University of Dar es Salaam

Lecture 4 – IT Audit Tools and Techniques

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Tools and Techniques

- Audit productivity tools
  - Reduce administrative tasks by automating some functions
- System documentation techniques
  - Flowcharting, data flow diagrams, business process diagrams
- Computer-assisted audit techniques (CAATs)
  - Help evaluate controls and analyze data

Audit Productivity Tools

- Assist auditors in automating necessary audit functions and integrate information
- Examples of audit functions:
  - Audit planning and tracking
  - Documentation and presentations
  - Communication
  - Data management, electronic working papers, and groupware
  - Resource management

Audit Planning and Tracking

- Standalone solutions
  - Spreadsheets, database software, project management software
  - Can be difficult to integrate
- Integrated solutions
  - Can simplify the process by providing quicker updates and keeping phases in sync
  - E.g., sync between budget and schedule

Documentation and Presentations

- Microsoft Office Tools
  - Good integration between different tools e.g. linked spreadsheet data in presentations
  - Save time, ensure consistency and accuracy
- Video conferencing software
- Video capture tools

Communication

- Allows audit team to share data and provide immediate access to data
- Allows management/client to exchange information
  - E.g., access to auditing risk universe database
- Nowadays, video conferencing has become popular
  - Cisco WebEx Meeting Center, Citrix GoToMeeting, Zoom, Skype for business, Meet

Data Management, EWS, & Groupware

- Data Management
  - **Central data depository** can archive data about historical risk, schedule, budget etc.
  - **Database applications** can
    - integrate and consolidate data from all audit functions i.e. audit schedule status, field audit status, fraud or shortage activities etc.
    - Generate reports
    - Store information about risk areas, audit program, findings, corrective action procedures etc
- **Electronic Working Papers (EWPs)**
  - Deliver consistent approach in creating, documenting, reviewing, sharing, and storing audit work
  - Allow auditors to work asynchronously, incorporate multimedia content
- **Groupware**
  - Specialized tool that enable teams to work faster, share info, and communicate more effectively
  - Video conferencing, e-mail, message boards, meeting support systems, workflow systems

