Management Information Systems 18th edition Laudon Solutions Manual

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Chapter 1 – Instructor Manual

Chapter Summary

This chapter explores the foundational role of information systems in modern organizations and the ways that they radically transform business operations, strategies, and careers. It introduces key concepts such as the essential nature of information systems, different types of business processes, and their integration with technology to achieve organizational goals. Several current trends are highlighted, including the increased importance of big data, cloud computing, artificial intelligence (AI), and the Internet of Things (IoT). The chapter addresses how these developments create both opportunities and challenges, requiring organizations to adapt to globalization, refine their decision-making, and develop new products, services, and business models. It emphasizes that technology alone will not guarantee success; rather, organizations need complementary assets, including a supportive culture, effective management, and robust organizational structures. The chapter also encourages learners to adopt a sociotechnical view, recognizing how social, managerial, and technical components must all align to deliver the full potential of information systems.

Learning Objectives

These are the chapter objectives:

1.1 Understand how information systems transform business and careers.

1.2 Describe key challenges and opportunities created by new MIS technologies.

1.3 Describe key features of a digital firm.

1.4 Describe the business objectives of information systems.

1.5 Explain what an information system is and how it works.

1.6 Describe organizational, management, and technology dimensions of information systems.

1.7 Understand the importance of IoT, big data, cloud computing, and AI.

1.8 Understand why complementary assets are essential.

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1.9 Describe different approaches used to study information systems.

1.10 Understand how this book prepares you for the future.

1.11 Understand how the information in this chapter can help your career.

MIS Headline Article (eText Only)

"Each chapter opens with an MIS Headline Article that is Updated monthly during the semester to keep your course content current and relevant. Use the article to:

- Start a lecture.
- Engage students to demonstrate how what they are learning applies to what's happening today.
- Use the provided discussion questions in class."

MyLab MIS

"If you are using the MyLab, you can assign the Chapter Reading Assignment. This includes each learning objective Broken into a reading activity followed by a question to be answered. The full activity is scored in the gradebook. You can remove learning objectives you don't plan to cover, and the questions related to it will be removed from the overall score."

Dirt Bikes Running Case

The Dirt Bikes Running Case is used throughout the text. Data files related to this case can be found at https://www.pearson.com/laudon.

Key Points to Cover

1.1 Understand How Information Systems Transform Business and Careers

- Highlight how internet connectivity and mobile applications have fundamentally changed customer interactions and daily operations.
- Emphasize the role of e-commerce, social media, and digital marketing in business transformation and job opportunities.

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- Discuss the rapid growth in demand for digital skills in the labor market and its implications for career development.

1.2 Describe Key Challenges and Opportunities Created by New MIS Technologies

- Show how emerging technologies such as cloud computing, AI, and big data offer new possibilities for process optimization and decision-making.
- Identify the organization, management, and technology challenges related to data privacy, security, and ROI measurement.
- Discuss the concept of globalization and how technological advances create both global competition and worldwide market opportunities.

1.3 Describe Key Features of a Digital Firm

- Define what a digital firm is, focusing on its reliance on digitally enabled processes, communication, and decision-making.
- Explain how digital transformation initiatives can position a firm for agility, competitiveness, and real-time responsiveness to market changes.
- Explore the concept of time shifting (24/7 operations) and space shifting (global presence) as integral attributes of a digital firm.

1.4 Describe the Business Objectives of Information Systems

- Examine how organizations leverage Information Systems to achieve operational excellence, product/service innovation, and customer/supplier intimacy.
- Demonstrate how information systems play a critical role in enhancing decision-making, maintaining competitive advantage, and ensuring organizational survival.
- Address the importance of environmental sustainability, proper governance, and responsible use of AI as emerging strategic business imperatives tied to IS.

1.5 Explain What an Information System Is and How It Works

- Clarify the difference between data and information, as well as between computer literacy and information systems literacy.
- Illustrate the three core activities in an information system: input, processing, and output, with feedback loops for continual improvement.
- Stress that information systems are more than just technology; they are integrated solutions encompassing people, processes, and technology.

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1.6 Describe Organizational, Management, and Technology Dimensions of Information Systems

- Show how organizational structures, cultures, and politics influence the adoption and effectiveness of information systems.
- Emphasize management's responsibility for setting strategy, supervising implementations, and controlling outcomes.
- Review the main components of IT infrastructure: hardware, software, data management, and networking/telecommunications, including the Internet.

1.7 Understand the Importance of IoT, Big Data, Cloud Computing, and AI

- Define the Internet of Things and how embedded sensors generate wide-ranging data streams ("big data").
- Describe how cloud computing offers scalable, on-demand computing power to manage and analyze enormous data sets and advanced AI workloads.
- Discuss the transformative potential of AI and machine learning in predictive analytics, automation, and decision support, as well as generative AI's unique capabilities.

1.8 Understand Why Complementary Assets Are Essential

- Define complementary assets and explain how they amplify the returns on technology investments.
- Explore the importance of organizational and managerial changes, such as supportive culture, incentivized innovation, and well-designed processes, to fully realize IT's value.
- Illustrate how lacking sufficient complementary assets can lead to poor returns on otherwise sound technology investments.

1.9 Describe Different Approaches Used to Study Information Systems

- Contrast the technical and behavioral approaches to studying IS, noting the disciplines that inform each (computer science vs. sociology, psychology, and economics).
- Highlight the sociotechnical view, which encourages joint optimization of both social/organizational and technical/IT elements.

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- Illustrate that effective IS solutions emerge from a holistic approach addressing technology, people, culture, and structure.

1.10 Understand How This Book Prepares You for the Future

- Stress the importance of broad-based problem-solving skills, including communication, analytical reasoning, and collaborative work.
- Relate the content of the text to real-world career needs in both IT-specific and non-IT job positions.
- Emphasize ways students can leverage their knowledge of IS to identify and solve business problems, creating value and advancing in their careers.

1.11 Understand How the Information in This Chapter Can Help Your Career

- Showcase how the critical thinking and IS literacy concepts in this chapter apply directly to workplace challenges.
- Provide examples of jobs (both technical and non-technical) that increasingly rely on utilizing information systems effectively.
- Encourage long-term skill development in digital tools, analytics, and strategic thinking around technology to adapt and grow professionally.

