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# Digitalization, Accounting Jobs, and Financial Reporting Quality

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• How does firm digitalization affect the demand for corporate accountants and their digital skills?



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- How does firm digitalization affect the demand for corporate accountants and their digital skills?
- Do digitalization and accountants' digital skills jointly affect financial reporting quality?

### Motivation – Large Investments in Digitalization

- Worldwide investments in digital technologies projected to be over US\$4.5 trillion in 2022 (Gartner 2021)
- No consensus how digital investments -> economic gains
  - Increase firms' growth opportunities and productivity (Brynjolfsson et al. 2018; Cockburn et al. 2018)

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- Lower profit margins and sales growth (Chen and Srinivasan 2021)



### Motivation – Substitute vs. Complement Debate





### Motivation – Substitute vs. Complement Debate



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> accountingTODAY Voices Automation won't replace CPAs. It will enhance them





### Modifying the Collegiate Accounting Curriculum to Prepare for the CPA Evolution Project

Incorporating Advances in Technology into Accounting Programs

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# Example of Digitalization - ABM



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- Digital integration of managing customer accounts
- Transaction-level data to improve product recommendations
- Broad firm-level strategy

### Example of Accountant's Digital Skills - ABM

### **Responsibilities:**

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- Improve account reconciliation process
- Develop and support process automation for repetitive processes
- Perform complex calculations on large data sets



**Qualifications:** - Bachelor in Accounting / Finance / **Information Systems** - GL account reconciliation experience - Willingness to learn new tools and techniques

### How does Digitalization Affect Accountants



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### How does Digitalization Affect Accountants



### H1 – Digitalization Affects Demand for Accountants



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- Technological advances may decrease labour input of routine tasks (Autor et al. 2003) and big data/AI can substitute for wider range of labour (Acemoglu et al. 2020)
- Bookkeeping, accounting and auditing clerks face high risk of substitution through digitalization (Frey and Osborne 2017)

### H1 – Digitalization Affects Demand for Accountants



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- Technological advances may decrease labour input of routine tasks *(Autor et al. 2003)* and big data/AI can substitute for wider range of labour *(Acemoglu et al. 2020)*
- Bookkeeping, accounting and auditing clerks face high risk of substitution through digitalization (Frey and Osborne 2017)



- But technological changes require highly skilled workers to maintain and use those tools (Frey and Osborne 2017)
- Digitalization enables accountants to create new services such as being a citizen data scientist (Marr 2018)

H1: The adoption of digital technologies has no impact on a firm's demand for corporate accountants.

### H2 – Digitalization Changes Accountants' Skillsets



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- Adoption of digital technologies may improve firm productivity and growth (*Tambe 2014; Babina et al. 2020*)
- No need for change in accountants' skillsets if technology replaces accountants

### H2 – Digitalization Changes Accountants' Skillsets



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- Adoption of digital technologies itself may improve firm productivity and growth (*Tambe 2014; Babina et al. 2020*)
- No need for change in accountants' skillsets if technology replaces accountants



• Proper adoption requires complementary technologyrelated management expertise (Haislip and Richardson 2018; Chen and Srinivasan 2021)

H2: The adoption of digital technologies does not change a firm's demand for accountants' digital skills.

### H3 – Digitalization & Accountants' Skillsets Affect FRQ



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- Stronger IT is associated with higher management forecast likelihood and accuracy (Dorantes et al. 2013)
- Digital technologies can increase quantity and quality of routine informational inputs (*Autor et al. 2003*)

### H3 – Digitalization & Accountants' Skillsets Affect FRQ



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- Stronger IT is associated with higher management forecast likelihood and accuracy (*Dorantes et al. 2013*)
- Digital technologies can increase quantity and quality of routine informational inputs (*Autor et al. 2003*)



• Audit committee with IT expertise less likely to restate or have IT-related control weaknesses (Ashraf et al. 2020)

H3: Digital technologies and accountants' digital skills independently affect financial reporting quality.

# Data and Sample

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- 1. U.S. Compustat Firms
  - Exclude technology firms following Chen and Srinivasan (2021)
  - Exclude financial & utility firms
- 2. Obtain 170,000 accountant job postings from Burning Glass
  - Crawls 40,000 online job boards and websites, de-duplicate postings, and parse data into fields like job title, Standard Occupational Classification (SOC) code, firm, location, education, skill requirements, etc.
- 3. Merge using employer name
  - 1,333 unique firms from 2011-2019



# **Key Variables**

- No. of digital-related terms in 10-K, converted into tercile by year
- Dictionary following Chen and Srinivasan (2021), includes: analytics, automation, AI, big data, cloud computing, digitization, machine learning

Digitalization



# **Key Variables**

- No. of digital-related terms in 10-K, converted into tercile by year
- Dictionary following Chen and Srinivasan (2021), includes: analytics, automation, AI, big data, cloud computing, digitization, machine learning

Digitalization

- 1. No. of job postings for accountants / total postings of firm in that year
- 2. Identify accountants by SOC code
  - a. Financial Specialists: relevant 13-2000
  - b. Financial Clerks: relevant 43-3000

Accountants Accountants<sup>FS</sup> Accountants<sup>FC</sup> **Financial Specialists** 

Responsible for financial reporting, budgeting, forecasting

#### Financial Clerks

 Perform administrative financial tasks such as invoicing, entering transactions into software



# **Key Variables**

- No. of digital-related terms in 10-K, converted into tercile by year
- 2. Dictionary following Chen and Srinivasan (2021), includes: analytics, automation, AI, big data, cloud computing, digitization, machine learning

Digitalization

- 1. No. of job postings for accountants / total postings of firm in that year
- 2. Identify accountants by SOC code
  - a. Financial Specialists: relevant 13-2000
  - b. Financial Clerks: relevant 43-3000

Accountants Accountants<sup>FS</sup> Accountants<sup>FC</sup>

- 1. No. of job postings for accountants requiring at least 1 digital skill divided by total accountant postings
- 2. Dictionary same as Digitalization + skillbased terms from Acemoglu et al. (2020) and Gao et al. (2021)

Digital Skills <sup>Acct</sup> Digital Skills <sup>FS</sup> Digital Skills <sup>FC</sup>



### **Descriptive Statistics**

Figure 1: Proportion of Digitalized Firms



Digital Non-Digital

### **Descriptive Statistics**

Figure 1: Proportion of Digitalized Firms



#### Figure 2: Proportion of Accounting Job Postings Requiring Digital Skills



Digital Non-Digital



### Main Result – H1 Demand for Accountants

	(1)	
Dependent Variable =	Accountants <sub>t</sub>	
Digitalization <sub>t-1</sub>	-0.001 (-0.60)	
Controls	Yes	
Firm & Year FE	Yes	
Ν	7,050	
Adj. R <sup>2</sup>	0.27	

• Firm's digitalization does not change overall demand for accountants

### Main Result – H1 Demand for Accountants

Dependent Variable –	(1) Accountants	(2) Accountants <sup>FS</sup>	(3) Accountants <sup>FC</sup>
Dependent variable =	-0.001 (-0.60)	0.001 (0.88)	-0.002** (-2.56)
Controls	Yes	Yes	Yes
Firm & Year FE	Yes	Yes	Yes
Ν	7,050	7,050	7,050
Adj. R <sup>2</sup>	0.27	0.25	0.22

- Firm's digitalization does not change overall demand for accountants
- Decrease in demand for financial clerks

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 Suggests that digitalization reduces demand for repetitive jobs but does not change demand for jobs requiring judgment

### Main Result – H2 Digital Skills

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Deve eved evet ) / evia la la	(1) Disital Chills Acct	
Dependent variable =	Digital Skillst	
Digitalization <sub>t-1</sub>	0.007*	
	(1.87)	
Controls	Yes	
Firm & Year FE	Yes	
Ν	7,050	
Adj. R <sup>2</sup>	0.36	

• Firm's digitalization increases demand for accountants' digital skills, driven by financial specialists

