

## SAMPLE PAPER

Ques. 1 Multiple Choice Questions:

1. The need for more versatile reporting than what was available in 1980s era ERP systems led to the development of what type of system?
  - A. management information systems
  - B. relational databases
  - C. executive information systems
  - D. data warehouses

Answer: C

2. Which of the following is an umbrella term that combines architectures, tools, databases, analytical tools, applications, and methodologies?
  - A) MIS
  - B) DSS
  - C) ERP
  - D) BI

Answer: D

3. Which of the following is NOT an example of transaction processing?
  - A. ATM withdrawal
  - B. bank deposit
  - C. sales report
  - D. cash register scans

Answer: C

4. Online transaction processing (OLTP) systems handle a company's routine ongoing business. In contrast, a data warehouse is typically
  - A. the end result of BI processes and operations.
  - B. a repository of actionable intelligence obtained from a data mart.
  - C. a distinct system that provides storage for data that will be made use of in analysis.
  - D. an integral subsystem of an online analytical processing (OLAP) system.

Answer: C

5. BI applications must be integrated with
  - A. databases.
  - B. legacy systems.
  - C. enterprise systems.
  - D. all of these

Answer: D

6. What type of analytics seeks to recognize what is going on as well as the likely forecast and make decisions to achieve the best performance possible?
- A. descriptive
  - B. prescriptive
  - C. predictive
  - D. domain

Answer: B

7. What type of analytics seeks to determine what is likely to happen in the future?
- A. descriptive
  - B. prescriptive
  - C. predictive
  - D. domain

Answer: C

8. Key performance indicators (KPIs) are metrics typically used to measure
- A. database responsiveness.
  - B. qualitative feedback.
  - C. external results.
  - D. internal results.

9. Which characteristic of data requires that the variables and data values be defined at the lowest (or as low as required) level of detail for the intended use of the data?
- A. data source reliability
  - B. data accessibility
  - C. data richness
  - D. data granularity

10. Which kind of chart is described as an enhanced version of a scatter plot?
- A. heat map
  - B. bullet
  - C. pie chart
  - D. bubble chart

Answer: D

## SECTION B

### Ques. 2 Case Study

#### A Better Data Plan: Well-Established TELCOs Leverage Data Warehousing and Analytics to Stay on Top in a Competitive Industry

Mobile service providers (i.e., Telecommunication Companies, or TELCOs in short) that helped trigger the explosive growth of the industry in the mid- to late-1990s have long reaped the benefits of being first to market. But to stay competitive, these companies must continuously refine everything from customer service to plan pricing. In fact, veteran carriers face many of the same challenges that up-and-coming carriers do: retaining customers, decreasing costs, fine-tuning pricing models, improving customer satisfaction, acquiring new customers and understanding the role of social media in customer loyalty. Highly targeted data analytics play an evermore-critical role in helping carriers secure or improve their standing in an increasingly competitive marketplace. Here's how some of the world's leading providers are creating a strong future based on solid business and customer intelligence.

**Customer Retention** It's no secret that the speed and success with which a provider handles service requests directly affects customer satisfaction and, in turn, the propensity to churn. But getting down to which factors have the greatest impact is a challenge. "If we could trace the steps involved with each process, we could understand points of failure and acceleration," notes Roxanne Garcia, manager of the Commercial Operations Center for Telefónica de Argentina. "We could measure workflows both within and across functions, anticipate rather than react to performance indicators, and improve the overall satisfaction with onboarding new customers." The company's solution was its traceability project, which began with 10 dashboards in 2009. It has since realized US\$2.4 million in annualized revenues and cost savings, shortened customer provisioning times and reduced customer defections by 30%.

**Cost Reduction** Staying ahead of the game in any industry depends, in large part, on keeping costs in line. For France's Bouygues Telecom, cost reduction came in the form of automation. Aladin, the company's Teradata-based marketing operations management system, automates marketing/communications collateral production. It delivered more than US\$1 million in savings in a single year while tripling email campaign and content production. "The goal is to be more productive and responsive, to simplify teamwork, [and] to standardize and protect our expertise," notes Catherine Corrado, the company's project lead and retail communications manager. "[Aladin lets] team members focus on value-added work by reducing low-value tasks. The end result is more quality and more creative [output]." An unintended but very welcome benefit of Aladin is that other departments have been inspired to begin deploying similar projects for everything from call center support to product/offer launch processes.