Key Terms

The Learning Objective in which the terms are covered appears in parentheses after the term.

- Artificial intelligence (AI) (1.7)
- Big data (1.7)
- Business functions (1.6)
- Business model (1.4)
- Business processes (1.3)
- Cloud computing (1.2)
- Computer hardware (1.6)
- Computer literacy (1.5)
- Computer software (1.6)
- Complementary assets (1.8)
- Culture (1.6)
- Data (1.5)

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- Data management technology (1.6)
- Data workers (1.6)
- Digital firm (1.3)
- Digital transformation (1.3)
- Extranet (1.6)
- Feedback (1.5)
- Generative AI (GenAI) (1.7)
- Globalization (1.2)
- Information (1.5)
- Information system (IS) (1.5)
- Information systems literacy (1.5)
- Information technology (IT) (1.5)
- Information technology infrastructure (IT infrastructure) (1.6)
- Input (1.5)
- Internet (1.6)
- Internet of Things (IoT) (1.7)
- Intranet (1.6)
- Knowledge workers (1.6)
- Machine learning (ML) (1.7)
- Management information systems (MIS) (1.5)
- Middle management (1.6)
- Network (1.6)
- Networking and telecommunications technology (1.6)
- Operational management (1.6)
- Output (1.5)
- Processing (1.5)
- Production and service workers (1.6)
- Senior management (1.6)
- Sociotechnical view (1.9)
- World Wide Web (web) (1.6)

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Case Studies

Opening Case Study: ConocoPhillips Drills Down with Digital Technology

Summary:

ConocoPhillips operates an extensive oil and gas exploration business and faces unique challenges in remote, harsh environments. The Kuparuk River oil field in Alaska provided a testing ground for innovations such as 3D printing of replacement parts and AI/ML-driven data analytics to optimize operations. By leveraging these technologies, ConocoPhillips slashed production delays, lowered inventory costs, and laid the groundwork for further digital transformations.

1. Identify the problem described in this case. What areas of the business did it affect?

Suggested Answer:

ConocoPhillips's problem was the difficulty of reliably procuring spare parts and maintaining operations in remote areas such as the Kuparuk oil field in Alaska. Long lead times, expensive shipping, harsh weather conditions, and limited suppliers significantly raised operational costs and risks of downtime. These issues affected multiple areas of the business, including supply chain management, inventory control, production efficiency, maintenance processes, and sustainability goals. Because parts had to be manufactured and shipped from distant locations, production could stall when older parts wore out, quickly raising expenses. Additionally, storing large quantities of extra parts cluttered facilities and added unnecessary warehousing costs. ConocoPhillips needed a solution that ensured timely and cost-effective delivery of critical components while reducing its environmental footprint.

2. How did ConocoPhillips benefit from using 3D printing and AI/ML?

Suggested Answer:

3D printing enabled ConocoPhillips to create replacement parts in weeks rather than months, cutting lead times dramatically. It also allowed for on-demand production, reducing unnecessary storage costs while ensuring the immediate availability of essential items. Additionally, 3D printing supported design enhancements, making certain parts more efficient and less prone to wear. AI/ML further optimized operations by analyzing big data generated from sensors and machinery. These algorithms

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provided insights into machine performance, predicting equipment failures or inefficiencies before they caused costly downtime. Automated analytics and modeling tools improved decision making, accelerated problem resolution, guided maintenance schedules, and helped reduce energy consumption. Collectively, these digital technologies helped ConocoPhillips save money, maintain production levels, and shrink its carbon emissions footprint.

3. How did these new technologies change the way ConocoPhillips ran its business?

Suggested Answer:

The introduction of 3D printing and AI/ML fundamentally shifted ConocoPhillips's operational and maintenance model. Instead of relying on lengthy procurement procedures and maintaining large warehouses of spare parts, the company transitioned to manufacturing parts on demand through additive manufacturing. AI/ML tools also transformed business processes, enabling predictive maintenance and real-time monitoring. Teams were re-trained to utilize data-driven insights from sensors, analytics platforms, and AI bots, which informed more strategic allocation of resources. Management processes became more agile, as decisions could be made using timely, accurate data rather than best guesses. Overall, these technologies encouraged a more innovative culture geared toward continuous improvement, efficiency, and sustainability, transforming ConocoPhillips into a more resilient, tech-driven organization.

Spotlight on Technology Case Study: UPS Competes Globally with Information Technology

Summary:

UPS leverages a range of information technologies, including bar codes, Delivery Information Acquisition Devices, wireless networks, and sophisticated AI solutions, to run its global delivery operation. Through real-time package tracking, automated logistics planning, and predictive analytics, UPS delivers millions of packages daily while containing costs and improving service quality.

1. What are the inputs, processing, and outputs of UPS's package tracking system?

Suggested Answer:

The inputs include a scannable bar-coded label with shipper details, recipient information, and the desired delivery time. Drivers use handheld devices to scan packages at every stage, capturing signatures, delivery confirmations, and pickup

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details. This information is then processed by the UPS central computer system, which matches package data against the company's databases, generating tracking updates and routing instructions. AI-driven logistics tools analyze these data streams to optimize route efficiency. The outputs consist of real-time tracking updates made available to customers, dispatchers, and delivery personnel. These outputs appear as notifications to end users for proof of delivery, shipping status, and any updated routing if issues arise. This fully integrated cycle keeps operations efficient, ensures packages are delivered on time, and provides transparency for both internal and external stakeholders.

2. What technologies are used by UPS? How are these technologies related to UPS's business strategy? What role is played by AI?

Suggested Answer:

UPS uses handheld DIADs (Delivery Information Acquisition Devices), barcode scanners, wireless networks, mainframe computers, and specialized software like ORION to coordinate and track packages. Additionally, AI-driven tools, such as DeliveryDefense and Network Planning Tools, identify at-risk deliveries and reroute packages to handle disruptions or large shipment volumes. These technologies satisfy UPS's core strategy of cost leadership combined with first-rate customer service. By leveraging real-time data, UPS can optimize delivery routes, reduce operation costs, and minimize errors, all of which strengthen its customer promise of reliable and timely delivery. AI provides deeper analytics and autonomous decisions—for instance, predicting potential theft targets or helping with advanced route optimization—making U PS more agile, competitive, and customer-focused in the global marketplace.