# Main Result – H2 Digital Skills

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Dependent Variable =	(1) <i>Digital Skills<sub>t</sub><sup>Acct</sup></i>	(2) <i>Digital Skills<sub>t</sub><sup>FS</sup></i>	(3) <i>Digital Skills<sub>t</sub><sup>FC</sup></i>
Digitalization <sub>t-1</sub>	0.007* (1.87)	0.011** (2.33)	-0.002 (-1.22)
Controls	Yes	Yes	Yes
Firm & Year FE	Yes	Yes	Yes
Ν	7,050	7,050	7,050
Adj. R <sup>2</sup>	0.36	0.35	0.37

- Firm's digitalization increases demand for accountants' digital skills, driven by financial specialists
- One std. dev. increase in Digitalization associated with 10% increase from sample
  mean of *Digital Skills*<sup>FS</sup>
- Placebo test: does not increase demand for other skills -> social skills, financial skills, accounting major, general ability

### Main Result – H3 Financial Reporting Quality

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Dependent Variable =	(1) $DA_t$	(2) <b>DD</b> <sub>t</sub>	(3) <b>DR</b> <sub>t</sub>
Digitalization <sub>t-1</sub> x Digital Skills <sub>t-1</sub> FS	-1.321* (-1.79)	-1.053*** (-3.16)	-0.718** (-2.34)
Controls	Yes	Yes	Yes
Firm & Year FE	Yes	Yes	Yes
Ν	5,728	5,728	5,728
Adj. R <sup>2</sup>	0.24	0.06	0.19

- Firm digitalization and accountants with digital skills alone do not affect FRQ
- Greater level of digitalization and having more accountants with digital skills
   improves financial reporting quality
- Results hold for composite measure of FRQ, and after controlling for (1) other employee's digital skills, (2) FS' other skills, and (3) FS' general ability



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	(1)		(2)		(3)		(4)	
Dependent Variable	D	$\boldsymbol{A}_t$	$DD_t$		$DR_t$		FRQ_PC <sub>t</sub>	
	High FV	Low FV	High FV	Low FV	High FV	Low FV	High FV	Low FV
Digitalization <sub>t-1</sub> x Digital Skills <sub>t-1</sub> FS	-1.148 (-0.56)	-0.399 (-0.48)	-2.213*** (-2.59)	-0.393 (-0.75)	-1.542** (-2.01)	-0.481 (-1.23)	-0.507** (-2.25)	-0.129 (-1.24)
P-value for diff test	0.30		0.00		0.06		0.01	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ν	1,910	1,904	1,910	1,904	1,910	1,904	1,910	1,904
Adj. R <sup>2</sup>	0.16	0.33	0.01	0.03	0.23	0.25	0.03	0.12

- Partition firms into high vs. low amount of Level 2 and 3 fair values; fair value estimation would benefit from technology use
- Improvement in FRQ for subsample of firms with high fair value



Contribution:



Contribution:

- 1. Extend literature on how technology changes job demand by showing how digitalization affects rank-and-file accounting employees
- 2.

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3.



Contribution:

- 1. Extend literature on how technology changes job demand by showing how digitalization affects rank-and-file accounting employees
- 2. Examine how interaction between human capital and technology affects financial reporting quality

3.



Contribution:

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- 1. Extend literature on how technology changes job demand by showing how digitalization affects rank-and-file accounting employees
- 2. Examine how interaction between human capital and technology affects financial reporting quality
- 3. Informs the development of accounting professionals

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### Tableau – Analyzing Accounts Receivable



# Tableau – Integrating with Python

Finding correlation coefficient of Sales & Profit by Python

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### Tableau – Identify Possible Channel Stuffing



# Tableau – Identify transactions causing negative cash flow



# Financial Specialists vs. Financial Clerks

Panel A: Financial specialists (N=114,340)

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Titles	%
Financial Analyst	5.27%
Senior Financial Analyst	4.58%
Senior Accountant	2.70%
Staff Accountant	2.55%
Accountant	2.27%
Pricing Analyst	0.95%
Senior Internal Auditor	0.90%
Cost Accountant	0.86%
Internal Auditor	0.76%
Senior Auditor	0.63%
Financial Analyst II	0.61%
Finance Analyst	0.59%
Tax Accountant	0.49%
Senior Tax Accountant	0.47%
Senior Tax Analyst	0.45%
Accountant II	0.44%
Mult Func Financial Analyst Asc	0.44%
Treasury Analyst	0.41%
Principal Financial Analyst	0.39%
Financial Analyst I	0.38%
Other	73.51%

Panel B: Financial clerks (N=58,824)

Titles	%
Buyer Assistant	4.29%
Accounts Receivable Clerk	3.02%
Accounts Receivable Specialist	2.08%
Accounting Clerk	1.95%
Accounts Payable Clerk	1.87%
Accounts Payable Specialist	1.55%
Back Up Scan	1.55%
Accounts Receivable Representative	1.32%
Billing Specialist	1.30%
Payroll Specialist	1.26%
Accounting Assistant	1.16%
Site Accounting Representative	0.81%
Accounting Associate	0.74%
Payroll Administrator	0.74%
Reimbursement Specialist	0.74%
Billing Clerk	0.73%
College Student Non-Technician	0.67%
Collections Specialist	0.67%
Payroll Coordinator	0.65%
Payroll Analyst	0.63%
Other	72.26%

- Clerks perform mostly administrative tasks (keying in transactions, sending invoices to customers)
- Accountants more involved in financial reporting, budgeting, and forecasting

# SOC Codes and Descriptions

SOC	Description
13-2011 Accountants and Auditors	Examine, analyze, and interpret accounting records to prepare financial statements, give advice, or audit and evaluate statements prepared by others. Install or advise on systems of recording costs or other financial and budgetary data.
13-2031 Budget Analysts	Examine budget estimates for completeness, accuracy, and conformance with procedures and regulations. Analyze budgeting and accounting reports.
13-2051 Financial and Investment Analysts	Conduct quantitative analyses of information involving investment programs or financial data of public or private institutions, including valuation of businesses.
13-2054 Financial Risk Specialists	Analyze and measure exposure to credit and market risk threatening the assets, earning capacity, or economic state of an organization. May make recommendations to limit risk.
13-2061 Financial Examiners	Enforce or ensure compliance with laws and regulations governing financial and securities institutions and financial and real estate transactions. May examine, verify, or authenticate records.
13-2082 Tax Preparers	Prepare tax returns for individuals or small businesses.
13-2099 Financial Specialists, All Other	All financial specialists not listed separately.

### SOC Codes and Descriptions

SOC	Description
43-3011 Bill and Account Collectors	Locate and notify customers of delinquent accounts by mail, telephone, or personal visit to solicit payment. Duties include receiving payment and posting amount to customer's account, preparing statements to credit department if customer fails to respond, initiating repossession proceedings or service disconnection, and keeping records of collection and status of accounts
43-3021 Billing and Posting Clerks	Compile, compute, and record billing, accounting, statistical, and other numerical data for billing purposes. Prepare billing invoices for services rendered or for delivery or shipment of goods.
43-3031 Bookkeeping, Accounting, and Auditing Clerks	Compute, classify, and record numerical data to keep financial records complete. Perform any combination of routine calculating, posting, and verifying duties to obtain primary financial data for use in maintaining accounting records. May also check the accuracy of figures, calculations, and postings pertaining to business transactions recorded by other workers.
43-3051 Payroll and Timekeeping Clerks	Compile and record employee time and payroll data. May compute employees' time worked, production, and commission. May compute and post wages and deductions, or prepare paychecks.
43-3061 Procurement Clerks	Compile information and records to draw up purchase orders for procurement of materials and services.
43-3099 Financial Clerks, All Other	All financial clerks not listed separately.