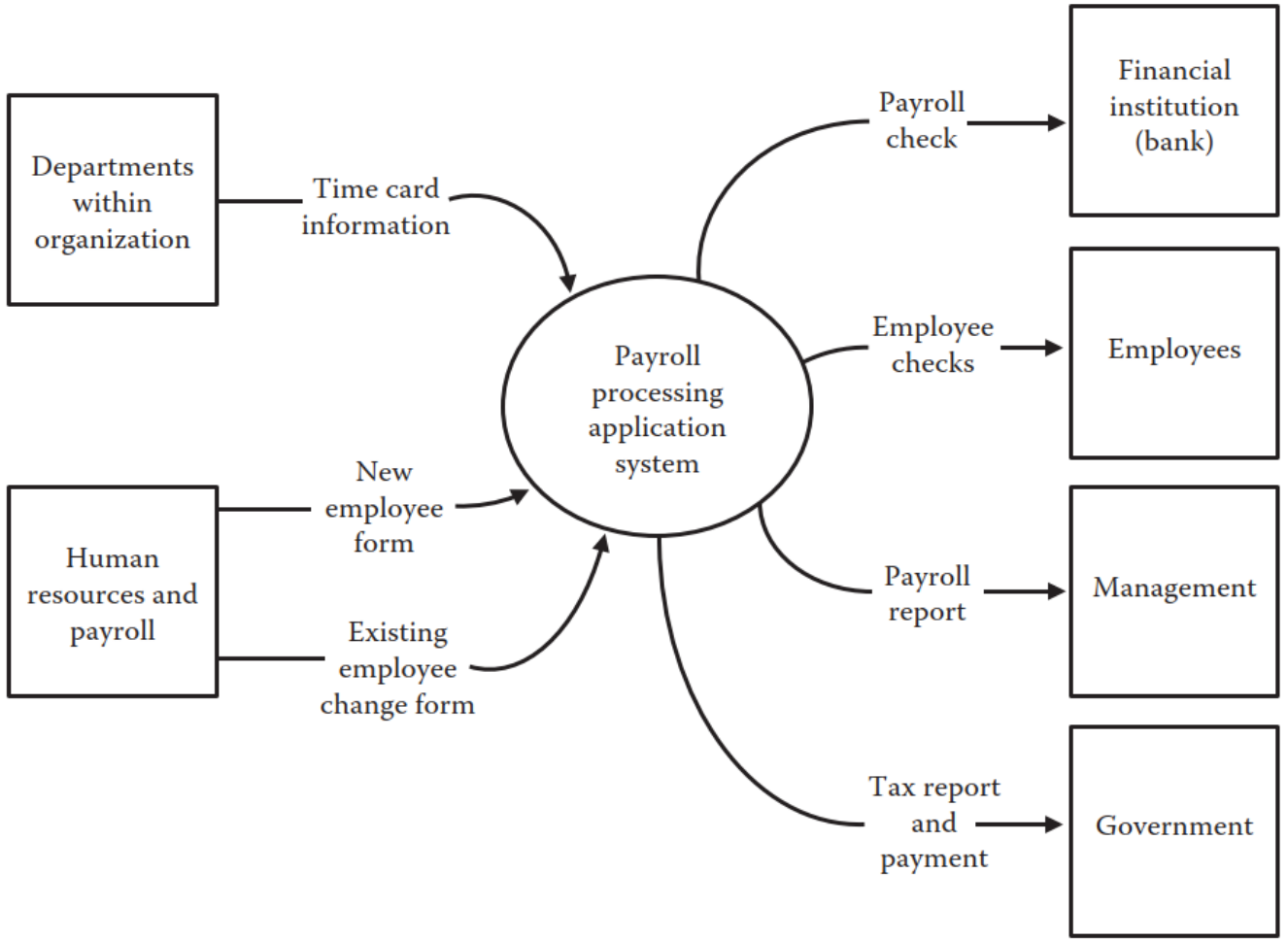
Resource Management

- Managing a remote workforce is a challenge
- Managers need to monitor, provide guidance, and review work
- **E-mail**, **message boards**, or **computer forums** can help disseminate info quickly
- Supervisors can provide feedback via online review of **electronic work papers**

System Documentation Techniques

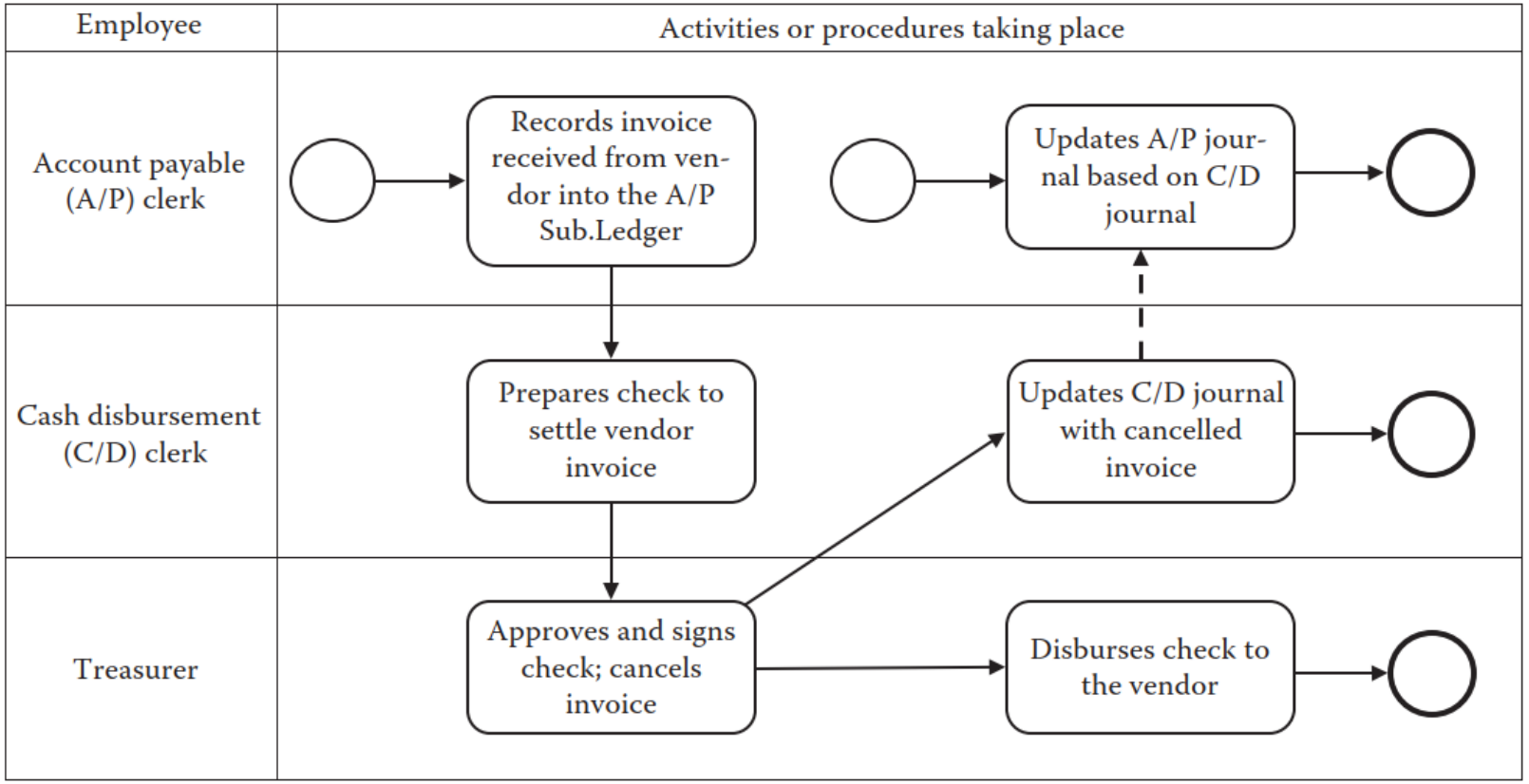
- Mostly use graphical representations
- Commonly performed using narratives, diagrams, tables, data flow diagrams, business process diagrams, flowcharts etc.
- **Entity Relationship Diagrams (ERDs)** represent the relationship between *entities (people, objects, places, concepts, events, etc)* within the information system
- **Data Flow Diagrams (DFDs)** are process oriented and describes data transformations and how it flows through the organization

