According to Statistics Canada, a small or medium-sized enterprise (SME) is any business that has fewer than 500 employees. Non-agriculture private business SMEs account for 54.2 per cent of the gross domestic product (GDP) in Canada (marginally higher than the United States’ comparable proportion of 50.7 per cent). In fact, SMEs contribute the majority of the GDP in 10 out of
of 14 Canadian industries. Further, 70 per cent of the total private sector workforce works in enterprises with fewer than 500 employees.

Canadian SMEs are significant drivers of the economy, but they are markedly different from large businesses (those with 500 or more employees). The share of both GDP and hours worked is larger for SMEs than for large enterprises. “Larger firms had considerably higher labour productivity defined as GDP per hour worked. For the total business sector, labour productivity in 2008 was $71.6/hour in large firms compared with $42.3/hour in medium-sized firms and $34.6/hour in small firms.” Given the difference in the productivity of large, medium-sized, and small businesses, it is clear that increasing productivity in SMEs will play a substantial role in growing the Canadian economy as a whole.

This briefing addresses the issue of digital technology adoption for SMEs from two sides of the same coin. The first part establishes both the context and the foundation of digital technology adoption. It addresses how well Canada competes, the elements of productivity, and the role that digital technologies play in driving the productivity of SMEs.

The second part examines lessons learned and identifies best practices among SMEs that have gone through the process of adopting technologies. It identifies barriers to digital technology adoption for SMEs and highlights first-hand accounts of individuals from SMEs across a range of sectors who have considered or undertaken digital technology adoption in their firms. Inputs for this research are both primary and secondary; they include a literature review, interviews, and dialogue from a one-day workshop for SMEs.

### HOW COMPETITIVE IS CANADA?

According to the most recent Global Competitiveness Index (GCI), Canada ranks 14th out of 144 countries, dropping five places since 2009. (See Table 1.) The GCI-associated report cites the quality of Canada’s research institutions and the “government’s role in promoting innovation through procurement practices” as reasons for Canada’s lagging competitiveness. Interviewees for our recent study *Adding Value—Competitiveness in Canadian Manufacturing* agreed that Canada’s competitiveness is a problem, especially given the country’s proximity to its biggest competitor and largest export market—the United States. Both innovation and digital technology adoption play a role in this productivity and competitiveness story.

### Table 1

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5 Ibid.


7 Ibid.
WHAT DO WE MEAN BY PRODUCTIVITY?
Statistics Canada defines productivity as a share of GDP per hour worked. More broadly, productivity can be described as “a measure of the efficiency of a person, machine, factory, system, etc., in converting inputs into useful outputs.” Productivity is critical in determining both cost-efficiency and competitiveness.

Phrases like “work smarter not harder” and “more for less” embody this concept of increased productivity. To be competitive, we need to adopt ways of doing things that allow us to do more for less. Innovation plays an essential role in productivity. George Westerman explains the difference between leaders and laggards: The former adopt not only the new technologies but also the new processes that optimize those technologies, while the latter choose to do nothing or simply adopt new technologies without changing their practices.

INNOVATION: WHAT IS IT AND WHAT ROLE DOES IT PLAY IN PRODUCTIVITY?
The Conference Board of Canada defines innovation as “a process through which economic or social value is extracted from knowledge—through the creating, diffusing, and transforming of ideas—to produce new or improved products, services, processes, strategies, or capabilities.”

Innovation means change. It is a disruptive process. It is about creating and sharing new ideas and identifying and developing new opportunities based on those ideas. Innovation is about the conversion of novelty into value. As Michael Schrage points out, innovation is not what innovators offer but rather what consumers adopt.

These descriptions all share the notion that innovation has two distinct parts. Simplified, innovation is something new that has value.

The Conference Board assesses Canada’s international innovation performance as poor. The How Canada Performs report card series ranks Canada 13th out of a peer group of 16 countries, receiving a D grade for innovation “despite a decade or so of innovation agendas and prosperity reports.” This grade is based on a series of 21 innovation indicators.

“Canada is well supplied with good universities, engineering schools, teaching hospitals, and technical institutions. It produces science that is well respected around the world.” But, with some exceptions, Canada does not do as well as other countries in enabling research to be successfully commercialized and used as a source of advantage for innovative companies seeking increased global market shares.

