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The Association of Accountants and Financial Professionals in Business

Management Accounting Competencies: Fit for Purpose in a Digital Age?

About IMA® (Institute of Management Accountants)

IMA, named 2017 and 2018 Professional Body of the Year by *The Accountant/ International Accounting Bulletin*, is one of the largest and most respected associations focused exclusively on advancing the management accounting profession. Globally, IMA supports the profession through research, the CMA® (Certified Management Accountant) program, continuing education, networking, and advocacy of the highest ethical business practices. IMA has a global network of more than 100,000 members in 140 countries and 300 professional and student chapters. Headquartered in Montvale, N.J., USA, IMA provides localized services through its four global regions: The Americas, Asia/Pacific, Europe, and Middle East/India. For more information about IMA, please visit www.imanet.org.

Institute of Management Accountants
10 Paragon Drive, Suite 1
Montvale, NJ, 07645
www.imanet.org/thought_leadership

About the Author

Raef Lawson, Ph.D., CMA, CSCA, CPA, CFA, is vice president of Research & Policy and Professor-in-Residence for IMA, where he leads IMA's global thought leadership efforts and oversees student and academic relations programs. Raef received his MBA and Ph.D. degrees from the Leonard N. Stern School of Business, New York University. Prior to joining IMA, Raef was a professor and Chair of the Department of Accounting and Law at the State University of New York at Albany. He has also held senior leadership positions in diverse practice areas in the field of accounting and finance. Raef has published several books and more than 100 articles in leading practice and academic journals. He can be reached at rlawson@imanet.org.

Executive Summary

Management accounting, like many fields, is being disrupted by a whole host of new technologies, including Big Data, predictive analytics, artificial intelligence (AI), blockchain, cognitive computing, machine learning, and robotics process automation (RPA). While these will result in the elimination of many management accounting positions, they also have the potential to create new ones. The key to the latter will be the continued evolution of the role of the management accountant from its traditional focus on financial reporting and stewardship to becoming a more complete business partner who enables an organization to enhance performance.

Are today's management accounting competencies fit for purpose to assume this new role in a digital age that is advancing at a dizzying rate of change? The answer is no—changes and rebalancing will need to occur in the skill set possessed by management accountants. Some current skills will become less important, others more important, and some new skills—especially in the areas of information technology and analytics—will need to be acquired. We explore the necessary changes in this paper, and we invite your comments.

The Changing Technological Landscape

For many companies, the supply chain consists of a series of largely discrete departments operating as functional silos, starting with research and product development, continuing through manufacturing, marketing, and distribution, and ending with the customer. A lack of transparency often leads to breakdowns in the supply chain, resulting in unresponsive, dysfunctional organizations.

Technology is rapidly changing this situation. Digitization is now eliminating silos, and value chains are becoming integrated ecosystems that are fully transparent to everyone—from the suppliers of raw materials, to the transporters of those supplies and finished goods, and finally to the customers. Companies are encountering an industrial revolution, sometimes referred to as Industry 4.0, in which companies use digitization to orient themselves to customers through e-commerce, digital marketing, social media, and the customer experience. As Daniel Hood notes, "The common wisdom these days is that every business is a technology business, but it might be more true to say that every business is a business that wrestles with technology—trying to make the most of the opportunities it offers while minimizing the disruption and disintermediation it inevitably brings."[1]

Behind the success of many new business models today is a connection to "information." The collection, assessment, interpretation, and use of data have become a service offering that makes life easier for customers. It also enables companies to create a more efficient, and

[1] Daniel Hood, "Accounting Leaders Tap Technology as Top Concern," *Accounting Today*, September 25, 2017, www.accountingtoday.com/news/accounting-leaders-tap-technology-as-top-concern.

frequently more networked, added value. These "data-centric" organizations see data not only as a useful commodity but also as a factor that's critically important for business strategy, directly affecting issues such as costs, efficiency, and quality of service. This shift in the use and importance of data is borne out by a recent *IMA Pulse* survey, conducted by IMA® (Institute of Management Accountants), in which almost half (45%) of the respondents indicated their company now takes a "strong" or "very strong" data-centric approach to information technology.[2]

A study sponsored by ACCA (Association of Chartered Certified Accountants) and IMA titled "Digital Darwinism: Thriving in the Face of Technology Change," identified 10 technologies—mobile, Big Data, artificial intelligence (AI) and robotics, cybersecurity, educational technologies, cloud, payment systems, virtual and augmented reality, digital delivery systems, and social—that will reshape the business landscape.[3] Other studies identify additional technologies (including the Internet of Things, blockchain, 3D printing, and drones) that will also radically alter how business is conducted. These technologies use data to help organizations unlock enterprise value.

While the advent of Big Data and other technologies has the promise to yield great benefits to companies, the ACCA-IMA study noted that technology is evolving faster than many organizations can adapt. Though our study identified this trend nearly five years ago, the pace of change is even faster than we or most others expected.