Payroll Processing DFD



Business Process Diagrams

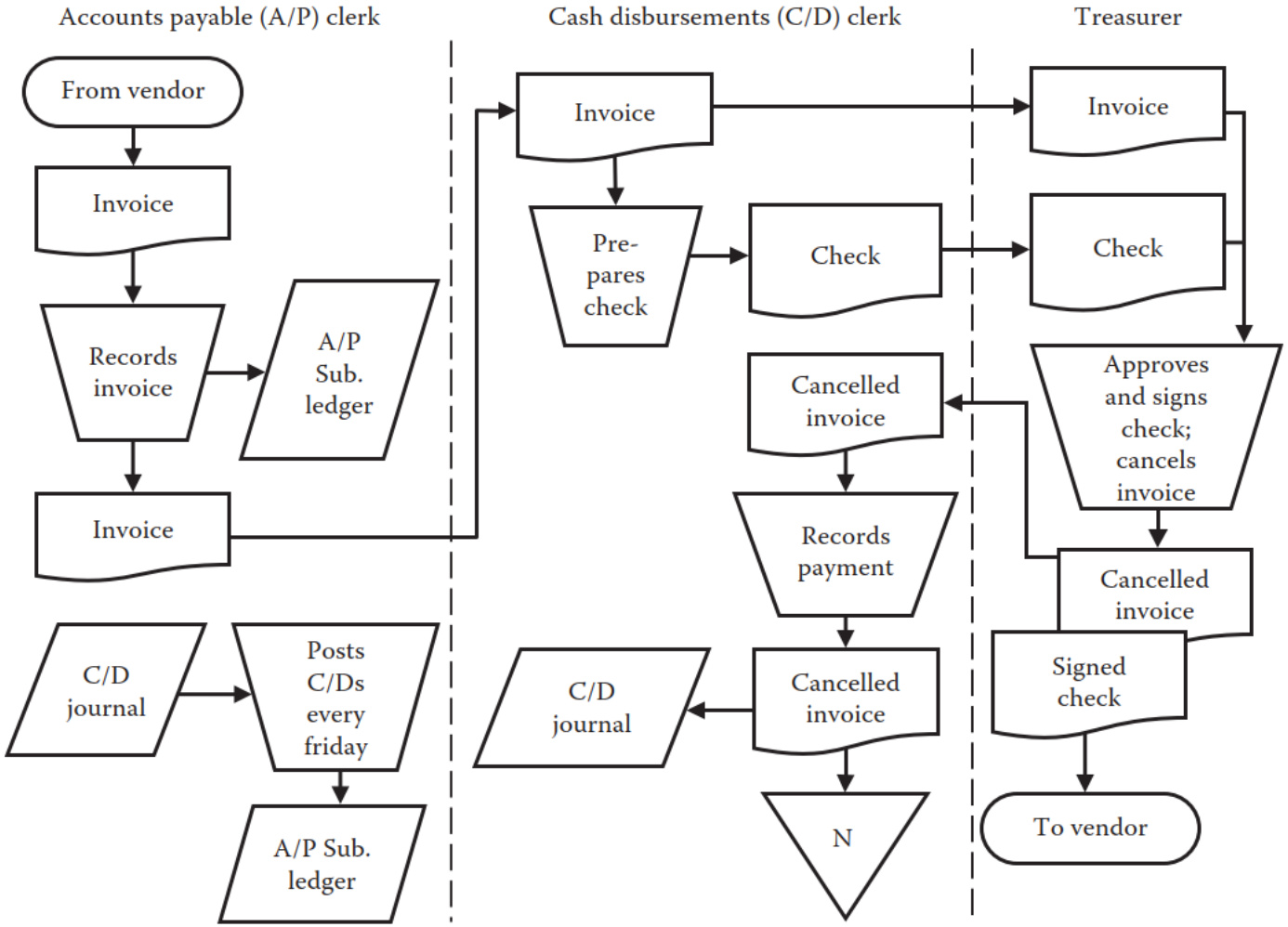
- Show various activities going on in the business process
- Show the organizational unit or process that performs the activity