In general, “Canada has been slow to adopt leading-edge technologies. This is problematic since innovative products have increasingly short cycles. Often within a couple of years products are upgraded or replaced. Slow adopters never catch up; they are always at least one generation behind the advancing frontier of possibilities that new technology represents. This is not a winning formula and Canada finds itself playing catch-up on too many technologies.”

“The problem shows itself in Canada’s relatively low productivity level. As other countries develop and adopt more innovation-related business methods, their companies are gaining in productivity more rapidly than Canadian companies.”

12 The Conference Board of Canada, How Canada Performs.
13 Ibid.
14 Ibid.
15 Ibid.
16 Ibid.
DIGITAL TECHNOLOGY AND PRODUCTIVITY

One of the indicators used to assess the level of innovation in Canada in the *How Canada Performs* series is ICT investment. ICT investment has three components:

1. software (including the acquisition of prepackaged software, customized software, and software developed in-house);
2. information technology (IT) equipment (computers and related hardware);
3. communications equipment.

Canada ranks eighth out of 15 peer countries on ICT investment as a percentage of non-residential gross fixed capital formation. In comparison, the U.S. is a clear leader in ICT investment. It ranks first overall and also places first in two of the three subcategories. (See Chart 1.)

From decades of research we know that “the use of ICT by staff increases productivity; … the adoption of computer networks and more than one type of ICT drive labour productivity growth; … and that ICT investment can be an important catalyst for a profound transformation of the firm.” Furthermore, “SMEs who have adopted ICT have experienced the kinds of productivity growth consistent with the findings of the empirical research across the economy.”

The Canadian Council of Chief Executives stated that “as a group, Canadian businesses have been too slow to invest in research and to adopt leading-edge technologies.” It described Canadian business leaders as “captured in a culture of complacency.” The lower adoption rate of digital technology seems to support this assertion, as it effectively limits the productivity performance. And despite the benefits of digital technology adoption, SMEs have a significantly lower rate of adoption than large enterprises.

WHY DOES PRODUCTIVITY MATTER TO CANADA’S ECONOMY?

The demographics of the Canadian population are quickly leading to a structural tightening of the Canadian labour market. “The aging of Canada’s population as a whole is being driven by the aging baby boomer cohort.” Strong immigration will work to mitigate the effects of the aging population but will not be able to fully offset it. Simply put, we will not be able to immigrate our way out of the problem. Ultimately, the portion of Canadians aged 65 and over will rise from 14.1 per cent in 2010 to 24.9 per cent in 2035. This demographic shift will reduce the available supply of labour and add to labour costs—a trend already being felt in the west and in Newfoundland. (See Chart 2.)

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17 ICT Investment refers to information communications technology investment. This report uses the term “digital technology” to describe ICT.
19 Ibid.
20 Ibid.
21 Martin and Milway, *Enhancing the Productivity of Small and Medium Enterprises Through Greater Adoption of Information and Communication Technology*.
22 Ibid.
23 Canadian Council of Chief Executives, *From Common Sense to Bold Ambition*.
24 Ibid.
26 Ibid.
27 Ibid., 12.
As the cost of labour rises, the pressure for increased productivity will grow more intense. SMEs are likely to be hardest hit, especially in regions where wages are already rising quickly, because they tend to pay less than larger firms.

The overall growth and productivity of the Canadian economy, however, depends heavily on SMEs since they contribute more than half of the national GDP. Their ability to meet this productivity challenge will be strongly linked to their success in incorporating new technologies into their business practices.

**ON ADOPTING TECHNOLOGY**

The linkages between adopting digital technology and increased productivity are clear. Despite the benefits to productivity, SMEs are slow to take the leap and invest in adopting new technologies. This portion of the briefing will focus on identifying the barriers and opportunities related to digital technology adoption by SMEs and showcasing best practices with digital technology adoption for SMEs through case studies. The information presented here was collected through:

- a one-day workshop on the topic, conducted by The Conference Board of Canada and attended by SMEs;
- a series of targeted interviews with SMEs that are interested in digital technology adoption or that have recently undergone the process.

