



MIAMI  
UNIVERSITY

**Farmer School of Business**

# External Information Technology Audit Process Quality: Development of A Grounded Theory

Douglas Havelka, Jeffrey W. Merhout, & Dale Stoel  
Farmer School of Business  
Miami University



MIAMI  
UNIVERSITY

**Farmer School of Business**

# Overview

- Overview
- Research Program
- Introduction/Background
- Research Question
- Data Gathering Approach
- Subject Demographics
- Analysis Approach
- Results: Codes, Concepts, and Categories
- Potential Relationships
- Conclusion





MIAMI  
UNIVERSITY

Farmer School of Business

# Research Program

- Study of **internal** information technology audit process
  - Paper submitted to special issue of EJIS
- Study of **external** information technology audit process
  - Preliminary findings presented at AAA
  - Initial theory presented at SIGASYS workshop
- Validation of **combined** data
  - Data gathered from ~ 150 members of ISACA
  - Factor analysis in progress

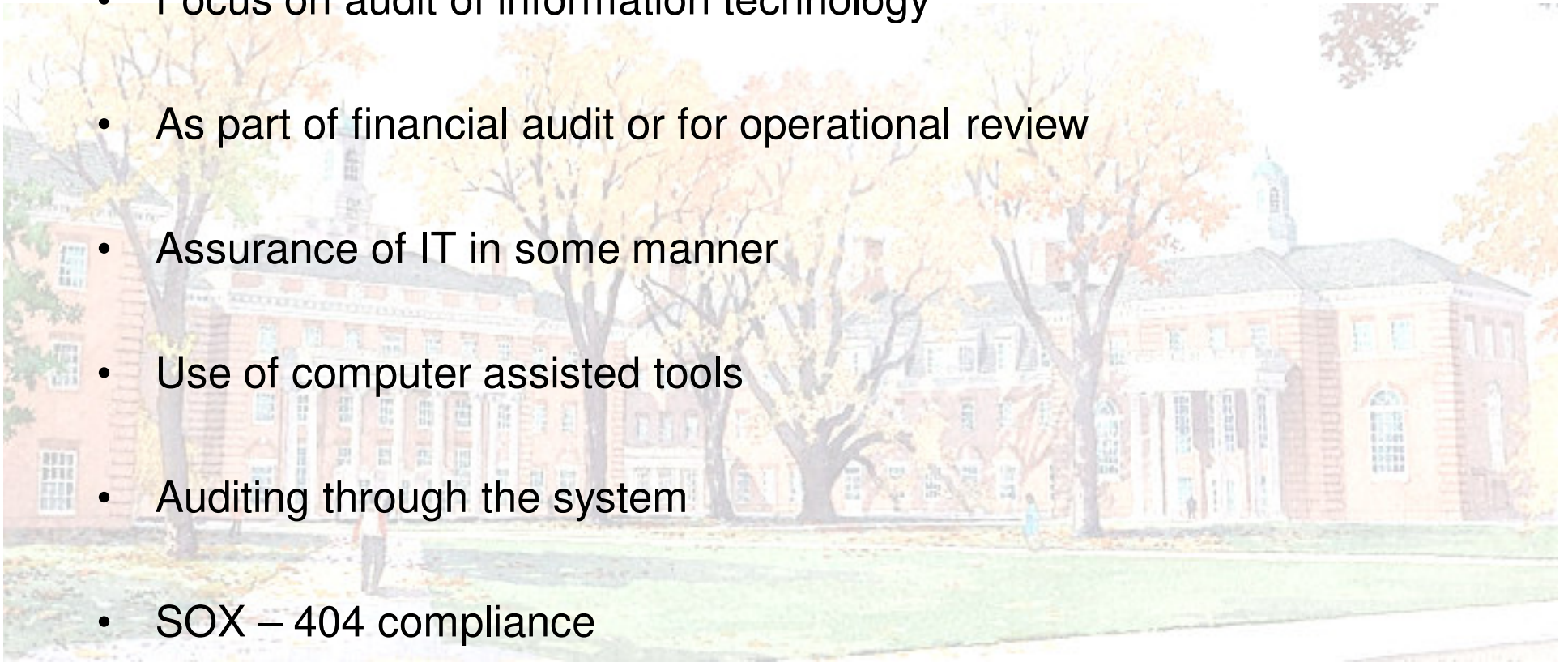


MIAMI  
UNIVERSITY

**Farmer School of Business**

# Introduction / Background

- Focus on audit of information technology
- As part of financial audit or for operational review
- Assurance of IT in some manner
- Use of computer assisted tools
- Auditing through the system
- SOX – 404 compliance