Flowcharting

- Graphical description of how business process are performed, and documents flow in a system
- Use symbols to describe transaction processing and flow of data by showing:
  - Inputs and outputs
  - Information activities
  - Data storage
  - Data flows
  - Decision steps

Cash Disbursement Process Flowchart



Flowcharting as an Analysis Tool

- Audit use flowchart to
  - represent application systems, workflows, or processes
  - Identify and evaluate control strengths and weaknesses within an application system
- Flowcharts should encompass all information processed from source documents to final outputs
- Flowcharts assist in evaluating
  - Quality of system documentation
  - Adequacy of manual or automated controls over documents
  - Effectiveness of processing by computer programs
  - Usefulness of outputs, including reports and stored files

Development Steps of Flowcharts

1. Understand how applications process data
   - Reviewing corporate documentation i.e., system documentation files, input preparation instructions & user manuals
   - Interviewing organization personnel i.e., users, system analysts, programmers etc.
   - Inspecting, comparing, and analyzing corporate records
2. Identify documents and their flow through the system
   - Document flow diagram should include:
     - Sources and source documents
     - Point of origin for each source document
     - Each operating unit through which data are processed
     - Destination of each copy of the source document(s)

Development Steps of Flowcharts

3. Define data elements
   - Good sources include data element dictionary or record layout
4. Develop flowchart diagram
   - Inputs should include copies of the following:
     - Descriptions of all major application systems
     - Source documents that affect application processing
     - Record layout for all major computer input and output records
     - All major outputs produced by the application system
     - List of standard codes, constants, and tables used by the application

Development Steps of Flowcharts

5. Evaluate the quality of system documentation
   - Is the documentation accurate?
   - Is the documentation complete?
6. Assess controls over documents
   - Identify gaps, strengths, and weaknesses of controls within the system
   - E.g., three-way match verification between invoice, purchase order, reconciliation report
7. Determine the effectiveness of data processing
   - Redundant processing of data or other forms of duplication
   - Bottleneck points that delay or congest processing
   - Points where clerks don’t have tie to review output reports and make corrections

Development Steps of Flowcharts

8. Evaluate accuracy, completeness, and usefulness of reports
   - Review key or major outputs e.g., edit listings, error listings of financial application systems
   - Review generated reports by interviewing appropriate users using questionnaire or survey

Use of Flowcharting in IT Auditing

- Flowcharts are also used in system analysis
- However, they are more used by IT auditors they are focused on the control-oriented view
  - E.g., Flowcharts emphasize physical processing steps and controls while other tools such as DFDs emphasize logical flows and transformations of data
- Software packages exist that automate the process
- Flowchart should conclude with understanding that includes
  - Sources for all financially significant accounting information
  - Processing steps especially points of major changes
  - Processing results
  - Nature and progress of audit trails

Computer–Assisted Audit Techniques (CAATs)

- IT Auditors use CAATs to
  - Evaluate the integrity of an application
  - Determine compliance with procedures
  - Continuously monitor processing results
- CAATs (ACL & Interactive Data Extraction and Analysis – IDEA) allow auditors to perform analysis more quickly and evaluate larger volumes of data
  - Select sample size
  - Analyze characteristics of data
  - Identify trends in data
  - Evaluate data integrity