**FACING THE BARRIERS**

Both workshop participants and interviewees consistently identified five barriers to adopting digital technology by SMEs:

- **Time:** The most common barrier—raised by an overwhelming consensus both at the workshop and through interviews—was time. Indeed time constraints pose a key challenge for SMEs, and they were quick to point out the inherent catch-22: Often, the implementation of a productivity-boosting technology would ease the time constraints greatly. One interviewee related that she is “so focused on keeping on top of the day-to-day operations in [her] company that [she has] no time available to even think about adopting a new digital technology.”
  
  A workshop participant summed this up succinctly, stating that “it is important to not only work *in* the business but *on* the business as well.”

- **Money:** The twin constraint to time, of course, is money; financial considerations were repeatedly identified as barriers to adoption. Interviewees noted that the financial investment needed to fund the adoption of technology is often considered akin to adding another salary to the payroll. Multiple respondents indicated that it is much easier for their SMEs and peer SMEs to “add another body” to their workforce instead of investing in a productivity-boosting technology. The attitude that “a person can do that” is counterproductive, as it entrenches the SME further in a less productive method or process through further financial constraints (i.e., the continuing salary cost of that new hire).

- **Fear and Resistance:** These two forces—fear and resistance—also work as barriers to digital technology adoption among SMEs. Many at the workshop and through interviews talked of the personnel within their firms as being resistant to change. They cited a certain level of distrust in

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new technologies. Change is notoriously challenging for humans, and organizations looking for ways to improve their productivity often fall victim to this challenge. Not only is there resistance among workers, but executive decision-makers in SMEs also express similar fears concerning technology.

- **Opportunity Cost:** SME representatives at the workshop expressed the fear of the opportunity cost involved in digital technology adoption. Top-level decision-makers in SMEs are concerned about what they may be missing while they are focused on the adoption and integration of the new technology. Executives also worry about scope creep and price escalation. Stories abound of digital technology adoptions that have taken longer and cost more than anticipated, and the fears of falling into that trap are often sufficient to prevent SME decision-makers from taking the leap.

- **Difficult to Understand:** For many SMEs, it can be difficult to understand the end result and benefit of undergoing a technology adoption. Many of the post-integration benefits of the new technology can be hard to measure and impossible to accurately predict at the outset. One interviewee who works closely with SMEs that are adopting new enterprise resource planning (ERP) software spoke of how SMEs often want to see that other companies, similar to their own, have undergone successful adoption of the same software. Because ERP software is so frequently customized and because each SME has a unique business model, it is often difficult for these executives to be fully assured of the benefits.

### IDENTIFYING THE OPPORTUNITY

Given these significant barriers to digital technology adoption, it is little wonder that so few of Canada’s SMEs pursue this path. Our research via the workshop and interviews found that, most often, the decision to adopt a productivity-boosting technology is made because the SME has hit a particular pain point. (See box “Pain Point as Motivator.”) Their methods have made them profitable companies, but they are unable to continue growing if they maintain these same methods. SMEs often pursue change when they recognize the need. Reaching this threshold and recognizing it as a barrier to further growth is often the incentive needed to adopt digital technology that can alleviate that pain.

Derek Sullivan, VP of Atlantic DataSystems, an ERP software and consultancy company, indicated that “companies approach us for one of two reasons: they are looking to reduce their costs or achieve an efficiency; or they are focused on growth but need help to be able to support more growth. This second growth-focused type is the most common. Their current processes are not sustainable moving forward with their expected growth.”

Through the course of their operations, SMEs reach critical junctures where it becomes essential to their growth to adopt more productive methods. This often includes incorporating digital technologies into their operations. These junctures or pain points are, in fact, opportunities for SMEs to examine their current practices and needs, as well as to assess their future needs. A better understanding of their business will, in turn, lead to better business decisions.

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31 Derek Sullivan (Vice President, Atlantic DataSystems [ADS]), phone interview by Sarah Dimick, January 10, 2014.

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**Pain Point as Motivator**

One interviewee\(^1\) noted that the company’s needs had outgrown the time entry system (TES). With a new large contract coming, it needed to be able to produce invoices at a substantially greater volume and much more quickly than the current system allowed. Given this need on the horizon, plus the short turnaround time stipulated in the contract, the company proceeded with the adoption of a new TES.