## **Robustness Checks**

Possible Concern	Test Description	Test Outcome
Unobserved correlated variables; Firm's decision to digitalize could be affected by technological development, industry trends,	<ol> <li>Coarsened exact matching (CEM) analysis following DeFond et al. (2017), which reduces effect of potential misspecification</li> </ol>	1. Matched sample shows that results hold across H1-H3
which may not be fully captured by fixed effects and controls	2. Assess sensitivity of baseline results (Frank 2000), which assesses how large the endogeneity problem has to be to change the OLS results	2. Possibility of unobserved confounding variable rendering main result insignificant is very small
Results may be sensitive to how we define <i>Digitalization</i> (tercile measure of raw counts)	1. Use number of <u>unique</u> digital terms to capture different dimensions of firm's digitalization	1. Results hold after replacing <i>Digitalization</i> with two alternative measures across H1-H3
	2. Number of <u>sentences</u> containing at least 1 digital term, to reduce overestimation	

# Validation of Accountants' Digital Skills

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# Example – Digital Firm, Non-Digital Accountant

- Title: Specialist Finance
- Company: Acuity Brands
- Responsibilities:

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- responsible for generating accounting related reports and maintaining data
- analyzes data from statements, ledgers, accounts etc
- assists with audit and banking controls with external auditors by retrieving, copying and providing information

# Example – Non Digital Firm, Digital Accountant

- Title: Senior Analyst (Financial Planning & Analysis)
- Company: Advanced Drainage Systems
- Responsibilities / Requirements:

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- Support FP&A, including business intelligence and M&A
- Strong comfort with advanced excel functions to realize potential of excel (e.g., constructing models, efficiently compiling data, building well-designed charts, incorporating analytics into presentations)
- Combine analytics to support a narrative and tell the story

# Example – Digital Firm, Digital Accountant

- Title: Financial Analyst
- Company: ResMed

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- Responsibilities/Requirements:
  - Designing, building and maintaining financial reports, graphs and presentations globally
  - Conduct research to determine the best means of obtaining and transforming data into management reports and dashboards
  - expense allocation process including the creation and maintenance of allocation rules and inputs
  - VBA, SQL or other equivalent basic programing knowledge
  - Previous experience with financial and reporting systems such as TM1, Cognos, Oracle, Tableau or equivalent is a plus

# Appendix A – Digital Keywords 10K

#### Panel A: Keywords used to identify firm digitalization

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> This appendix lists the keywords used to identify firms' digitalization activities based on the dictionary of digitalrelated terms developed in Chen and Srinivasan (2021). The keywords are self-explanatory. Note that "DevOps" is a set of practices that combine software development and operations; it increases an organization's ability to deliver applications and services faster than traditional software development processes; "digita" is the short root word for words containing "digita," such as "digitalization" and "digital"; and "biometric" is used to capture automatic recognition of biometric characteristics.

AI related, AI tech, analytics, artificial intelligence, augmented reality, automation solutions, autonomous tech, big data, biometric, business intelligence, cloud based, cloud computing, cloud deployment, cloud enablement, cloud platform, cognitive computing, computer vision, conversational AI, customer intelligence, data lake, data mining, data science, deep learning, DevOps, digital marketing, digital revolution, digital strategy, digital transformation, digital twin, digiti, edge computing, evolutionary AI, evolutionary computing, facial recognition, hybrid cloud, image recognition, intelligent automation, intelligent system, machine learning, marketing automation, natural language processing, neural network, operating intelligence, process automation, proprietary algorithm, robotic process automation, smart data, speech recognition, virtual agent, virtual assistant, virtual machine, virtual reality

# Appendix A – Digitalization in 10K

#### **Tyson Foods**

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10-K for the fiscal year ended September 30, 2017 https://www.sec.gov/Archives/edgar/data/0000100493/000010049317000133/tsn201710kg4.htm

Information technology is an important part of our business operations and we increasingly rely on information technology systems to manage business data and increase efficiencies in our production and distribution facilities and inventory management processes. We also use information technology to process financial information and results of operations for internal reporting purposes and to comply with regulatory, legal and tax requirements. In addition, we depend on information technology for digital marketing and electronic communications between our facilities, personnel, customers and suppliers. Like other companies, our information technology systems may be vulnerable to a variety of disruptions, including but not limited to the process of upgrading or replacing software, databases or components thereof, natural disasters, terrorist attacks, telecommunications failures, computer viruses, cyber-attacks, hackers, unauthorized access attempts and other security issues. Attempted cyber-attacks and other cyber incidents are occurring more frequently, are constantly evolving in nature, are becoming more sophisticated and are being made by groups and individuals with a wide range of motives and expertise.

We are engaged in a multi-year implementation of an enterprise resource planning ("ERP") system. Such an implementation is a major undertaking from a financial, management, and personnel perspective. The implementation of the ERP system may prove to be more difficult, costly, or time consuming than expected, and there can be no assurance that this system will continue to be beneficial to the extent anticipated... <u>Additionally, our implementation of the ERP system may involve greater</u> <u>utilization of third-party "cloud" computing services in connection with our business operations.</u> <u>Problems faced by us or our third-party "cloud" computing providers, including technological or</u> <u>business-related disruptions, as well as cybersecurity threats, could adversely impact our business,</u> <u>results of operations and financial condition for future periods</u>.

# Appendix A – Digitalization in 10K

#### ABM Industries

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10-K for the fiscal year ended October 31, 2020 https://www.sec.gov/ix?doc=/Archives/edgar/data/0000771497/000077149720000018/abm-20201031.htm

#### Human Resources and Labor Management

During 2019 we launched our new cloud-based human capital management system. This investment will create an HR structure that centralizes and standardizes hiring and training practices to help us make more informed decisions and ultimately manage certain costs. We have also introduced new tools to help our operators manage labor more efficiently, and we continue to invest in attracting, developing, and retaining talent.

#### Evaluation of Goodwill Impairment Charge

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of an internal control over the Company's goodwill impairment process including the evaluation of the forecasted revenue growth rates, operating margins, and discount rate assumptions used to estimate the fair value of the reporting units. We performed sensitivity analyses over the forecasted revenue growth rates, operating margins, and discount rate assumptions to assess the impact of the changes in those assumptions on the impairment charge. We evaluated the Company's forecasted revenue growth rates and operating margins for the Aviation and Education reporting units by comparing them to underlying business strategies and growth plans and to relevant industry information, including trends and analytics.

## Appendix B – Digital Keywords Job Posts

Panel A: Keywords used to identify digital skills

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This panel lists the keywords used to identify accountants' digital skills. It includes the digital-related terms developed by Chen and Srinivasan (2021) and the digital-related skill terms developed by Acemoglu et al. (2020) and Gao et al. (2021).

acl, ai chatbot, ai related, ai tech, amazon web services, analytics, apache, apache drill, apache flink, apache hbase, apache hdfs, apache hive, apache pig, apache presto, apache samza, apache spark, apache storm, apache zookeeper, artificial intelligence, audit command language, augmented reality, automation solutions, autonomous tech, big data, biometric, business intelligence, caffe, caseware analytics, chatbot, cloud based, cloud computing, cloud deployment, cloud enablement, cloud platform, cntk, cognitive computing, computer vision, conversational ai, customer intelligence, data lake, data mining, data scien, data visualization, deep learning, devops, digital marketing, digital revolution, digital strateg, digital transformation, digital twin, digiti, eclipse deeplearning4j, edge computing, evolutionary ai, evolutionary computing, facial recognition, gradient boost, hadoop, hybrid cloud, idea data analysis, image processing, image recognition, intelligent automation, intelligent system, keras, kernel method, kylin, latent dirichlet allocation, latent semantic analysis, libsym, machine learning, machine translation, machine vision, mahout, mapreduce, marketing automation, microsoft powerbi, microsoft visio, mongodb, mxnet, mysql, natural language processing, neural network, nosql, object recognition, opency, operating intelligence, opinion mining, pattern recognition, predictive model, process automation, proprietary algorithm, python, pytorch, qlikview, random forest, recommender system, robotic process automation, sas, scala, scikit-learn, scipy, sentiment analysis, sentiment classifi, smart data, spark mllib, speech recognition, spss, sql, structured query language, supervised learning, support vector machine, tableau, tensorflow, text mining, theano, unsupervised learning, vba, virtual agent, virtual assistant, virtual machine, virtual realit, visual basic for application, visualization, word2vec, xgboost