With software and hardware becoming smarter as more "intelligence" is built into them, they're complementing and replacing human activities and decision-making processes. Robotics process automation (RPA) is increasingly being used to automate processes across multiple systems by using software tools accessible to nontechnical users. Interactive web robots (bots), for example, are now giving advice, customer service, information, and support in areas as diverse as financial services, retail, and utilities.

AI systems are the data, people, procedures, hardware, software, and knowledge needed to develop computer systems and machines that demonstrate characteristics of intelligence. AI systems have been developed that can learn from experience, determine what's important, handle complex situations, understand visual images, and be creative or imaginative. Most experiences of AI involve rule-based "expert systems" that use stored knowledge to provide advice or to guide users through complex processes by emulating the decision-making abilities of a human expert.

The ACCA-IMA study noted the following potential benefits to business from adopting AI and robotics:

- automating routine, repetitive, and labor-intensive tasks and processes,
- reducing operating costs and increasing efficiency,
- providing 24/7 service via myriad fixed and mobile devices,

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[2] Kip Krumwiede, "How to Keep Your Job," *IMA Pulse* blog, September 21, 2017, http://sfmagazine.com/technotes/september-2017-how-to-keep-your-job.

[3] ACCA-IMA, "Digital Darwinism: Thriving in the Face of Technology Change," October 2013, www.accaglobal.com/content/dam/acca/global/PDF-technical/futures/pol-afa-tt2.pdf.september-2017-how-to-keep-your-job.

- developing innovative new products and services,
- ensuring that products and services meet customer needs,
- scaling up operations with fewer and cheaper resources, and
- extracting more value from existing investments in technology.

Clearly, these new technologies have the potential to automate routine and repetitive tasks and processes—starting with auditing, transaction processing, and financial accounting—and to do them more cheaply and with greater accuracy and reliability than human beings. These advances are leading to the elimination of not only "blue-collar" jobs but also clerical and professional services positions. As more processes are automated, more highly skilled jobs could also become obsolete. In this report we examine the impact of the development of new technologies on the evolving role of the management accountant, the skills finance and accounting (finance, hereafter) professionals need in this digital age, and how you can prepare for a future in our field.

The Digitization of the Value Chain: Implications for the Management Accounting Profession

Finance professionals are proficient at pulling data from a variety of information systems, manipulating that data in spreadsheets, and perhaps feeding the results of that manipulation into yet another system. This inefficient handling of data is error-prone and ripe for automation. The ACCA-IMA study found that finance professionals are very aware that radical changes will result from this and other emerging technologies.

The reality is that many traditional "accounting" jobs that exist today may not exist in a few years. The recent *IMA Pulse* survey found that 42% of management accounting professionals worried that technology will eliminate their jobs, with those doing general accounting functions most concerned.[4] Survey respondents also identified other jobs that involve standardized processes and repetitive tasks as being likely to be automated in the very near future. Yet even other functions currently performed by accountants are susceptible to encroachment by technology. A study by Forrester Research, Inc., predicts a loss of 72% of jobs in management, business, and finance to be eliminated by technology by the year 2020 (see Figure 1).[5]

The impact of technology is being felt in every area of the accounting profession—including public, corporate, and governmental. Even academia is affected—according to the *IMA Pulse* study, more than half of those in education are at least somewhat worried that technological advances will eliminate their job, reflecting the growing popularity of online education and massive open online courses (MOOCs).[6]

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[4] Krumwiede, 2017.

[5] Forrester Research, Inc., "The Future of Jobs, 2027: Working Side by Side With Robots," April 3, 2017, www.forrester.com/report/The+Future+Of+Jobs+2027+Working+Side+By+Side+With+Robots/-/E-RES119861.

[6] Krumwiede, 2017.

Figure 1: Percentage of Jobs Eliminated by Technology

FORRESTER® RESEARCH

Cumulative Percentage Of Job Tasks Cannibalized (Absent Secular CAGR)

The Future Of Jobs, 2027: Working Side By Side With Robots

Employment categories	2015	2016	2017	2018	2019	2020
Management, business, and financial	11%	21%	33%	45%	58%	72%
Professional and related	10%	19%	30%	42%	54%	67%
Protective service	6%	13%	21%	30%	39%	49%
Nonprotective	7%	14%	22%	30%	40%	51%
Production	6%	12%	20%	28%	37%	46%
Construction and extraction	6%	12%	20%	28%	37%	47%
Installation, maintenance, and repair	6%	12%	20%	28%	37%	47%
Transportation and material moving	6%	13%	20%	29%	38%	48%

Note: Secular CAGR is the compound annual growth rate over a period of time.

