**Chapter 7 Summary**

**Functional Information Systems**

**Overview:**

Functional Information Systems form the backbone of large organizations, organizing various departments and activities. Each functional area, such as accounting, finance, sales, marketing, human resources, purchasing, production, and research and development, utilizes specialized information systems tailored to their specific needs.

**Accounting:**

Focus Points: Automation, General Ledger, Income Statement, Balance Sheet

Accounting modules automate repetitive calculations, tracking financial transactions and ensuring accurate recording of data. These systems receive inputs from various modules, creating a cohesive financial overview for the organization.

**Finance:**

Focus Points: Decision Making, Financial Planning, Pro Forma Financial Statements

Finance systems analyze past data and use specialized software, including spreadsheets, to make future-oriented decisions. They evaluate borrowing options, repayment strategies, and investment choices, often projecting outcomes through pro forma financial statements.

**Sales:**

Focus Points: Sales Process Automation, Customer Relationship Management

Sales information systems vary based on the industry, supporting processes like checkout, project costing, and ticket sales. They forecast sales, track customer interactions, and ensure seamless customer engagement.

**Marketing:**

Focus Points: Market Analysis, Product Development, Pricing Strategies

Marketing systems analyze market data, shaping product offerings, pricing strategies, and promotional activities. These systems rely on comprehensive market research, guiding the company in its product development and customer engagement efforts.

**Human Resources:**

Focus Points: Workforce Planning, Training Management, Succession Planning

Modern HR systems extend beyond basic record-keeping, aiding in strategic planning. They assess current staffing, anticipate turnover, facilitate training programs, and support succession planning, ensuring organizational stability and growth.

**Purchasing:**

Focus Points: Procurement Efficiency, Supplier Management, Inventory Control

Purchasing systems optimize procurement processes, ensuring efficient vendor interactions, consistent approaches, and favorable terms based on purchase volume. They manage workflows, automate purchase orders, and minimize delays in the supply chain.

**Production:**

Focus Points: Bill of Materials Processing, Material Requirements Planning, Production Scheduling

Production-focused systems calculate materials needed for manufacturing, compare inventory levels, and plan production schedules. They integrate with accounting and purchasing modules, ensuring seamless coordination between departments.

**Research and Development:**

Focus Points: Computer-Aided Design, Collaboration, Product Lifecycle Management

R&D departments use computer-aided design (CAD) software to create detailed product designs. These systems enable collaboration, allowing engineers and designers to share information, create bills of materials, and estimate costs, facilitating the product development lifecycle.

Understanding these functional information systems is essential for professionals, providing insights into the intricate processes that drive organizational success. Integration and collaboration between these departments ensure a streamlined approach, enhancing efficiency and strategic decision-making within the organization.

**7.3 Transaction Processing**

**Focus Points:**

- Definition of a transaction in information systems.

- Sequence of activities involved in transaction processing.

- Challenges and risks associated with concurrent transactions and system failures.

- Importance of ACID properties in transaction processing.

- Data validation techniques and their significance.

- Distinction between batch processing and online transaction processing (OLTP).

**Summary:**

In information systems, a transaction is defined as a business activity that affects the organizational database. Each transaction involves several steps: input from an external source, reading additional information from files or databases, performing calculations, and storing the results in a file or database. Transactions can occur simultaneously and involve multiple system elements, leading to the risk of losing updates or incomplete transactions.

**To address these challenges, transactions must adhere to the ACID properties:**

- Atomicity: Transactions are processed as a unit, and if any part fails, the entire transaction is rolled back.

- Consistency: Transactions bring the database from one valid state to another, maintaining internal consistency.

- Isolation: Processing a transaction is isolated from other transactions to prevent interference.

- Durability: Once a transaction is committed, it remains in the database indefinitely.

Ensuring ACID properties requires complex software, which can be expensive but is necessary for large-scale transaction processing. Managers and knowledge workers typically don't enter transactions but rely on summarized reports generated from transaction data. Data validation techniques, such as format checks, validation against lists, and check digits, help ensure data accuracy.

Batch processing, where transactions are collected and processed in groups, is efficient in terms of resource utilization but lacks timeliness. Online transaction processing (OLTP) processes transactions immediately as they occur, providing real-time updates and ensuring timely information for decision-making.

Understanding the nuances of transaction processing, including validation techniques and the distinction between batch and online processing, is crucial for designing effective information systems and ensuring the integrity and accuracy of data.

**7.4 Enterprise Resource Planning Systems**

**Interconnectedness of Organizational Parts**

- Parts of an organization are interconnected, essential for common goals.

- Examples of interconnections: sales linked to production, shipping, and accounts; commission affecting payroll; production connected to purchasing; impact of business and HR planning on various departments.

**Introduction to ERP Software**

- ERP connects organizational parts through a shared database.

- Modules for Accounting, Sales, Purchasing, HR, Manufacturing, etc., share data.

- Originated from MRP-II, now applicable to various sectors.

- Relies on shared databases and networks for organizational coordination.

**Business Processes and ERP**

- Illustration of processes triggered by a toy factory order.

- Challenges in handling processes, e.g., credit checks, inventory management, and production scheduling.

- ERP software customization to fit specific business processes.

- ERP developers incorporate industry best practices into their packages.

**Approaches to ERP Implementation**

- Traditional licensing, Software as a Service (SaaS), and third-party operation.

- Growing trend towards cloud-based ERP solutions.

- Integration with IoT through edge and fog computing.

- Inclusion of Manufacturing Execution Systems (MES) in ERP processes.