3. What strategic business objectives do UPS's information systems address?

Suggested Answer:

UPS's information systems help achieve several strategic objectives: operational excellence, customer intimacy, and competitive advantage. Operational excellence stems from streamlined processes—route optimization, real-time package tracking, and data analytics—enabling cost efficiencies and improved productivity. Customer intimacy is addressed by providing convenient online tracking tools, personalized delivery statuses, and automated alerts for delays or reroutes, resulting in reliable customer relationships. Further, these innovations create a robust competitive advantage by reducing dependence on older, manual processes and consistently delivering superior service at scale. Enhanced data analytics, AI-driven capabilities, and integrated workflows help UPS stand out in a crowded logistics industry.

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4. What would happen if UPS's information systems were not available?

Suggested Answer:

Without its comprehensive information systems, UPS's end-to-end logistics chain would slow drastically and lose transparency. Packages would be tracked manually, leading to inefficiencies and delayed deliveries. Route planning would be suboptimal, causing excess mileage and fuel consumption, with higher operational costs passed on to customers. Customer satisfaction would plummet as lost or late packages increased and real-time updates disappeared. Managers could not easily measure performance, optimize scheduling, or detect operational bottlenecks. Ultimately, UPS would struggle to maintain its reputation for reliability, risking market share losses to more technologically advanced competitors. The intricate orchestration of international deliveries relies heavily on data-driven decision-making tools—removing these systems would be disastrous for the firm's competitive position.

Chapter Case Study: Capital One: A Digital Transformation in the Making

Summary:

Capital One is a large financial holding company that has pioneered using data analytics and AI to offer personalized financial products and services. The firm embraced cloud computing and in-house software development, shifting from outsourcing most of its technology to building an internal IT workforce for agile, customer-driven innovation. These changes facilitated an ambitious digital transformation that aligns every step of the business with technology.

1. Why was Capital One a good candidate for digital transformation?

Suggested Answer:

Capital One was already a significant innovator in financial services, using data analytics to tailor credit offerings. This data-driven approach, combined with a rapidly evolving financial environment, made it ripe for further transformation. As new technologies emerged—especially AI and mobile banking—management saw that delivering real-time, customized options to customers was critical to stand out in a crowded marketplace. Given Capital One's history of analyzing customer behavior and offering specialized credit products, integrating cloud-based infrastructure and agile development processes was a natural next step for modernizing its operations. Additionally, the company's competitive environment, featuring major banks and fintech

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startups, incentivized bold moves to remain ahead. Together, these factors primed Capital One to leverage cutting-edge tools and reshape its fundamental business model around digital solutions.

2. How did Capital One change its business model to make it technology-driven? What management, organizational, and technology issues did it address?

Suggested Answer:

Capital One redesigned its business model by emphasizing software engineering, cloud computing, and data analytics as core competencies. Rather than fully outsourcing, it developed in-house capabilities for building and customizing applications, including mobile and customer portals. Management dedicated resources to hiring specialized technical talent, reorganizing teams for agile workflows, and fostering a culture centered on innovation and iteration. Organizationally, it dismantled traditional silos between IT and business, encouraging collaboration so every department could leverage real-time data insights. On the technology side, the shift to cloud-based platforms provided flexible and scalable computing power, enabling rapid experimentation and deployments. Security and compliance—crucial in the heavily regulated financial sector—were integrated into these processes from the outset. By focusing on big data analytics and AI, Capital One confidently launched new products and personalized services faster than its less-digitized competitors.

3. What role does AI play at Capital One?

Suggested Answer:

AI is intrinsic to almost every facet of Capital One's decision making and customer engagement. At a rudimentary level, it powers credit risk and fraud detection, generating real-time alerts and assessments. More advanced applications include chatbots like Eno, which uses natural language processing to handle personalized customer inquiries, detect irregular spending, and even lock credit cards for suspected fraud. AI also underpins predictive analytics for new product development, mining large data sets to forecast consumer needs in real time. Machine learning algorithms glean insights from massive transaction records, helping Capital One refine marketing messages and identify emerging trends in financial services. Through these tailored offerings and enhanced scripting, AI gives the company a persuasive way to stand out in digital banking, yielding consistent productivity and revenue gains.

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4. How does Capital One differ from a traditional bank?

Suggested Answer:

Where traditional banks might rely on legacy processes and extensive physical branches, Capital One operates primarily as a “digital-first” institution. It has relatively few traditional branches, choosing instead to invest in technology, mobile banking applications, and data-driven customer insights. While many large financial institutions talk about digitalization, Capital One reorganized its workforce to become a technology innovator, prioritizing in-house software development and large-scale use of cloud computing. It runs agile teams that continuously experiment with new digital products, quickly iterating and improving. Its customer interactions revolve around real-time data analytics, delivering personalized financial recommendations, specialized credit card offers, and intuitive mobile services. Thanks to flexible, scalable IT infrastructure, Capital One can consistently roll out updated features and harness advanced AI tools—traits not commonly found at banks still anchored in legacy systems.

5. Visit the Capital One website and identify all the personalization options that are available for Capital One credit cards.

Suggested Answer:

Upon visiting capitalone.com, students will discover an array of personalization paths for credit cards, such as tailoring offers based on credit score range, lifestyle preferences (e.g., rewards for travel, cash back on groceries or restaurants, and secured cards for credit-building), and specialized products like student cards or business offerings. A prospective customer typically sees a pre-qualification tool that suggests credit lines and interest rates according to their financial data. The website pairs individuals with reward structures they care about—like miles, points, or no annual fees—and highlights each offer’s unique benefits. Students might also see real-time AI-driven recommendations about how to earn the most from each card. Once selected, the credit card can be managed entirely online, including autopay, mobile alerts, and easy dispute handling. These personalized details exemplify how Capital One integrates data analytics into seamless, customer-centric experiences.