119861 Source: Forrester Research, Inc. Unauthorized reproduction, citation, or distribution prohibited.

Business Partner

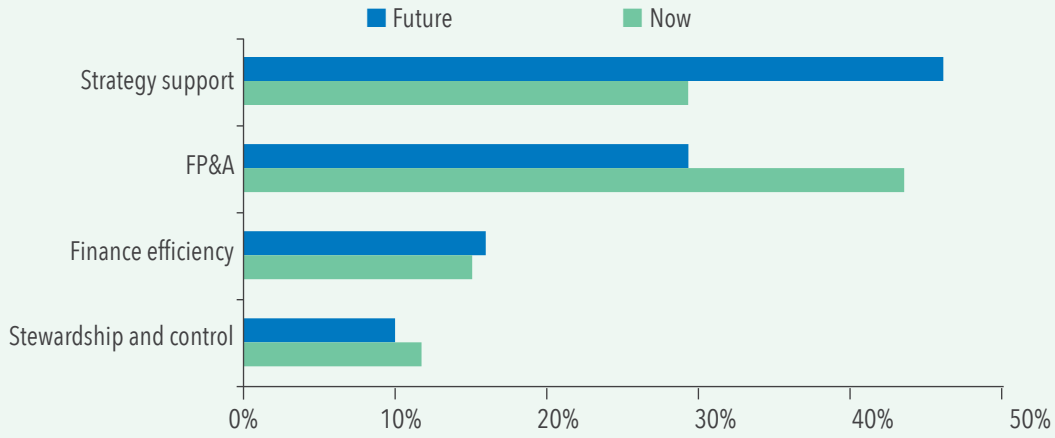
The essential role of accountants is and will continue to be value creation. Accounting's value proposition can be defined in terms of strategy formulation and analysis, planning, and execution. Effective managers need to understand how to help formulate, analyze, and execute strategies that enable their organizations to succeed.[7] Finance professionals need the skills for providing enhanced reporting of risk exposures, reporting information to inform decisions on deploying capital to grow the business profitably, supporting the long-term value creation for their enterprise, and communicating the ways in which accounting can promote the success of enterprise leaders.[8]

[7] CFO Research Services, *From Keeping Score to Adding Value*, CFO Publishing, Boston, Mass., 2011.

[8] Raef A. Lawson, Edward J. Blocher, Peter C. Brewer, Gary Cokins, James E. Sorensen, David E. Stout, Gary L. Sundem, Susan K. Wolcott, and Marc J. F. Wouters, "Focusing Accounting Curricula on Students' Long-Run Careers: Recommendations for an Integrated Competency-Based Framework for Accounting Education," *Issues in Accounting Education*, May 2014, pp. 295-317.

Over the past several decades, IMA has published numerous research studies documenting the evolution of the role of the management accountant from being that of record keeper and "compliance cop" to that of being a strategic business partner.[9] The reality for many finance functions is that the potential for being able to provide strategic insights to senior management has been hampered by the need to focus on lower-value-added activities, including transaction processing. Yet an ACCA-IMA study of senior finance professionals, called "The Future CFO Role," clearly indicates the desire to spend more time on strategy support and less on financial planning and analysis (FP&A) (see Figure 2).[10]

Figure 2: The Evolving Role of the CFO as a Trusted Business Advisor



Far from needing to be feared as a destroyer of the management accounting profession, technology has the potential to free the CFO organization in several ways:

- It will free the finance function from the need to perform rote, repetitive tasks, enabling it instead to better support decision making and assist in strategy formulation and implementation. It has been estimated that automation has the potential to eliminate up to 40% of transaction accounting work (including activities such as billing, management reporting, general accounting, and budgeting) by 2020. Implementing technology such as RPA and AI will enable finance professionals to perform higher-value-adding activities.
- It will enable finance professionals to improve their decision-making abilities. Practitioners are increasingly relying on the expert knowledge built into software to work efficiently and effectively.

[9] See, for example, Gary Siegel and James E. Sorensen, *What Corporate America Wants in Entry-level Accountants: A Joint Research Project of the Institute of Management Accountants and the Financial Executives Institute*, Institute of Management Accountants, Montvale, N.J., 1994; Gary Siegel and James E. Sorensen, *Counting More, Counting Less: Transformations in the Management Accounting Profession: The 1999 Practice Analysis of Management Accounting*, Institute of Management Accountants, Montvale, N.J., 1999; and Gary Siegel and James E. Sorensen, *How to Become a Business Partner*, Institute of Management Accountants, Montvale, N.J., 2002.

[10] ACCA-IMA, "The Future CFO Role," November 2014.

- It will provide the finance function with the ability to use organizational data to provide greater insights into the business, unlocking enterprise value and enabling finance professionals to truly become business partners. Technology will enable those in finance to create organizational value by producing real-time financial performance insights and connecting them to operational levers. They will be able to detect anomalies or trends embedded at a transaction level and to work seamlessly with functional peers in other functional areas or departments to uncover new sources of value across corporate data silos.

Although potential benefits range from automating repetitive tasks and processes to improving compliance and decision making, the CFO organization faces some significant challenges. A focus on rules makes some areas of accountancy ideal for automated, self-learning systems that have the potential to become more effective than individual professionals. Finance functions must:

- carefully assess and prioritize tasks and processes for automation,
- identify the areas of accounting most likely to be "de-skilled" or commoditized,
- develop new skills to take advantage of the potential to focus on higher-value tasks and services, and
- develop new ways to communicate and measure value and success, including advanced data analytics (beyond descriptive statistics to predictive and prescriptive analytics), data visualization, and "storytelling."