JOB TITLE: Senior Accountant

ORGANIZATION: Tyson Foods

JOB LOCATION: Springdale, AR

#### POSITION TYPE: Full-Time

#### JOB DESCRIPTION:

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As part of Corporate Accounting, this position is responsible for managing all aspects of the Enablement Finance & Report Automation Team. Primary responsibilities include facilitating the Shared Services accounting process in its entirety, which includes ensuring the accuracy of the Shared Services financial statements in accordance with Generally Accepted Accounting Principles and ensuring that our Shared Services group leaders and their team members are informed of and understand their financial statements so they can better manage the finances of their areas alerting them to issues and trends seen in the financial results. Additionally, this position will be responsible for driving projects that result in standardizing, simplifying and modernizing current processes. This will also include the successful execution of sustainable, value-added reporting capabilities across Corporate Accounting and the Enterprise. Other essential duties and responsibilities include, but are not limited to; evaluating all Cloud Computing Arrangements and other internally developed software projects to ensure proper accounting treatment, participating in the evaluation of new accounting standards, ensuring the successful execution of the annual AOP process for each of the supported Shared Services groups, including providing accurate, timely and ongoing insights to the plan (AOP, SP, etc.). Additionally, this position will be responsible for accurately forecasting financials of the supported Enablement Functions and optimizing management's decision-making capabilities. Assist in the preparation and review of capital requests. Assist in managing the Company's Financial Fitness activities, including evaluating and reporting out monthly results. Assisting with other quarter-close activities and ad-hoc projects. Building and maintaining effective working relationships with various levels in the organization and being a champion of Tyson's mission, core values, and team behaviors (the 5 Cs) are critical.

- Bachelor's degree in an academic field directly related and essential to this job (Accounting or Finance degree preferred)
- 10+ years of progressive experience
- Working knowledge of SAP and basic knowledge of Microsoft Office applications including Excel, Word, Outlook, PowerPoint, Preferred. <u>Additionally, basic knowledge of</u> <u>Power BI and Tableau is also preferred</u>
- Excellent verbal and written communication skills; strong presentation skills
- Certified Public Accountant, eligible to sit for CPA exam, preferred, but not required. Strong analytical skills and people skills; must be comfortable working with Enabling Functions leaders; possess good knowledge of Generally Accepted Accounting Principles and SOX 404

JOB TITLE: Corporate Financial Analyst

ORGANIZATION: ABM Industries

JOB LOCATION: Sugar Land, TX

POSITION TYPE: Full-Time

#### JOB DESCRIPTION:

😪 SMU

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> The Financial Analyst is a key member of the Corporate team. <u>This position will be responsible for</u> <u>developing and supporting process automation</u>, utilizing TRECS and our current ERP JDE, and improving the current account reconciliation process. The Financial Analyst will have 3 primary functions: Developing and implementing new processes and tools utilizing various business technologies like Excel, Power BI, TRECS, and Cloud Fusion; Supporting the implementation of process improvements; GL Account Reconciliations. Build tools and processes to enable business process improvement initiatives by automating repetitive processes, improving controls through standardization of workflows, providing enhanced analytical capabilities, and performing complex calculations on large data sets. Create monthly reporting to calculate time savings from robotics and other automation tools. Develop and maintain documentation needed to understand and maintain solutions. Collaborate with IT to integrate new data elements and facilitate data transformations.

- Bachelor of Science in Accounting, Finance, or Information Systems/Technology or related field
- 2 years of relevant professional experience
- GL Account Reconciliation experience
- Proficient in software such as Excel, Power BI, TRECS, and Cloud Fusion Strong
  organizational skills including attention to detail and multi-tasking
- Ad-hoc reporting experience
- · Able to define a problem, generate potential solutions, and evaluate those solutions
- · Willingness to learn new tools and techniques
- Proven abilities to take initiative and be innovative
- Able to work in a team environment and on individual projects/tasks with a high level of independence
- Strong sense of ownership and accountability
- Excellent written and verbal communication skills

JOB TITLE: Financial Analyst

School of Accountancy

ORGANIZATION: ResMed

JOB LOCATION: San Diego, CA

POSITION TYPE: Full-Time

#### JOB DESCRIPTION:

This position will be responsible for designing, building and maintaining financial reports, graphs and presentations globally at all levels of the commercial organization and will report to the Finance Manager. This will require becoming familiar with how financial data is generated and consumed across the business. Financial/data analyst will also be involved in the expense allocation process including the creation and maintenance of allocation rules and inputs. Financial/data analyst may also conduct research to determine the best means of obtaining and transforming data into management reports and dashboards. Assist in gathering and interpreting reporting requirements from internal business customers. Assist in designing, standardizing and automating dashboards and reports using a variety of systems. Troubleshoot, validate, and test new and existing reports to ensure data completeness and consistency. Maintain report lists and distribution lists and keep them up to date. Generate and distribute reports in a timely manner according to a predetermined schedule, including daily, monthly, quarterly and annual reports. Assist in generating presentations and reporting packages involving revenue and expense for budget, forecast and actuals. <u>Become a subject matter expert within FP&A on TM1, Cognos, Tableau</u> and other sources of data/reporting.

- Familiar with financial reporting and concepts and also have significant technical proficiencies
- Proficiencies should include advanced excel knowledge including complex formulas and some VBA, SQL or other equivalent basic programing knowledge. Previous experience with financial and reporting systems such as TM1, Cognos, Oracle, Tableau or equivalent is a plus.
- Ability to plan, execute and deliver on projects in a timely manner and to multi-task on varying projects and initiatives with external driven deadlines that may shift during the course of the project
- Strong technical, planning, analytical and problem-solving skills with a high level of demonstrated quantitative, system thinking and finance skills
- · Detail-oriented, organized and thorough with desire for continuous improvement
- Ability to understand new business and financial models quickly with less than full information
- · Performs well under pressure in both team and individual settings
- Collaborative work style
- · Enthusiastically makes contributions and takes satisfaction in team accomplishments
- · Ability to build relationship and trust with local and remote colleagues

#### JOB TITLE: IT Auditor Staff

😪 SMU

School of Accountancy

ORGANIZATION: AERONAUTICS COMPANY

JOB LOCATION: City Fort Worth

POSITION TYPE: Full-Time

#### JOB DESCRIPTION:

Performs IT and business systems audits reviewing a variety of platforms, operating systems, applications, and processes. Will be responsible to gain a working understanding of the business processes under review, an understanding of and relationship to related requirements and to communicate clearly defined issues. Accountable to comprehend and assess procedures and work instruction to actual process in place. Will work with functional management to provide recommendations for resolution, develop solutions to complex problems which require the regular use of ingenuity and innovation, determine a course of corrective action and present audit results to senior-level management. Auditor may handle multiple complex tasks and will be a team player. Auditor must clearly document assignment while adhering to the Institute of Internal Audit Standards.

- A professional, with working experience in information technology (IT) platforms and applications.
- Good analytical and organizational skills. Initiative to understand and learn various
  applications, databases and interfaces. MS Office applications, specifically Excel for <u>analytics</u>
  and databases.
- Ability to clearly and concisely communicate ideas orally and in writing.
- Customer service orientated.
- Familiar with basic auditing principles.
- Able to take instruction and perform independently.
- Personable, a team player and can easily adapt to change. Flexible and willing to learn new processes.
- SAP expertise
- Certified Information Systems Auditor
- Certified Internal Auditor
- Experience in TeamMate audit software
- Experience in <u>ACL</u> or similar audit analytic software
- Data mining expertise
- Knowledge of FAR, DFAR, CAS, EVM, MMAS, Estimating, Procurement, and MRP systems is a plus.

