

COST MANAGEMENT IN THE DIGITAL ERA

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Today's turbulent environment has made cost management a competitive necessity. Traditionally, cost management efforts have focused on defensive actions taken in response to cost pressures, reduced demand, and liquidity and credit concerns. But in the face of rapidly changing global business environments, companies are increasingly taking more proactive approaches that emphasize the use of cost management as a strategic lever to help fund growth and achieve sustainable profitability through structural cost efficiencies and improvements. These trends are seen in the responses by Chinese businesses in Deloitte's first biennial global cost management survey¹. The cost management efforts in the majority of these companies have been driven by efforts to gain competitive advantage over peers (65%) or to fund required investments in growth areas (64%), with a further 47% undertaking cost management to improve the performance of their international business portfolios. In contrast, the cost management efforts in only 17% of these Chinese firms are driven by significant reductions in consumer demand, 32% by unfavorable cost positions relative to their peers,

¹ Deloitte's First Biennial Cost Survey: Thriving in Uncertainty in the Age of Digital Disruption, Deloitte, December 2017, <https://www2.deloitte.com/us/en/pages/operations/articles/global-cost-management-survey.html>

35% by regulatory changes, and 36% by decreases in liquidity or tighter credit.

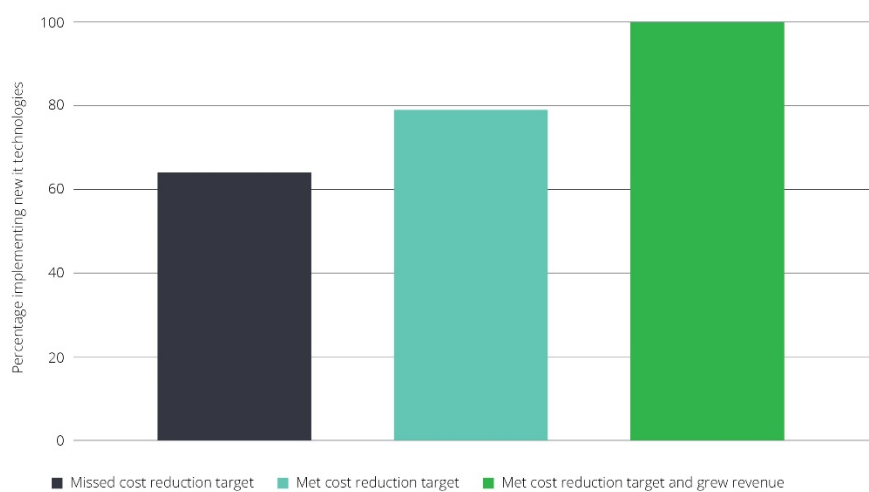
Using cost management to achieve competitive advantage and fund growth is far more prominent in Chinese businesses than in other parts of the world. The survey indicates that the percentages of cost management programs that are driven by efforts to gain competitive advantage are only 58% in other Asia-Pacific countries, 57% in the United States, and 46% in both Europe and Latin America. Similarly, the percentages of cost management initiatives that are driven by the need to fund growth are just 53% in other Asia-Pacific countries, 43% in the United States, 36% in Latin America, and 36% in Europe.

Yet, despite the strategic importance of cost management to Chinese businesses, just 35% of these companies have achieved their cost reduction targets, and only 12% have achieved their cost reduction targets while also increasing revenues by 10% or more. These percentages compare to cost reduction target achievement rates varying from 28% in other Asia-Pacific countries to 44% in Europe, and the joint achievement of cost reduction targets and large revenue increases varying from 7% in Europe to 14% in the United States.

The survey data indicate that one of the primary factors differentiating the more successful cost management programs is the implementation of new information technology infrastructures, systems, and business intelligence platforms. As shown in Figure 1, all of the Chinese firms that met their cost reduction targets while significantly increasing revenues implemented new information technologies as part of their cost management programs. This stands in contrast to the 79% of firms surveyed that met their cost targets but did not grow revenues by 10% or more, and the 64% that did not meet their cost reduction targets or grow revenues. In the rest of the world, 62% of the companies that met their cost reduction targets and significantly increased revenues implemented new information technology solutions,

versus 50% of all companies that met their cost reduction targets and 46% of companies that missed their cost reduction targets. Clearly, implementing new information technology solutions does not ensure cost management success, but the lack of such investments does appear to hinder the achievement of cost reduction and growth objectives.