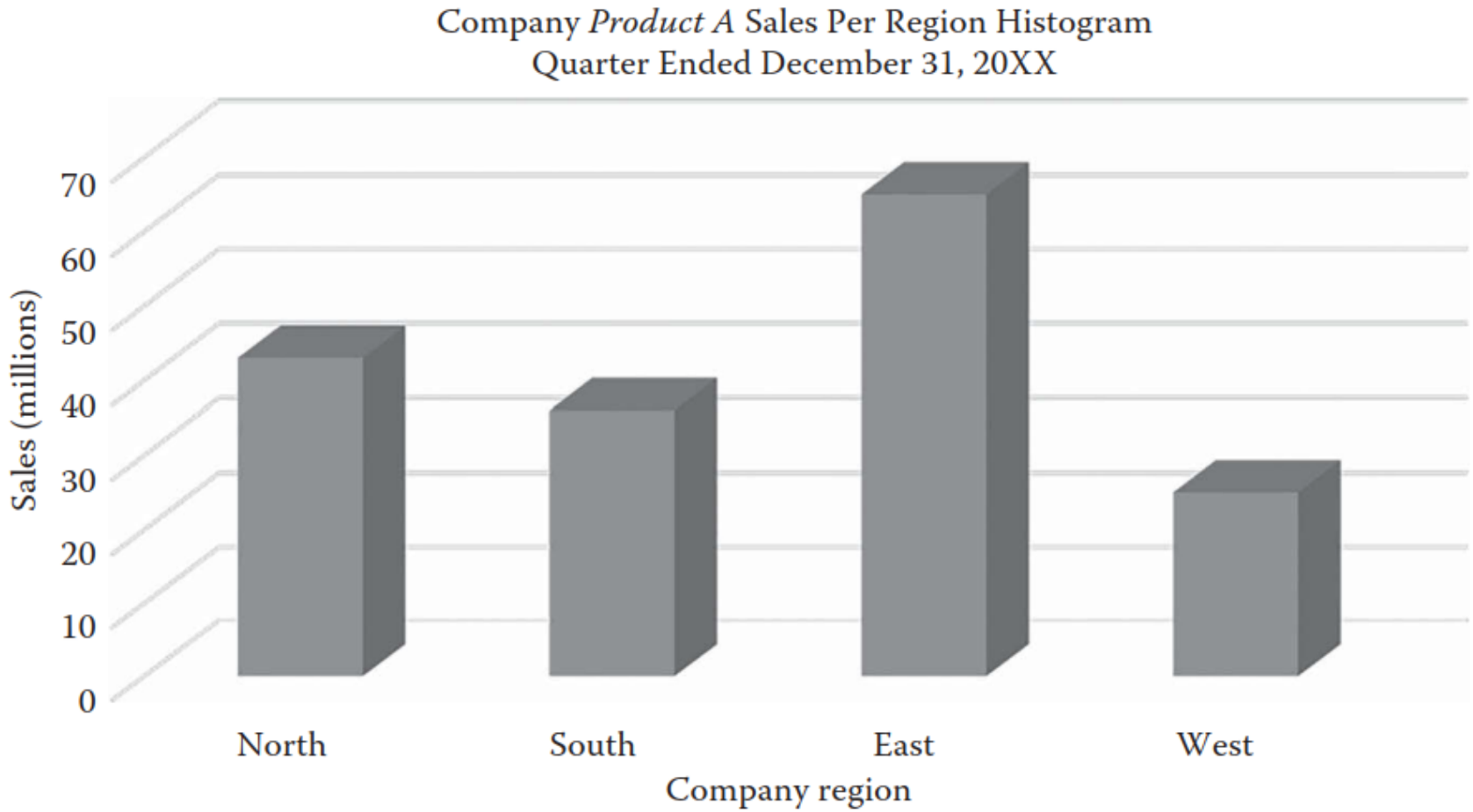
Computer–Assisted Audit Techniques (CAATs)

- **Microsoft Access**: analyze data , create reports, query data
- **Microsoft Excel**: analyze data, generate samples, create graphs, perform regression analysis
- **SAP Audit Management**: documentation of evidence, organization of working papers, creation of audit reports