MIAMI  
UNIVERSITY

**Farmer School of Business**

# Introduction / Background

## IT Audit Activities

- Evaluation of controls over specific applications.
- Analyzing risks and controls over applications such as e-business, enterprise resource planning (ERP) systems, transaction processing systems, etc.
- Provide assurance over specific processes, i.e. where auditor and client agree upon procedures to be performed and the scope of the assurance.
- Provide third party assurance including evaluation of risks and controls of information systems for others.
- Penetration testing, i.e. to discover and assess security weaknesses of systems.
- Support the financial audit, i.e. evaluate IT risks and controls affecting the reliability of the financial reporting system.
- Investigation of IT-based fraud.



MIAMI  
UNIVERSITY

Farmer School of Business

# Research Question

- How can we improve the quality of the IT audit process?
- What constructs influence the efficient, effective, and successful conduct of IT audits?
  - What are the constructs?
  - What are their dimensions?
  - What values can they possess?
  - How might they relate to one another?

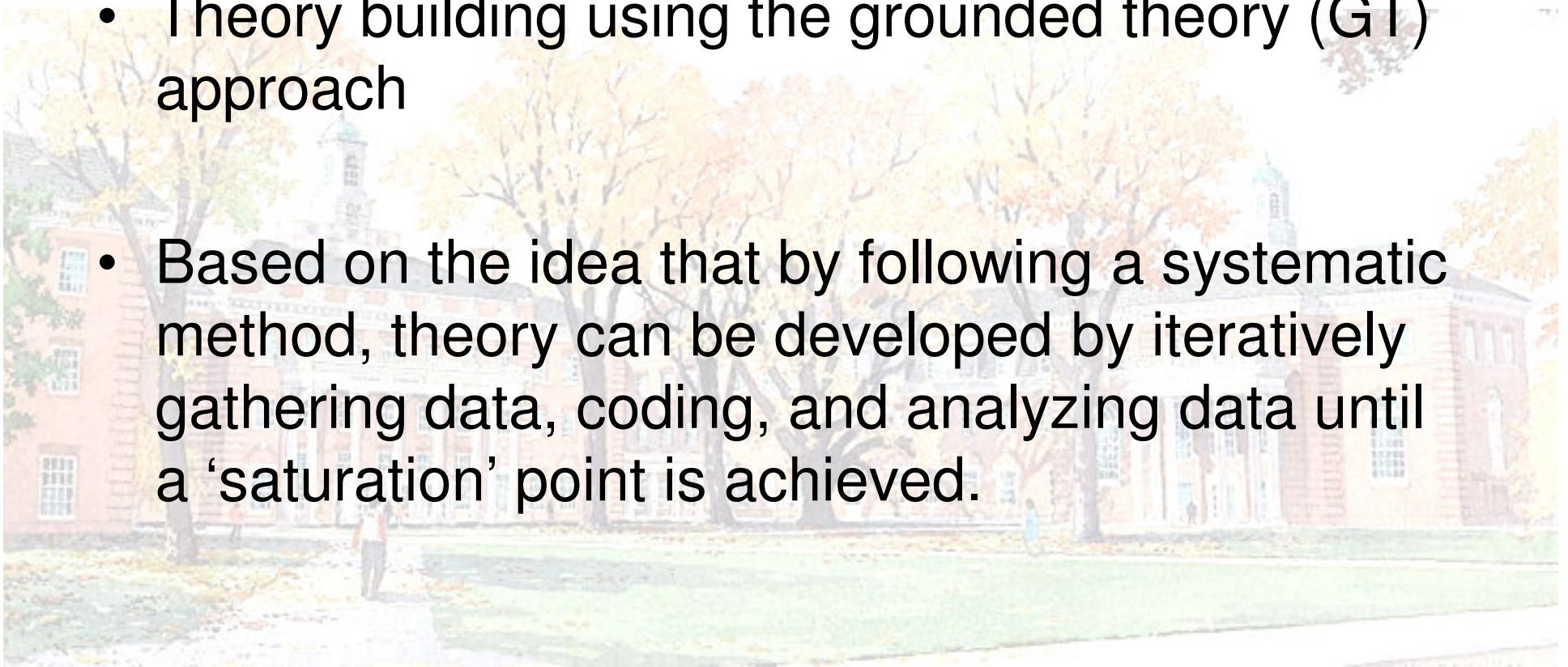


MIAMI  
UNIVERSITY

Farmer School of Business

# Research Method

- Theory building using the grounded theory (GT) approach
- Based on the idea that by following a systematic method, theory can be developed by iteratively gathering data, coding, and analyzing data until a 'saturation' point is achieved.



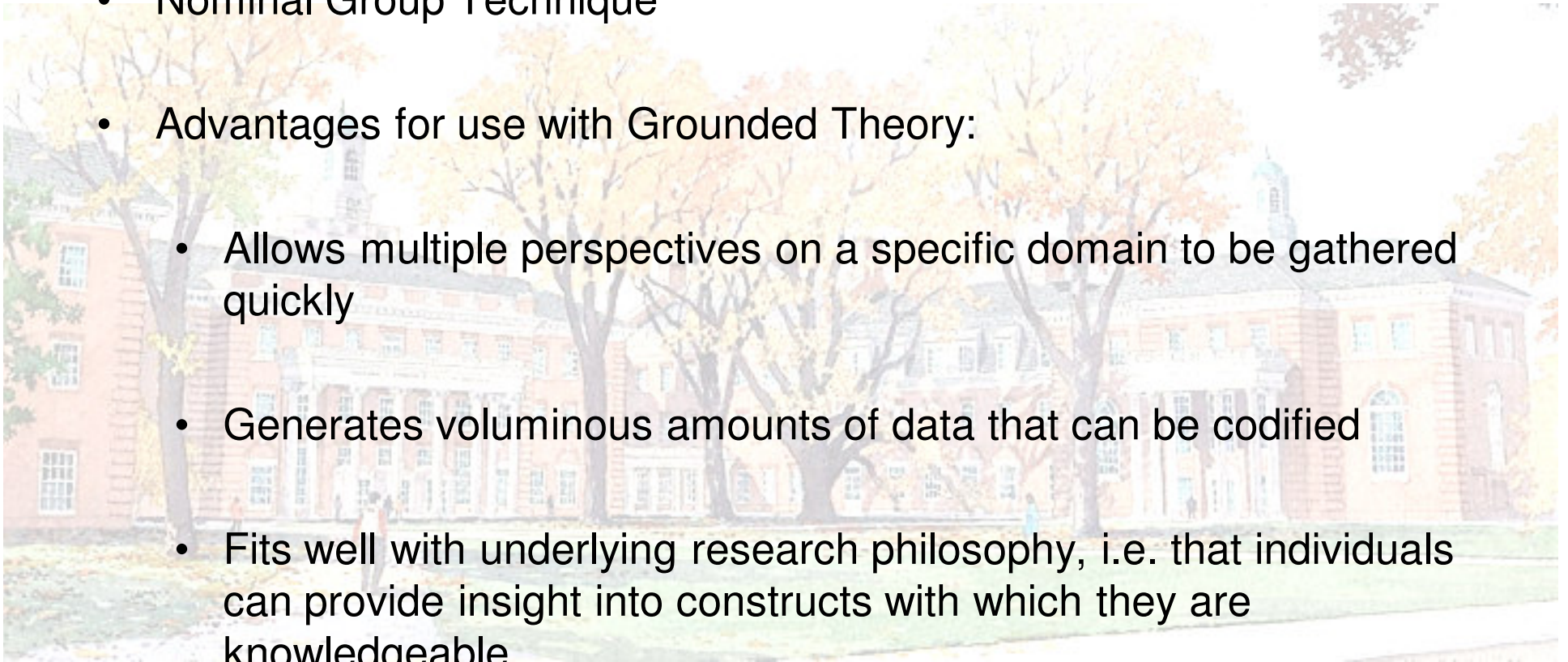


MIAMI  
UNIVERSITY

Farmer School of Business

# Data Gathering Approach

- Nominal Group Technique
- Advantages for use with Grounded Theory:
  - Allows multiple perspectives on a specific domain to be gathered quickly
  - Generates voluminous amounts of data that can be codified
  - Fits well with underlying research philosophy, i.e. that individuals can provide insight into constructs with which they are knowledgeable.