Figure 1: The implementation of new information technologies and cost management program outcomes in Chinese companies



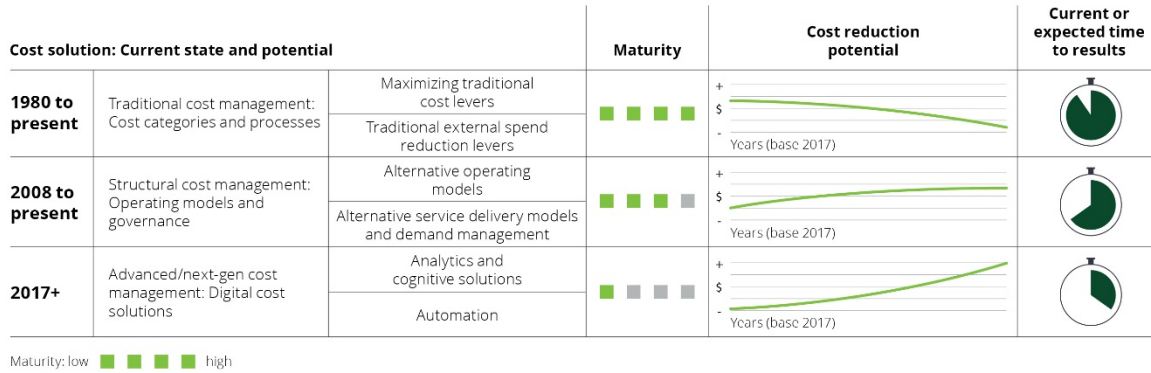
Source: Deloitte's First Biennial Cost Survey: Thriving in uncertainty in the age of digital disruption: Deloitte's first biennial global cost survey report, December 2017, <https://www2.deloitte.com/us/en/pages/operations/articles/global-cost-management-survey.html>

Our experience suggests that the emerging digital era is making new information sources and technologies even more important to effective strategic cost management. Digital sources are providing larger volumes of structured and unstructured data with greater speed than ever before. At the same time, advances in analytical modelling methods and technology are making it easier to transform this data into insights that dramatically improve cost management by enabling greater optimization of existing operations and fundamental transformations in business models and cost structures.

The rise of digital innovations represents a major evolution in cost management

solutions and methods. Traditionally, the emphasis has been tactical practices such as category-focused cost management, external spend reduction, continuous improvement, and process re-engineering. More recently, structural approaches that are more strategic in nature have emerged – such as global outsourcing, offshoring, and centralization – that deliver greater savings through fundamental changes to a company's operating model, service delivery model, and governance. The rise of advanced, next-generation cost management solutions that harness the power of digital technologies offer the potential to boost efficiency and effectiveness even further by enabling fundamentally new ways of working and competing that can dramatically reduce costs and increase organizational flexibility (Figure 2).

Figure 2: Cost solutions—current and future potential



Source: Deloitte's First Biennial Cost Survey: Thriving in uncertainty in the age of digital disruption: Deloitte's first biennial global cost survey report, December 2017, <https://www2.deloitte.com/us/en/pages/operations/articles/global-cost-management-survey.html>

DIGITAL COST MANAGEMENT SOLUTIONS

Analytics and Cognitive Technologies

Digital cost management solutions revolve around two inter-related areas: analytics/cognitive technologies and automation. As the quantity, variety, and velocity of data available through digital means continues to grow, the ability to analyze and exploit it for cost management purposes becomes essential. Predictive analytics uses a variety of statistical modeling and cognitive technology techniques to develop predictive models of future activities, trends, and behaviors based on high volumes of disparate data. Traditional statistical techniques are very good at processing and analyzing structured data such as numbers and transactions. With the growth of cognitive technologies such as artificial intelligence, natural language processing, and machine learning that can accurately analyze both structured and unstructured

data such as text, images, videos, or tables, companies are in an even better position to identify hidden and sometimes unexpected relationships in complex and seemingly disparate information.