**Benefits of ERP Implementation**

- Reduction of manual data transfer between departments.

- Comprehensive view of the business through a central database.

- Elimination of inconsistent data views; decisions based on consistent data.

- Implementation of best practices, leading to efficiency.

- Timely reporting and compliance facilitation through centralized data.

- Reduction of inventory costs and improved customer satisfaction by eliminating duplicate data entry.

**Concerns with ERP Implementation**

- High initial and ongoing costs of ERP software.

- Complexity and cost of customizing ERP packages to fit specific organizational processes.

- Potential challenges in changing established work processes.

- Hardware upgrades and staff retention concerns due to ERP implementation.

- Management support crucial for successful ERP implementation.

**Business Process Re-engineering (BPR)**

- BPR involves re-examining and optimizing existing processes.

- Enabled by ERP, BPR aims to eliminate or redesign inefficient processes.

- Successful BPR examples, like Ford's accounts payable operation.

- Challenges in BPR, including strategy misunderstanding and human factors.

- Potential benefits of BPR when applied effectively.

**Managerial Perspective**

- Understanding the benefits of IT, including ERP and BPR, is essential for managers.

- Inclusion of BPR in the managerial toolkit for process optimization and organizational efficiency.

**7.5 Enterprise Application Integration (EAI)**

**Introduction to EAI:** Organizations evaluating ERP packages often encounter modules that may not perfectly fit their needs. While some modules can be customized or adapted to, there might be a few that do not align well with the organization's processes. Enterprise Application Integration (EAI) offers a solution to seamlessly connect various applications or groups of related applications within an organization.

**Role of Middleware:** EAI involves the use of middleware, positioned between applications, ensuring data sharing and updates. Middleware acts as a mediator, converting and facilitating data flow between different applications. It can operate as push or pull, depending on business priorities and the need for real-time data access.

**Push vs. Pull Approach:**

* *Push Approach:* Changes made in one database are immediately pushed to other locations. This ensures up-to-date information, though some efforts might be redundant.
* *Pull Approach:* Data is moved when required, allowing more efficient updates. However, there might be a lag in data availability as elements need to be retrieved, converted, and entered into the destination database.

**ERP vs. EAI:** The choice between ERP and EAI is a critical business decision. Advantages of ERP include centralized system management, best practices implementation, unified user experience, and streamlined security. On the other hand, EAI offers a best-of-breed approach, flexibility in application choices, reduced customization needs, and the ability to retain existing applications.

**Trends and Considerations:** The trend is shifting towards ERP as its costs decrease, technical skills become more widespread, and familiarity grows. However, EAI might still be relevant in specific contexts, especially when a diverse range of applications needs to be integrated.

**7.6 Intranets and Intranet of Things (IoT)**

**Introduction to Intranets:** In addition to utilizing shared databases through systems like ERP, organizations require networks to connect various parts of their operations. Large organizations often deploy Local Area Networks (LANs) within their premises, linked through building wiring and the internet. These networks provide connectivity, but accessing databases necessitates applications. An internal network enabling organizational resource access, utilizing Internet protocols, is referred to as an intranet.

**Intranet Functionality:** Users access intranets via browsers, similar to public web pages. Intranet servers deliver web pages that appear as if they originated from public sites but contain internal information. Intranets support email, file transfer, and other information-based activities, enhancing communication and collaboration within organizations.

**Access Control and Security:** Intranet access is controlled via physical connections and wireless links, requiring authorization, usually through user ID and password. Users within the intranet can access corporate databases and resources with a single sign-on mechanism, simplifying user authentication. Firewalls often mediate intranet access to the internet, ensuring security by blocking harmful content and unauthorized sites.

**Intranet of Things (IoT) Applications:** The concept of Intranet of Things involves connecting non-human devices within an organization. Utilizing Internet protocols, this internal network links devices with sensors and actuators. Examples include agricultural systems monitoring water levels and quality, offshore oil and gas platforms integrating sensors for safety and efficiency, and wind farms optimizing turbine performance through data-driven adjustments.

**Integration with Manufacturing Execution Systems (MES):** In manufacturing, the Intranet of Things plays a crucial role in MES. MES systems leverage automatic production and process monitoring via IoT, enabling factories to transition from manual to automated systems. MES can accommodate data from machines directly, allowing organizations to evolve their processes gradually.

**7.7 Integrating Society: Social Networks and Network Effects**

**Introduction to Social Networks:** Human society, the largest organization known, can be interconnected through information systems, akin to how businesses and universities connect their internal components. Social networks like Facebook, Instagram, and YouTube have become pervasive, connecting millions globally. These networks play a crucial role in modern society, enhancing communication, collaboration, and community engagement.

**Economic Challenges of Social Networks:** The sustainability of social networks poses economic challenges. Business models, including public sponsorship, member benefits, subscription fees, and advertising, support these platforms. The business model's viability evolves as the network expands, requiring continuous review and adaptation. Social networks are influenced by network effects, where the value of the network increases as more people join, fostering growth and engagement.

**Network Effects and Language:** Network effects extend beyond digital networks. Languages, for example, gain value with more speakers, creating a positive feedback loop. However, network effects are not permanent; languages and digital platforms can rise and fall based on various factors, including economic shifts and technological advancements.

**Navigating Network Effects:** Understanding network effects is essential for businesses. Positive feedback reinforces the dominance of a network or language, while negative feedback can limit growth. Recognizing these dynamics allows businesses to leverage existing social networks and potentially create their own, enhancing their online presence and engagement with customers.