## Appendix D – Job Titles Distribution

#### Panel A: Financial specialists (N=114,340)

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Titles	%
Financial Analyst	5.27%
Senior Financial Analyst	4.58%
Senior Accountant	2.70%
Staff Accountant	2.55%
Accountant	2.27%
Pricing Analyst	0.95%
Senior Internal Auditor	0.90%
Cost Accountant	0.86%
Internal Auditor	0.76%
Senior Auditor	0.63%
Financial Analyst II	0.61%
Finance Analyst	0.59%
Tax Accountant	0.49%
Senior Tax Accountant	0.47%
Senior Tax Analyst	0.45%
Accountant II	0.44%
Mult Func Financial Analyst Asc	0.44%
Treasury Analyst	0.41%
Principal Financial Analyst	0.39%
Financial Analyst I	0.38%
Other	73.51%

#### Panel B: Financial clerks (N=58,824)

Titles	%
Buyer Assistant	4.29%
Accounts Receivable Clerk	3.02%
Accounts Receivable Specialist	2.08%
Accounting Clerk	1.95%
Accounts Payable Clerk	1.87%
Accounts Payable Specialist	1.55%
Back Up Scan	1.55%
Accounts Receivable Representative	1.32%
Billing Specialist	1.30%
Payroll Specialist	1.26%
Accounting Assistant	1.16%
Site Accounting Representative	0.81%
Accounting Associate	0.74%
Payroll Administrator	0.74%
Reimbursement Specialist	0.74%
Billing Clerk	0.73%
College Student Non-Technician	0.67%
Collections Specialist	0.67%
Payroll Coordinator	0.65%
Payroll Analyst	0.63%
Other	72.26%

![](_page_56_Picture_0.jpeg)

#### Panel C: Sample distribution by Fama-French industries

Because we exclude utility and financial firms, the sample only includes firms in 10 Fama-French industries.

### Table 1

#### Panel A: Sample selection

	# of firm-years	# of unique firms
Firm-years in Compustat between 2010 and 2019	85,902	13,411
Less:		
Financial and utility industry (SIC 6000-6999, 4900-4949)	21,133	3,038
Technology firms	14,679	2,523
Firm-years without Burning Glass data	37,948	7,257
Firm-years with missing data for calculating related variables	4,514	2,182
Singleton firms	578	578
Total	7,050	1,333

#### Panel B: Sample distribution by year

Year	# of firms	# of firms with digitalization	Digitalization percent	# of firms requiring digital skills from accountants	Digital skills accountant percent
	(1)	(2)	(3) = (2)/(1)	(4)	(5) = (4)/(1)
2011	639	55	9%	137	21%
2012	698	84	12%	181	26%
2013	749	100	13%	202	27%
2014	760	114	15%	222	29%
2015	768	153	20%	229	30%
2016	795	262	33%	265	33%
2017	832	252	30%	284	34%
2018	936	288	31%	330	35%
2019	873	398	46%	339	39%
Total	7,050	1,706	24%	2,189	31%

Industry	# of firm- years	# of firm- years with digitalization	Digitalization percent	# of firm-years requiring digital skills from accountants	Digital skills accountant percent
	(1)	(2)	(3) = (2)/(1)	(4)	(5) = (4)/(1)
Consumer Nondurables	619	207	33%	241	39%
Consumer Durables	266	57	21%	70	26%
Manufacturing	926	249	27%	321	35%
Oil, Gas, and Coal Extraction and Products	557	51	9%	156	28%
Chemicals and Allied Products	276	37	13%	106	38%
Business Equipment	206	101	49%	84	41%
Telephone and Television Transmission	137	68	50%	53	39%
Wholesale and Retail	1,070	418	39%	403	38%
Healthcare, Medical Equipment, and Drugs	1,857	487	26%	394	21%
Other	1,136	373	33%	361	32%
Total	7,050	2,048	29%	2,189	31%

#### Panel D: Job postings distribution by year

Year	# of accounting job postings	# of accounting postings requiring digital skills	Digital skills accountant percent	Average # of digital skills required per accounting job posting requiring digital skills
	(1)	(2)	(3) = (2)/(1)	(4)
2011	12,991	1,295	10%	1.5
2012	14,821	1,305	9%	1.5
2013	17,248	1,679	10%	1.6
2014	18,469	1,759	10%	1.8
2015	21,841	2,287	10%	1.9
2016	20,276	2,556	13%	1.8
2017	20,579	2,945	14%	1.8
2018	23,335	3,420	15%	1.9
2019	23,604	3,642	15%	2.1
Total	173,164	20,888	12%	1.8

0.41

### Table 2 – Descriptive Statistics

Variable	Ν	Mean	Std. Dev.	Q25	Median	Q75
Variables used in the analysi	s of the dema	ind for acco	unts and acco	untants' dig	rital skills	
Digitalization t-1	7,050	0.385	0.771	0.000	0.000	0.000
Accountants t	7,050	0.043	0.082	0.000	0.018	0.046
Accountants $t^{FS}$	7,050	0.030	0.068	0.000	0.007	0.030
Accountants $t^{FC}$	7,050	0.012	0.033	0.000	0.001	0.011
Digital Skills (	7,050	0.069	0.162	0.000	0.000	0.059
Digital Skills t	7,050	0.085	0.188	0.000	0.000	0.077
Digital Skills <sup>FC</sup>	7,050	0.014	0.070	0.000	0.000	0.000
Size t-1	7,050	7.021	2.024	5.612	7.059	8.428
Age t-1	7,050	24.810	17.970	10.000	20.000	34.000
ROA <sub>t-1</sub>	7,050	-0.050	0.268	-0.038	0.037	0.078
Leverage 1-1	7,050	0.258	0.225	0.066	0.229	0.380
MTB <sub>t-1</sub>	7,050	3.458	8.304	1.350	2.392	4.233
Sales Growth t-1	7,050	0.172	0.662	-0.010	0.062	0.172
$R\&D_{t-1}$	7,050	0.076	0.170	0.000	0.000	0.045
SG&A 1-1	7,050	0.273	0.297	0.060	0.178	0.393
CAPEX <sub>t-1</sub>	7,050	0.055	0.065	0.017	0.034	0.066
Return t-1	7,050	0.188	0.633	-0.163	0.087	0.360
RetVol <sub>t-1</sub>	7,050	0.028	0.014	0.017	0.024	0.034
Financial reporting quality va	ariables					
DA <sub>t</sub>	5,728	1.126	9.093	-2.173	1.825	5.465
$DD_t$	5,728	0.080	4.990	-2.068	0.089	2.286
$DR_t$	5,728	-0.190	2.976	-1.337	-0.317	0.767
$FRQ_PC_t$	5,728	0.001	0.989	-0.431	0.022	0.436

### Table 3 – Demand for Accountants

	(1)	(2)	(3)
Dependent Variable =	Accountants t	Accountants $t^{FS}$	Accountants $t^{FC}$
Digitalization 1-1	-0.001	0.001	-0.002**
	(-0.60)	(0.88)	(-2.56)
Size t-1	0.004	0.003	0.000
	(1.01)	(1.03)	(0.16)
Age t-1	0.004	-0.002	0.005
	(0.65)	(-0.56)	(1.35)
<i>ROA t</i> -1	0.005	0.006	0.002
	(0.49)	(0.71)	(0.42)
Leverage t-1	-0.002	0.004	-0.005
	(-0.17)	(0.42)	(-1.14)
$MTB_{t-1}$	0.000	0.000	0.000
	(0.93)	(0.24)	(0.55)
Sales Growth t-1	0.001	0.000	0.000
	(0.39)	(0.28)	(0.37)
$R\&D_{t-1}$	0.010	0.007	0.002
	(0.47)	(0.38)	(0.26)
SG&A 1-1	-0.003	-0.007	0.003
	(-0.37)	(-1.09)	(0.69)
CAPEX <sub>t-1</sub>	-0.059	-0.047	-0.013
	(-1.62)	(-1.47)	(-0.98)
Return t-1	-0.002	-0.001	-0.001
	(-0.89)	(-0.60)	(-0.72)
RetVolt t-1	0.058	0.122	-0.065
	(0.31)	(0.73)	(-1.04)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Ν	7,050	7,050	7,050
Adj. R <sup>2</sup>	0.27	0.25	0.22