The interviewee told us that the adoption of the new system allowed the company to process 70 invoices in three to four business days. Previously, the average would have been about a third of that volume over seven or eight business days. Under the old system, the increased volume of work would have required the addition of one to one-and-a-half full-time equivalent staff.

\(^1\) Danny Penton (Chief Financial Officer, Camouflage Datamasking Specialists), phone interview by Sarah Dimick, January 15, 2014.
BEST PRACTICES
During our research, a number of best practices for digital technology adoption emerged. The following six best practices represent the most common employed among our SME contributors. Collectively, they are a recipe for successful digital technology adoption by SMEs.

1. Know Your Processes, Keep It Simple
This best practice is applicable in more ways than one. SME representatives emphasized the value of identifying the processes involved in their business and working diligently to keep those processes as simple and straightforward as possible. One SME workshop presenter indicated that her company was working with lean principles and this had certainly eased the process of adopting new technology. Others talked about the need to get their house in order first by simplifying existing processes before trying to adopt new technologies. Interviewees stressed the importance of having processes clearly outlined in advance of any technology adoption initiative.

2. Total Organizational Buy-In
Our interviewees spoke of the best practice of having total organizational commitment to the adoption of a new technology. Although total commitment throughout the organization may be initially unattainable, the clear and visible commitment of key players from the outset is essential. (Key players include those at the highest level of the organization as well as those who will be in constant contact with and applying the new digital technology.) Involvement in and support of the adoption process from those at the highest level of authority demonstrates clear organizational commitment. Several interviewees indicated that having support from their CEO during the adoption of a new technology ensured their ability to push things through and gave them tools to work with when they faced internal resistance.

3. Enlist Champions
Closely related to total organization buy-in is the best practice of utilizing champions. Each of the workshop speakers and many SME representatives in the room knowledge will enable decision-makers to choose the technology best suited for your organization—one that will support your current needs and provide room to grow in the coming years.

Equally important is knowing your process of adoption. Many SME representatives asserted that their technology adoption process was aided by or necessitated extensive documentation. Keeping careful records of the decisions being made and why is, as one interviewee described, “tedious but essential” work. Having these records will save time and confusion in the future.

Other interviewees stressed the importance of understanding the company’s requirements. By fully knowing your processes, you will be in a position to assess at the outset your company’s current and future needs. This

33 Goobie, “Demonstrating the Value of Adopting Digital Technologies.”
34 Penton, interview.
35 Ibid.
indicated the need for champions when adopting new technology. (For an example see box “Project Manager as Champion.”) It’s essential to have the right project manager shepherd the adoption process.

### Project Manager as Champion

PF Collins International Trade Solutions, a trade solutions provider and customs broker, presented its digital technology adoption story at the Conference Board workshop. With 90 years in the business, the company had begun to feel the impact of its competitors. Recognizing that the records management system was paper-oriented and inefficient, it decided to adopt an electronic document management system.

Sharlene Goobie, the company’s Controller, spoke of the lengthy adoption process that was undertaken, including working with an external consultant, conducting a fit/gap analysis, and testing the newly adapted software for four weeks. She stressed that having a project manager was an essential best practice they employed through their adoption process. The project manager worked to move the adoption through various stages and worked closely with the external consultant. This project manager championed the adoption process and fuelled them forward.1

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1 Goobie, “Demonstrating the Value of Adopting Digital Technologies.”

### 4. Enlist the Right Expertise

SME representatives we interviewed and engaged at the workshop all stressed the need for bringing in appropriate expertise to assist in the adoption process. Interviewees spoke about the value of having free and open discovery sessions with outsiders who are able to assess the business and its needs. There is great value in being able to connect with someone who has the expertise and knowledge required to assess the needs and potential fit for new technologies. These are specialized skills, and many SMEs are not equipped to take on this type of assessment internally. Outsourcing this role also means that those responsible for keeping the business running can continue to focus where they’re needed.