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Review Questions

1.1 Understand how information systems transform business and careers

1. Identify three ways information systems are transforming business.

Suggested Answer:

Information systems reshape how organizations operate by enabling greater connectivity, data analytics, and efficiency. First, online platforms and mobile applications change how businesses reach and serve customers: nearly any product or service can be delivered or managed via digital channels. This fosters deeper, ongoing interactions and real-time updates on consumer preferences. Second, advanced data analytics let firms respond quickly to market dynamics, automate supply chains, and develop personalized marketing strategies. This capability lowers operational costs and shortens the feedback loop necessary for product improvements. Third, social media integration accelerates brand awareness and allows companies to engage with customers directly in a more personal and interactive way. Together, these factors yield a dynamic business environment where companies can anticipate trends, customize offerings, and stay competitive globally. Such transformations also demand a workforce skilled in data handling, user experience design, omnichannel marketing, and strategic IT management—reshaping both job roles and career paths.

2. Describe the demand for digital skills in the U.S. labor market.

Suggested Answer:

The U.S. labor market has seen a surge in demand for digital skills across nearly every industry, from entry-level to specialized professional roles. In today's data-driven environment, even fundamental job tasks often require proficiency in productivity software, basic data analytics, and cloud-based collaboration tools. Numerous positions seek employees adept at handling complex digital platforms—like CRM systems or advanced spreadsheet functions—to manage customer data and streamline processes. Additionally, coding and software development abilities can command significantly higher wages in fields such as AI, cybersecurity, and software engineering. Government research and private sector reports consistently show that among in-demand skills, digital fluency ranks high, and job seekers lacking these competencies often face lower earning potential. As businesses pursue cloud-based transformations and explore emerging technologies such as machine learning or big data analytics, the demand for

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workers with strong digital aptitudes continues to grow, making these relevant skills a strategic asset for career advancement.

1.2 Describe key challenges and opportunities created by new MIS technologies

1. Describe the key challenges created by new technologies used in management information systems.

Suggested Answer:

Emerging technologies such as AI, big data, IoT devices, and cloud computing generate several challenges for organizations. First, they require significant investment in specialized staff and retraining for existing employees, creating pressure on HR and management. Second, organizations must address security, privacy, and compliance concerns when handling massive volumes of potentially sensitive data, ensuring adherence to legal and ethical standards. Third, choosing among countless technology platforms requires careful cost-benefit analyses—companies risk investing in expensive solutions that might not align with their operational goals. On top of that, acceptance among employees can be mixed, especially if they fear automation could displace jobs or complicate established processes. Additionally, setting up and maintaining robust AI or IoT infrastructures can be technologically complex, demanding new skill sets in data handling and predictive analytics. Overall, these technologies promise transformative benefits but come with challenges necessitating strategic planning, cultural readiness, training, and a strong governance framework.

2. Define globalization, and describe challenges and opportunities it creates.

Suggested Answer:

Globalization is the flow of goods, services, people, capital, and ideas across national boundaries, creating highly interdependent global markets. From a business standpoint, globalization offers vast new markets for expansion and potential cost savings through international labor sourcing or cross-border supply chains. For businesses, the primary advantage is reaching billions of potential consumers worldwide, while simultaneously tapping a broad talent pool to create more innovative products and services. However, it also poses challenges. Heightened competition from foreign firms may threaten domestic markets, forcing businesses to adapt quickly or risk losing market share. Companies must navigate different cultures, regulatory environments, and infrastructures, which can complicate marketing strategies, supply chains, and product design. In addition, labor shifts can lead to offshoring and outsourcing, affecting

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workforce dynamics at home. Ultimately, effective use of digital networks and systems is crucial for capitalizing on globalization's myriad opportunities while also mitigating associated risks in intellectual property, data protection, and cultural sensitivity.

1.3 Describe key features of a digital firm

1. Describe the characteristics of a digital firm.

Suggested Answer:

A digital firm is an organization in which nearly every business process is electronically enabled and mediated, bolstering efficiency and responsiveness to environmental changes. Core operations—like supply chain management, customer relations, and employee collaboration—are accomplished through digital networks that integrate seamlessly with external stakeholders. In a digital firm, information flows in real time, ensuring constant visibility of inventory levels, customer interactions, or financial metrics. This connectivity often extends globally, allowing the firm to coordinate distributed resources and operations 24/7. An essential characteristic is the reliance on digital assets—such as intellectual property, data, and analytics—which form the backbone of strategic planning and execution. Additionally, digital firms tend to adopt flexible structures, rapid feedback, and continuous iterative improvement, enabling them to pivot swiftly in competitive or disruptive environments. Collectively, these traits result in greater agility, deeper customer engagement, and potentially better profitability than traditional companies.

2. Describe digital transformation.

Suggested Answer:

Digital transformation is the large-scale initiative undertaken by organizations to leverage digital technologies and data in fundamentally changing how they operate and deliver value to customers. Rather than a single project, it is an ongoing process, encompassing rethinking business models, redesigning workflows, and continually integrating new technologies such as cloud computing, AI, IoT, or advanced analytics. Transformation efforts focus on digitizing core processes for greater efficiency, harnessing real-time data to inform managerial decisions, and fostering an organizational culture of agility and innovation. The transformation extends beyond technology implementation—management structures change, internal collaboration methods evolve, and employees often get reskilled to handle emerging roles. Companies that successfully transition reap benefits including optimized customer

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experiences, a faster pace of innovation, and a stronger competitive position in an increasingly digital market landscape.

1.4 Describe the business objectives of information systems

1. List and describe six reasons why information systems are so important for businesses today.

Suggested Answer:

First, operational excellence refers to technology's role in optimizing internal processes, driving down costs, and enhancing productivity. Second, new products, services, and business models arise when companies use information systems to innovate offerings, as exemplified by music streaming services. Third, customer or supplier intimacy focuses on data-driven personalization and tight coordination with suppliers to boost loyalty and reduce operating friction. Fourth, improved decision making emerges from sophisticated analytics that enable managers to respond quickly and accurately to real-time data. Fifth, competitive advantage is gained by outperforming rivals through smarter IT deployments—leading to lower costs or higher-quality products. Lastly, survival becomes urgent when regulatory changes or industry practices make certain technologies a must-have. Together, these imperatives highlight how effective systems align technology directly with the firm's growth and continuity.

2. Explain what governance relates to, and why it has become important for a company to show leadership with respect to governance issues, as well as sustainability and environmental impact.

