

Role of Information Systems in Businesses

Chartered Accountancy Business Level 2 Digital Business Strategy (DBS)

Susantha Weerakoon B.Sc. (MIS), MBA (ISM), PHD (Business Psychology)



JMC Jayasekera Management Centre (Pvt) Ltd Pioneers in Professional Education 65/2A, Sir Chittampalam A Gardiner Mawatha, Colombo 02 | T: +94 112 430451 | E: info@jmc.lk | F: +94 115 377917

BL -8 Digital Business Strategy CA Business Level 2

Role of Information Systems in Business



Dr. Susantha Bandara Weerakoon (BSc (MIS), MBA (ISM), PhD (Business Psychology)

Information and Information Systems

Information strategy can be divided into information systems strategy, information technology strategy and information management strategy.

- Information systems (IS) strategy sets out to provide a long-term direction for the development of information systems throughout the organization.
- Information technology (IT) strategy is concerned with the development and maintenance of hardware and software to facilitate the overall IS strategy (e.g. to provide the required information).
- Information management (IM) strategy outlines how the organization will control and manage information in the organization

Strategic Approach

The writer Michael Earl argues that information systems and information strategy are too important to leave in the hands of technology professionals alone. He suggests the following characteristics of IT/IS strategy support this view:

- Involves high costs
- Is critical to the success of many organizations
- Is now used as part of the commercial strategy in the battle for competitive advantage
- Has an impact on customer service
- Potentially affects all levels of management and staff in an organization

Strategic Approach

- May lead to structural changes within an organization which require HR planning
- Affects the way management information is created and presented
- Requires effective management to obtain the maximum benefit
- Involves many stakeholders inside and outside the organization, therefore stakeholder analysis is required
- Requires effective management to obtain the maximum benefit
- Involves many stakeholders inside and outside the organization, therefore stakeholder analysis is required

Critical Success for many organizations

When developing an IS/IT strategy a firm should assess how important IT is in the provision of products and services. The role that IT fills in an organization will vary depending on the type of organizations. IS/IT could be:

- A support activity
- A key operational activity
- Potentially very important
- A strategic activity (without IT the firm could not function at all; eg Amazon, eBay)
- A source of competitive advantage

Critical Success for many organizations

An organization's information systems may not only support business strategy; they may also help determine corporate/business strategy. In particular:

- a. IS/IT/IM may provide a possible source of competitive advantage. This could involve new technology not yet available to others or simply using existing technology in a different way.
- b. Information systems may help in formulating business strategy by providing information from internal and external sources.

Critical Success for many organizations

C. Developments in IT may provide new channels for distributing and collecting information and/or for conducting transactions. The most fundamental illustration of this has been the way the internet has opened up opportunities for e-Business and e-Commerce.

e-Business is the use of electronic technologies (including the internet) to support and transform business processes, while e-Commerce is the use of electronic technologies (including the internet) to buy and sell products and services.

Critical Success for many organizations

Slack et al in their text, Operations Management, 2013, also highlight that e-Business has an impact in many areas of operations management:

- **Purchasing:** orders (EDI), funds transfer (EFT) and supplier selection. (More specifically, IT has also enabled e-Procurement
- **Production:** production planning and control, scheduling, inventory management, quality control
- Marketing/sales and customer servicing: opening new sales channels, internet sales, third-party logistics, customer services, CRM
- Warehousing: inventory management, forecasting (and real time updating)

Types of information systems



Strategic Information Levels		
Strategic Information	Tactical Information	Operational Information
Derived from both internal and external sources	Primarily generated internally (but may have a limited external component)	Derived from internal sources; often includes 'transaction data' from transaction processing systems
Summarized at a high level	Summarized at a lower level	Detailed, the processing of raw data
Relevant to the long term	Relevant to the short and medium term	Relevant to the immediate term
Concerned with the whole organization	Concerned with activities or departments, and with the efficiency/ effectiveness of resource usage	Task-specific
Often prepared on an ad hoc basis	Prepared routinely and regularly	Prepared very frequently
Both quantitative and qualitative	Based on quantitative measures (eg budgets, benchmarks)	Largely quantitative, but often expressed in operational measures (eg units produced, transactions processed) rather than monetary terms
Focus on planning; future orientation	Some focus on planning, but greater focus on control	Focus on control (rather than planning)
Uncertain, as the future cannot be accurately predicted		<u> </u>

Strategic Level information systems

Strategic IT systems include

- Executive information systems (EIS),
- Management information systems (MIS)
- Decision support systems (DSS).