**Customer Acquisition** With market penetration near or above 100% in many countries, thanks to consumers who own multiple devices, the issue of new customer acquisition is no small challenge. Pakistan's largest carrier, Mobilink, also faces the difficulty of operating in a market where 98% of users have a pre-paid plan that requires regular purchases of additional minutes. "Topping up, in particular,

keeps the revenues strong and is critical to our company's growth," says Umer Afzal, senior manager, BI. "Previously we lacked the ability to enhance this aspect of incremental growth. Our sales information model gave us that ability because it helped the distribution team plan sales tactics based on smarter data-driven strategies that keep our suppliers [of SIM cards, scratch cards and electronic top-up capability] fully stocked." As a result, Mobilink has not only grown subscriber recharges by 2% but also expanded new customer acquisition by 4% and improved the profitability of those sales by 4%.

**Social Networking** The expanding use of social networks is changing how many organizations approach everything from customer service to sales and marketing. More carriers are turning their attention to social networks to better understand and influence customer behavior. Mobilink has initiated a social network analysis project that will enable the company to explore the concept of viral marketing and identify key influencers who can act as brand ambassadors to cross-sell products. Velcom is looking for similar key influencers as well as low-value customers whose social value can be leveraged to improve existing relationships. Meanwhile, Swisscom is looking to combine the social network aspect of customer behavior with the rest of its analysis over the next several months.

**Rise to the Challenge** While each market presents its own unique challenges, most mobile carriers spend a great deal of time and resources creating, deploying and refining plans to address each of the challenges outlined here. The good news is that just as the industry and mobile technology have expanded and improved over the years, so also have the data analytics solutions that have been created to meet these challenges head on. Sound data analysis uses existing customer, business and market intelligence to predict and influence future behaviors and outcomes. The end result is a smarter, more agile and more successful approach to gaining market share and improving profitability.

### Questions for Discussion

1. What are the main challenges for TELCOs?

Answer: To stay competitive, TELCOs must continuously refine everything from customer service to plan pricing. The major challenges faced by both entrenched and new companies in this industry include: retaining customers, decreasing costs, fine-tuning pricing models, improving customer satisfaction, acquiring new customers, and understanding the role of social media in customer loyalty.

2. How can data warehousing and data analytics help TELCOs in overcoming their challenges?

Answer: Highly targeted data analytics play an ever more critical role in helping carriers secure or improve their standing in an increasingly competitive marketplace. Argentina's Telefónica de Argentina used analytics for its "traceability project," which tracked the factors involved in customer churn, a big problem among phone service carriers. France's Bouygues Telecom used BI technologies to facilitate cost reduction through automation via its Teradata-based marketing operations management system, which automates

marketing/communications collateral production. Pakistan's Mobilink uses BI to help acquire customers and grow their subscriber network, largely aided by social networking.

3. Why do you think TELCOs are well suited to take full advantage of data analytics?

Answer: TELCOs control the telecommunications infrastructure, and acquire much usage data as a result. They have the technical expertise to create, deploy, and refine plans to address their business challenges. The industry and mobile technology have expanded and improved over the years, which provides a strong foundation on which to build intelligent solutions. The data analytics solutions that have been created to meet these challenges have also improved drastically over the past few years, placing TELCOs in a good position to capitalize on their technological advantages.

**Ques. 3 Sabre Helps Its Clients Through Dashboards and Analytics**

Sabre is one of the world leaders in the travel industry, providing both business-to-consumer services as well as business-to-business services. It serves travelers, travel agents, corporations, and travel suppliers through its four main companies: Travelocity, Sabre Travel Network, Sabre Airline Solutions, and Sabre Hospitality Solutions. The current volatile global economic environment poses significant competitive challenges to the airline industry. To stay ahead of the competition, Sabre Airline Solutions recognized that airline executives needed enhanced tools for managing their business decisions by eliminating the traditional, manual, time-consuming process of collecting and aggregating financial and other information needed for actionable initiatives. This enables real-time decision support at airlines throughout the world that maximize their (and, in turn, Sabre's) return on information by driving insights, actionable intelligence, and value for customers from the growing data. Sabre developed an Enterprise Travel Data Warehouse (ETDW) using Teradata to hold its massive reservations data. ETDW is updated in near-real time with batches that run every 15 minutes, gathering data from all of Sabre's businesses. Sabre uses its ETDW to create Sabre Executive Dashboards that provide near-real-time executive insights using a Cognos 8 BI platform with Oracle Data Integrator and Oracle Goldengate technology infrastructure. The Executive Dashboards offer their client airlines' top-level managers and decision makers a timely, automated, userfriendly solution, aggregating critical performance metrics in a succinct way and providing at a glance a 360-degree view of the overall health of the airline. At one airline, Sabre's Executive Dashboards provide senior management with a daily and intra-day snapshot of key performance indicators in a single application, replacing the once-a-week, 8-hour process of generating the same report from various data sources. The use of dashboards is not limited to the external customers; Sabre also uses them for their assessment of internal operational performance. The dashboards help Sabre's customers to have a clear understanding of the data through the visual displays that incorporate interactive drill-down capabilities. It replaces flat presentations and allows for more focused review of the data with less effort and time. This facilitates team dialog by