# Structured Group Process Steps

1. Introduction and instructions, explain the purpose, provide definitions, explain the procedure and activities, and pose the question:

What factors do you believe influence the efficiency, effectiveness, and quality of the IT audit process?

2. Each participant is asked to silently generate as many factors as possible.
3. After 10-15 minutes, the facilitator will elicit one factor at a time from participants (round robin fashion) and write on a white board.
4. After all factors generated by participants are listed, discussion for clarification is performed.
5. Each participant is then asked to select from the comprehensive list, those factors they consider to be critical to IT audit quality.
6. Then, each participant is asked to rank order the factors they consider to be critical.
7. Demographic data is asked for and the session worksheets are collected. Informal discussion.



MIAMI  
UNIVERSITY

Farmer School of Business

# Subject Demographics

Subject Demographics						
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
	IT Audit Managers, Firm 1	IT Audit Managers, Firm 2	IT Audit Managers, Firm 3	IT Audit Seniors & Staff, Firm 1	IT Audit Seniors & Staff, Firm 2	IT Audit Seniors & Staff, Firm 3
Males	4	2	3	4	4	3
Females	0	1	1	2	1	2
Total	4	3	4	6	5	5
Education	5 – 1 MBA	4	5.25 – 1 MBA	4.33 – 1 MBA	4.8 – 3 MBA	4.6 – 1 MAcc
Mean Yrs Audit Experience	8.85	6.44	7.5	1.67	5.03	1.472
Mean Yrs IT Audit Experience	7.45	6.44	12.25	1.58	3	1.622
Mean Self Assessed Level of Computer Literacy (1-10 scale)	7.25	8.67	8.375	8	8.25	8



MIAMI  
UNIVERSITY

**Farmer School of Business**

# Analysis Approach

Modified Glaserian Grounded Theory approach: Constant comparative analysis

1. Theoretical sampling, gathering the data
2. Open coding, identify “incidents” as atomic unit of analysis
3. Theoretical coding, concept emergence, incidents as indicators of concepts  
– common themes or semantic notion, category as higher level abstraction
4. Selective coding: delimiting the theory, identify core categories, relationships are proposed
5. Achieve saturation: Substantiation through literature or further data collection and testing



MIAMI  
UNIVERSITY

Farmer School of Business

## Results: Example of Codes – Auditor Competence: Interpersonal Skills

CATEGORY: AUDITOR COMPETENCE	
Concept	Codes
<b>Auditor Interpersonal Skills</b>	Auditors' communication skills (both conveying and receiving) (1Y) Ability to ask the right type of questions (1AG) Auditor's ability to articulate findings and exceptions in a way that the auditee or other stakeholders understand (1T) Auditors interpersonal skills (4AB) Auditor's ability to speak the client's language (5AD) Ability to deal with multiple client personalities, get what's needed without turmoil (6K) Good oral and written communication skills (6N) Maintaining professionalism with specific individuals, i.e. clients (6AG) Atmosphere of comfort with audit team peers (6AL) Ability to follow-up with clients when they are not fulfilling their documentation requirements, i.e. doing it in a timely and effective manner (6BB)



