ARTIFICIAL INTELLIGENCE AND COST AND PROFITABILITY MANAGEMENT

Rather than be threatened by the increasing use of technology and robotic process automation, accountants can use it to their advantage to stay relevant in a COVID-19–impacted world.

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Old normal, new normal, remote working, hybrid working — the longer-term impact of COVID-19 on the ways in which businesses operate is still unclear. Many employees are embracing the idea of a hybrid model of work with a flexible combination of remote and office-based working hours. HSBC Bank embraces the new way of working; Goldman Sachs rejects it entirely. Studies comparing productivity levels for remote and office-based workers were initially favorable for those working from home but seem to be less so over the long term.[1]

The circumstances of the past few months have provided a catalyst for likely enduring change in some organizations. While most workforces have suddenly been forced to operate remotely, initiatives such as digitization, adoption of cloud-based technologies, and robotic process automation (RPA) have accelerated. "The Future of Work," an article published by the World Economic Forum in October 2020, identified the twin threats to many traditional jobs: the pandemic and an increasing drive to automation.[2] Eighty-four percent of companies surveyed reported an increasing drive toward digitalization of work processes with 50 percent committed to accelerating the automation of tasks within the business. It is predicted that by 2025, 85 million traditional jobs will have been displaced by automation, although 97 million new jobs will have been created as part of that transformation. Of the top 20 jobs decreasing in demand, "accounting, bookkeeping and payroll clerks" are in third place, and "accountants and auditors" are in fourth.[3]

The future reality is that many routine, repetitive tasks using structured data will be automated with implications for reskilling individuals in the workforce who find themselves displaced. Gary Cokins, in an article for *Intelligent Automation Network*,

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identified five accounting functions that will be most impacted by automation: traditional accounting processes, month-end closures, auditing, business process outsourcing, and regulatory reporting.[4]

Where does this leave cost management?

Many organizations have traditionally maintained very basic reporting of costs with little emphasis on analysis or connection to decision-making. Simple cost center reporting, labor and material variance, and high-level overhead allocations are all tasks that can be automated in the future. The drive toward the automation and migration of financial accounting and operational systems to the cloud will improve the timeliness, availability, and quality of data available, making automation of basic cost management reporting much easier. The benefits of RPA also include reduced wage costs, greater consistency, and faster processing.

The writing is on the wall. Accountants must either create more value for organizations or face long-term redundancy.

Creating value

In 2019, the Institute of Management Accountants (IMA) published a statement on management accounting titled "Costing System Attributes that Support Good Decision-Making."[5] The authors, IMA's Managerial Costing Taskforce, correlate the necessary level of sophistication of cost models with the information required to inform management decision-making. For organizations making decisions based on the most basic cost reporting with highly aggregated costs and no analysis, it is not difficult to imagine how that process can be completely automated.

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It is important to recognize that the rise of RPA and its relationship with human labor does not present a zero-sum game. The win-win solution is one where the strengths of automation (handling relatively straight-forward, repetitive tasks using structured data) can be combined with those of human ingenuity, creativity, and higher-order thinking.

Demand

The starting point for increasing the value of cost management in an organization is to establish the connection between strategy and management decisions and to accelerate the provision and utilization of the cost information needed to support those strategies and decisions. The circumstances over the past year have led many organizations to revise their business processes, restructure products and product groups, revise routes-to-market, and reprioritize customers. For example, where local COVID-19 restrictions have discouraged consumers from visiting physical outlets, companies have developed online offerings and digital channels to provide access to their products or services. A recent Forrester Consulting report found that 70 percent of decision makers have had to rethink or reprioritize channel strategies because of the pandemic.[6]

A competitive organization must be positioned to differentiate between the cost and profitability of channels, customers, and products. Recent research from Linnworks, an e-commerce platform provider, showed that 76 percent of consumers now value convenience over price, with 95 percent citing delivery options as a major determinant of purchasing decisions.[7] Many local and regional companies in the past year have shifted their emphasis from physical distribution channels to an online offering. U.S. online grocery sales surged 54 percent to reach $95.8 billion in 2020, up from $62.2 billion in 2019.[8] An unintended consequence is that these companies are finding they are now serving a national (and even international) customer base. This shift in channel sales comes at a cost. The logistics costs of online retail are anything up to three times higher than traditional channels, and customer returns in many categories often exceed 30 percent.