The application of predictive analytics and cognitive technologies to cost management are many.² For example, companies can develop greater insight into cost drivers and their inter-relationships, thereby improving their ability to optimize existing operations and forecast the cost consequences of future decisions. Similarly, revenue driver analysis can help companies determine which expenditures provide little value to the customer and should therefore be reduced or eliminated, and which expenditures should be increased due to their positive impact on profits. Predictive analytics can be used to reduce quality problems and waste by identifying their underlying root causes, and can help companies predict when machines and products in the field will require maintenance. Fraud analytics can help prevent losses by predicting which potential employees, customers, and suppliers are more likely to commit fraudulent acts.

Applying predictive analytics and cognitive technologies to forecasting, planning, and budgeting can be particularly beneficial. Accurate plans, budgets, and forecasts set the foundation for developing cost management practices that can help businesses react to competitive threats, take hold of opportunities, and grow profitably. Our analysis of the cost management survey data found that companies that improved their forecasting, budgeting, and reporting processes as part of their cost management programs were more likely to realize their cost reduction targets and achieved larger operating cost and working capital savings. Predictive analytics and cognitive technologies can further enhance forecasting, planning, and budgeting by providing decision-makers with a better understanding of the factors that have impacted performance in the past and the potential threats to their plans going forward. The gathering,

² For academic research on the application of advanced analytics techniques to cost management issues, see Levitan and Gupta (1996), Fischer and Ittner (1999), Coakley and Brown (2000), Kim and Haan (2003), and DeGraeve, Labro, and Roodhooft (2004).

analysis, and modeling of a broad range of structured and unstructured data can ensure that critical information on business drivers and their expected impact is utilized to improve accuracy. Moreover, predictive analytics and advanced modelling increases a company's ability to incorporate risk considerations into their forecasting, planning, and budgeting processes. The advanced modeling techniques can be used to perform simulations and "what-if" analyses that provide greater insight into how the chosen cost management practices will influence performance. In response, managers can test different scenarios and modify budgets and forecasts as necessary, and can develop contingency plans should the expected results from the cost management efforts fail to materialize.³

Automation

Automation has long been associated with cost management efforts. The use of automation has traditionally focused on improving the efficiency and effectiveness of the physical production of goods. What is changing with digital innovation is the increasing focus on revolutionizing knowledge-based, labor-intensive processes. Robotic Process Automation (RPA), for example, uses specialized computer programs to automate and standardize repeatable human processes. RPA not only performs repetitive work far more quickly, accurately, and tirelessly than humans, it also allows employees to devote more time to higher-value tasks.

More advanced cognitive technologies take the digitalization of knowledge work a step further by making it possible to automate tasks that require human perceptual skills, such as recognizing handwriting or identifying faces, and those that require cognitive skills, such as planning, reasoning from partial or uncertain information, and learning. Because cognitive technologies extend the power of information technology to tasks traditionally performed by

³ See Ittner and Michels (2017) and Ittner and Keusch (2017) for research on the performance effects of applying stochastic modelling and other advanced analytics to risk-based forecasting, planning, and budgeting.

humans, they can enable organizations to break prevailing trade-offs between speed, cost, and quality.

DIGITAL COST MANAGEMENT SOLUTIONS IN PRACTICE

The rise of advanced, next-generation cost management solutions that harness the power of digital technologies to boost efficiency and effectiveness have initially focused on automation and analytics/ cognitive technology, such as incorporating analyses of cost and revenue drivers into decision-making or replacing or augmenting human labor in existing business processes. These solutions are still in the early stages of maturity. However, unlike traditional tactical and structural cost management approaches – which may be nearing or past their peak potential – cost management programs employing advanced digital solutions are just emerging and have the potential to deliver increasing savings over time due to the exponential nature of digital technology growth (i.e., “Moore’s Law”), as well as the ability to be implemented more quickly, thereby enabling companies to achieve greater savings in much less time.

In the following sections, we provide case studies to illustrate some of the benefits from digital cost solutions in companies that we have worked with.

Using Predictive Analytics to Optimize Manufacturing Operations

An assembly plant for a leading automobile manufacturer was facing increasing complexity as the marketing organization made more and more drivetrain and trim options available to customers. The manufacturing organization feared that the costs of assembly line downtime and quality problems that resulted from this complexity far exceeded the revenue benefits from the additional option availability. However, the plant’s managers had no way of validating this conjecture, so they turned to predictive analytics.