MIAMI  
UNIVERSITY

Farmer School of Business

# Categories & Concepts

## Auditor Competence

1. Interpersonal Skills
2. Business Knowledge
3. Audit Skills
4. Attitude
5. Technology Skills
6. Preparation

## Audit Management

1. Communication
2. Supervision
3. Resource Management
4. Planning
5. Audit Methodology
6. Quality Control

## Audit Environment

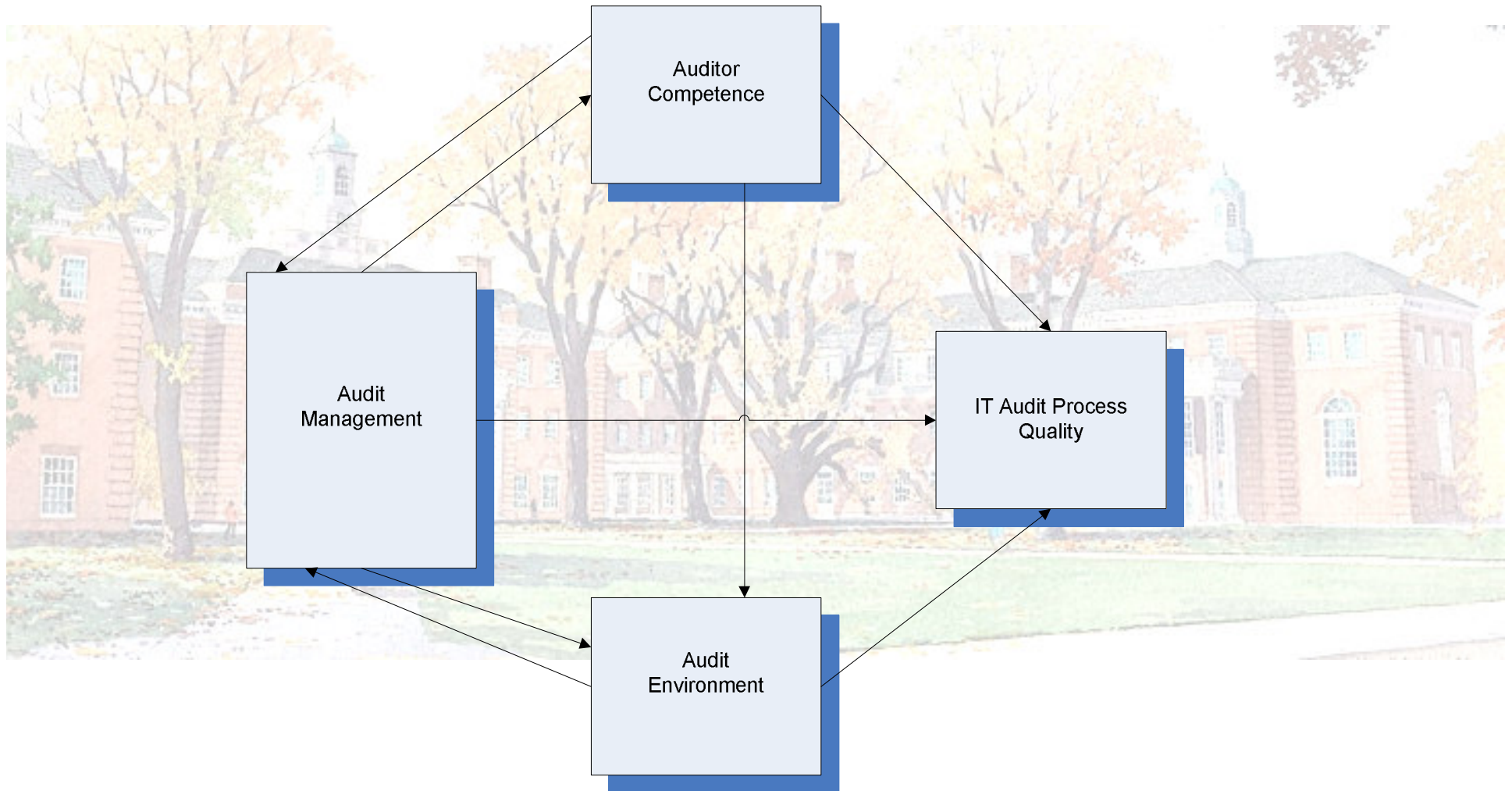
1. Auditee Attitude
2. Auditability
3. Resource Availability
4. Business Environment



MIAMI  
UNIVERSITY

Farmer School of Business

# Potential Relationships





# Literature Analysis

Added additional concepts identified by financial accounting audit literature

## Auditor Competence

1. Interpersonal Skills
2. Business Knowledge
3. Audit Skills
4. Attitude
5. Technology Skills
6. Preparation
7. GAAP / GAAS Knowledge