Suggested Answer:

Governance generally refers to the set of rules, processes, and practices that dictate how a company is controlled, managed, and held accountable to stakeholders, including shareholders, employees, customers, and the broader community. It includes executive oversight, ethical conduct, transparency, and fiduciary responsibilities. This concept has become crucial for modern corporations since mismanagement can lead to public distrust, legal repercussions, and significant financial losses. Moreover, societal pressure and regulations increasingly encourage businesses to reduce negative environmental consequences, monitor carbon footprints, adopt sustainable business strategies, and responsibly manage AI-driven processes. Demonstrating leadership in governance underscores a company's commitment to ethical, transparent, and accountable operations, especially in an era when social media quickly exposes corporate misdeeds. Strong governance not only helps mitigate risk but also builds

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brand reputation and customer loyalty, and it ensures that investments in technology or sustainability will truly align with the overall values and strategy of the firm.

1.5 Explain what an information system is and how it works

1. Define an information system and describe the activities it performs.

Suggested Answer:

An information system is a set of interrelated components that collect, process, store, and distribute data for decision making, coordination, and control in an organization. Its core activities are input, processing, output, and feedback. During the input stage, raw data from inside or outside the organization is captured—for instance, scanner data from a retail checkout. In processing, this data is organized and transformed into meaningful information, such as sales trends or inventory reports. Output delivers the processed information to various stakeholders including managers, employees, and customers who can then act upon it. Finally, feedback loops this output back to the organization's relevant participants, enabling them to refine processes, correct errors, or improve strategies. As a result, information systems play a critical role in guiding business decisions and facilitating efficient operations.

2. Explain how data differs from information.

Suggested Answer:

Data consists of raw, unorganized facts or measurements—such as a list of customer transactions, sensor readings, or web traffic logs—awaiting interpretation. By itself, data may hold little meaning unless structured or processed. Information, in contrast, is the result of shaping that data into a format that is comprehensible and useful for humans, often by categorizing, calculating, or contextualizing. For example, daily sales figures for a retail store are merely data until compiled into a report showing best-selling items, peak sales hours, or profitability margins. Information thus adds a layer of insight that guides better decisions, making it integral to any process that depends on timely, accurate understanding. In business, bridging the gap between data and information can lead to more informed strategic planning, improved day-to-day operations, and a sustained competitive edge.

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3. Define information system literacy and explain how it differs from computer literacy.

Suggested Answer:

Information system literacy involves understanding not only the technical components of hardware and software but also the organizational and managerial dimensions that shape systems. It includes knowledge of how people interact with technology, how data is used in decision making, and how processes and structures are impacted. Computer literacy, on the other hand, is concerned largely with technical proficiency in operating systems, software applications, and the basic principles of computing hardware. Someone with strong computer literacy might be adept at programming or navigating an operating system but still lack a broader perspective on how technological systems fit within an organization’s strategy or culture. In today's world, information system literacy is especially critical because executing technology projects successfully depends on leadership, planning, and stakeholder engagement—not just mastery of code or hardware.

1.6 Describe organizational, management, and technology dimensions of information systems

1. List and describe the organizational, management, and technology dimensions of information systems.

Suggested Answer:

From an organizational perspective, information systems are embedded in company hierarchies, business processes, and cultures. Rules, roles, and organizational politics can directly influence how effectively a system is adopted. From a management viewpoint, leaders are tasked with defining strategy, allocating resources, and making decisions about the implementation and goals of new technologies. They set the vision and must create policies that encourage adoption, training, and employee buy-in. Finally, the technology dimension includes hardware, software, data management capabilities, and networking/telecommunications infrastructure, including the Internet. These tools support data capture, storage, and dissemination, but their success depends on integration with business needs and user acceptance. For information systems to deliver real value, all three dimensions must be aligned and consistently nurtured.

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2. Explain how the Internet and the World Wide Web are related to the other technology components of information systems.

Suggested Answer:

The Internet is a vast global network that interconnects millions of smaller networks, allowing for the transfer of data, voice, video, and more. The World Wide Web (web) is a service running on top of the Internet, using standardized protocols like HTTP to present rich, linked, multimedia content. Hardware devices—including servers, routers, and client computers—come together to transmit and store information across this network, while software such as browsers and web servers helps users navigate and retrieve online resources. Data management technology ensures that the enormous volume of web-based data is stored efficiently, and networking/telecommunication systems enable high-speed, reliable data movement. The synergy of these elements forms a technology infrastructure that underpins nearly all significant business processes, making global communication and distributed resources accessible to organizations of all sizes and sectors.

3. Describe the role IT infrastructure plays in a firm.

Suggested Answer:

IT infrastructure is the foundational platform of hardware, software, networking tools, and data storage that supports an organization’s information systems. It allows both internal and external stakeholders to capture, process, and share information, ensuring critical business operations can be run and scaled efficiently. For example, servers and virtualized cloud environments handle company databases and websites, whereas networking hardware and protocols facilitate secure communication between employees, suppliers, and customers. Properly maintaining and updating the IT infrastructure is essential for business continuity, as downtime in servers or networks can disrupt daily operations. Moreover, a well-structured infrastructure gives firms the flexibility to adopt cutting-edge applications—like machine learning or advanced analytics—enabling them to innovate quickly. Without a robust, reliable, and scalable IT infrastructure, even the most strategic technology investments can fall short of generating real business impact.

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1.7 Understand the importance of IoT, big data, cloud computing, and AI

1. Define the Internet of Things (IoT) and explain why it is important.

Suggested Answer:

The Internet of Things (IoT) is a network of physical “things”—whether devices, sensors, or appliances—that are equipped with software, electronics, or connectivity enabling them to exchange data via the Internet. IoT is important because it allows real-time monitoring, automation, and decision-making across countless environments. For instance, production machinery can self-report maintenance needs, wearable sensors in healthcare can monitor patient vitals remotely, and smart household appliances can adjust energy consumption patterns or reorder supplies. This granular, interconnected data feeds into larger analytics engines, enabling both predictive and prescriptive strategies. By linking and digitalizing every facet of operations, IoT can reveal inefficiencies and optimize resource usage, creating competitive advantages in cost, productivity, customer engagement, and product innovation.

2. Define big data and explain why it is important.

Suggested Answer:

Big data typically describes extremely large and diverse datasets that stream in at high velocity from sources like social media, e-commerce transactions, or IoT sensors. These datasets exceed the processing capabilities of traditional data management tools. Big data is important because it underpins advanced analytics and AI, allowing organizations to uncover patterns or insights that were previously hidden. When managed properly, big data can reveal consumer behavior trends, increase operational efficiencies, and inform predictive models. Retail giants use big data apps to predict inventory needs based on real-time buying patterns, while healthcare firms crunch big data from electronic medical records to enhance patient care and identify at-risk populations. In short, data volume, variety, and velocity are now recognized as strategic assets—if organizations can harness them effectively.