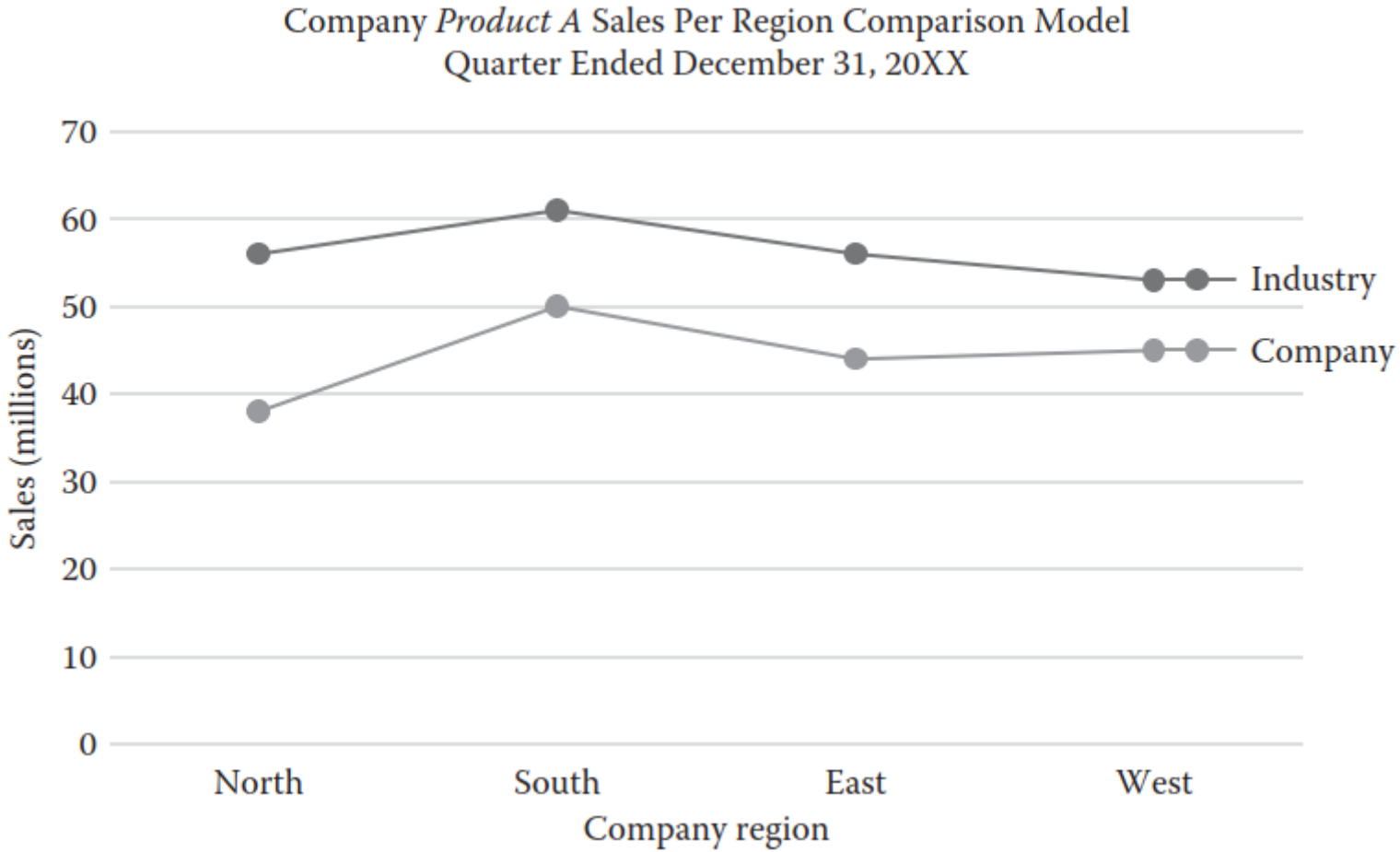
CAAT Categories

- Items of audit interest
  - Auditor can use computer to select statistical sample of items by specifying criteria
  - E.g., all transactions above X amount
- Audit mathematics
  - Computers can be used to perform extensions or footing in a cost-effective way
  - E.g., in addition to selecting items a computer can be programmed to extend and foot all invoicing transactions
- Data analysis
  - Histograms
  - Modeling
  - Comparative Analysis

Histogram Example



Modeling Example



CAATs for Sampling

- Some auditing techniques assist in defining and selecting samples
  - **Judgmental sampling**: sample selected based on auditor's knowledge and experience
  - **Statistical sampling**: sample randomly selected and evaluated via probability theory
- Statistical sampling methods
  - **Random Attribute Sampling**: tests for specific pre-defined attributes of transactions selected on a random basis from a file e.g., signatures, acc distribution, compliance with policies
  - **Variable Sampling**: estimates dollar value of a population or some other quantifiable characteristic
  - In both methods need to define expected *error rate, precision, confidence level*