Beyond working with consultants and outside experts, there must be a match with the company or partner that is ultimately selected to provide the new technology. Interviewees stressed that a successful adoption is less about the technology than it is about the partner. There needs to be a close fit with the technology provider to best facilitate implementation. One interviewee stated that when choosing a technology provider, a critical question to ask is whether they will be available to spend time working with you to fully integrate the new technologies into your business.36 Factors to consider include personality traits (which may impact collaboration), geographic location (which may affect their accessibility to your business), and their continuing care policies (i.e., will they be available to help as you move forward).

### 5. Keep Your Eyes on the Prize

SME interviewees spoke at length about the need to have a clear end goal—what will successful adoption of this technology look like?—and the importance of keeping that vision in mind. One interviewee posted a description of the end goal above his workstation, and another used it to refocus his team whenever they reached a challenging crossroad or faced resistance.

There is great value in being able to connect with someone who has the expertise and knowledge required to assess the needs and potential fit for new technologies.

Keeping your end goal in mind ensures that it remains the priority and helps to avoid scope creep. Its communication throughout the company reinforces organizational buy-in. By prioritizing key benefits of the technology adoption, SMEs are able to develop a clear image of what success looks like. This is especially important for those companies engaged in lengthier adoption processes. One respondent, who was involved with a technology development and adoption project that took

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36 Sullivan, interview.
approximately two years, added that it is important to also be responsive to changing realities. He stressed that the goals should remain the same but, as technologies change, it is useful to periodically step back and make sure you are on the right path to achieving those goals.37

6. Plan Carefully and Appropriately Execute Plans

Finally, in the adoption process, once all the background work of consulting and identifying the appropriate technology is complete, it is important to plan the actual adoption process carefully and to stick to the plan. (See box “Careful Planning and Established Timelines” for a case study example.) Slipping timelines are as big a risk as scope creep. Working with the technology experts to develop an appropriate plan and timeline will contribute greatly to successful adoption. This must include sufficient training and testing time. As one interviewee noted, “there will always be push back on timelines; keeping a deadline date with the support from the highest level of the organization allows for successful adoption.”38

Organizations need to embrace change and new technologies or tools; to resist doing things the same way as before.

Despite these tried-and-true best practices, the process is rarely smooth. Even companies that apply them have challenges adopting digital technology. One interviewee described the technology adoption process as “six months of constant pain and transition work, the benefits of which are only felt on the other side.” One of the most common challenges cited for those SMEs in the process of adopting new digital technology is change. Organizations need to embrace change and fully adopt the new technology or tool. Resistance to change is part of human nature, even with new tools SMEs have to resist the bias to do things the same as before. The successful implementation of adopted digital technologies requires an appropriate change management plan (including training as well as other activities) that rolls out over time.

PRODUCTIVITY AND OTHER BENEFITS OF DIGITAL TECHNOLOGY ADOPTION

All of the SME workshop participants and interviewees noted improvements in productivity after adopting technology, but many suggested that an exact measure was difficult to determine. (One example of increased productivity is highlighted in box “Digital Technology

37 Dr. Majed Khraishi (Clinical Professor of Medicine [Rheumatology], Memorial University of Newfoundland, President, NL Research Technologies), phone interview by Sarah Dimick, January 28, 2014.

38 Penton, interview.
Adoption Results in Productivity. ") One interviewee, whose company consults with SMEs considering digital technology adoption, indicated that his company uses a broad check for productivity by comparing the size of the business pre- and post-adoption (at least one year after). Since digital technology adoption is most frequently associated with the client’s need for growth, assessing the health and growth of the business is a good indicator of success.

Other indicators of success include softer measures that typically correlate with productivity levels. Multiple respondents noted that their customers’ satisfaction had increased since the digital technology adoption. Reasons for this included the customer’s ability to receive invoices more quickly or in alternate formats; the ability of the SME to more accurately predict the availability of services; and the accessibility of the customer’s case history by both the customer and the SME representatives they were working with.

Success is not limited to customer satisfaction. Once the transitional dust has settled, training has been completed, and the new technology is fully integrated, employees themselves are often happier seeing the benefits of the technology applied in their daily work. Helping employees perform their roles more productively and effectively can drive employee satisfaction, leading to lower turnover and enhanced employee engagement. The SMEs we interviewed all indicated that there are positive spillover effects to their technology adoption. Pre-adoption benchmarking and the use of performance indicators can ensure that success can be measured.