3. Define cloud computing and explain why it is important.

Suggested Answer:

Cloud computing is a model where computing resources—servers, storage, and applications—are delivered as services over the Internet on a pay-per-use or subscription basis. Instead of investing heavily in on-premises hardware and fixed

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infrastructure, organizations can dynamically scale resources up or down as needed. Cloud computing is important because it democratizes access to advanced computing power and sophisticated software without requiring huge capital outlays. This flexibility supports rapid innovation cycles, enabling businesses to prototype ideas quickly, process large data sets, or handle sudden surges in web traffic. Moreover, security, backup, load balancing, and software updates are often managed by cloud providers, freeing internal IT teams to focus on strategic projects rather than routine maintenance. Overall, cloud services can accelerate growth, reduce operational costs, and foster agile development in both large and small enterprises.

4. Define artificial intelligence (AI) and explain why it is important.

Suggested Answer:

Artificial intelligence (AI) involves developing computer systems capable of performing tasks that typically require human intelligence, including recognizing patterns, interpreting language, and learning from data. AI is transforming industries by automating repetitive functions, detecting fraud, enabling personalized marketing, and even powering self-driving cars. Companies of all sizes now use AI in chatbots for customer support, advanced analytics for supply chain management, and machine learning algorithms to detect complex patterns in vast datasets. It is important because AI can improve decision-making speed and accuracy, increase operational efficiency through predictive analysis, and free employees to focus on more creative or interpersonal work. As AI technologies evolve, they enable entirely new business models, reduce operational errors, and help organizations gain a competitive advantage in an increasingly data-centric world.

1.8 Understand why complementary assets are essential

1. Define complementary assets and describe their relationship to information technology.

Suggested Answer:

Complementary assets are additional organizational or social resources necessary to receive the full value from a primary investment, such as an information system. For instance, simply installing advanced software does not inevitably lead to better productivity if organizational practices and employee skills fail to align. Assets like a supportive corporate culture, effective business processes, staff training programs, and strong governance structures must accompany the IT investment. When deployed together, these elements enhance system utilization and improve results. Without

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complementary assets, technology implementations often underperform, as employees resist unfamiliar interfaces, or outdated processes limit the software's potential. By blending the right mix of cultural, managerial, and technical resources in conjunction with new technology, companies can transform processes, adapt more flexibly, and mitigate common pitfalls.

2. Describe the complementary social, managerial, and organizational assets required to optimize returns from information technology investments.

Suggested Answer:

To unlock the highest possible value from an IT investment, businesses must develop social, managerial, and organizational assets to support usage. Socially, this can include an external environment that supports stable market regulations, widespread computing standards, and a reliable Internet infrastructure. Internally, a supportive organizational culture that champions efficiency, knowledge sharing, and continuous innovation ensures that employees see the system as a key tool for daily success. Managerial assets play a pivotal role here, including strong leadership alignment on technology goals, a reward system that fosters innovation, and readiness to train or re-skill staff so that they can master new tools. At the organizational level, well-designed business processes, decentralized authority structures that encourage quick decisions, and agile project management teams are crucial. Together, these complementary assets align around the technology, boosting collaboration, resilient processes, and an environment that continuously refines itself for higher returns.

1.9 Describe different approaches used to study information systems

1. List and describe each discipline that contributes to a technical approach to information systems.

Suggested Answer:

Technical approaches to information systems heavily rely on quantitative and formal models to analyze how systems function from a computational standpoint. Three major disciplines inform this perspective. Computer science provides the fundamental theory of computing, algorithmic design, and system architecture. These help define what computers can and cannot do, forming the backbone of software development. Management science applies mathematical modeling and optimization techniques to solve business problems like resource allocation, logistics, and schedule planning. Operations research delivers methods to optimize specific operational variables, such as minimizing transportation costs or maximizing throughput in production lines.

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Together these disciplines illuminate the technological limits, algorithmic possibilities, and mathematical underpinnings crucial for designing and implementing information systems.

2. List and describe each discipline that contributes to a behavioral approach to information systems.

Suggested Answer:

A behavioral approach frames information systems within the social context of the organization. Psychology explores how individual users perceive, learn, and react to technology, guiding user-centric designs and change management strategies. Sociology studies group-level dynamics, power structures, and organizational processes, revealing how technology adoption emerges—or is stifled—by cultural norms, roles, and social interactions. Economics, meanwhile, focuses on incentives, costs, benefits, and market impacts of technology, illuminating how digital systems can shift balance sheets and competitive landscapes. Together, these behavioral disciplines emphasize that maximizing technology's benefits requires understanding human factors, policy implications, and broader social trends. Only by integrating these perspectives can firms address real-world complexities like employee resistance, customer engagement, and ethical considerations, ensuring that systems are accepted and have a meaningful impact on performance.

3. Describe the socio-technical perspective on information systems.

Suggested Answer:

The sociotechnical perspective posits that optimized organizational performance stems from harmonizing both the social and technical dimensions of a system. Technically, an effective design of hardware, software, databases, and networks is vital, but organizations must equally consider the human elements: training, workflows, leadership styles, and cultural attitudes toward innovation. When both aspects work in tandem, employees readily adopt technology, remain productive, and contribute to ongoing refinements. For instance, implementing advanced data analytics tools will not succeed if the corporate culture is resistant to data-driven decision making. Conversely, a highly collaborative team with minimal technology may remain limited in performance if they lack the computing resources to scale their operations. Thus, the sociotechnical view stresses iterative feedback, where social and technical adjustments occur in parallel, refining processes and maximizing the system's overall value creation.

