



HC1041: Information Technology for Business

Lecture 1

Title: Business Information Systems: An Overview



This lecture is divided into the following structure:

- Does Information Technology Matter?
- The Purpose of Information Systems
- Data, Information, and Information Systems
- What is a System?
- Information and Managers
- Information Systems in Organizations



This lecture is divided into the following structure:

- Computer Equipment for Information Systems
- Transaction Processing Systems
- Supply Chain Management (SCM) Systems
- Customer Relationship Management (CRM) Systems
- Business Intelligence (BI) Systems
- Decision Support Systems and Expert S

Does Information Technology Matter?

- Examples of IT applied by businesses
 - Social media for engaging customers
 - Mobile banking
- Today's business professionals must know how to develop and use IT



This slide discusses the relevance of Information Technology (IT) in business, with practical examples including the use of social media for customer engagement and mobile banking, emphasizing the importance for business professionals to be proficient in IT development and usage.

Practical Examples:

Social Media for Engaging Customers: Many businesses leverage social media platforms like Facebook, Twitter, and Instagram to connect with their customers. For instance, a clothing retailer may use Instagram to showcase its latest fashion collections, interact with customers through comments and direct messages, and even run targeted advertising campaigns to reach a wider audience. This engagement not only enhances customer relationships but also serves as a valuable marketing tool.

Mobile Banking: The financial industry heavily relies on IT for mobile banking services. Banks offer mobile apps that allow customers to check their account balances, transfer funds, pay bills, and even deposit checks using their smartphones. For example, a customer can use a mobile banking app to take a picture of a check and deposit it

electronically without visiting a physical bank branch. This convenience not only benefits customers but also streamlines banking operations.



The Power of Digital Systems

- Binary counting system uses only two digits: 0 and 1
- **Digital systems:** computers and devices that use the binary system
 - Can represent any information as a combination of zeroes and ones
- Information can be represented, stored, communicated, and processed digitally

This slide explains the binary counting system, digital systems' use of binary code, and the digital representation, storage, communication, and processing of information.

Practical Examples in Australia:

Binary Counting System: In Australia, binary code is fundamental to various technologies, including computer programming. For instance, software developers use binary code to write and execute programs that power applications, websites, and digital services.

Digital Systems: Australia relies heavily on digital systems, such as telecommunications networks, to facilitate communication and data transfer. The National Broadband Network (NBN) is an example of a digital infrastructure project that uses binary code to transmit data across the country efficiently.

Information Representation: The Australian healthcare sector utilizes digital systems to store and manage patient records, ensuring that medical information is represented digitally and can be securely accessed by authorized healthcare professionals.

Information Storage and Processing: Australian financial institutions employ digital systems to store and process financial data, enabling customers to conduct online banking transactions securely and efficiently.



The Power of Digital Systems (cont'd.)

- Digital information is stored and communicated by means of electromagnetic signals
 - Extremely fast
 - Exact copy of the original is possible
- Accuracy and speed make digital systems powerful, useful, and important

This slide highlights the use of electromagnetic signals to store and communicate digital information, emphasizing the speed, exact replication, accuracy, and significance of digital systems.

Practical Examples in Australia:

1. **Telecommunications:** In Australia, mobile networks and the National Broadband Network (NBN) rely on electromagnetic signals to transmit digital data rapidly, enabling high-speed internet access and seamless communication.
2. **Digital Media Streaming:** Services like Netflix and Stan use digital systems to deliver high-quality, exact copies of movies and TV shows to Australian viewers, enhancing the entertainment experience.
3. **Medical Imaging:** Australian hospitals and clinics utilize digital systems for medical imaging, like MRI and CT scans, which provide precise, fast, and accurate representations of patients' conditions, aiding in diagnosis and treatment.
4. **Financial Transactions:** Australia's banking and payment systems operate digitally, ensuring rapid and accurate financial transactions for individuals and businesses, contributing to the efficiency of the economy.