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Digitalization alone does not change firm's demand for accountants

### Table 4 – Demand for Digital Skills

	(1)	(2)	(3)
Dependent Variable =	Digital Skills ,	Digital Skills "	Digital Skills <sup>FC</sup>
Digitalization 1-1	0.007*	0.011**	-0.002
	(1.87)	(2.33)	(-1.22)
Size t-1	0.004	0.008	0.006**
	(0.65)	(1.02)	(1.99)
Age 1-1	-0.032	-0.021	-0.014
	(-1.37)	(-0.84)	(-1.42)
ROA t-1	0.002	0.000	-0.005
	(0.14)	(0.01)	(-1.34)
Leverage t-1	-0.005	-0.007	-0.000
	(-0.32)	(-0.38)	(-0.01)
MTB t-1	0.000	0.000	0.000
	(0.30)	(0.04)	(0.91)
Sales Growth t-1	0.001	0.001	0.001
	(0.25)	(0.33)	(1.15)
$R\&D_{t-1}$	-0.021	-0.038	0.006
	(-0.76)	(-1.15)	(1.20)
SG&A 1-1	-0.011	-0.010	-0.004
	(-0.58)	(-0.46)	(-1.12)
CAPEX <sub>t-1</sub>	-0.011	0.028	-0.031
	(-0.23)	(0.52)	(-1.28)
Return t-1	0.008**	0.009**	0.001
	(2.15)	(2.18)	(0.53)
RetVolt t-1	0.005	0.147	-0.078
	(0.02)	(0.50)	(-0.72)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	7,050	7,050	7,050
Adj. R <sup>2</sup>	0.36	0.35	0.37

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> The more digitalized the firm is, the more it demands for accountants with digital skills

### Table 5 – Other Skills of Accountants

	(1)	(2)	(3)	(4)
Dependent Variable =	Social Skills <sup>FS</sup>	Financial Skills <sup>FS</sup>	Accounting Major <sup>FS</sup>	General Ability <sup>FS</sup>
Digitalization 1-1	-0.003	-0.013	-0.008	-0.007
0	(-0.44)	(-1.51)	(-0.92)	(-1.46)
Size <sub>t-1</sub>	0.087***	0.107***	0.053***	0.022**
	(5.16)	(6.08)	(3.43)	(1.98)
Age 1-1	0.032	0.039	0.048	-0.001
_	(0.84)	(1.09)	(1.30)	(-0.04)
$ROA_{t-1}$	0.006	-0.005	0.034	0.002
	(0.15)	(-0.14)	(0.93)	(0.09)
Leverage t-1	0.023	0.004	0.044	0.036
	(0.47)	(0.08)	(0.92)	(1.02)
MTB t-1	0.000	0.000	0.000	0.000
	(0.66)	(0.11)	(0.45)	(0.53)
Sales Growth t-1	-0.002	-0.004	-0.004	-0.009*
	(-0.21)	(-0.57)	(-0.49)	(-1.74)
<i>R&amp;D</i> t-1	0.027	0.017	0.054	0.054
	(0.32)	(0.19)	(0.62)	(0.89)
SG&A 1-1	-0.017	-0.039	-0.033	-0.032
	(-0.39)	(-0.87)	(-0.70)	(-1.11)
CAPEX <sub>t-1</sub>	-0.017	-0.065	0.008	-0.005
	(-0.11)	(-0.42)	(0.05)	(-0.05)
Return t-1	0.002	0.005	0.005	-0.002
	(0.28)	(0.53)	(0.55)	(-0.27)
RetVolt t-1	1.004	0.999	0.949	0.689
	(1.55)	(1.37)	(1.43)	(1.48)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	7,050	7,050	7,050	7,050
Adj. R <sup>2</sup>	0.44	0.52	0.42	0.30

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> Digital firms do not increase demand for accountants' other skills, suggesting that digital firms are not hiring better quality accountants in general

### Table 6 – FRQ

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Panel A: Individual measures of financ	cial reporting o	quality							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable =	$DA_{t}$	$DA_t$	$DA_t$	$DD_t$	$DD_t$	$DD_t$	$DR_t$	$DR_t$	$DR_{t}$
Digitalization 1-1	0.000		0.153	0.004		0.129	-0.048		0.038
	(0.00)		(0.65)	(0.03)		(0.90)	(-0.60)		(0.41)
Digital Skills $\frac{FS}{F1}$		0.161	1.001		-0.311	0.359		-0.441	0.019
		(0.23)	(1.34)		(-0.77)	(0.76)		(-1.49)	(0.06)
Digitalization $_{l-1} \times Digital Skills _{l-1}^{FS}$			-1.321*			-1.053***			-0.718**
			(-1.79)			(-3.16)			(-2.34)
Size t-1	0.388	0.386	0.383	-0.251	-0.247	-0.249	-1.179***	-1.172***	-1.174***
	(0.72)	(0.72)	(0.71)	(-0.89)	(-0.87)	(-0.88)	(-6.63)	(-6.61)	(-6.62)
Age t-1	-0.428	-0.426	-0.387	-0.356	-0.360	-0.328	0.230	0.229	0.246
	(-0.32)	(-0.31)	(-0.28)	(-0.64)	(-0.65)	(-0.59)	(0.68)	(0.68)	(0.73)
ROA t-1	-0.291	-0.289	-0.276	2.360**	2.357**	2.369**	1.447**	1.449**	1.451**
	(-0.17)	(-0.17)	(-0.16)	(2.49)	(2.48)	(2.50)	(2.50)	(2.50)	(2.51)
Leverage :-1	0.043	0.044	0.074	1.326	1.325	1.350	-0.042	-0.035	-0.026
	(0.03)	(0.03)	(0.04)	(1.35)	(1.36)	(1.38)	(-0.07)	(-0.06)	(-0.05)
MTB t-1	-0.010	-0.010	-0.009	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003
	(-0.48)	(-0.48)	(-0.46)	(-0.28)	(-0.27)	(-0.24)	(-0.47)	(-0.43)	(-0.41)
Sales Growth 1-1	0.411	0.411	0.410	0.186	0.185	0.184	0.066	0.063	0.063
	(1.43)	(1.43)	(1.42)	(0.97)	(0.96)	(0.96)	(0.65)	(0.62)	(0.62)
<i>R&amp;D t</i> -1	-3.233	-3.234	-3.249	4.584**	4.587**	4.574**	0.570	0.569	0.565
	(-0.90)	(-0.90)	(-0.91)	(2.35)	(2.36)	(2.35)	(0.55)	(0.55)	(0.54)
SG&A .	3.422*	3.419*	3.423*	-0.673	-0.667	-0.664	-0.709	-0.701	-0.698
	(1.92)	(1.92)	(1.92)	(-0.63)	(-0.63)	(-0.62)	(-1.63)	(-1.62)	(-1.61)
CAPEX 1	0.468	0.469	0.417	3.696*	3.698*	3.652*	-0.064	-0.100	-0.096
	(0.12)	(0.12)	(0.11)	(1.95)	(1.94)	(1.93)	(-0.05)	(-0.07)	(-0.07)
Return	0.817**	0.818**	0.830**	-0.025	-0.026	-0.017	0.032	0.030	0.037
	(2.51)	(2.51)	(2.55)	(-0.15)	(-0.15)	(-0.10)	(0.31)	(0.30)	(0.36)
RetVolt -1	-16.398	-16.369	-16.062	11.143	11.089	11.331	2.694	2.592	2.781
	(-0.69)	(-0.69)	(-0.68)	(0.77)	(0.77)	(0.79)	(0.34)	(0.32)	(0.35)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,728	5,728	5,728	5,728	5,728	5,728	5,728	5,728	5,728
Adi R <sup>2</sup>	0.24	0.24	0.24	0.06	0.06	0.06	0.19	0.19	0.19