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Discussion Questions

1.10 Information systems are too important to be left to computer specialists. Do you agree? Why or why not?

Suggested Answer:

It is reasonable to argue that information systems are indeed too critical to be constrained solely within the tech team. In modern organizations, technology underpins every major function, from operations to marketing, and shapes how decisions get made at the highest levels. Consequently, limiting decision-making about systems and data strategies to only the IT department can miss broader business insights, such as customer needs, market trends, and revenue objectives. A purely technical view may focus exclusively on system performance metrics—like response time or uptime—while overlooking alignment with corporate strategy or user adoption challenges. Likewise, nontechnical managers and employees bring invaluable contexts, such as product knowledge, customer pain points, or compliance considerations, which can lead to a more comprehensive and effective technology roadmap. When organizations integrate cross-functional perspectives on IT investments, they typically see stronger returns and more agile responses to market or regulatory changes. Thus, while technical specialists are vital for the system's performance, the broader organization should also shape its development and usage.

1.11 If you were setting up the website for a new minor league baseball team, what management, organizational, and technology issues might you encounter?

Suggested Answer:

From a management angle, you'd first need alignment on the website's strategic goals—whether those include ticket sales, fan engagement, merchandise revenue, or local community outreach. Additionally, there may be budgeting constraints to address, along with deciding how marketing, promotions, and day-to-day content approvals will be handled. Organizationally, the baseball team's staff must be prepared to handle increased user interactions, such as responding to fan inquiries, posting frequent updates, or coordinating with third-party vendors for online ticketing and merchandise fulfillment. This might require training staff to manage content and customer data while ensuring robust communication channels across departments like marketing, finance, and operations. On the technology side, challenges could include selecting a reliable hosting platform that can handle sudden traffic peaks, ensuring secure payment

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processing, and integrating real-time scoring or scheduling components. Additionally, the site would need to be mobile-friendly and built to accommodate potential expansions, like live streaming or a loyalty rewards program. Handling these factors effectively would help foster a stable online presence capable of engaging fans and driving revenue.

1.12 What are some of the organizational, managerial, and social complementary assets that help make UPS's information systems so successful?

Suggested Answer:

UPS's organizational assets feature well-defined processes and robust training for thousands of drivers, ensuring consistent data capture and on-time deliveries. The firm operates within a culture that values efficiency, reliability, and continuous improvement—practices that complement its technology investments. On the managerial side, UPS leadership dedicates sizeable budgets to IT research and development, aligns AI initiatives with business goals, and emphasizes ongoing metrics analysis. Managers also empower employees by providing intuitive handheld devices (DIADs) and advanced applications like ORION, delivering real-time routing suggestions and automated alerts. Socially, UPS benefits from global networking standards, widely adopted data security practices, and supportive regulatory and technical infrastructures (like universal broadband access and established shipping routes). These external conditions help integrate UPS's technology platform seamlessly with partners and customers in over 200 countries. Together, such complementary organizational, managerial, and social assets reinforce UPS's strategic technology vision, thereby amplifying returns on each new digital application or system upgrade.

AI Project

1.13 AI Project: Selecting a Business Name

"You have been hired as a consultant by two friends who want to open a retail store selling organic pet food and treats, as well as pet toys and clothing made from organic materials. They have asked you to advise them on a good name for their business. Using Microsoft's Copilot, Google's Gemini, or ChatGPT, develop a prompt that suggests some appropriate names for the business. Select the name that you believe to be the best and explain why this is a good choice. Save a copy of your prompt, the output of the chat session, and your decision and rationale with respect to your choice of name. Submit to your instructor as requested."

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Suggested Answer:

A well-thought-out prompt might ask the AI tool not just for generic ideas but for names that connote health, sustainability, and the friendly nature of pets. For instance, the prompt might mention key brand values—such as “organic,” “eco-friendly,” and “pet wellness”—and request multiple ideas. Assuming the AI output includes names like “GreenPaws Market,” “EcoFetch Organics,” “WholesomeWag,” or “PurelyPet Naturals,” you could select “GreenPaws Market” due to its clear suggestion of environmentally responsible products (“Green”) plus a direct connection to pet care (“Paws”). This name would be memorable, easy to pronounce, and does well in brief digital contexts (e.g., a social media handle). Additionally, “Market” implies a range of offerings and evokes a welcoming space where pet owners can shop confidently. The choice aligns with the brand’s emphasis on natural goods, resonates with both returning and first-time customers, and can be accompanied by an appealing brand logo or tagline. Such a name also leaves room for potential expansion into items like grooming services or broader pet health accessories in the future.

Hands-On MIS Projects

Download Data Files at https://www.pearson.com/laudon.

1.14 Management Decision Problem

“The Brooklyn Navy Yard (BNY) is a shipyard and industrial complex located in Brooklyn, New York. It encompasses a 300-acre waterfront site for more than 450 businesses employing more than 11,000 people and generating more than $2.5 billion per year in economic impact for New York City. The BNY needed to keep track of its thousands of visitors and nearly 10,000 employees per day, but it had been unable to do so efficiently and safely. Its internally hosted web portal for managing visitors was slow and not very user-friendly and was unable to scale to handle the many thousands more visitors projected for the future. Most BNY tenants were not pre-registering their visitors or delivery drivers, causing long lines and traffic at the security gates. Security checks were performed manually by checking IDs against a printed watch list. BNY was unable to create a welcoming experience for visitors and employees. Identify BNY’s problem and analyze its business impact. What business functions were affected? Is it a management problem, an organizational problem, or a technology problem? Suggest an information system solution and identify some implementation challenges that the solution would have to address.”

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Suggested Answer:

BNY's core problem is its inadequate visitor management system: the platform cannot scale effectively while most tenants do not utilize the existing pre-registration tools. This leads to congestion at the security checkpoints, manual ID verification, and a poor end-user experience for both visitors and employees. The business impact includes operational inefficiency (long waits, traffic, and scheduling delays), which could discourage potential clients, investors, or vendors from partnering with the facility. The business functions affected range from security (needing robust ID verification) to facilities management (coordinating space usage) to public relations (visitor impressions). In many respects, this is a combination of management, organizational, and technology issues. Management must set more rigorous policy enforcement, ensuring tenants register visitors appropriately; organizationally, employees need training and standard procedures; technologically, a modern, cloud-based visitor management system with automated ID scanning could expedite check-ins while addressing scaling issues. Potential implementation challenges include ensuring data security, especially when scanning driver's licenses or other identification. Another consideration is integrating any new system with the site's broader infrastructure, training both staff and tenants, and introducing mobile-friendly pre-registration to eliminate manual bottlenecks.