- Businesses use information systems to:
 - Make sound decisions
 - Solve problems
- Problem: any undesirable situation
- Decision: arises when more than one solution to problem exists
- Both problem solving and decision making require information

This slide conveys that businesses utilize information systems for making informed decisions and resolving problems, where a problem represents an undesirable situation and a decision arises when multiple solutions to the problem exist.

Practical Examples in Australia:

1. **Inventory Management:** Australian retailers use information systems to make decisions about inventory levels, ensuring they have enough stock to meet customer demand (decision-making) while avoiding overstocking or stockouts (problem-solving).
2. **Traffic Management:** Transport authorities in Australian cities employ information systems to analyze traffic data, making decisions on traffic signal timing adjustments (decision-making) and addressing traffic congestion issues (problem-solving).

3. **Healthcare Records:** Australian healthcare institutions rely on information systems to manage patient records, aiding in clinical decisions (decision-making) and diagnosing and treating medical conditions (problem-solving).
 4. **Financial Analysis:** Australian financial institutions use information systems for investment decisions (decision-making) and to address financial anomalies or fraud (problem-solving), ensuring the stability of the financial sector.
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- Keys to success in business
 - Gathering correct information efficiently
 - Storing information
 - Using information
- Information systems support daily operations

This slide highlights that success in business relies on efficiently gathering, storing, and using correct information, and information systems play a crucial role in supporting daily business operations.

Practical Examples in Australia:

Customer Relationship Management (CRM): Australian businesses utilize CRM systems to gather and manage customer information efficiently (gathering), store customer data securely (storing), and use this data to personalize marketing and improve customer service (using).

Inventory Management: Retailers in Australia employ information systems to gather real-time data on inventory levels (gathering), store this data in databases (storing), and use it to optimize stock levels and reordering processes (using).

Energy Management: Australian industries leverage information systems to gather data on energy consumption (gathering), store historical energy usage records (storing), and use this information to make energy-saving decisions and reduce costs (using).

Supply Chain Management: Companies in Australia use information systems to efficiently gather data on the movement of goods and materials throughout the supply chain (gathering), store this data in centralized systems (storing), and use it for supply chain optimization and demand forecasting (using).

- Commonly used terms
 - Data
 - Information
 - System
- Important to understand similarities and differences among terms

This slide emphasizes the need to understand the distinctions and connections between commonly used terms such as data, information, and system.

Practical Examples in Australia:

1. **Data:** In Australia, weather stations collect raw weather data, including temperature and humidity readings.
2. **Information:** By processing the weather data, meteorologists in Australia can generate weather forecasts and provide information to the public.
3. **System:** The computer systems and software used by meteorological agencies in Australia facilitate the collection, analysis, and dissemination of weather data and information.

- **Data:** a given or fact
 - Can be number, statement, or picture
 - Is the raw material in the production of information
- **Information:** facts or conclusions that have meaning within context
 - Composed of data that has been manipulated

This slide defines data as raw facts and information as meaningful facts within a context.

Practical Examples in Australia:

1. **Data:** The population figures for different states and territories of Australia, such as New South Wales or Queensland, are raw data.
2. **Information:** When these population figures are analyzed and compared to historical data, they become meaningful information for policymakers in Australia to make decisions about resource allocation and infrastructure planning.



- Survey is common method of collecting data
- Reading data can be extremely time consuming
- Manipulating the data may provide valuable information
- Examples: categorizing and producing statistics
 - May be applied to marketing and manufacturing practices

This slide highlights the importance of surveys in data collection and the value of data manipulation through categorization and statistics, which can be applied in various fields including marketing and manufacturing in Australia.