Data were gathered on the option content of every car produced over a 161 day period and the number of labor hours, quality problems, and downtime in 71 individual work stations in the chassis and trim areas. The analyses indicated that greater day-to-day variability in option content had a significant adverse impact on total labor hours per car produced, overhead hours per car produced, assembly line downtime, minor repair and major rework, and inventory levels. In addition, workstations with higher variability in option content had greater slack direct labor resources to buffer against process time variation, introducing an additional cost of product variety.

Based on these results, a simulation model of the factory was developed to determine how to optimally offer more options to customers while minimizing the extra costs resulting from option variability. The simulation results indicated that once each workstation was optimally buffered against process time variation, product variety had an insignificant impact on direct assembly labor. The simulations also showed that bundling options could reduce the amount of buffer capacity required. These analyses allowed the company to dramatically reduce the costs of product variety by changing their labor staffing rules and grouping available options into a small set of option bundles that customers could choose from.

Using Predictive Analytics to Redeploy Expenditures to Higher-Value Uses

A fast food restaurant chain that offered both sit down and delivery services faced employee turnover of more than 300% per year, causing rising costs due to hiring expenditures, training requirements, and lost productivity. In response, the chain introduced a series of costly initiatives to reduce turnover, including paying the educational expenses for front-line employees who stayed in the job for more than a year and tying managers' bonuses to employee retention.

Despite these initiatives and the resulting lower turnover of front-line employees, the chain saw no increase in store profitability. Data analytics helped shed light on the reasons why. First, some of the most profitable stores had the highest front-line employee turnover, which turned out to be due to better managers who spent more time interacting with employees being quicker to fire those who were under-performing. Second, and more importantly, the only employee turnover that really mattered to store profitability was the turnover of supervisors, who were directly responsible for scheduling and managing front-line employees and ensuring the smooth day-to-day operation of the store. Based on this analysis, the chain shifted its focus to reducing supervisor turnover, resulting in lower overall expenditures on employee retention and higher store profitability.

Using Cognitive Intelligence to Analyze and Reduce External Spend

A global beverage manufacturer was under severe margin pressure as its core product offerings became increasingly commoditized, and as the industry's production efficiency gains caused product supply to far outpace consumer demand. This led the company to seek better visibility into external spend and associated opportunities.

As part of a rapid cost transformation initiative designed to deliver a cost savings impact, the company applied advanced cognitive technologies to reduce external spend. The cognitive intelligence tool was able to use fragmented and unstructured data from various systems, and provided the ability to learn and reason like a human, understanding the subtle nuances of industry-specific language and getting smarter with each analysis. Unlike a traditional rules-based system, it could identify and create data categories it had never seen before and could classify more than 40,000

transactions per minute. Traditionally, this kind of analysis has required significant time and manual effort to classify and analyze millions of purchase transactions. However, thanks to the power of cognitive intelligence, the company was able to classify more than 98% of the transactions through automation, completing the task in just 2–3 weeks rather than the 6–8 weeks that would typically be needed.

Once the company's transactions had been accurately categorized by spend category, supplier, geography, and time period, the company was able to generate deep insights about their external spend, including identifying purchase price variances across suppliers and locations, the degree of supplier fragmentation by supplier, and the level of commodity risk. These insights drove targeted actions for improving external spend efficiency, eliminating waste, and increasing purchasing power through supply consolidation.

Using Cognitive Intelligence for Organization Simplification and Optimization

A large automotive original equipment manufacturer (OEM) needed to streamline its organization to reduce costs. At the same time, the company needed to retain critical talent, invest in strategic capabilities, and reposition itself for future success. Building on the company's existing cost management efforts, the company sought to simplify its organization structure and optimize management spans and layers within its worldwide organization. This analysis required cleansing and classifying human resources data for more than 30,000 employees. This complex and time-consuming task typically requires 3-6 weeks of painstaking full-time effort to manually analyze and categorize each individual employee's true position in the organization structure based on a variety of indeterminate clues, such as job title, department, physical location, and reporting relationships. However, drawing on

cognitive intelligence capabilities, the assigned team was able to complete the task in just two weeks of part time work (20% of the usual effort).

On the first pass, the cognitive intelligence tool's accuracy rate was approximately 60%, but that quickly improved to 95% as the machine learned from its mistakes and retrained itself. In the end, the project helped the company save \$80-100 million annually in labor costs, while increasing its focus on critical talent and strategically positioning itself for the future.

