Digital Technology Adoption Pilot Program

Productivity into profits:
A guide to digital technology adoption for SME productivity leaders

White Paper

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Overview

To compete with foreign companies that produce goods at lower labour costs, Canadian small and medium-sized enterprises (SMEs) need to improve their productivity. They can do this by cutting the input costs (time, material and labour) of the products and services they sell. The fastest, most effective approach to competing successfully in this area is to adopt digital technology.

The general Canadian population is well ahead of other countries in adopting digital technology in their personal lives. However, Canadian SMEs lag behind in adopting it for their businesses. And that is one of the primary contributors to Canada’s productivity problem.

SME management must take a leading role in accelerating digital technology adoption toward increasing enterprise productivity and profitability—and government must support them for the national benefit (Goss Gilroy Inc., 2013). The National Research Council of Canada Industrial Research Assistance Program (NRC-IRAP) and Digital Technology Adoption Pilot Program (DTAPP) deliver on-the-ground support to Canadian SMEs exploring or embarking on this journey.

This white paper explains how to capitalize on digital technology by following a seven-step process:

1) Conducting an environmental scan
2) Developing a corporate strategy
3) Benchmarking
4) Analyzing organizational capabilities, capacity and gaps
5) Defining key performance indicators (KPIs)
6) Monitoring KPIs (balanced scorecard approach)
7) Adopting technology

In the seven steps, we argue for an holistic and comprehensive approach to embracing digital technology. While every framework or model has critics, experience shows that most companies using this approach see improvements in value added per employee (VAPE).
Background and definitions

Why are we writing this paper?

- Considerable economic research has shown that productivity improvement in Canadian SMEs is lagging behind that of other countries. (Conference Board of Canada, 2012).

- Providers of digital technology for managing enterprises claim that the technology can produce significant increases in productivity, and economic research bears them out. (McAfee, 2002. Ahearne, Srinivasan & Weinstein, 2004. Majumdar & Chang, 2010.)

- Supporting industries that have a positive influence on the productivity of others, such as biotechnology, aerospace, autos and information and communications technologies (ICT) also positively influence productivity. (Rao, 2011.)

- Canadian SMEs are lagging behind in implementing digital technology for managing their businesses. This undoubtedly contributes to their slower productivity improvement. (Arcand, 2008. Arcand & Lefebvre, 2010. Arcand & Lefebvre, 2011.)

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Some productivity impacts and resulting gains that DTAPP participants have reported include:

- Lower cost of maintaining/holding inventory
- Faster, more competitive quotes
- Shorter production lead times
- Lower production costs
- Fewer delays in product delivery
- Greater data accuracy and availability
- New career growth and learning opportunities for employees
- Improved, more impactful and more targeted management decisions
- Improved customer service and overall experience
- Better ability to compete in new/global markets, win more business and increase sales
- Faster, more accurate product design
- Improved product quality
- Creation of new full-time equivalent (FTE) jobs
What is enterprise productivity?
Definitions of productivity and its measurement vary widely. For the purposes of this white paper, we propose the following:

1. Enterprise productivity is the rate at which companies produce output that has market and social value.

2. A sound and general measure of enterprise-wide productivity is the financial value added per employee (VAPE) over a specific period. VAPE is operating profit plus salaries, wages and payroll expenses divided by the total number of full-time equivalent (FTE) employees. To calculate VAPE, take the information from a company’s most recent income statement and use this formula:

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VAPE = \frac{\text{EBITDA}^1 + \text{total salaries \& wages}}{\text{total FTE}^2}
\]

Improving VAPE is not a destination; rather, it is a continuous journey guided by a disciplined step-by-step process. As one cycle finishes, the next takes over.

Why the focus on digital technology?
In today’s complex enterprises, every business aspect is connected. A sound understanding of this multifaceted business interconnectivity, interdependence, interoperability and gaps (barriers) that prevent an enterprise from becoming more productive is crucial. Digital technology enhances the process of analyzing, understanding and changing systems, and effecting enterprise VAPE improvements.

Enterprise-level digital technology can move a company from managing with inadequate systems and software such as manually completed spreadsheets to integrating all business aspects digitally through an enterprise resource planning (ERP) system. By using custom dashboards that visually display that fully integrated information, ERP systems help decision-makers improve key aspects of a company’s productivity.