Digitalization and accountants with digital skills alone do not affect FRQ – it is the joint impact of the 2 that improves FRQ

### Table 6 – FRQ PCA

Panel B: The composite measure of financial reporting quality

	(1)	(2)	(3)
Dependent Variable =	$FRQ_PC_t$	FRQ_PCt	$FRQ_PC_t$
Digitalization t-1	-0.006		0.026
	(-0.23)		(0.91)
Digital Skills <sup>FS</sup> <sub>+1</sub>		-0.082	0.088
		(-0.97)	(0.99)
Digitalization $_{t-1} \times$ Digital Skills $_{+1}^{FS}$			-0.267***
			(-3.32)
Size t-1	-0.161***	-0.160***	-0.161***
	(-2.88)	(-2.87)	(-2.88)
Age 1-1	-0.027	-0.028	-0.020
	(-0.21)	(-0.21)	(-0.15)
ROA <sub>t-1</sub>	0.416**	0.416**	0.418**
	(2.19)	(2.19)	(2.20)
Leverage t-1	0.132	0.132	0.138
	(0.73)	(0.74)	(0.77)
MTB 1-1	-0.001	-0.001	-0.001
	(-0.58)	(-0.56)	(-0.53)
Sales Growth t-1	0.048	0.047	0.047
	(1.26)	(1.25)	(1.24)
<i>R&amp;D</i> 1-1	0.382	0.382	0.379
	(0.96)	(0.96)	(0.95)
SG&A 1-1	0.007	0.009	0.010
	(0.04)	(0.04)	(0.05)
CAPEX <sub>t-1</sub>	0.391	0.386	0.380
	(0.99)	(0.98)	(0.97)
Return t-1	0.042	0.042	0.044
	(1.26)	(1.26)	(1.34)
RetVol t-1	0.678	0.661	0.725
	(0.24)	(0.24)	(0.26)
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	5,728	5,728	5,728
Adi, R <sup>2</sup>	0.10	0.10	0.11

Digitalization and accountants with digital skills alone do not affect FRQ – it is the joint impact of the 2 that improves FRQ (Composite measure)

### Table 7 – Cross-sectional

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Dependent Variable =	$DA_{t}$		$DD_t$		DRt		$FRQ_PC_t$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample Partitions	High FV	Low FV	High FV	Low FV	High FV	Low FV	High FV	Low FV
Digitalization t-1	0.674	-0.052	0.425	0.032	-0.031	0.154	0.073	0.023
	(1.35)	(-0.15)	(1.53)	(0.13)	(-0.16)	(1.05)	(1.19)	(0.52)
Digital Skills <sup>FS</sup> <sub>F1</sub>	-0.452	0.261	0.169	0.859	0.117	0.197	0.013	0.131
	(-0.29)	(0.19)	(0.15)	(1.04)	(0.17)	(0.42)	(0.05)	(0.83)
Digitalization $_{l-1} \times Digital Skills_{l-1}^{FS}$	-1.148	-0.399	-2.213***	-0.393	-1.542**	-0.481	-0.507**	-0.129
	(-0.56)	(-0.48)	(-2.59)	(-0.75)	(-2.01)	(-1.23)	(-2.25)	(-1.24)
P-value for tests on diff. between High and Low	0.1	30	0.00		0.06		0.01	
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,910	1,904	1,910	1,904	1,910	1,904	1,910	1,904
Adj. R <sup>2</sup>	0.16	0.33	0.01	0.03	0.23	0.25	0.03	0.12

FRQ result stronger for sub-sample with higher value of fair value estimates

## Table 8 – Additional Controls for FRQ

Panel A: Controlling for non-accounting employees' digital skills								
	(1)	(2)	(3)	(4)				
Variable	$DA_t$	DD,	DR	FRQ_PC,				
Digitalization t-1	0.201	0.158	-0.028	0.022				
	(0.83)	(1.06)	(-0.31)	(0.78)				
Digital Skills $\frac{FS}{r_1}$	0.865	0.283	0.136	0.089				
	(1.15)	(0.58)	(0.45)	(0.98)				
Digitalization $_{t-1} \times$ Digital Skills $_{t-1}^{FS}$	-1.175	-0.962**	-0.970***	-0.283***				
	(-1.42)	(-2.53)	(-2.76)	(-3.04)				
Digital Skills NonAcct	1.863	0.993	-0.987	0.063				
	(1.19)	(0.92)	(-1.53)	(0.31)				
Digitalization $_{t-1} \times Digital Skills _{t-1}^{NonAcct}$	-0.789	-0.471	1.047**	0.051				
	(-0.68)	(-0.68)	(2.33)	(0.35)				
Control Variables	Yes	Yes	Yes	Yes				
Firm Fixed Effects	Yes	Yes	Yes	Yes				
Year Fixed Effects	Yes	Yes	Yes	Yes				
Observations	5,728	5,728	5,728	5,728				
Adj. R <sup>2</sup>	0.24	0.06	0.20	0.10				

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Coefficient on interaction term remains the same even after controlling for (A) other employees' digital skills, (B) FS' other skills such as social skills, financial skills, accounting majors, and (C) general ability such as CPA designation, Bachelor's degree, working experience

Panel B: Controlling for other skills of financial specialists								
	(1)	(2)	(3)	(4)				
Variable	$DA_t$	$DD_t$	$DR_t$	$FRQ_PC_t$				
Digitalization t-1	-0.128	0.290	0.083	0.034				
	(-0.38)	(1.28)	(0.65)	(0.79)				
Digital Skills 15	0.853	0.096	0.071	0.061				
	(1.10)	(0.19)	(0.22)	(0.64)				
Digitalization 1-1 × Digital Skills 1-1	-1.692**	-0.816**	-0.660**	-0.253***				
	(-2.08)	(-2.31)	(-2.05)	(-2.92)				
Other Skills <sup>FS</sup> <sub>F1</sub>	0.371	0.435*	-0.111	0.048				
	(0.87)	(1.74)	(-0.74)	(0.93)				
Digitalization $_{t-1} \times O$ ther Skills $_{t-1}^{FS}$	0.497	-0.274	-0.081	-0.014				
	(1.33)	(-1.07)	(-0.59)	(-0.29)				
Control Variables	Yes	Yes	Yes	Yes				
Firm Fixed Effects	Yes	Yes	Yes	Yes				
Year Fixed Effects	Yes	Yes	Yes	Yes				
Observations	5,728	5,728	5,728	5,728				
Adj. R <sup>2</sup>	0.24	0.06	0.19	0.11				

Panel C: Controlling for general ability of financial specialists

	(1)	(2)	(3)	(4)
Variables	DAt	$DD_t$	DR	FRQ_PCt
Digitalization t-1	0.031	0.132	-0.011	0.014
	(0.12)	(0.81)	(-0.11)	(0.43)
Digital Skills $\frac{FS}{1}$	0.905	0.354	0.107	0.095
	(1.19)	(0.74)	(0.36)	(1.04)
Digitalization $_{t-1} \times$ Digital Skills $_{t-1}^{FS}$	-1.408*	-1.048***	-0.799**	-0.281***
	(-1.86)	(-3.12)	(-2.58)	(-3.45)
General Ability FS	0.830	0.032	-0.524**	-0.025
	(1.22)	(0.09)	(-2.22)	(-0.33)
Digitalization $_{t-1} \times$ General Ability $_{t+1}^{FS}$	0.763	-0.022	0.306	0.076
	(1.05)	(-0.06)	(1.24)	(0.98)
Control Variables	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	5,728	5,728	5,728	5,728
Adj. R <sup>2</sup>	0.24	0.06	0.20	0.11