Executive Information Systems - EIS

An executive information system (EIS) pools data from internal and external sources and makes information available to senior managers in an easy to use form. An EIS helps senior managers make strategic, unstructured decisions.

An EIS is likely to have the following features:

• Flexibility • Quick response time • Sophisticated data analysis and modelling tools.



Management Information Systems - MIS

Management information systems (MIS) convert data from mainly internal sources into information for example summary reports, and exception reports, such as;

- 1 Decisions on pricing levels
- 2 Decisions on pricing of products

This information enables managers to make timely and effective decisions for planning, directing and controlling the activities for which they are responsible. **MIS have the following characteristics:**

- Support structured decisions at operational and management control levels
- Designed to report on existing operations
- Have little analytical capability
- Relatively inflexible
- Have an internal focus

Decision Support Systems -DSS

Decision support systems (DSS) combine data and analytical models or data analysis tools to support semi-structured and unstructured decision making. Although DSS use internal information from TPS and MIS, they often bring in information from external sources, such as current stock prices or product prices of competitors.

Executives at small and medium-sized companies are making critical business decisions every day based on the information available to them. This information can come from a variety of sources: opinions from peers and colleagues; a personal sense of intuition or business judgement; or data derived internally or externally to the organisation. Value added networks

Business Intelligence Systems -BI

Business Intelligence (BI) is a set of methods and tools that are used by organizations for accessing and exploring data from diverse source systems to better understand how the business is performing and make the better-informed decision that improves performance and create new strategic opportunities for growth. BI is a Business Intelligence system which tells you what happened, or is happening right now in your business – it describes the situation to you. In addition, a good BI platform describes this to you in real time in a granular, accurate and presentable form.

Business/Data Warehouse systems – (DW/BW)

Business/Data Warehouse (DW/BW) is simply a consolidation of data from a variety of sources that set a foundation for Business Intelligence, which helps in making a better strategic and tactical decision.

Management and operational level IS

Transaction Processing Systems (TPS) perform and record routine transactions. TPSs are used for routine tasks in which data items or transactions must be processed so that operations can continue. TPSs support most business functions in most types of organization. TPSs are sometimes referred to as Data Processing Systems (DPSs).

Office Automation Systems (OAS) are computer systems designed to increase the productivity of data and information workers. OASs support the major activities performed in a typical office such as document management, facilitating communication and managing data. Examples include: Word processing, desktop publishing, presentation software Digital filing systems Email, voice mail, videoconferencing (or teleconferencing) Groupware (calendars, address books and journals), intranets, extranets, schedulers Spreadsheets, desktop databases

Management and operational level IS

Enterprise-wide Systems are designed to co-ordinate all business functions, resources and information, wherever they are geographically. Under an enterprise-wide system, each business area (such as accounts, HR, production and sales) is provided with a system that fulfils its needs; however, each module shares a common database that is the basis of all the information within the organization. The central database allows each business area to access and update information in real time and this means that information is easy to share, available to all business areas and, above all, reliable.

Enterprise resource planning (ERP) software is an example of an enterprisewide systems

IT Infrastructure and emerging Technologies

Management and operational level IS

Big data and performance management

The amount of data available to organizations is increasing ever more rapidly, and big data – with its characteristics of volume, velocity, veracity, variety and value – highlights both the opportunities and the challenges which new sources of data present to organizations.

What is Big Data

Big data – modern technology gives the ability to analyze large amounts of data very quickly and deliver results in real time. This may include financial and non-financial data. Organizations are increasingly requiring this from their finance functions.