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1. Earnings before income tax, depreciation & amortization
2. Full-time equivalent
Why an holistic approach?

Companies that adopt digital technology without an holistic and comprehensive approach risk not only generating fewer improvements in productivity, but also making changes that become counterproductive.

This calls for companies to consider the basic questions posed by strategy and operations teams:

1. **Strategy**: are we doing the right thing?
2. **Operations**: are we doing the thing right?

Investing in technology to do things right without at least considering whether we are doing the right thing jeopardizes the investment.

The various frameworks or models highlighted in this paper have been proven, utilized by many Fortune 500 companies and vetted by industry experts. They are tools that have been field-tested by SMEs in Canada, the U.S.A. and elsewhere with annual revenues ranging from $500K to $30M.

The seven-step roadmap to digital technology adoption: tools for enterprise productivity leaders

To help SMEs analyze, strategize and implement digital technology, we propose a seven-step roadmap to increasing profitability and enterprise productivity.

This roadmap will likely benefit newer productivity improvement leaders the most. However, more experienced leaders may also benefit by incorporating some of the suggestions into their practices. Steps 1 and 2 address strategy, while Steps 4 through 6 address operations. Step 7 simply closes the loop. A company in the midst of a strategic or operational planning cycle can start at any appropriate step in the cycle and then finish the cycle to start again.
Digital Technology Adoption for Productivity

Value-Added Per Employee Plan

1. Environmental scanning
2. Corporate strategy and its fit with the environment
3. Benchmarking
4. Analysis of organizational capabilities, capacity and gaps
5. Defining key performance indicators (KPIs)
6. Using the balanced scorecard approach to monitor key performance indicators
7. Adopting technology to enhance organizational capacity and capabilities to deliver, manage and monitor key performance indicators

Typical Supporting Initiatives
- TQM
- Value Stream
- LEAN
- SIX SIGMA
- 5S
- Safety Task Teams
Step #1: Environmental scanning

In today’s globally connected market where information flowing from one end of the globe to the other is felt across the world within seconds, it is critical to continuously monitor the micro and macro environments in which a firm operates. Intense rivalry within industries, customer and supplier bargaining power, threat of new entrants and imitation products all signal the position of an enterprise and its offerings in the market.

A 360-degree scan of a firm’s operating environment includes a political, economic, social, technological, environmental and legal (PESTEL) analysis. This examines how the macro environment is evolving and identifies opportunities and threats arising from these factors, as well as the enterprise’s strength and weaknesses. The process for understanding the macro environment is described in “The five competitive forces that shape strategies.” (Porter, 2008).

A firm usually has little or no direct control over the macro environment in which it operates. However, reshaping an enterprise’s strategy or realigning/re-engineering organizational capability and capacity to align with that environment is very much possible.

Step #2: Aligning corporate strategy with its business environment

A strategy is the path to a firm’s goal of delivering products or services that meet the needs or wants of a target market. Crossan, Fry, Killing & Rouse (2008) have identified four components comprising a strategy:

- a goal that is aligned with
- product market focus and
- activities resulting in a unique
- value proposition for a targeted market segment.

Productivity improvement leaders must ask not only the CEO but also every employee of a company to describe the corporate strategy. While many enterprises have a stated strategy, their activities are often influenced by an implied strategy that can be very different from the stated one. In truly productive organizations, both stated and implied strategies are the same.

The second question the productivity improvement leader needs to ask is if the firm’s strategy is a good fit with its business environment. Only when that answer is “yes” should a productivity leader begin to analyze the alignment of the organization’s strategy with its current capability to meet the goal.

The alignment of a company’s strategy with the external environment on the one hand and its ability to deliver on that strategy on the other are crucial to improving enterprise productivity.
Step #3: Benchmarking

The next step in the journey of decoding an organization’s productivity opportunity is benchmarking against others in the same sector—a quick, easy way to understand where an enterprise’s productivity ranks (current state). Financial statements—often the most important benchmark—are a good starting point for gauging a company’s productivity. However, others could also contribute a broader perspective and sometimes help to identify productivity issues.

These include:

- competitive benchmarking
- strategic benchmarking
- operational benchmarking
- internal benchmarking
- human resources benchmarking
- external benchmarking
- international benchmarking.