With people confined to their homes for extended periods during the past year, consumer spending patterns have changed. Sales of products such as casual clothing, personal hygiene, home gym equipment, and digital streaming services have shown strong growth. Personal service industries, travel and tourism, and many other sectors have been devastated by lockdown restrictions. Consumers facing financial uncertainty are seeking to limit spending on large capital items.

COVID-19 has fostered a period of unprecedented change, testing the resilience of many organizations and requiring complex, far-reaching responses. How are managerial accountants and cost management specialists providing information to support executives in navigating these extraordinary times?

Build a model

Cost management needs a model if it is genuinely going to add value for senior decision makers and provide multi-dimensional analysis across channels, customers, and product lines that cost business processes; model capacity constraints; disaggregate resource data into meaningful levels of detail; identify causal relationships between inputs and outputs; and describe cost contribution by resource and processes to outputs. In a recent study by Gartner, 65 percent of organizations either used inconsistent cost management frameworks or no framework at all.[9]

The simplest models can be built in spreadsheets or use the functionality of an enterprise resource planning (ERP) system. More complex models will benefit from dedicated software tools that can more easily handle multiple periods, dimensions, business rules, and cost drivers. Such costing models are criticized because maintaining them becomes time-consuming and unwieldy, requires data from a variety of sources, and is more akin to an IT exercise than the work of a financial analyst. However, it makes the models perfect for RPA.

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So where is the value? Model design, business logic, cost driver selection, level of detail, and reporting attributes are all a reflection of the objectives of the model. Product management, customer lifetime value analysis, product pricing, strategic channel management, capital investment decisions, discounting strategies, outsourcing decisions, regulatory submissions, and scenario planning are all examples of the kinds of decisions businesses need supported by reliable, reasonably accurate cost and profitability analysis. Therefore, the first step in the journey of adding value is to design a costing model that is fit for this purpose.

Improve the model

The capability of technology to improve the costing model has already arrived. Artificial intelligence (AI) can be used to sift through huge amounts of data and identify relationships that human beings are extremely unlikely to uncover. For example, understanding the correlation between cost driver quantities and costs may reveal that assumptions on which model is logic-based are not as robust as first thought. The algorithm could then search all other drivers in the model and evaluate, over a time series, which correlates more closely with cost behavior.

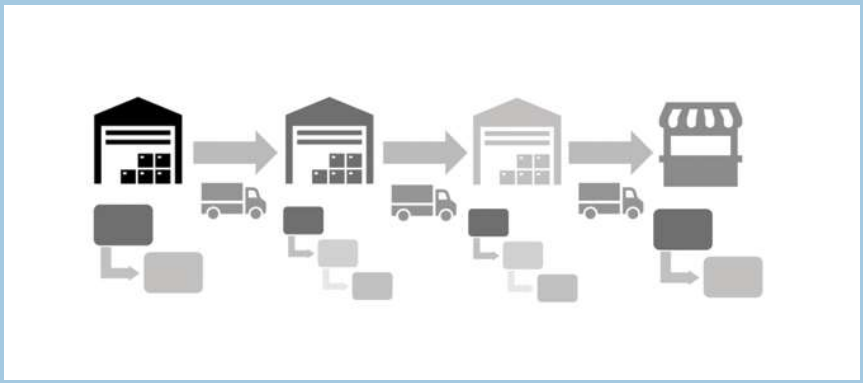
This use of AI is win-win. Human beings respond to change by adding value through creative design and connecting the cost modeling effort with the decisions needed. Technology is automating the mundane, repetitive data-processing tasks associated with maintaining the costing model. Technology is then further guided to review the causal relationships between costs and cost drivers in the model and identify possibilities for improvement.