Big data 'Is a popular term used to describe the exponential growth and availability of data, both structured and unstructured.' (SAS, 2016)

Characteristics of Big Data

SAS (2016) cite the work of Laney (2000), who suggested that big data can be defined by considering the three Vs: volume, velocity and variety. The three Vs have now been extended to include veracity. It is important to note that other authors may refer to other terms when discussing big data;

Volume – The vast volume of data generated is a key feature of big data

Variety – Variety is defined as the different types of data we can now use. Data today looks very different than data from the past.

Veracity – This concerns the quality or truthfulness of captured data

Velocity – This refers to the speed at which 'real time' data is being streamed into the organization and with which it is processed within the organization

(Adapted from: SAS, 2016)

V – value – Value refers to the worth of the data being extracted.

Big Data Analytics

Big data analytics – This refers to the process of collecting, organizing and analyzing large sets of data ('big data') to discover patterns and other useful information that an organization can use in its future business decisions.

Big data analytics should help an organization to reveal insights in data which had previously been too difficult or costly to analyze, due to the volume and variability of the data involved. These insights can be historical, real-time or predictive. Being able to extract insights from the data available is crucial for organizations to benefit from the availability of big data – for example, to help them understand the complexity of the environment in which they are operating, and to respond swiftly to the opportunities and threats presented by it; or to develop new insights and understanding into what customers need or want.

Data warehousing and improved reporting capabilities

A data warehouse contains data from a range of internal (e.g. sales order processing system, nominal ledger) and external sources. One reason for including individual transaction data in a data warehouse is that if necessary, the user can drill down to access transaction-level detail.

The warehouse provides a coherent set of information to be used across the organization for management analysis and decision making. The reporting and query tools available within the warehouse should facilitate management reporting and analysis.

Internet of things IOT

The Internet of Things is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

The growth of the internet, multimedia, wireless networks, smartphones, social media, sensors and other digital technologies is helping to fuel a data revolution. In the so-called 'internet of things', sensors embedded in physical objects, such as mobile phones, motor vehicles, smart energy meters, RFID tags, tracking devices and traffic flow monitors, all create and communicate data which is shared across wired and wireless networks that function in a similar way to the internet.

Machine learning and Automation / Robotics

Although robots have been used in manufacturing processes for some time and involve a computer-controlled device, such as a gripper or arm, to control a work process, it is widely assumed that this will only increase over time. Robots are commonly used in three ways.

- **Material-handling robots** are used to transfer materials and products and to load or unload other machines
- **Inspection robots** can be used to ensure products meet certain quality standards.
- Assembly robots are used to assemble sub-parts into a larger product.

Machine learning and Automation / Robotics

Automated guided vehicles (AGVs)

AGVs are used to increase the speed and accuracy of transporting materials and products around a production system. They are autonomous and therefore require no human input other than developing their operational software. Some AGVs follow a fixed path and are useful for routine tasks, while others have a form of artificial intelligence and can be told to find their own route to a particular location. These are useful for one-off tasks or roles where a number of destinations are possible.

Machine learning

Organizations are now using "chat bots' more and more, and even in the home, individuals are becoming reliant on the technology of machine learning to operate and undertake tasks.



Instant Access to data

Developments in IT have facilitated the distribution of data, making it instantly available to those who require it. Such developments are known generally as office automation systems.

Distribution of data

- Word processing
- Electronic schedules
- Desktop databases
- Web publishing
- Voicemail
- Email

Sharing of data There have also been significant developments in the ways in which data can be shared.

Instant Access to data

Groupware

Groupware is a term used to describe software that provides functions that can be used by collaborative work groups. Typically, groups using groupware are small project-orientated teams that have important tasks and tight deadlines.

Features of groupware

- A scheduler allowing users to keep track of their schedule and plan meetings with others
- An address book
- 'To do' lists
- A journal, used to record interactions with important contacts, items (such as email messages) and files that are significant to the user, and activities
- A jotter for jotting down notes as quick reminders of questions, ideas, netc (f) File sharing and distribution utilities

Cloud Computing

Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user.

Cloud computing technologies have changed the ways in which organizations store and manage their data. An increasing amount of organizational data is now held in servers operated by cloud-based service providers.