1.15 Using Spreadsheet Software to Create a Payroll Register

"Spreadsheet software skills: Formulas, absolute and relative addressing, worksheet formatting, SUM, AVERAGE. Business skills: Payroll accounting. In this project, you will create a payroll register for the eight senior executives of a machine tool company with 8,500 employees. All employees are paid through the firm's automated payroll system except for these executives, forming a confidential payroll. Develop a worksheet that creates a payroll register report for the first month of the year (January 2025). Include columns for monthly gross pay, year-to-date gross pay, deductions, and net pay. Use an 'Assumptions' section for all deduction rates and references. Include totals for each category and an AVERAGE function for annual salary."

Suggested Answer:

The solution begins by labeling columns for Employee Name, Social Security Number, Annual Salary, Monthly Gross Pay, Year-to-Date Gross Pay, and each deduction type (federal income tax, state tax, FICA, Medicare, health insurance, profit-sharing), followed by Net Pay. Under an "Assumptions" section, reference cells contain the deduction rates or amounts (e.g., "Federal Income Tax Rate: 25%"). Use absolute cell referencing (e.g., A2) when calculating monthly gross pay to avoid accidental

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changes if the formulas are dragged. By dividing the annual salary by 12, students can compute the monthly salary. Then, year-to-date can be computed as identical to monthly gross in January, though the formula can be extended for subsequent months. For each deduction category, multiply monthly gross pay by the rate or add in a static cost, referencing the “Assumptions.” Summation formulas (SUM) create a row for total deductions. Subtotal net pay emerges by subtracting total deductions from monthly gross pay. At the bottom, use the SUM function for each deduction column and net pay. Finally, the AVERAGE function in a suitable cell calculates the average annual salary among these eight executives, providing a concise managerial view of total compensation costs.

1.16 Using The Internet to Research Jobs

“Software skills: Online research. Business skills: Job searching. Visit a job search website/app such as Monster.com or Indeed.com. Spend some time examining jobs for accounting, finance, sales, marketing, and human resources. Find two or three descriptions of jobs that require some information systems knowledge. What information systems knowledge do these jobs require? What do you need to do to prepare for these jobs? Write a one- to two-page report summarizing your findings.”

Suggested Answer:

Using a major job site like Indeed.com, a student might find, for example, a “Financial Analyst” role requiring knowledge of SQL or Microsoft Power BI for structuring and interpreting large datasets. Another example might be a “Marketing Coordinator” position that calls for experience using CRM platforms like Salesforce to track leads and worthwhile marketing campaigns. A “Human Resources Generalist” ad could list proficiency in HRIS (Human Resource Information System) as a plus, ensuring accurate onboarding, payroll, and benefits administration. Beyond the functional knowledge of these systems, the postings may mention data analytics, spreadsheet modeling, or cloud-based collaboration tools.

To prepare, students can build skills in relevant areas such as database querying, advanced spreadsheet functions, or specialized vendor training courses in platforms like SAP, Oracle, or Workday. Additionally, completing online certifications—e.g., Microsoft Power BI certification or Salesforce Administrator credentials—often appears advantageous to prospective employers. Demonstrating practical experience (through internships or volunteer projects) can further enhance job readiness. In summary, these job listings highlight that even in non-IT roles, the ability to gather, manipulate, and derive insights from digital information is a key competitive advantage in today’s market.

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1.17 Collaboration and Teamwork Project: Selecting Team Collaboration Tools

“Form a team with two or more of your classmates and review the capabilities of Google Drive and Google Sites for your team collaboration work. Compare the capabilities of these two tools for storing team documents, project announcements, source materials, work assignments, illustrations, presentations, and web pages of interest. Learn how each works with Google Docs. Explain why Google Drive or Google Sites is more appropriate for your team. If possible, use Google Docs to brainstorm and develop a presentation of your findings for the class. Organize and store your presentation using the Google tool you have selected.”

Suggested Answer:

Students will find that Google Drive excels at file storage and seamless integration with Google Docs, Slides, and Sheets, making it ideal for collaborative authoring, version control, and real-time editing. Team members can organize files into folders, set sharing permissions, and quickly comment on each document. Google Sites, in contrast, is specialized for building an internal or external website, which can be used as a centralized hub to display or embed project assets, calendars, or web-based information. While it also integrates with Google Docs, Sites focuses more on offering a visually structured, navigable interface, rather than day-to-day file management. For a group project requiring frequent iterative document editing—like drafting a research paper or preparing slides—Google Drive is typically more appropriate. However, if the team wants to present a polished final product, or house all resources (links, videos, docs) in one well-organized web location, Google Sites may suit better. Practical steps involve creating a shared folder or site, inviting team members, testing the real-time collaboration features, and developing a short sample project to understand which service best meets the team’s needs.

Suggested Assignments

1. **Analyze a Global Logistics Challenge:** Present students with a mock scenario where a local company expands to overseas markets. Have them propose how information systems (e.g., cloud-based ERPs, AI demand forecasting) can address shipping logistics, customs documentation, and real-time product tracking. Students will identify the complementary assets required for success.
2. **Design a Digital Firm Readiness Survey:** Ask students to create a survey instrument that measures an organization’s readiness for digital transformation. This survey should include questions about culture, management support for innovation, I

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T infrastructure maturity, and employee tech skills. Students present results and propose next steps for improvement.

3. **IoT Implementation Proposal:** Have students prepare a plan for incorporating IoT sensors into a small manufacturing operation or service process—e.g., a café tracking equipment usage and energy consumption. The plan should detail potential steps, technology choices, data privacy considerations, and complementary organizational changes necessary to see real ROI.
4. **Dashboards for Finance or Marketing:** Students choose either a finance or marketing context and design a simple dashboard using spreadsheet or BI tools (e.g., Microsoft Excel, Google Data Studio). They must specify the key performance indicators (KPIs) relevant to their chosen function, discuss how these data are captured, and demonstrate how managers might use the dashboard to make data-driven decisions.
5. **Developing IT Governance Guidelines:** Ask students to draft a high-level IT governance policy for a fictitious company. This includes establishing roles (CIO, IT steering committee), decision rights (budgets, vendor selection), guidelines for responsible AI use, security measures, and processes for continuous reevaluation of IT investments. The assignment encourages them to think about managerial oversight in technology deployments.

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