Looking forward

Human beings are firmly in the driver's seat now. A flexible, reasonably accurate, and up-to-date costing model describes the links between an organization's resources, business processes, and outputs (channels, customers, products, and services) as a series of mathematical relationships. Now, the question is no longer about evaluating the impact of alternative decisions based on historical analysis; it becomes a forward-looking model.

Activity-based budgeting takes the modeling one stage further and combines forecast output volumes with the knowledge of cost relationships and behavior to predict cost and profitability outcomes. The model now enables the cost and profitability of alternative strategies to be evaluated through running different scenarios. Much of the

EXHIBIT 1 Supply Chain



heavy lifting in terms of data processes can be handled through RPA and modeling tools, and the refinement of cost relationships can be handled through AI tools. The skill to design and manage this environment must lie within cost accounting.

Good, better, best

Let us look at an example of where the costing is currently being taken to the next level. With global labor productivity growth in long-term decline, innovative approaches are required to eliminate inefficiency and create value. [10] One such area is within supply chains where manufacturers, distributors, and retailers have traditionally sought to reduce costs in individual silos. Such decisions may benefit one party but are often at the expense of another participant in the chain as, consequentially, overall end-to-end (E2E) costs may rise.

In addition, logistics activity is highly complex and varies constantly due to promotions, seasonal demand, and changes in product range and suppliers. This constant change can often result in significant variances between supply chain costs and budgets. Retrospectively analyzing the costs in one period is a poor predictor of how to control or reduce them in another.

There is a need to move from passive post-analysis of costs that have occurred to active predictive management of costs in response to real time changes.

Historically, labor productivity gains in process improvements have yielded less than 5 percent of cost savings. The opportunity now lies in optimizing the flow of goods throughout the supply chain at the individual SKU level where cost reductions of 10 percent to 30 percent are achievable. While E2E cost modeling has been around for a while, it has historically been constrained by the effort required to update models, process the data, and analyze results. It is typically conducted as a quarterly exercise.

A new initiative in the United Kingdom led by Incept Consulting has attracted the attention of U.K. Research and Innovation, leading fast-moving consumer goods manufacturers, logistics companies, and major retailers to work together. [11] The consortium is developing and testing the operational integration of predictive AI modeling with enterprise value network cost modeling (see Exhibit 1).

There are four stages in this exercise:

1. AI generates a predictive optimum order configuration for all SKUs about to be ordered, based on their order history. It generates the data to model all the possible alternative flows of individual SKUs and load combinations through the supply chain within defined operational rules and constraints.
2. The E2E cost model then calculates accurate costs of each SKU using the AI-generated scenario for the various flows including outbound handling, transport routes and vehicle utilization, inbound handling, storage and inventory from manufacturer through

national and regional distribution centers, and on to store level.

3. AI uses these results to select the optimal SKU, order and truck load configurations, and route-to-market for individual SKUs, and then supplies this to the order management systems, aiming to minimize overall costs, packaging waste, and CO_2 emissions.
4. The final step is for the AI optimization model to evaluate the cost impacts in all the scenarios across the entire supply chain and the changes in cost for each participant. It will discard scenarios where the total system cost rises, and in the remaining scenarios where the E2E costs are reduced, it identifies if the costs have increased for some sectors to enable the savings for others. The model then calculates compensation between sectors according to agreed commercial rules.

Here we have a combined cost modeling and AI-derived optimal solution that directly impacts operational purchasing decisions. Total supply chain costs are minimized, and the model calculates the fair share of benefits across supply chain partners.

The value added by cost management practitioners comes from their ability to work with operational supply chain management across companies to develop new business and compensation models. Human ingenuity combines these new, interconnected commercial and operational rules with related cost methodologies while harnessing the power of RPA and AI technologies.

Conclusion

The COVID-19 pandemic has far-reaching implications for the working patterns and business operations of many organizations. It has accelerated initiatives to introduce technology-driven change such as RPA and cloud-based computing. RPA is set to replace human effort for rules-based, repetitive tasks including those in the finance function. Financial professionals must ultimately re-skill to create value for the organizations for whom they work. COVID-19 has also led to changes in consumer behavior, forcing