Practical Examples in Australia:

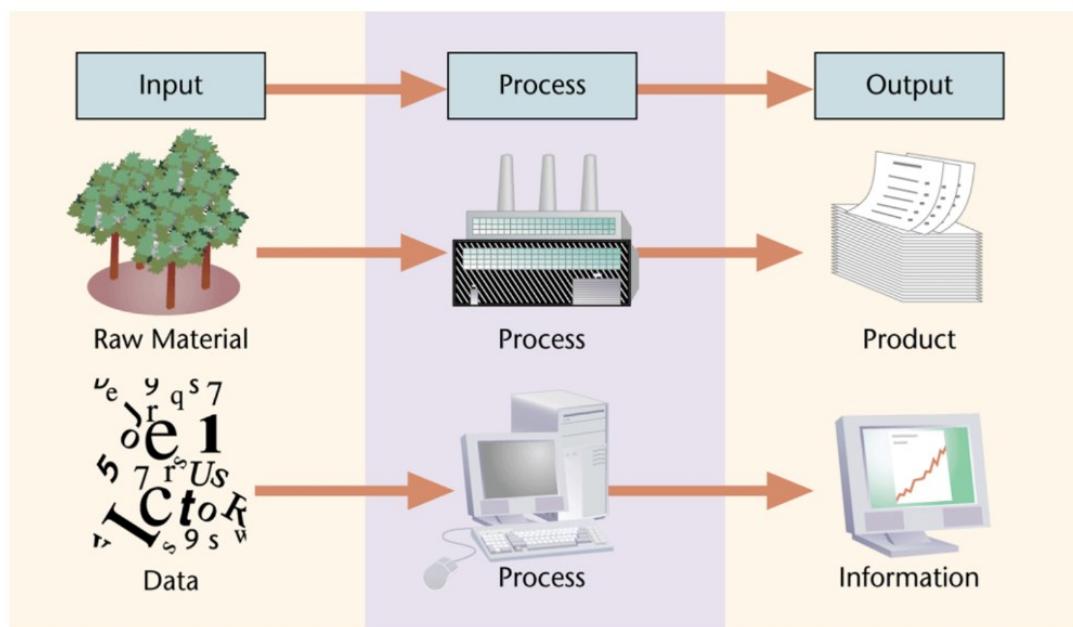
1. **Survey Data:** Australian government agencies often conduct surveys to gather data on various topics, such as the Australian Bureau of Statistics (ABS) conducting the Census to collect demographic information.
2. **Data Manipulation:** Businesses in Australia, especially in the retail sector, use data manipulation techniques to categorize customer preferences and produce statistics on sales trends to optimize marketing and inventory management.

- **Process:** the manipulation of data
 - Usually produces information
 - May produce more data
- A piece of information (output of a process) in one context may be considered data (input to a process) in another context

This slide emphasizes that processes involve manipulating data to produce information, and what may be considered information in one context can be treated as data in another.

Practical Examples in Australia:

1. **Tax Return Processing:** In Australia, when individuals submit their tax returns (data), the Australian Taxation Office (ATO) processes this data to calculate tax owed or refunds (information).
2. **Medical Records:** In the healthcare sector, patient medical records (data) are processed to generate reports and diagnoses (information) for further treatment, illustrating how the same data can become information in a different context.



- Not all information is useful
- Characteristics of useful information
 - Relevant
 - Complete
 - Accurate
 - Current
 - Economical

This slide emphasizes that not all information is valuable and highlights the characteristics of useful information, which include being relevant, complete, accurate, current, and economical.

Practical Example in Australia:

In the context of healthcare in Australia, when doctors and medical professionals review a patient's medical history, they prioritize relevant, complete, and accurate information to make informed decisions about treatment and care. Timely updates to the patient's medical records also ensure that the information remains current and economical in terms of resource utilization.

- **System:** array of components that work together to achieve goal or goals
- A system:
 - Accepts input
 - Processes input
 - Produces output

This slide defines a system as a collection of components working together to achieve specific goals, involving input acceptance, processing, and output generation.