Statistical Sampling Techniques

Sampling Technique	*Description*
Random Number Sampling	Items are randomly selected from a population so that each item has an equal chance of being selected.
Systematic Sampling (Interval Sampling)	A method of random sampling that begins the sample by selecting a random starting point in a population and then selecting the remaining items at fixed intervals. This method should not be used for selection from a population that has a fixed pattern.
Stratified Sampling	A method of random sampling that separates the population into homogeneous groups before selecting a random sample. This method should be used for selection from a population with wide variances in value.
Cluster Sampling (Block Sampling)	A method of random sampling that separates the population into similar groups, and then selects a random sample from the group.
Stop-or-go Sampling (Sequential Sampling)	Minimizes the sample size by assuming a low error rate. It estimates the error rate of the population within a specified interval (e.g., plus or minus number, etc.).
Discovery Sampling	Tests for a significant error or irregularity. It should not be used where there are known deviant conditions.
Dollar-unit Sampling (Probability Proportional to Size)	This method uses the dollar as a sampling unit, which increases the probability that larger dollar values will be selected. It primarily detects overpayments.
Mean Per Unit	The mean value of a sample is calculated and multiplied by the units in the population to estimate the total value of the population.
Difference Estimation	The average difference between the audit value and book value for a sample unit is calculated. This difference is then multiplied by the population to estimate the total value.
Ratio Estimation	The sample ratio to book value is multiplied by the population book value to estimate the total value.

CAATs for Application Reviews

- Generalized audit software can be used to **analyze spreadsheet logic** and calculations, **evaluate data** produced from applications & **produce logical data flowcharts**
- **Data Mining** techniques can analyze data from different perspectives and summarize into useful information
- **Data Analytics (DA)** examines raw data to draw conclusions
- **Data Mining** sorts through huge amounts of data to identify hidden patterns while **DA** focuses on deriving conclusion (inferring) based on what is known

Generalized Audit Software

- Auditors use these software to:
  - Analyze and compare filed
  - Select specific records for examination
  - Conduct random samples
  - Validate calculations
  - Prepare confirmation letters
  - Analyze aging of transaction files
- Examples include *Audit Analytics by Arbutus Software, TopCAATs, CaseWare Analytics IDEA Data Analysis, Easy2Analyse, TeamMate, and ACL*

Audit Command Language (ACL)

- A general audit software that reads from most formats (databases, delimited files, text files, Excel files etc) and provides data selection, analysis, and reporting
  - A file interrogation tool designed to assist the audit of applications
- Benefits
  - Ability to import various types of raw data filed
  - Easy creation of audit samples and summaries
  - Increased testing coverage and improved efficiency
  - Increased process and system understanding of complex environments
  - Reduced manual procedures

ACL Features

- Defining and importing data into ACL
  - Auditor can define location and format/structure of data
- Customizing views
  - Auditor can modify original file's view to better meet data analysis requirements
- Filtering data
  - Auditors can search and focus on specific accounting entries to facilitate analysis
- Data Analysis
  - Auditors can evaluate and transform data into usable information

Examples of ACL Commands

ACL Command	*Description*
Extract	Selects records or fields from a file or current table, and copies them to a different file or table.
Export	Sends data to external file (e.g., database, Excel, text file, etc.) for use outside ACL.
Sorting	Sorts or organizes the active table into ascending or descending order based on specified key fields.
Verify	Checks for data validity errors in the active table. Ensures that data in a table conform to the table layout and reports on any errors encountered.
Search	Locates first record in an indexed table that meets a specified criteria/ condition.
Append	Adds command output to the end of an existing file instead of overwriting the existing file.
Count	Totals the number of records in the current table, or only those records that meet a specified criteria or test condition.
Total	Sums numeric fields or expressions in the active table.

ACL Data Analysis Steps

1. Acquiring the data
   - Meet with stakeholders to understand size, format, structure etc
2. Accessing the data
   - Auditor must know where data is stored, file structure, no. Of records etc
3. Verifying integrity of the data
   - Data must be valid, accurate, complete etc
4. Analyzing and testing the data
   - Auditors transform data into meaningful info to assist decision-making
5. Reporting findings
   - Auditors present and communicate findings in easily readable format