Analytics Translator vs. Data Scientist

The enhanced focus on data as a driver of enhanced performance requires that companies possess the skills to master the data-centric value-adding process. This creates a need for a new role: data scientist. This role involves designing a data strategy that's relevant and manageable and the extraction of information from large quantities of data. To do that, data scientists combine analytical skills with business knowledge, creative and interpersonal skills, and communication skills.

At first glance, this role might seem very similar to that of the management accountant, which raises the question of whether data scientists will replace management accountants or whether the two roles will coexist—and, if so, what the relationship between them will be. There's a distinct difference in the roles of management accountants and data scientists: "[Management accountants] must…have a profound understanding of the requirements of [management accounting concepts] and at the same time understand which data can be used so that they can obtain the data from the respective departments. Data scientists must use their professional, methodological, and technical understanding to search for relevant patterns in an existing pool of data."[11]

[11] Ulrike Baumöl, Christian Grawe and Alina Bockshecker, "Data Scientist – Controller in Digitisation?" January 2017.

This difference in roles means that data scientists can serve as valuable support for finance professionals, making it possible to derive recommendations for action from large quantities of unstructured data. Yet in order to utilize the synergies of both roles, finance professionals must learn to communicate with data scientists and technology specialists, helping to translate data into business insights. A recent study by Deloitte notes, "If you leave it to the data scientists and the analysts, they lack the domain knowledge and they don't know the right questions to ask. If you leave it to the businesses on their own, they don't necessarily see the potential and power of analytics. So it's a challenge for finance here to be able to bridge the gap."[12]

This role has been described as being that of an analytics translator. The role requires combining domain knowledge and quantitative and project management skills with other abilities. "Translators play a crucial role in bridging the technical expertise of data engineers and data scientists with the operational expertise of marketing, supply chain, manufacturing, risk, and other frontline managers."[13]

Competencies Needed by Finance Professionals in the Digital Age

The skills needed by finance professionals to transition to the role of strategic advisor are different than those learned in a traditional accounting education. In order to exploit the digital transformation of business, management accountants will need to be able to explore new ways to manage, analyze, and extract value from data, to apply analytical and critical thinking skills to address strategic issues, and to identify the most useful questions Big Data can answer. Yet many of the skills needed by management accountants in the past will, to varying degrees, remain important going forward.

There are four "lines of sight" for today's finance team: oversight, insight, hindsight, and foresight. *Oversight,* a traditional CFO role, includes resource allocation, ensuring a healthy financial profile for future investment, and more. *Hindsight* entails looking backward to influence the future in a positive way—in other words, using historical data for future projections. *Insight* involves turning information into intelligence; it's where business partnering begins and business analytics takes over. Perhaps the most important of the four "sights" is *foresight,* where finance professionals play a leading role in anticipating the future, helping their organizations envision a great future. It includes strategic planning, competitive moves, and innovation.

In the past, management accountants have performed analytics at a fairly rudimentary level, largely relying on the use of descriptive and diagnostic statistics. In order to stay relevant, we must aspire to the higher end of the analytics continuum—to predictive and prescriptive analytics. But in order to perform this type of analysis, new competencies are required. It's essential that management accountants acquire these skills in order to be relevant and "fit for purpose," not only today but for the next five to 10 years.

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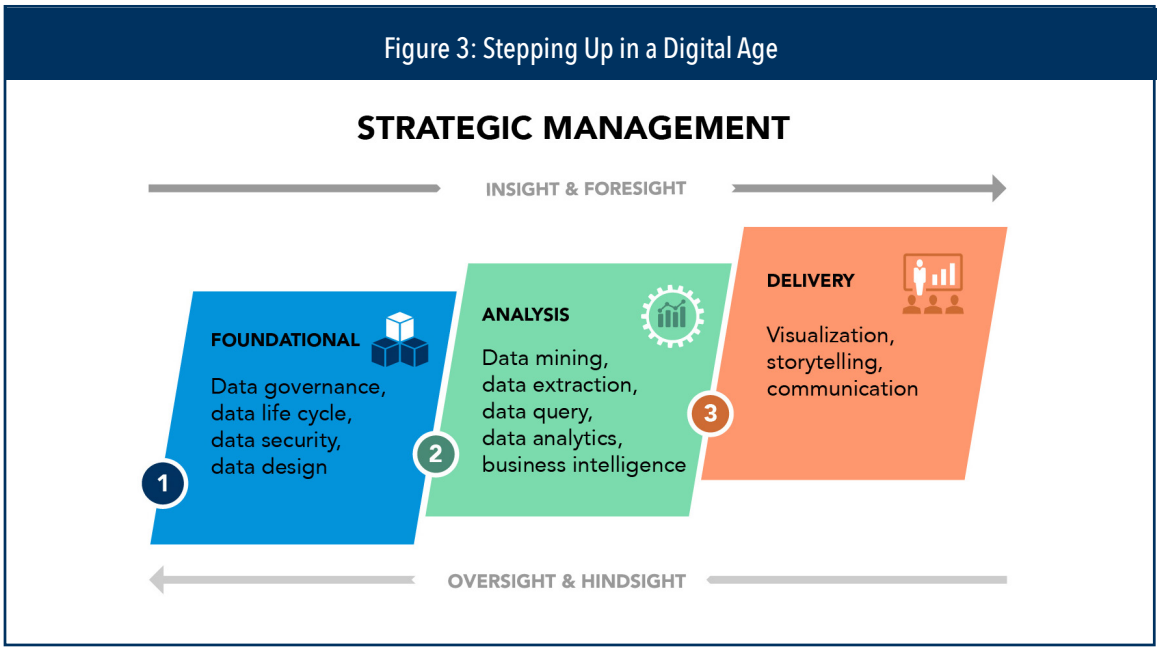
[12] Deloitte, "Crunch Time, Too," www2.deloitte.com/content/dam/Deloitte/us/Documents/finance-transformation/us-ft-crunch-time.pdf.