## Audit Management

1. Communication
2. Supervision
3. Resource Management
4. Planning
5. Audit Methodology
6. Quality Control
7. Skepticism
8. Independence
9. Responsiveness

## Audit Environment

1. Auditee Attitude
2. Auditability
3. Resource Availability
4. Business Environment
5. Fieldwork



MIAMI  
UNIVERSITY

**Farmer School of Business**

# Concept Validation

- Develop survey based on codes identified in initial focus groups and from prior financial audit quality literature
- Approx. 150 responses from Ohio ISACA chapters
- Factor analysis used to group codes into higher-order concepts



# Individual Codes

## Ten Highest Rated Attributes of IT Audit Quality

Description	Mean
The audit is adequately planned	4.524
Audit team has good communication skills (oral and written)	4.510
The audit team members have high ethical standards	4.422
Risk-based audit approach is used to develop audit plan, and risk assessment model is understandable to auditee and audit team	4.374
Auditee understands the audit process and purpose of the audit	4.347
Audit team members are very knowledgeable about internal controls and business processes	4.327
Sufficient resources exist to meet audit scope and timeframe	4.320
The audit team members conduct the audit field work in an appropriate manner	4.224
Fieldwork is reviewed by a higher level audit team member	4.177
Audit objectives, scope and plan are documented and agreed to by auditee and audit team	4.177

## Lowest Rated Attributes of IT Audit Quality \*

Description	Mean
The majority of audit team personnel have passed the CPA exam	1.925
The audit team members are competent in their knowledge/application of GAAP and GAAS	2.884
Inclusion of geographically and culturally dispersed business units and processes in the audit	2.891

Scale: 1 = No Impact    3 = Some Impact    5 = Extremely Impactful

\* Other attributes have a mean above 3



MIAMI  
UNIVERSITY

Farmer School of Business

# Validated Concepts

Added additional concepts identified by financial accounting audit literature

## Auditor Competence

1. Firm / Business Knowledge
2. Audit Skills
3. Technology Skills
4. GAAP / GAAS Knowledge

## Audit Management

1. Communication
2. Planning / Audit Methodology
3. Quality Control
4. Skepticism
5. Independence
6. Responsiveness

## Audit Environment

1. Auditee Attitude
2. Resource Availability – Computer Tools
3. Business Environment
4. Fieldwork
5. Fieldwork – Internal Controls



# Factor Rank

<b>Comparison of Ratings of IT Audit Factors</b>	
<b>Factor</b>	<b>Mean of Factor Items (Rank)</b>
Auditee Attitude and Understanding of Audit	4.35 (1)
Audit scope and planning	4.24 (2)
Independence	4.14 (3)
Communications	4.11 (4)
Fieldwork - Internal controls	4.01 (5)
Firm / Business Knowledge	3.90 (6)
Technical and controls knowledge	3.88 (7)
Responsiveness	3.86 (8)
Audit process quality controls	3.73 (9)
Audit skill / experience	3.69 (10)
Skepticism	3.69 (10)
Fieldwork	3.56 (12)
Resources - Computer tools	3.42 (13)
Business Environment	3.22 (14)
GAAP and GAAS Knowledge	2.82 (15)



MIAMI  
UNIVERSITY

Farmer School of Business

# Impact of Experience

<b>Evaluation of differences between more and less experienced IT audit personnel</b>	
<b>Factor</b>	<b>Higher Impact: Senior Vs Junior</b>
Audit process quality controls	Junior
Communications	Junior
Firm / Business Knowledge	Junior
Auditee Attitude and Understanding of Audit	Junior
GAAP / GAAS Knowledge	No Difference
Audit scope and planning	No Difference
Business Environment	No Difference
Fieldwork	No Difference
Fieldwork - Internal controls	No Difference
Audit skill / experience	No Difference
Skepticism	No Difference
Technical and controls knowledge	No Difference
Resources - Computer tools	Senior
Independence	Senior
Responsiveness	Senior



MIAMI  
UNIVERSITY

**Farmer School of Business**

# Conclusion

- Identify potential concepts for IT Audit Quality
- Validation of the concepts by survey and factor analysis
- Next steps
  - Potential relationships between factors
  - Theory testing studies