Practical Example in Australia:

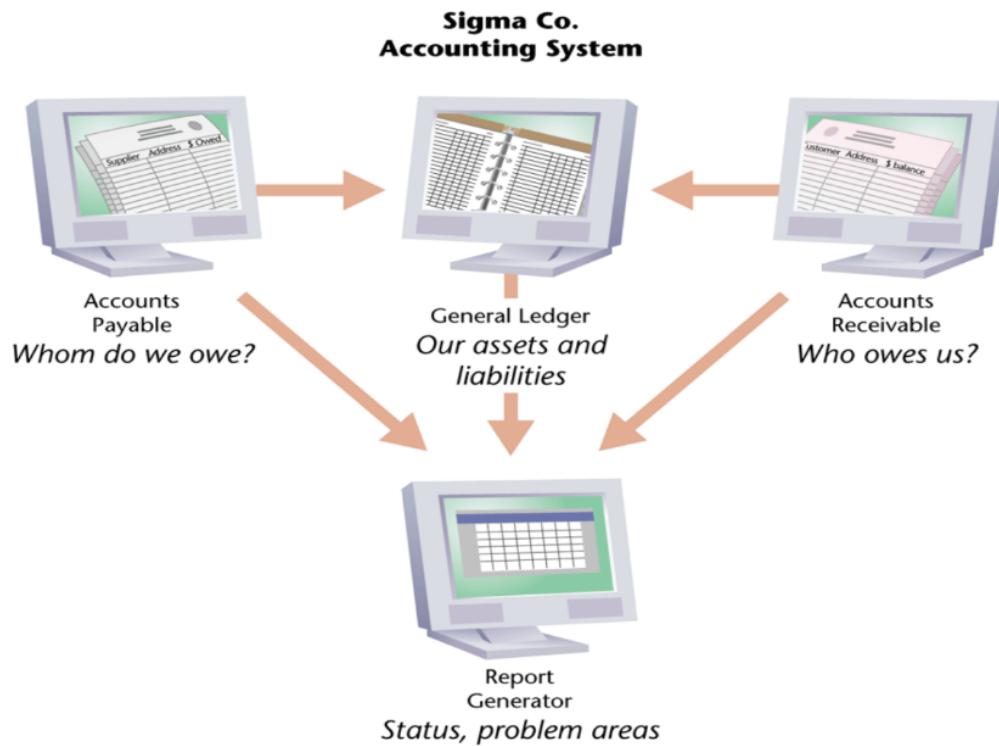
The public transportation system in Sydney, Australia, is a clear example of a system that accepts passenger input (boarding), processes it by transporting passengers along predefined routes, and produces output in the form of passengers reaching their desired destinations efficiently.

- Characteristics of a system:
 - May have multiple goals
 - May contain subsystems
- **Subsystem:** component of a larger system
 - Has sub-goal that contributes to main goal
 - Can receive input from and transfer output to other subsystems

This slide outlines the characteristics of a system, which may have multiple goals and can contain subsystems with sub-goals contributing to the main goal.

Practical Example in Australia:

A practical example of a system with subsystems in Australia is the national healthcare system, where hospitals, clinics, and medical practitioners (subsystems) contribute to the overall goal of providing healthcare services to the population. Each subsystem has its own specific goals and can interact with others to achieve the main goal of ensuring public health.



- **Closed system:** has no connections with other systems
- **Open system:** interfaces and interacts with other systems
 - Often a subsystem of a bigger system
 - Subsystems by definition are always open
- **Information system (IS):** all components that work together to process data and produce information

This slide distinguishes between closed systems (having no connections with other systems) and open systems (interfacing and interacting with other systems), with information systems (IS) encompassing all components working together to process data and produce information.

Practical Example in Australia:

A practical example of an open system in Australia is the transportation network, where various subsystems like roadways, public transportation, and airports interface and

interact to facilitate the movement of people and goods within the country, making it a part of the larger transportation system.

An information system example in Australia would be a hospital's healthcare information system, where components like electronic health records, diagnostic tools, and patient management systems work together to process patient data and produce medical information for healthcare professionals.