In any improvement effort, current and future states must be well-defined and then monitored regularly to measure changes. A classic case is Walmart, which through diligent benchmarking became the benchmark for its industry by surpassing all competition. Founder Sam Walton was keen on benchmarking not only against the company’s competitors, but also internally in Walmart stores, both within a geographic area and departments. The company’s benchmarking numbers were available to all employees so they could measure, improve and monitor each business unit’s productivity. After Walmart’s revenue topped that of Kmart’s, Walton was asked by a reporter how it felt to be the largest retailer in the world. He expressed sadness that Walmart had no one else to chase after, and fear that his enterprise would become complacent.

Occasionally the results of benchmarking suggest that a strategy should be revisited. If benchmarking shows a firm to be at an unchangeable competitive disadvantage, strategic positioning must be reconsidered.

Step #4: Analysis of organizational capabilities, capacity and gaps

Assessing organizational capabilities, capacity and gaps in delivering on strategy is one of the hardest tasks, second only to strategy execution. To successfully conduct this assessment, productivity improvement leaders must take an holistic approach.

Understanding an enterprise’s culture is the foundation for identifying the gaps in its capability for delivering on its strategy. Management guru Peter Drucker’s famous saying, “Culture eats strategy for breakfast” expresses that, no matter how far-reaching a leader’s vision or how brilliant the strategy, neither will be realized if not supported by an organization’s culture.
To create or modify an organization's culture, companies need three levers—leadership behaviour, organization structure and management processes. Unless all three are synchronized to create a productivity-oriented culture, organizational capabilities are not maximized.

The Diamond-E Framework (Crossan et al., 2008) is an excellent tool for analyzing the gaps in any enterprise and understanding the general relationship between a firm and its environment. It investigates the alignment of an organization’s environment, strategy, management preferences, resources and organizational capabilities.
**Step #5: Defining key performance indicators (KPIs)**

After a firm completes a productivity improvement exercise that identifies capability gaps preventing it from delivering on its strategy, recommendations for change are often made and actions taken without first defining key performance indicators (KPIs). This is similar to following an urgent marching order without a map or an odometer. Before making any changes, a company must identify what KPIs are required to achieve desired results. Well-defined KPIs can also guide an enterprise in prioritizing changes.

KPIs can vary widely in different companies, even within the same sector. For a high-end retailer, for example, a critical KPI could be average transactions per customer while for a discount retailer it could be gross margin. For a manufacturer of a mass commodity, a critical KPI could be production per hour, while for a custom manufacturer it could be error-free delivery. Key performance indicators come in two categories: leading indicators and lagging indicators. In a social media marketing campaign, for example, the number of likes an ad campaign generates on Facebook may be a leading indicator, while the number of those likes converting into sales is a lagging indicator.

Most organizations do a good job of monitoring lagging indicators e.g., revenue; earnings before interest, taxes, depreciation and amortization (EBITDA); customer satisfaction; cost of goods sold (COGS); etc. However, very few SMEs measure leading indicators, which drive those lagging indicators and therefore need to be monitored.

Changes made by the organization must be directly related to driving KPIs higher or otherwise improving them. The key to ensuring that digital technology adoption maximizes productivity improvements is to tie it directly into well-thought-out KPIs (future state) and feed real-time operations data into a dashboard using a balanced scorecard approach and principles.

**Step #6: Using the balanced scorecard approach to monitor KPIs**

Once KPIs have been identified and changes made to effect the desired organizational productivity improvements, a monitoring mechanism must be set up. Setting up and monitoring KPIs can be risky, however. They are often one-sided, not part of an holistic approach and biased by their creators’ areas of expertise.

A good performance management tool—the balanced scorecard (BSC)—mitigates this risk by identifying and monitoring an organization’s four interconnected functions: customer, financial, internal business processes, learning and growth (Kaplan & Norton, 1996). When designing and implementing a balanced scorecard approach to monitor KPIs, an organization may need to develop different layers of the scorecard. For example, a CEO’s scorecard will monitor the execution of strategy at a high level, while scorecards lower down on the organizational hierarchy feed into that of the CEO.
A common error in designing a balanced scorecard is monitoring historical numbers such as last year's sales increase over the previous year or last month's margin over the previous month. The company needs both leading and lagging indicators, but in the balanced scorecard approach, a company should focus more on leading indicators to influence the outcomes of strategic goals.
Step #7: Adopting technology to enhance organizational capacity and capabilities to deliver, manage and monitor KPIs

Adoption of digital technology to enable, deliver, monitor and continuously redesign a company’s enterprise KPIs is the final step in the enterprise productivity journey. It happens in two phases:

- the management decision to adopt it, and
- user acceptance of it for their daily work.