[13] Nicolaus Henke, Jordan Levine, and Paul McInerney, "You Don't Have to be a Data Scientist to Fill This Must-Have Analytics Role," *Harvard Business Review,* February 5, 2018, https://hbr.org/2018/02/you-dont-have-to-be-a-data-scientist-to-fill-this-must-have-analytics-role.

Figure 3 depicts the relationship between management accountants' various "lines of sight" and these new competencies. Competencies listed lower are more related to the oversight and hindsight responsibilities of the management accountant, whereas those toward the delivery side are more related to delivering insight and foresight.

Figure 3: Stepping Up in a Digital Age



So what competencies will be needed by management accountants of the future? The answer to this question can be obtained by looking at the newly updated IMA Management Accounting Competency Framework (see Figure 4).

IMA's Management Accounting Competency Framework covers the competencies management accountants need to be "future-proof." It identifies six areas of core knowledge, skills, and abilities: Strategy, Planning & Performance, Reporting & Control, Technology & Analytics, Business Acumen & Operations, Leadership, and Professional Ethics & Values. Descriptions of the six competency domains are presented in Figure 5. For each of these areas, the Framework identifies specific competencies along with attributes of various skill levels for each competency. As the business world changes and technology evolves, so will the competencies needed in each of these six areas.

Figure 4: IMA Management Accounting Competency Framework

In a similar way, the CMA® (Certified Management Accountant) certification, maintained by ICMA® (Institute of Certified management Accountants), is being updated as of January 2020 to reflect the competencies, including analytical skills, that will become increasingly important to future management accountants. These include forecasting and analytical techniques for making investment decisions, such as regression analysis, sensitivity and scenario analysis, and Monte Carlo simulation.

Figure 5: Description of Competency Domains

We now look at each of the six competency domains included in the Management Accounting Competency Framework.

Strategy, Planning & Performance

The Strategy, Planning & Performance competency domain encompasses the range of strategy-related activities from strategic planning through strategy implementation (i.e., execution) to strategic evaluation (i.e., performance evaluation). It includes such diverse competencies as strategic and tactical planning, decision analysis, strategic cost management, capital investment decisions, enterprise risk management, budgeting and forecasting, corporate finance, and performance management.

The digital revolution is enabling management accountants to focus more on higher-value-added activities, including strategy formulation and analysis and planning and execution, thereby enabling them to become true business partners with the rest of the organization.

Effective finance managers will need to understand how to help formulate, analyze, and execute strategies that enable their organizations to succeed. There will be an expansion of their duties from the traditional ones of budgeting and historical performance evaluation into the area of the real-time analytics that is essential for a quick yet strategic response to changes in the environment. By making this change, accounting and finance professionals can contribute to significant value creation for their organizations.

Accounting and finance professionals will also need the skills required to provide enhanced reporting of risk exposures, for reporting information to inform decisions on deploying capital to grow the business profitably, for supporting the long-term value creation for their enterprise, and for communicating the ways in which accounting can promote the success of enterprise leaders.

Reporting & Control

This competency domain includes those activities related to internal control, financial recordkeeping, cost accounting, financial statement preparation, financial statement analysis, tax compliance and planning, and integrated reporting.

With RPA increasingly being used to automate accounting processes, the portion of management accountants' time spent on preparing information for financial reporting will decrease dramatically. Despite this, knowledge of professional accounting concepts and standards will remain an essential competency for accounting professionals. With much of routine data processing being automated, much of what remains will involve unusual or complex transactions that will require a greater mastery of accounting concepts and reporting standards. These include not only external financial reporting standards but also sustainability reporting requirements and managerial costing concepts.[14]

Management accountants will need to be able to evaluate the efficiency and effectiveness of accounting processes and to make recommendations to optimize them. They'll need to be able to implement sophisticated costing techniques as well as procedures and processes that ensure data security, protect an organization's assets, and meet legal and reporting requirements.