Information and Managers

- **Systems thinking:** considering an organization in terms of subsystems
 - Powerful management approach that creates a framework for problem solving and decision making
 - Helps keep managers focused on overall goals
- **Database:** collection of electronic records
- Information systems automate information exchange among subsystems

This slide emphasizes systems thinking as a powerful management approach that views organizations in terms of subsystems, and it explains databases as collections of electronic records, while highlighting that information systems automate information exchange among subsystems.

Practical Examples in Australia:

1. **Systems Thinking:** In the context of an Australian university, systems thinking involves considering various departments like admissions, academics, finance, and student services as subsystems that contribute to the university's overall goal of providing quality education. This approach helps university management make decisions that benefit the entire institution.
2. **Database:** An example in Australia would be a customer database used by a national retail chain. This database contains electronic records of customer information, purchase history, and preferences, enabling the chain to tailor marketing strategies and improve customer experiences.
3. **Information Systems:** In the healthcare sector in Australia, information systems in hospitals automate the exchange of patient data among various subsystems such as the emergency department, laboratory, and pharmacy, ensuring that healthcare providers have access to accurate and up-to-date patient information for better patient care.

- **Information map:** description of data and information flow within an organization
 - Shows a network of information subsystems that exchange information with each other and with the outside world
- **Information technology:** technologies that facilitate construction and maintenance of information systems

This slide introduces the concept of an information map as a description of data and information flow within an organization, and it defines information technology as the technologies that facilitate the construction and maintenance of information systems.

Practical Examples in Australia:

1. **Information Map:** In an Australian government department, an information map could depict how citizen data flows between various subsystems, including tax, immigration, and social services, to ensure efficient and secure data exchange while adhering to privacy regulations.
2. **Information Technology:** A practical example in Australia would be the use of cloud computing technology by an Australian financial institution to build and maintain its information systems, enabling secure data storage, real-time transactions, and accessibility for customers and employees.



- Consist of data, hardware, software, telecommunications, people, and procedures
- **Computer-based information system** includes one or more computers at its center
 - Computers collect, store, and process data into information
 - People give instructions via computer programs

This slide highlights that information systems consist of data, hardware, software, telecommunications, people, and procedures, with computer-based information systems centered around one or more computers that collect, store, and process data into information based on instructions from people.

Practical Examples in Australia:

- Healthcare Information System:** In an Australian hospital, a healthcare information system includes patient data, medical devices (hardware), electronic health records software, a secure network (telecommunications), healthcare professionals (people), and clinical workflows (procedures) to manage patient information efficiently.
- Online Banking System:** An Australian bank's online banking system involves customer account data, banking software, internet infrastructure (telecommunications), bank staff (people), and security protocols (procedures) to allow customers to access and manage their accounts online.



Data	Input that the system takes to produce information
Hardware	A computer and its peripheral equipment: input, output, and storage devices; hardware also includes data communication equipment
Software	Sets of instructions that tell the computer how to take data in, how to process it, how to display information, and how to store data and information
Telecommunications	Hardware and software that facilitate fast transmission and reception of text, pictures, sound, and animation in the form of electronic data
People	Information systems professionals and users who analyze organizational information needs, design and construct information systems, write computer programs, operate the hardware, and maintain software
Procedures	Rules for achieving optimal and secure operations in data processing; procedures include priorities in dispensing software applications and security measures



- Trends that have made information systems (ISs) important in business
 - Growing capacity and decreasing costs of data storage devices
 - Increasing variety and ingenuity of computer programs
 - Cloud computing capabilities

This slide underscores the trends that have heightened the importance of information systems in business, including the growing capacity and decreasing costs of data storage devices, the increasing variety and ingenuity of computer programs, and the capabilities offered by cloud computing.