Choosing technology that is the right fit for an organization’s culture is a critical success factor in any technology adoption. And Drucker’s phrase, “Culture eats strategy for breakfast” can also apply to the adoption of technology. The culture will influence the answers to certain operational questions such as:

- Should an ERP system have mobile capabilities and to what extent?
- Should the ERP system be hosted in a cloud or not?
- Would the organization give employees access to the business system from their personal devices, and to what extent?
- What is the total cost of ownership (TCO) of this proposed technology?
- An organization’s digital maturity must also be measured by prioritizing and adopting appropriate technology (MIT Sloan Management, 2012).

Drucker pointed out that an organization has two functions—to innovate and to market. In choosing digital technology to enhance productivity, therefore, an enterprise must have an overall digital strategy that includes both production and marketing sides of the business. With the strong emergence of social media and rising usage of smartphones, for example, an enterprise has to constantly monitor and adjust its marketing and customer relationship.

Digital technology adoption must also prioritize elements of the process and curtail ineffective business processes, systems or technology. For example, a large distributor might benefit from establishing a barcoded inventory management system before implementing e-commerce. In other cases, technology-savvy companies may hinder their enterprise productivity by overburdening themselves with too much technology that may be redundant or only partially functional.
Too often, SMEs acquire enterprise resource planning (ERP) systems to automate business processes, expecting productivity to improve automatically. That is partially true because automating manual business processes saves time immediately. However, companies need to ask whether this increased productivity maximizes profit, whether the right processes have been automated, and whether those being automated support the enterprise strategy. Before automating or digitizing business processes, a firm must scrutinize existing business practices utilizing proven and appropriate processes and quality improvement tactics such as Lean manufacturing, value stream mapping, Six Sigma, total quality management (TQM), just-in-time (JIT) manufacturing, Kaizan, Konbon, 5S methodology, ISO and the like.

ERP or any business systems—whether material requirements planning (MRP), customer relationship management (CRM), ERP, e-commerce or other—should be implemented to monitor productivity and profitability goals, and integrated systematically into business processes.

**Conclusion**

Digital technology is quickly changing the competitive landscape of business everywhere. Operating—and succeeding—in this highly competitive economy is especially challenging for SMEs, which have been slow to adopt digital technology.
Through the National Research Council of Canada Industrial Research Assistance Program and the Digital Technology Adoption Pilot Program (DTAPP), the government has so far supported the productivity improvement and technology adoption efforts of more than one thousand Canadian SMEs. DTAPP is being delivered from October 2011 through March 2014.

“THE FINANCIAL HELP PROVIDED BY DTAPP WAS FUNDAMENTAL TO ACHIEVING THE EFFICIENCY ON PROCESSES AND PROCEDURES THAT ENABLES OUR COMPANY TO BECOME MORE COMPETITIVE IN TODAY’S AGGRESSIVE MANUFACTURING INDUSTRY.”
– DTAPP client.

Results from an evaluation on DTAPP (Goss Gilroy Inc., 2012) show that:

- There is a productivity gap between Canadian SMEs and those in other countries. The adoption of digital technologies is one way to address this.
- SMEs do face barriers to adoption, and DTAPP addresses their digital technology challenges.
- The federal government does have a role in raising awareness among SMEs about the benefits and importance of adopting digital technologies.

A study conducted recently by the Centre for Business Innovation, Conference Board of Canada, The State of Firm-Level Innovation in Canada, 2012, reports that:

- “Many companies in Canada consider governments to be the second-most used source of financing for innovation,” and that “more than half of the firms see federal government support for innovation as being valuable to themselves and their industry sector.”
- In addition, “Firms that appreciate government support for innovation exhibit higher performance in the market than firms that find government support to be of little value.”

DTAPP CONTRIBUTED GREATLY TO OUR FIRM’S SUCCESSFUL ADOPTION OF A VERY COMPLICATED DIGITAL TECHNOLOGY TO MANAGE ALMOST ALL GREENHOUSE AND BUSINESS OPERATIONS.”
– DTAPP client.
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