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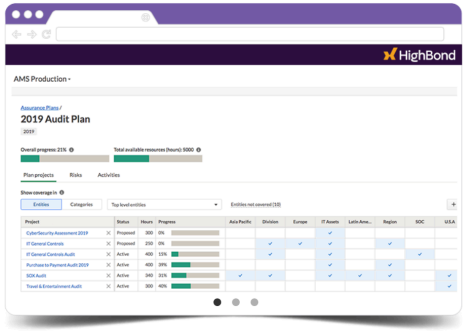
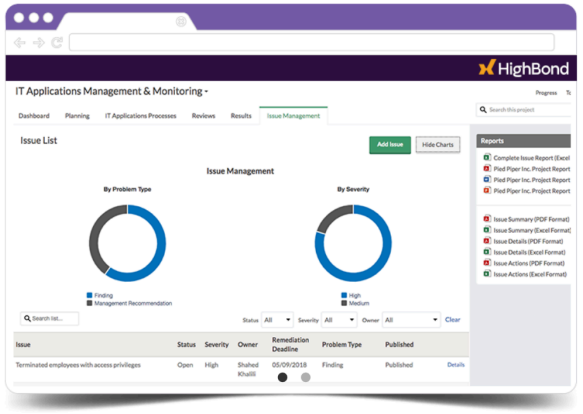
New version of ACL now called AuditBond

Audit planning & workflow

+ Create risk-based audit plans for your entire audit universe to provide assurance that your organization's risks are managed effectively.
+ Schedule and manage audit projects for efficient project management.
+ Maintain a library of past audits, workflow templates, and risk and control matrices to reduce re-work across your audit activities.
+ Conduct fieldwork offline on-site, with mobile apps and offline modes.
+ Send requests directly to process owners with built-in emails and reminders.
+ Provide coaching notes and in-line to-dos to make reviews faster, and sign-offs to ensure work is completed.





Issue management & reporting

+ Get real-time visibility across all your audits, and drill down into status, findings, and remediation plans in individualized dashboards.
+ Create one-click reports to keep stakeholders informed.
+ Consolidate all issues found across your audits to track remediation efforts by owner with scheduled follow-ups, reminders, and notifications.
+ Aggregate assurance over risks into your enterprise risk management framework.

CAATs for Auditing Application Controls

- CAATs assist auditors to evaluate application controls related to processing of transactions
  - Accuracy, completeness, validity, authorization
- Auditors examine 3 types of controls
  - Input: e.g., characters in field, amounts
  - Processing: e.g., matching data before actions – purchase order vs invoice
  - Output: e.g., report data reconciliation - general ledger vs subsidiary ledgers
- **Spreadsheet Controls**: CAATs help auditors asses client-prepared spreadsheets for analyzing their data and forming opinions
- **Database Controls**: CAATs help auditors test DB controls which include referential integrity, transaction integrity, value constraints, backup & recovery etc

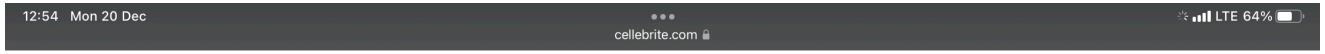
CAATs for Operational Reviews

- Operational review is the evaluation of effectiveness, efficiency, and goal achievement related to information systems management operations.
- Operational review includes activities such as
  - Reviewing operating policies and documentation
  - Procedure confirmation with management and operational personnel
  - Observing operating functions and activities
  - Testing accuracy of operating information
  - Testing operational controls
- Tools such as Access in MS Office and MS Excel can be used to perform analysis (histograms, frequencies, summaries) and visually portray info to see and forecast trends

Computer Forensics Tools

- The examination, analysis, testing, and evaluation of computer-based material conducted to provide relevant and valid information to a court of law
- Computer Forensics Tool Testing (CFTT) – www.cftt.nist.gov
- Examples
  - EnCase Forensics by Guidance Software – deleted files, unallocated space etc
  - Cellebrite

Example of Computer Forensics Tools



On a Platform to Meet Your Needs

Don't let complicated locks, encryption barriers, deleted and unknown content prevent critical evidence from coming to light.

- **UFED 4PC is a cost**-effective, flexible, and convenient software format for any user requiring access and collection capabilities on their existing PC or laptop
- **UFED Touch2** enables comprehensive data collection capabilities anywhere, whether in the lab, a remote location, or in the field
- **UFED Ruggedized Panasonic Laptop** is loaded with UFED software and comes in a purpose-built ruggedized case that can withstand drops, shocks, and extreme temperatures to ensure a seamless workflow wherever the investigation takes you

Further Readings

- Chapter 4 – Course Book (Information Technology Control and Audit – Fifth Edition)
- Lecture readings in the course website