Technology & Analytics

As Big Data matures, finance professionals now have at their disposal vast amounts of data that can be exploited to create value for their organizations. Management accountants will need knowledge of data extraction tools for mining structured and unstructured data. They'll need to be able to employ data analysis tools that help collate, manage, and analyze this data and tools for data visualization and storytelling. Given the rapidly expanding use of mobile technology and social media, there will be dramatic change in the skills needed by management accountants in this area.

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[14] See Larry R. White and B. Douglas Clinton, *Conceptual Framework for Managerial Costing,* IMA, 2014, www.imanet.org/insights-and-trends/strategic-cost-management/conceptual-framework-for-managerial-costing?ssopc=1.

The Competency Framework includes four competencies in this domain: information systems, data governance, data analytics, and data visualization. **Information systems** encompasses using technology to effectively support operational and financial processes, solve problems, analyze data, and enhance business performance. It includes familiarity with Big Data, data storage, data mining, systems architecture, and database management. Management accountants will need to understand how enterprise resource planning systems, the cloud, and other new and emerging technologies are used and operate in the context of the accountant's role. Additionally, they will need an understanding of how the generating, processing, and flow of information will be impacted by new technologies such as finance automation, AI, and robotics.

Data governance deals with ensuring the availability, utility, integrity, and security of data. Management accountants need to be able to understand data flows, data life-cycle management, and governance requirements. They will also need to understand and influence how governance effectively oversees the impact of technology, including data/cybersecurity. This will help ensure that data from various sources can be combined and analyzed and that the data is secure.

Data analytics includes the extraction, transformation, and analysis of data using quantitative and qualitative techniques to gain insights, improve predictions, and support decision making.

In the ACCA-IMA study "Digital Darwinism: Thriving in the Face of Technology Change," knowledge of data extraction tools and use of tools that support data modeling and analysis were considered the two most important skills for the coming decade.[15] Although rudimentary analytical skills may have been acceptable in the past, the management accountant of the future will need to possess more advanced skills in order to succeed.

While the required level of competency may vary, at a minimum it must include knowing what types of analytical models are available (for example, deep learning vs. logistic regression) and to what business problems they can be applied. Beyond that, important, perhaps essential, skills include the ability to transform raw, unstructured data into a form more appropriate for analysis (data wrangling), the ability to mine large data sets to reveal patterns and provide insights, and the ability to interpret results, draw insights, and make recommendations based on analysis.

Data visualization covers the presentation of data in a visual context to make patterns, trends, and correlations more easily detected in support of better decisions. Management accountants will need to be able to evaluate data visualization options and select the best tool for presentation to stakeholders. They'll need to be able to make analysis of complex data accessible through simplicity of design, often through the use of advanced visualization applications. Additionally, management accountants will need to be able to assess the impact of data integrity on interpreting the "story" that the data is telling.

[15] ACCA-IMA, 2013.

Business Acumen & Operations

Business acumen includes industry-specific and operational knowledge as well as quality management, continuous improvement, and project management competencies. By combining operational knowledge with their other skills, management accountants enhance the value of their organizations. The finance team is increasingly required to understand the business across all lines, not just the financial ones. Management accountants need to be able to see the business through the eyes of the CEO and other members of the C-suite. This will enable the finance function to be more proactively engaged in the evolution of the business. With the increasing use of integrated business, integrated thinking, and reporting, understanding all aspects of a business and integrating that thinking into strategy will enable management accountants to be future-proof.

The changing technological environment will require an understanding of the impact that information and communication technology have on business risk, processes, and models. This includes understanding how current and expected technologies will impact the manner in which business is conducted and measured.

Leadership

While we've largely discussed hard (technical) skills so far, soft (personal) skills will remain critical for career success as a management accountant. The competency domain of Leadership includes skills in the areas of communication, motivating and inspiring others, collaboration, teamwork and relationship management, change management, conflict management, negotiation, and talent management.

Rapid technological change will necessitate changes in products offered, customers served, processes employed, or even whole business models. That will require change in management skills. Moreover, management accountants will need to have the necessary emotional skills needed to be able to motivate and inspire others.

Because the greater transparency of the new "digitized" business environment will enable greater collaboration and teamwork, professionals will need to be adept at collaborating and working on teams. This greater interdepartmental collaboration also will create a need for negotiation and conflict management skills.

While communication skills have always been important for accountants, the advent of new technologies will make the ability to communicate effectively even more important. Management accountants will need to be able to communicate with impact, have the ability to influence, and be able to use effective communication techniques. New and emerging technologies will change the channels of communication from and across systems (for example, through the use of social media and smart devices).

Additionally, finance professionals will need enhanced communication skills in order to better understand managers' changing information needs and their key performance metrics. They would be able to help managers understand the information provided by analytical models by translating analysis into a format useful for business decisions as well as to discuss how new

information can improve decision making. They will need to be able to both work with and communicate effectively with IT and analytics professionals in order to scope out projects and determine data and modeling requirements. Working together with others on an interdisciplinary team will help enable finance professionals to uncover opportunities and create value.