Using Robotic Process Automation to Improve Productivity and Reduce Costs

A global Fortune 1000 bank needed to expand its operational capacity to handle a high volume of financial transactions without hiring additional staff. Thanks to robotic process automation (RPA), the bank has been able to boost its throughput in lending and retail banking by the equivalent of 300 full-time employees – and the number continues to grow as the scope and scale of bot deployment increases.

Before RPA, many of the bank's processes were highly manual in nature, which had a negative impact on both efficiency and quality. However, bank leaders were initially skeptical about automation because: (1) many of the bank's processes were highly complex, (2) the required data was scattered across numerous legacy and third-party systems, and (3) most of the processes when viewed in isolation did not justify deployment of a full robot. However, an end-to-end analysis of the business found that RPA was indeed a viable option because many of the processes were sufficiently similar to allow a combined approach to bot planning, development, implementation, optimization, and maintenance.

Specific examples of RPA use at the bank include:

- Accepting requests for credit card remediation due to an issue or refund, and then

gathering thousands of related data items for each remediation application;

- Logging into a statement repository and converting PDF-based unstructured data into structured data, using the power of natural language processing to identify key terms to inform claims assessment;
- Applying a tailored rule-set to transactional data, and then feeding the results into a remediation calculator for processing and payment.

The bank's first bot was developed and deployed in just six weeks as a pilot project to prove the viability of RPA, and to start getting teams across the enterprise to buy in. However, the effort quickly expanded to include 30-50 bots within the first six months, and 150 bots within the first year and a half (handling 90,000 operational requests per week).

As a key part of the effort, an RPA-specific quality assurance (QA) methodology was developed to ensure that quality is constantly maintained, and that bots do not fail in production. Manual checks are regularly performed on samples of recent bot output, and defined test cases are periodically rerun to verify each bot is producing the expected results. Also, the Risk and Internal Audit teams periodically conduct assurance reviews on deployed bots and on the RPA Center of Excellence and hubs.

Today, more than 150 bots are executing more than 120,000 operational requests per week, at only 30% of the cost that would have been incurred had the bank been required to hire additional staff. Overall, the payback period for this effort was just six months, and over the first three years RPA is expected to save the bank more than \$40 million.

Conclusions

In today's rapidly changing global environment, effective cost management has become a true strategic differentiator. And with the emergence of digital innovations such as analytics, cognitive technologies, and robotic process automation, next generation cost management solutions offer the opportunity take cost reduction and margin improvement to a whole new level. To date, most digital cost management solutions have focused on improving the efficiency and effectiveness of product and service offerings and delivering a superior customer experience. But going forward, the biggest potential impact of these digital solutions is supporting innovative business models that disrupt entire industries and deliver sustainable cost reductions that completely reset expectations about cost structures and efficiency.

REFERENCES

- Coakley, J.R. and Brown, C.E., 2000. Artificial neural networks in accounting and finance: Modeling issues. *Intelligent Systems in Accounting, Finance and Management*, 9(2), pp.119-144.
- Degraeve, Z., Labro, E. and Roodhooft, F., 2000. An evaluation of vendor selection models from a total cost of ownership perspective. *European Journal of Operational Research*, 125(1), pp.34-58.
- Fisher, M.L. and Ittner, C.D., 1999. The impact of product variety on automobile assembly operations: Empirical evidence and simulation analysis. *Management Science*, 45(6), pp.771-786.
- Ittner, C.D. and Keusch, T., 2017. Incorporating risk considerations into planning and control systems: The influence of risk management value creation objectives. In P. Linsley and M. Woods (eds.), *Routledge Companion on Risk and Accounting*.
- Ittner, C.D. and Michels, J., 2017. Risk-based forecasting and planning and management earnings forecasts. *Review of Accounting Studies*, 22(3), pp.1005-1047.
- Kim, K.J. and Han, I., 2003. Application of a hybrid genetic algorithm and neural network approach in activity-based costing. *Expert Systems with Applications*, 24(1), pp.73-77.

Levitan, A. and Gupta, M., 1996. Using Genetic Algorithms to Optimize the Selection of Cost Drivers in Activity-based Costing. *Intelligent Systems in Accounting, Finance and Management*, 5(3), pp.129-145.

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