making the data/ metrics pertaining to sales performance, including ticketing, seats sold and flown, operational performance such as data on flight movement and tracking, customer reservations, inventory, and revenue across an airline's multiple distribution channels, available to many stakeholders. The dashboard systems provide scalable infrastructure, graphical user interface (GUI) support, data integration, and data aggregation that empower airline executives to be more proactive in taking actions that lead to positive impacts on the overall health of their airline. With its ETDW, Sabre could also develop other Web-based analytical and reporting solutions that leverage data to gain customer insights through analysis of customer profiles and their sales interactions to calculate customer value. This enables better customer segmentation and insights for value-added services.

### **What We Can Learn from This Application Case This Application**

Case shows that organizations that earlier used reporting only for tracking their internal business activities and meeting compliance requirements set out by the government are now moving toward generating actionable intelligence from their transactional business data. Reporting has become broader as organizations are now trying to analyze archived transactional data to understand underlying hidden trends and patterns that would enable them to make better decisions by gaining insights into problematic areas and resolving them to pursue current and future market opportunities. Reporting has advanced to interactive online reports that enable users to pull and quickly build custom reports as required and even present the reports aided by visualization tools that have the ability to connect to the database, providing the capabilities of digging deep into summarized data.

### **Questions**

1. What is traditional reporting? How is it used in organizations?

**Answer:** The traditional reporting process is a manual process of collecting and aggregating financial and other information. Organizations have used this time-consuming process as a way to obtain information for making decisions. However, the resulting presentations may be flat, slow to develop, and difficult to apply to specific situations.

2. How can analytics be used to transform traditional reporting?

**Answer:** Analytics can enable real-time decision support and deliver information to a user-friendly dashboard. Users of a dashboard such as the one provided by Sabre's Enterprise Travel Data Warehouse can see at a glance a 360-degree view of the company's overall health generated from various data sources. Many stakeholders in the organization can request data needed for particular types of decisions, and the graphical user interface makes the information easily understandable.

3. How can interactive reporting assist organizations in decision making?

**Answer:** When a system incorporates interactive drill-down capabilities, users can select the data they need for evaluating a specific kind of performance and making decisions in a particular function or situation. For example, the airlines using the Sabre system can focus on data about sales performance (ticketing, seats sold, etc.) and operational performance (flight movement, inventory, etc.). This flexibility encourages decision makers to use data in support of their decisions.

**Ques.4** Given Below is regression summary output which has been run on the two variable i.e. house age and square feet. Markets experts of second owner houses believe that the market value of the house is based on the age of the house and the area in square feet. An Analyst is interested in empirically testing it and therefore extracted and loaded 42 observations and ran a Regression on it. Based on output you are required to answer the following.

1. Is there any problem of multicollinearity? State the reason to support your answer.
2. Is the model is a valid model. How do you know?
3. Are both variable are important in the model, explain.
4. Based on the regression equation predict the market value of house of it is 2100 square meters in area.

| <i>Regression Statistics</i> |           |
|------------------------------|-----------|
| Multiple R                   | 0.7454948 |
| R Square                     | 0.5557625 |
| Adjusted R Square            | 0.532981  |
| Standard Error               | 7211.8485 |
| Observations                 | 42        |

| ANOVA      |           |            |             |           |                       |
|------------|-----------|------------|-------------|-----------|-----------------------|
|            | <i>df</i> | <i>SS</i>  | <i>MS</i>   | <i>F</i>  | <i>Significance F</i> |
| Regression | 2         | 2537650171 | 1268825085  | 24.395435 | 0.0000001             |
| Residual   | 39        | 2028419591 | 52010758.75 |           |                       |
| Total      | 41        | 4566069762 |             |           |                       |

|             | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> | <i>Lower 95%</i> | <i>Upper 95%</i> | <i>Lower 95.0%</i> | <i>Upper 95.0%</i> |
|-------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|--------------------|--------------------|
| Intercept   | 47331.382           | 13884.3466            | 3.408974347   | 0.0015278      | 19247.63991      | 75415.123        | 19247.64           | 75415.123          |
| House Age   | -825.16122          | 607.312842            | -1.358708664  | 0.1820459      | -2053.56738      | 403.24494        | -2053.567          | 403.24494          |
| Square Feet | 40.911068           | 6.69652399            | 6.109299165   | 0.0000004      | 27.3660703       | 54.456067        | 27.36607           | 54.456067          |