### Table 9 - CEM

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable =	Accountants $t$	$Accountants_{t}^{FS}$	Accountants $t^{FC}$	Digital Skills <sup>FS</sup>	$DA_t$	$DD_t$	$DR_t$	FRQ_PC,
Digitalization t-1	-0.001	0.001	-0.002*	0.011*	0.261	0.055	0.112	0.033
	(-0.52)	(0.71)	(-1.75)	(1.88)	(0.98)	(0.33)	(1.03)	(1.03)
Digital Skills <sup>FS</sup> <sub>+1</sub>					1.362	0.235	0.117	0.107
					(1.62)	(0.49)	(0.31)	(1.18)
Digitalization $_{t-1} \times Digital Skills _{t-1}^{FS}$					- <b>1.4</b> 90*	-0.810**	-0.509	-0.223**
					(-1.94)	(-2.27)	(-1.41)	(-2.53)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5,835	5,835	5,835	5,835	4,743	4,743	4,743	4,743
Adj. R <sup>2</sup>	0.34	0.30	0.33	0.37	0.33	0.18	0.10	0.22

Results hold after using CEM matched sample between Digitalized and Non-digitalized firms

### Table 10 - ITCV

Panel A: Analyses of Digital Skills <sup>FS</sup>

Dependent Variable =	Digital Skills <sup>FS</sup>				
	(1)	(2)			
	ITCV	Impact			
Digitalization 1-1	0.034				
Size t-1		0.000			
Age <sub>t-1</sub>		0.005			
ROA t-1		0.004			
Leverage t-1		0.000			
MTB 1-1		0.000			
Sale Growth 1-1		0.003			
<i>R&amp;D t</i> -1		0.003			
SG&A t-1		0.000			
CAPEX <sub>t-1</sub>		0.000			
Return t-1		-0.001			
RetVolt <sub>r-1</sub>		0.001			

If we look at controls, Age has the highest impact, but it is only 0.0005, whereas ITCV is 0.034. This means that any confounding variable needs to have significantly larger impact than ROA to render our main results insignificant.

#### Panel B: Analyses of DA, DD, DR, and FRQ\_PC

Dependent Variable =	L	DA t	DD <sub>t</sub>		$DR_{t}$		$FRQ_PC_t$	
-	ITCV	Impact	ITCV	Impact	ITCV	Impact	ITCV	Impact
Digitalization $_{t-1} \times Digital Skills _{t-1}^{FS}$	0.007		0.024		-0.011		0.022	
Size t-1		0.000		0003		-0.0001		-0.0001
Age 1-1		0.000		0003		0.0001		0.0001
ROA t-1		0.000		0.0010		-0.0002		-0.0001
Leverage <sub>t-1</sub>		0.000		-0.0002		0.000		-0.0001
MTB t-1		0.000		0.000		0.000		0.000
Sale Growth t-1		-0.0004		-0.0003		-0.0002		-0.0001
$R\&D_{t-1}$		0.0001		-0.0013		-0.0001		-0.0001
SG&A 1-1		0.000		-0.0001		0.000		0.000
CAPEX <sub>t-1</sub>		0.000		-0.0004		0.000		-0.0001
Return t-1		-0.0001		0.0002		0.000		-0.0001
RetVolt <sub>t-1</sub>		0.000		0.000		0.000		0.000

### Table 11 – Alternative *Digitalization* Measures

Panel A: Alternative definition of digitalization using unique digital-related terms								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable =	Accountants $t$	Accountants $t^{FS}$	Accountants $_{t}^{FC}$	Digital Skills <sup>FS</sup>	$DA_t$	$DD_t$	$DR_t$	FRQ_PC <sub>t</sub>
Digitalization Unique t-1	-0.003	-0.000	-0.002**	0.014***	0.072	0.114	0.020	0.018
	(-1.62)	(-0.32)	(-2.16)	(2.82)	(0.30)	(0.80)	(0.20)	(0.63)
Digital Skills $\frac{FS}{t+1}$					0.942	0.253	-0.046	0.066
					(1.28)	(0.55)	(-0.16)	(0.75)
Digitalization Unique $_{t-1} \times Digital Skills _{t-1}^{FS}$					-1.271**	-0.923***	-0.640*	-0.241***
-					(-2.09)	(-2.80)	(-1.96)	(-3.23)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ν	7,050	7,050	7,050	7,050	5,728	5,728	5,728	5,728
Adj. R <sup>2</sup>	0.27	0.25	0.22	0.35	0.24	0.06	0.19	0.11

#### Panel B: Alternative definition of digitalization using the number of sentences with digital-related terms

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v	20	0		0				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable =	Accountants t	Accountants $_{t}^{FS}$	Accountants $_{t}^{FC}$	Digital Skills ;	DA <sub>t</sub>	DD <sub>t</sub>	$DR_t$	$FRQ_PC_t$
Digitalization Sent 1-1	-0.000	0.001	-0.001***	0.005**	0.013	-0.027	0.030	0.002
	(-0.09)	(1.18)	(-2.83)	(2.42)	(0.13)	(-0.45)	(0.78)	(0.15)
Digital Skills <sup>FS</sup> <sub>1-1</sub>					0.729	0.128	-0.056	0.042
					(1.04)	(0.29)	(-0.19)	(0.48)
Digitalization Sent t-1 × Digital Skills <sup>FS</sup>					-0.403*	-0.307**	-0.277**	-0.087***
0					(-1.75)	(-2.40)	(-2.28)	(-2.96)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ν	7,050	7,050	7,050	7,050	5,728	5,728	5,728	5,728
Adj. R <sup>2</sup>	0.27	0.25	0.22	0.35	0.24	0.06	0.19	0.11

Results hold after replacing *Digitalization* with two alternative measures across H1-H3

### Table 12 – Salary Test

	Accountants	Financial Specialists	Financial Clerks
	(1)	(2)	(3)
Dependent Variable =	Salary,	Salary,	Salary
Digital Skills t	0.186***	0.104***	0.167***
	(9.32)	(5.00)	(3.25)
Num Skills ,	0.004***	0.000	0.010***
	(4.05)	(0.35)	(6.48)
Social Skills ,	-0.024*	-0.022	-0.031*
	(-1.77)	(-1.26)	(-1.73)
Financial Skills ,	0.147***	0.186***	0.035
	(8.12)	(6.62)	(1.65)
Accounting Major,	0.120***	-0.039**	0.095***
	(8.64)	(-2.33)	(4.18)
General Ability ,	0.203***	0.124***	-0.068
	(10.53)	(6.42)	(-0.65)
Size 1-1	-0.081**	-0.042	-0.098
	(-2.05)	(-0.81)	(-1.64)
Age t-1	0.028	-0.043	0.116**
	(0.83)	(-1.12)	(2.14)
ROA <sub>t-1</sub>	0.123	-0.400	0.796***
	(0.68)	(-1.57)	(3.52)
Leverage 1-1	-0.336***	-0.373***	0.164
	(-3.34)	(-2.82)	(1.17)
MTB 1-1	0.000	-0.001	0.003**
	(0.29)	(-1.25)	(2.46)
Sales Growth 1-1	-0.013	-0.101	0.100
	(-0.19)	(-1.12)	(1.06)
$R \& D_{t-1}$	-3.387**	-3.774**	-3.522
	(-2.55)	(-2.33)	(-1.28)
SG&A 1-1	-0.103	0.214	-0.361
	(-0.70)	(1.11)	(-1.42)
CAPEX <sub>t-1</sub>	-0.189	0.370	-0.905*
	(-0.50)	(0.74)	(-1.90)
Return 1-1	0.018	0.041	-0.003
	(0.83)	(1.43)	(-0.10)
RetVolt 1-1	2.849	9.235***	-0.259
	(1.35)	(2.82)	(-0.10)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Ν	5,013	2,686	2,224
Adi, R <sup>2</sup>	0.47	0.42	0.38

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Firms pay 20% higher annual salary for accountants with digital skills than those without