Professional Ethics & Values

"Professional values, ethics, and attitudes refer to the professional behavior and characteristics that identify accountants as members of a profession. They include commitments to technical competence, ethical behavior, professional manner, pursuit of excellence, societal responsibility, professional skepticism, objectivity, professional judgment, creativity, and innovation."[16]

This competency domain includes competencies related to professional ethical behavior, recognizing and resolving unethical behavior, and legal and regulatory requirements. The evolution of technology and analytics will have a substantial impact in this area as well. New technologies will raise new ethical dilemmas that must be addressed by the finance professional. As finance professionals get more involved in the strategic planning process, there will be a greater need for professional skepticism with regard to the inputs and assumptions in that process. The ability to employ critical thinking will also be of increased importance as the role of the management accountant continues to evolve.

The availability of new technology will require finance professionals to exercise creativity and be innovative with regard to the adoption of technology and new business models in order for their organizations to remain competitive. It will require a greater commitment to lifelong learning in order to maintain professional competence. And ultimately, regardless of the extent to which technology replaces or supplements humans, ethical judgment will be required. This is especially true as professionals move from performing routine tasks to more value-added responsibilities where professional judgment, including ethical judgment, will be required.

Competency Integration

In delivering on their value proposition of strategy formulation and analysis, planning, and execution, accountants will increasingly need to draw on their various skills in an integrated manner. For example, finance professionals responsible for financial reporting may see their responsibilities are expanding to include reporting on risks, pro forma performance measures, and sustainability. Similarly, tax accountants will spend less time preparing tax returns and more time on developing tax strategies to improve the organization's financial performance. In an increasing number of business situations, finance professionals will need to draw on their competencies in an integrated way.[17]

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[16] Lawson, et al., 2014.

[17] Raef A. Lawson, Edward J. Blocher, Peter C. Brewer, Jan Taylor Morris, Kevin D. Stocks, James E. Sorensen, David E. Stout, and Marc J. F. Wouters, "Thoughts on Competency Integration in Accounting Education," *Issues in Accounting Education,* August 2015, pp. 149-171.

Preparing for Your Future

What is the future role of accounting and finance professionals? While it's still evolving, several things are clear. First, accountants need to enhance or develop advanced skills in data governance, data query, data analytics, and data visualization to be able to add insight and foresight as business partners—rather than only serving in the traditional roles of providing hindsight and oversight. It's easy for data scientists to model repetitive activities, rule-based execution, and optimization. It's harder for data scientists to model creativity, trust, innovation, and implementation.

Second, a key role for finance professionals will be serving as the link between the massive volumes of data and business leaders. In order to do this, finance professionals will need to be fluent in the languages of business, analytics, and technology. They must be able to communicate in the language of data scientists and technology specialists, translate data into key business insights, and communicate these insights to business leaders. Ultimately, AI could be viewed not as *artificial intelligence* but as *augmented intelligence,* with management accountants managing the pace and nature of automation through the depth of their technical accounting skills and breadth of business operations expertise.

What can you do to prepare for the future? Consider the following:

- **Develop an appropriate mind-set.** Management accountants must work to become full business partners with the rest of their organization's leadership team. It's important for finance business partners to have the desire and drive to create effective relationships outside the finance organization, influence business colleagues, and demonstrate a real impact on the business decisions being made.[18] An important part of doing this will be to embrace technology as an opportunity, not just as a risk. By doing so, accountants will be able to provide decision makers with the information they need.
- **Develop enhanced communication and relationship-management skills.** Given its ability to see a holistic view of an organization, the finance function has a unique opportunity to assist management in leading the organization. Finance will take on increasing importance in the future, but effective communication skills will be needed. Management accountants will need to understand managers' information needs and help them understand the information provided by data scientists. They'll also need to be able to work with and communicate effectively with IT and analytics specialists.
- **Develop the ability to think critically.** Management accountants need to be able to identify issues, develop questions, determine appropriate analysis, and interpret the results. While critical thinking skills are important now, they will be even more important

[18] ACCA-IMA, "Financial Insight: Challenges and Opportunities," September 2014, www.accaglobal.com/content/dam/acca/global/PDF-technical/finance-transformation/pol-afb-ficao-financial-insight.pdf.

in the future. Technological advances are eliminating many entry-level accounting jobs. While this frees up accountants to focus on higher-level, more strategically oriented tasks, it means that critical thinking skills will become increasingly important and required earlier in one's career.