Practical Examples in Australia:

1. **Big Data Analytics:** Australian companies leverage the growing capacity of data storage to analyze large datasets, such as customer preferences or market trends, using advanced analytics programs to make informed business decisions.
2. **Software as a Service (SaaS):** Many Australian businesses adopt cloud computing through SaaS solutions, allowing them to access software applications, like customer relationship management (CRM) systems, over the internet, reducing the need for on-premises infrastructure and software maintenance.



The Four Stages of Processing

- **Input:** enter data into the IS
 - **Transaction:** a business event, usually entered as input
 - **Transaction processing system (TPS):** a system that records transactions
 - Input devices include keyboards, bar code readers, voice recognition systems, and touch screens
- **Processing:** changing and manipulating the data

This slide discusses the input and processing components of an information system, including transactions, transaction processing systems (TPS), and various input devices.

Practical Examples in Australia:

1. **Supermarket Barcode Scanners:** Supermarkets in Australia use barcode readers as input devices to quickly scan products at the checkout counter, recording transaction data in real-time through TPS.
2. **Voice-Activated Virtual Assistants:** Many Australian businesses and households use voice recognition systems like Amazon's Alexa or Google Assistant to input commands and perform tasks, such as setting reminders or controlling smart home devices, demonstrating the processing capabilities of information systems.

- **Output:** get information out of the IS
 - Output devices include printers and speakers
- **Storage:** maintaining vast amounts of data and information
 - Storage devices include optical discs

This slide covers the output and storage components of an information system, including devices like printers for output and optical discs for storage.

Practical Examples in Australia:

1. **Office Laser Printers:** Businesses in Australia use office laser printers to generate hard copies of reports and documents as output from information systems.
2. **Cloud Storage Services:** Many individuals and organizations in Australia utilize cloud storage services like Google Drive and Dropbox to store vast amounts of data and information securely, demonstrating the storage capabilities of information systems.

- Different technologies are used to support the four data processing functions
 - Input devices: receive input
 - Computers: process data
 - Output devices: display information
 - Storage devices: store data
 - Network devices and communication lines: transfer data
- **Telecommunications:** communication that occurs between computers over distances

This slide discusses the various technologies used to support data processing functions in information systems, including input devices, computers, output devices, storage devices, and telecommunications.

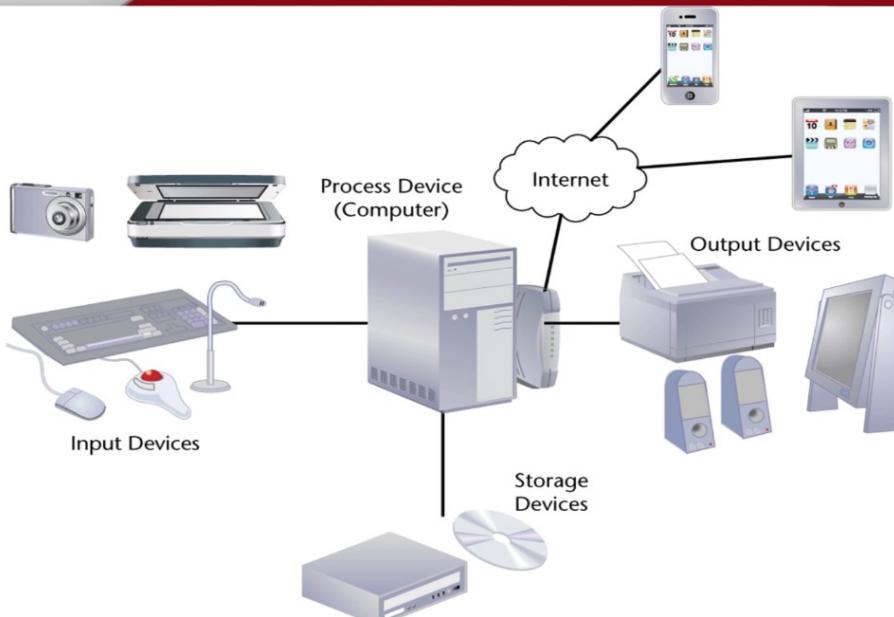
Practical Examples in Australia:

1. **Smartphones and Tablets as Input Devices:** In Australia, smartphones and tablets are commonly used as input devices to interact with various applications and systems, such as mobile banking or e-commerce apps.

