want. By 2011, the company had several locations providing S3 and EC2 Web services. It also offered online relational database services using either MySQL or the Oracle DBMS. Anyone can pay to store data in the DBMS, with charges being levied per hour, per data stored, and per data transferred. The point is that Amazon handles all of the maintenance and other companies avoid fixed costs. Even government agencies are adopting the benefits of storing data in these cloud services—including those run by Amazon. For example, the U.S. Treasury Department moved is public Web sites to the Amazon cloud. Perhaps the most unusual service is Mturk. The name derives from an 18-century joke where a "mechanical" chess-playing machine surprised European leaders and royalty by beating many expert players. The trick was that a human was hidden under the board and moved the pieces with magnets. Amazon's trick is to use human power to solve problems. Companies post projects on the Mturk site and offer to pay a price for piecemeal work. Any individual can sign up and perform a task and get paid based on the amount of work completed. Amazon takes a 10 percent commission above the fee. For example, the company Casting Words places audio files on the site

and pays people 42 cents to transcribe one minute of audio files into text. The Amazon EC2 and S3 services suffered some problems in the summer of 2011. A configuration error during an upgrade in the East Coast facility triggered a cascade that delayed all services in the facility. Internet services including Foursquare and Reddit that used the facility were impacted by the problems for almost a week. Amazon engineers learned a lot from the problems and the same issue is unlikely to occur again. But, the outage points out the risks involved in any centralized system. Ironically, the main problems were caused by algorithms designed to copy data to multiple servers to reduce risks. On the other hand, with multiple facilities, Amazon provides the ability to spread content and risk across multiple locations.

Adam Selipsky, vice president of product management and developer relations at Amazon Web Services observed that ""Amazon is fundamentally a technology company; we've spent more than one and a half billion dollars investing in technology and content. We began by retailing books, but it was never in our business plan to stay with that".

Questions

1. Who are Amazon's competitors?
2. If Amazon buys products from other firms and simply ships them to customers, why does it need so many of its own distribution centers? Why would customers shop at Amazon if they can find better prices elsewhere?
3. Why did Amazon create most of its own technology from scratch?
4. Will other retailers buy or lease the Web software and services from Amazon? Can Amazon make enough money from selling these services?
5. Write a report to management that describes the primary cause of the problems, a detailed plan to solve them, and show how the plan solves the problems and describe any other benefits it will provide.