EXPERIENCES WITH DTAPP
The majority of the SME interviewees and workshop participants we consulted had accessed NRC-IRAP’s Digital Technology Adoption Pilot Program (DTAPP) for funding and advisory support. Each of those who did engage with DTAPP found incredible value in the program’s offerings. It is important to note that, as one interviewee pointed out, “the DTAPP program has helped many SMEs take the risk to adopt digital technology.” Another interviewee, whose company is on the precipice of digital technology adoption, confirmed this: “I doubt very much that we would go ahead with the adoption plans we have without DTAPP funding; it is critical to our decision. Our business is growing and our current methods of operations management have created a strain. They are not a good utilization of people’s time; however, without DTAPP, we will continue on as is, under increasing pressure, because the cost is too much to take on without support.”

Digital Technology Adoption Results in Productivity
Nexus Research, a clinical research company, in partnership with its sister company NL Research Technologies, adopted a statistical database for its work. Through the integration of richly detailed information in a system that allows for effective analysis of trends and searchable results, the company has reached new levels of productivity.

Application of the software has enabled the company to produce research that has led to published results and garnered interest from the media as well as the broader medical community. It has established itself with a relatively unique data set that enables it to conduct targeted research.

Having the power to quickly access information on health factors and trends through mining its dataset means that Nexus Research is able to compete and contribute globally in the fields of psoriatic and rheumatoid arthritis research.

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1  Khraishi, interview.

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40 National Research Council of Canada Industrial Research Assistance Program.
41 DTAPP is a Government of Canada initiative to increase the productivity growth of SMEs through the adoption of digital technologies. For more information, visit www.nrc-cnrc.gc.ca/eng/irap/dtapp/index.html.
42 Sullivan, interview.
43 Cuff-Young, interview.
The model provided by DTAPP was shown to be so effective that RDEE TNL, a francophone-focused community economic development organization, indicated that it was interested in piloting a project that would help existing francophone entrepreneurs integrate technology into their businesses by matching them with a company and/or advisor. This program would model some of its activity on the DTAPP model and would hope to connect clients with future DTAPP funding.

CONCLUSIONS

The adoption of technologies that serve to facilitate and automate business processes significantly improves a company’s productivity, and therefore its competitiveness. This applies in all firms, regardless of size. SMEs have a lower adoption rate of these technologies, for a variety of reasons—costs, time, lack of expertise, and even fear associated with the adoption. Finding ways to leap the adoption hurdles will be a key contributing factor in the future success of Canadian SMEs.

Given the labour markets issues and rising wages, the traditional approach of “putting a body on the payroll” to ease growth-related pressures will no longer be a viable option. Achieving greater productivity is the only way for these firms to be able to continue to grow their businesses. Adopting appropriate digital technology is one effective way to do this.

It is our sincere hope that, by presenting selected technology adoption best practices identified through our consultation with SME representatives, we have empowered decision-makers in other SMEs to explore the potential for their companies to adopt technology and improve their productivity. One of the resounding messages we heard at the workshop was that the testimonials and sharing from other organizations in similar situations was educational and valuable.

Adopting technology to improve productivity will always represent, at least in part, a leap of faith. Our intention here has been to add information to the dialogue in order to aid decision-makers and encourage appropriate technology adoption.

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Acknowledgements

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Interview Participants

- Sean Cook, Senior Consultant/Chief Operating Officer, Tech Knowledge Solutions Inc.
- Wanda Cuff-Young, Vice President Operations, Work Global Canada
- David Jensen, Economic Development Officer for Eastern Newfoundland, Réseau de développement économique et d’employabilité de Terre-Neuve-et-Labrador (RDEE TNL)
- Majed Khraishi, MD, Clinical Professor of Medicine (Rheumatology), Memorial University of Newfoundland, President, NL Research Technologies
- Garreth McGrath, Program and Sales Associate, The Lifesaving Team Inc.
- Danny Penton, Chief Financial Officer, Camouflage Datamasking Specialists
- Derek Sullivan, Vice President, Atlantic DataSystems (ADS)

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**Adopting Digital Technologies:**
The Path for SMEs

by Sarah Dimick