2. **Computers for Data Processing:** Computers are extensively used for data processing in various sectors in Australia, including finance, healthcare, and education.
3. **Printers and Monitors as Output Devices:** Businesses and individuals in Australia rely on printers to produce hard copies of documents, while monitors display information and data.
4. **Network Infrastructure:** Australia has a robust network infrastructure with telecommunications technologies supporting data transfer between computers and devices, including broadband internet connections and 4G/5G networks.



Computer Equipment for Information Systems



From Recording Transactions to Providing Expertise

- Different types of information systems serve different functions
- Capabilities of applications have been combined and merged
- **Management Information Systems (MISs)** support management activities
 - Planning, controlling, and making decisions

This slide highlights the diversity of information systems, the convergence of their capabilities, and the role of Management Information Systems (MISs) in supporting managerial activities such as planning, controlling, and decision-making.

Practical Examples in Australia:

1. **Enterprise Resource Planning (ERP) Systems:** Many large Australian organizations use ERP systems like SAP or Oracle to integrate various business functions, streamlining processes, and aiding in managerial decision-making.

2. **Customer Relationship Management (CRM) Systems:** Australian businesses often employ CRM systems to manage customer interactions, improve relationships, and make informed decisions regarding marketing and sales strategies.
3. **Business Intelligence (BI) Tools:** Companies in Australia leverage BI tools like Tableau or Power BI to gather and analyze data, assisting management in making data-driven decisions for their operations.
4. **E-Government Systems:** In the public sector, government agencies in Australia use information systems to manage various activities, including planning policies, controlling budgets, and making decisions to improve public services.



- **Transaction processing system (TPS):** most widely used ISs
 - Records data collected at point where organization transacts business with other parties
- **Point-of-sale (POS) machines:** record sales
 - Include cash registers, ATMs, and purchase order systems

This slide introduces Transaction Processing Systems (TPS), the most widely used Information Systems, which record data at the point where an organization conducts business with other parties, with practical examples including point-of-sale (POS) machines like cash registers, ATMs, and purchase order systems in Australia.



- **Supply chain:** sequence of activities involved in producing and selling products or services
 - For products, activities include:
 - Marketing, purchasing raw materials, manufacturing and assembly, packing and shipping, billing, collection, and after-sale services
 - For services, activities include:
 - Marketing, document management, and monitoring customer portfolios

This slide explains the concept of a supply chain as a sequence of activities involved in producing and selling products or services, with practical examples in Australia.

including marketing, purchasing raw materials, manufacturing, billing, collection, and after-sale services for products, and marketing, document management, and monitoring customer portfolios for services.



- **SCM systems** support supply chain activities
 - Also known as **enterprise resource planning systems**
- SCM systems eliminate the need to reenter data captured elsewhere in the organization
- **Enterprise application:** separate business process subsystems connected to form one large IS

This slide explains that SCM (Supply Chain Management) systems, also known as enterprise resource planning systems, support supply chain activities by eliminating the need to reenter data, and in Australia, practical examples include the integration of inventory management, order processing, and logistics to streamline the supply chain.



- **CRM systems** help manage relations with customers
 - Used in combination with telephones to provide customer service
 - Often linked to Web applications that track online transactions
- Retaining loyal customers is less expensive than acquiring new ones

This slide highlights that CRM (Customer Relationship Management) systems help manage relations with customers, and in Australia, practical examples include businesses using CRM software in combination with telephones to provide customer service, and CRM systems being linked to web applications to track online transactions for efficient customer management.