- **Develop strategic management/thinking skills.** Finance functions are pivoting toward strategy support to assist their organizations' growth in complex and volatile environments. With their understanding of all aspects of a business, CFOs and their teams can help to formulate, validate, and execute strategy while performing traditional finance support activities. Finance professionals of the future need to be able to support these efforts.
- **Develop enhanced risk management skills.** With its increased involvement in strategy formulation and implementation, and consistent with its traditional stewardship responsibilities, the finance function often assumes oversight of an organization's risk management efforts. These efforts will assume increased importance as technological developments raise new risks for an organization. Data governance will be an increasingly important role for accountants. Having the ability to address concerns over data security and the general area of cybersecurity will be vital.
- **Focus more on innovation and change management.** The business environment is becoming less predictable, with increased experimentation in products and services, business models, and more. The ability of finance professionals to think creatively, to oversee innovation efforts, and to manage change will become essential skills.
- **Develop skills in data analytics.** According to the *IMA Pulse* survey, the primary obstacle to businesses wanting to leverage their data for business success was a shortage of people with data analytics skills.[19] While management accountants don't need to become data scientists, they will need greater analytical skills in order to derive greater insights from data and to enable more effective decision making. This will require data mining, modeling, and visualization skills.
- **Consider obtaining a professional certification.** The accounting profession is rapidly changing, and so is the skill set needed to succeed. By obtaining a professional certification such as the CMA or CSCA® (Certified in Strategy and Competitive Analysis), accounting professionals can ensure they are enhancing their skills in areas that are practice-relevant.

[19] Krumwiede, 2017.

Call to Action

IMA has long advocated that management accountants expand their skill sets to elevate our profession. In order to remain relevant and have influence in our organizations, we as management accountants need to expand our skill sets—starting today. While this is our challenge, in many ways it's also our broader obligation to our organizations, their stakeholders, and to society. Now is the time to understand the risks facing our profession and seize opportunities that change will bring. By doing so, we will ensure that we are "future-ready" for the coming digital age.

So let's get back to the fundamental question: Are today's management accounting competencies fit for purpose in a digital age that is advancing at a dizzying rate of change? No. Our profession is less known for its agility and adaptability compared with its commitment to ethics and serving the public interest. This is a call to action for our profession. Automation in many forms isn't merely a part of the future; it's already here and apparent in many parts of our profession, especially auditing, transaction processing, and financial accounting. If our profession is to remain relevant, influential, and inspiring, now and in the future, we must move faster than the pace of technological change and build new competencies in critical thinking, innovation, advanced data analytics, data visualization, and much more. IMA intends to be a leader in advancing the profession.

Appendix–Additional Resources

The following resources provide additional information on the evolving competencies needed for accounting and finance professionals.

ACCA-IMA, "Big data: its power and peril," November 2013, www.accaglobal.com/bigdata.

Steven Ehrenhalt, "Crunch Time: Finance in a Digital World," Deloitte, 2016, www2.deloitte.com/content/dam/Deloitte/us/Documents/finance-transformation/us-ft-crunch-time-finance-in-a-digital-world.pdf.

Raef Lawson, "How to Master Digital Age Competencies," *Strategic Finance,* September 2018, https://sfmagazine.com/post-entry/september-2018-how-to-master-digital-age-competencies.

Raef Lawson, "Preparing to Compete in the Digital Age," *Strategic Finance,* December 2018, https://sfmagazine.com/post-entry/december-2018-preparing-to-compete-in-the-digital-age.

Nicolaus Henke, Jordan Levine, and Paul McInerney, "You Don't Have to Be a Data Scientist to Fill This Must-Have Analytics Role," *Harvard Business Review,* February 5, 2018, https://hbr.org/2018/02/you-dont-have-to-be-a-data-scientist-to-fill-this-must-have-analytics-role.

Rod Koch, "From Business Intelligence to Predictive Analytics," *Strategic Finance,* January 2015, pp. 56-57, http://sfmagazine.com/wp-content/uploads/sfarchive/2015/01/TECH-PRACTICES-From-Business-Intelligence-to-Predictive-Analytics.pdf.

PwC, "Confidence in the Future: How Tomorrow's Technologies Can Help the Finance Function of Today," 2017, http://recursos.pwc.mx/landing.asp?pagina=confidence-in-the-future-how-tomorrows-technologies-can-help-the-finance-function-of-today.

M. Soerberg, Chris Harris, and Jonathan Englert, "Robotics and cognitive technologies: More finance transformation ahead," Deloitte, January 25, 2018, www2.deloitte.com/us/en/pages/dbriefs-webcasts/events/january/2018/dbriefs-robotics-and-cognitive-technologies-more-finance-transformation-ahead.html.

Daniel Smith and Timothy Driscoll, "Partnering with Data Scientists for Management Accounting Success," *Strategic Finance,* May 1, 2017, http://sfmagazine.com/post-entry/may-2017-partnering-with-data-scientists-for-management-accounting-success/.

Daniel Smith and Timothy Driscoll, "Key Skill Sets for Management Accounting," *Strategic Finance,* June 2, 2017, http://sfmagazine.com/post-entry/june-2017-key-skill-sets-for-management-accounting/.

Daniel Smith and Timothy Driscoll, "Growing Up in Analytics," *Strategic Finance,* July 1, 2017, http://sfmagazine.com/post-entry/july-2017-growing-up-in-analytics/.

Isaac Tucker, "Are You Ready for Your Robots?" *Strategic Finance,* November 1, 2017, http://sfmagazine.com/post-entry/november-2017-are-you-ready-for-your-robots/.