- Human resource (HR) management systems assist in:
 - Record-keeping
 - Employee evaluation
 - Employee benefits

This slide explains that HR (Human Resource) management systems assist in record-keeping, employee evaluation, and managing employee benefits, and practical examples in Australia include companies using HR software to maintain employee records and evaluate performance, as well as administer benefits like payroll and leave management.

- **E-commerce:** buying and selling goods and services through Internet
- Internet is a vast network of computers connected globally
- Web has a profound impact on information systems
 - A place to conduct e-commerce
 - An emerging advertising medium

This slide describes e-commerce as the buying and selling of goods and services through the Internet, and practical examples in Australia include online retail stores like Amazon and local businesses with online shopping websites that enable customers to make purchases over the Internet.

- Information technology professionals are increasingly in demand
- U.S. Bureau of Labor Statistics estimates a 22 percent increase in demand for computer and information technology specialists for the decade 2010–2020

This slide highlights the increasing demand for information technology professionals, and practical examples in Australia include job openings and career opportunities in the IT sector, such as software development, cybersecurity, and data analysis roles.

- **Systems analyst:**
 - Starts career as programmer or **programmer/analyst**
 - Researches, plans, and recommends software and systems choices
 - Responsible for developing cost analyses, design considerations, implementation timelines, and feasibility studies
- Requires excellent communication and presentation skills

A systems analyst in Australia typically begins their career as a programmer or programmer/analyst, and they play a key role in researching, planning, and recommending software and systems solutions, often working on tasks such as developing cost analyses, design considerations, implementation timelines, and feasibility studies, all of which require strong communication and presentation skills.

- **DBA** is responsible for databases and data warehouses
 - Develops and acquires database applications
 - Must adhere to federal, state, and corporate regulations to protect privacy of customers and employees
 - Responsible for securing the database

A Database Administrator (DBA) in Australia is tasked with overseeing databases and data warehouses, which includes developing and acquiring database applications, ensuring compliance with federal, state, and corporate privacy regulations to protect customer and employee data, and maintaining the security of the database.

Network Administrator

- **Network administrator:** acquires, implements, manages, maintains, and troubleshoots networks
- Implements security
 - Firewalls
 - Access codes

A Network Administrator in Australia is responsible for acquiring, implementing, managing, maintaining, and troubleshooting networks, including the implementation of security measures like firewalls and access codes to safeguard network integrity and data.



System Administrator

- **System administrator ("sys admin"):** manages an organization's computer operating systems
 - Must ensure that operating systems work together, support business requirements, and function properly
 - Responsible for backup and recovery, adding and deleting user accounts, and performing system upgrades

A System Administrator (Sys Admin) in Australia is responsible for managing an organization's computer operating systems, ensuring their compatibility, functionality, and security, while also handling tasks like backup and recovery, user account management, and system upgrades to support business operations.



Mobile Applications Developer

- **Mobile applications developer** skills
 - Technical expertise: software development tools for mobile devices and programming languages
 - Ability to determine users' needs
 - Communication and system design skills

Mobile applications developers in Australia require technical expertise in software development tools and programming languages for mobile devices, along with the ability to understand and address users' needs through effective communication and system design skills.

Webmaster

- **Webmaster:** creates and maintains Web site
 - Must be familiar with Web transaction software, payment-processing software, security software
 - Manages both the intranet and extranet
- Involved in creatively representing the organization on the web

A webmaster in Australia is responsible for developing and maintaining websites, requiring proficiency in web transaction software, payment processing software, security software, and managing both intranet and extranet, while creatively representing the organization online.



Chief Security Officer (CSO)

- **CSO:** supervises security of information system
 - Also called chief information security officer (CISO)
- Position exists due to growing threat to information security
- Usually reports to chief information officer (CIO)

In Australia, a Chief Security Officer (CSO), also known as a Chief Information Security Officer (CISO), oversees the security of information systems, a role that has become increasingly vital due to the growing threats to information security, typically reporting to the Chief Information Officer (CIO).

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