Is it worth our while to invest in manufacturing?

If you read and believe everything in the media, my guess is that you wouldn’t invest another dollar in manufacturing. And let’s face it, we do hear a lot of gloom and doom about manufacturing in Canada, and in Ontario in particular.

Less than a year ago, the Globe & Mail carried this headline: “The future looks bleak for Ontario’s manufacturing sector.”

Of course, just about the same time, the Globe also reported, in a complete contradiction: “It may take time before the statistics or surveys prove manufacturing is back, but it has started.”

So what are we to believe? Is it worth our while to invest in manufacturing – especially, considering the theme of today’s gathering, in advanced manufacturing?

Let me end any mystery, right now: my answer to that question is a strong, positive, definite “Yes”.

There is conclusive evidence that the tide has turned, and that manufacturing is again a growth industry in this country.

In KPMG’s “Canadian Manufacturing Outlook 2014” report, it says that the outlook for Canadian manufacturing is by far the best it has been since the 2008-2009 recession.

We have left “survival mode” behind and we’re genuinely launched into a true recovery. However, we cannot take this for granted. The opportunity for success will require unprecedented commitment on the part of every one of us.

We all know that manufacturing took a hit in 2008 but according to KPMG’s survey, only 14 per cent of Canadian firms plan to outsource production to China; that’s down from 30 per cent only one year ago! Only 3 per cent were planning to outsource from India, compared to 12 per cent a year earlier.

Last year, approximately 80 thousand manufacturing companies in Canada generated revenues of 600 billion dollars, and gave employment to 1.8 million Canadians, half of them in Ontario. That’s about 10 per cent of our entire national workforce.

That’s a significant upturn, by the way, from 2011, when according to Statscan, about 1.5 million workers were employed in manufacturing. These figures represent the manufacturing sector, in general, not specifically advanced manufacturing.

But let me make a bold suggestion: going forward, there will be no manufacturing businesses that do not employ advanced manufacturing technologies. If the manufacturing industry is to
succeed, it must be, in fact, **the advanced manufacturing industry**.

Our industry will be green, it will be digitized, it will be built on a virtual foundation of networking, value creation chains and new business models.

In my home country, Germany, this new model has become known as Industry 4.0, or the Fourth Industrial Revolution, and I will tell you more about it in a few minutes.

Advanced manufacturing is not a choice, it’s an inevitable evolution. The revitalization of manufacturing in this country is not because we have kept doing the same things we did before 2008 – the rebirth has happened because we are shifting from low tech to highly advanced manufacturing.

Canadian manufacturing success stories are going to be advanced manufacturing success stories.

Let’s consider, for example, clean technology. Clean tech is more than a necessary response to environmental challenges – it often holds the solution to increasing our viability and sustainably exponentially. Or even to saving an entire industry.

According to the Toronto Star, the clean tech industry now employs 41,000 people, including 2,300 new jobs last year. Clean tech generates about 5.8 billion dollars in export revenues.

Siemens Canada is deeply committed to clean tech. World-wide, 43 per cent of our total revenue comes from green products and solutions. Here in Ontario, we’re heavily invested in the clean energy sector, and we have just been awarded two new orders, Samsung and Pattern Development’s Armow project and Suncor’s Cedar Point, for onshore wind projects that will have the capacity to power more than 100,000 homes.

From those two new projects alone, over 400 turbine blades will be manufactured in our plant in Tillsonburg, Ontario – and I celebrate the fact that we are the biggest employer in Tillsonburg today.

Siemens is proud to be a leader in the Canadian clean tech field, and in advanced manufacturing in general. We are a major player in sectors ranging from building technologies to health care. We’re in space, we’re in operating rooms, and we’re travelling on railroad tracks.

We have accomplished all of this because we are never content to rest on our success.

As I often say: We are successful. Therefore, we must change.

At Siemens, we follow that philosophy. And I believe that if advanced manufacturing companies – from the auto industry to aerospace, from food processing to IT – if we all do the same, we will all be worth the investment.

Change creates challenge; meeting challenges creates enthusiasm; enthusiasm creates a dynamic environment that produces success.

Change is also not an option. Let’s consider one phrase to illustrate this harsh reality: 3D Printing.

At Siemens, the first generation of 3D printers was used to make models and molds. Today, 3D
printers are making the parts themselves – and one result is a 90 per cent saving on repair time for some turbines. Costs are reduced by 30 per cent. You probably can tell some of the same stories about the impact of innovation.

We all need to step up to the challenge. Opportunities abound for Canadian advanced manufacturers. And again, this is not unfounded optimism. An ideal confluence of circumstances is putting us right where we should want to be.

First of all, off-shore costs are increasing. We haven’t hit parity, but the gap is much narrower. And we all understand that we don’t need to reach actual parity – it’s to our advantage as Canadian advanced manufacturers when offshore labour rates rise to the point where they no longer off-set the other challenges and risks associated with taking business offshore.

We all know what those risks are – from quality control to shipping challenges to unreliable partnerships. When the labour cost savings drop, these other mitigating factors quickly bring manufacturing back home to Canada.

Bottom line: there’s no place like home, when it comes to having confidence in a manufacturing supplier.

There are other plusses for Canadian manufacturers. There is evidence of a growing world market for Canadian products. We all know the danger of putting too many eggs in one basket, a basket called The United States of America, and over the past decade, we have moved in a positive direction on that issue. Canadian exports to other countries – including China and India –rose by $24.1 billion in ten years. That’s good news.

But none of this will matter unless we get our act together here at home, and commit to investing in advanced manufacturing. We need to exploit and build the capacity we could have in Canada for research and development, and for world-class training and education for new entrants into our industries.

But neither of these is a done deal.

In fact, both need our attention, now, if we are truly to ride the wave of recovery in advanced manufacturing.

Let’s look at Research and Development, for a moment. There is an odd contradiction, here. Recent decades have seen an emerging and often effective partnership between universities, industry and government in encouraging research and development through educational institutions. One Ontario university says it, alone, is responsible for 250 start-ups, all born in that school’s classrooms and laboratories.

But are we, in industry, doing our share? According to a very recent study by Deloitte – no.

The study found that Canadian private-sector firms R&D investment totals one percent of our Gross Domestic Product; that’s less than half of comparable investment levels in the United States.

In Canada we spend only 65 per cent on new machinery and equipment, compared to our US counterparts; and only 53 per cent as much as Information and Communication Technology.

If what I said is true – that to succeed, all manufacturing must become advanced manufacturing
– then this is not good news. We must improve. We must invest.

Part of the problem is, we don’t know we have a problem. That same study found that more than a third of Canadian businesses believe they are leaders in their field – that they are investing more than their peers – but they aren’t. They are investing less.

We think we are leading, when we are lagging. This will not work. And the gap in innovation and productivity is widening faster than we think.

At Siemens, we recognize that constant innovation, continual adaptation, has to be a way of life. In fact, the majority of our revenue comes from products did not even exist, a few years ago.

Manufacturing is not simply changing a little bit – it is undergoing a revolution. In Europe and elsewhere in the world, this new revolution has already started: The Fourth Industrial Revolution, or Industry 4.0.

A PWC commissioned German study reflects an unprecedented level of buy-in among manufacturers. It found that 85 per cent of those surveyed will implement Industry 4.0 solutions over the next five years, investing 40 billion Euro annually.

It’s a revolution, indeed, and we must become Revolutionaries right here in Canada.

Each stage of Industrial Revolution has been sparked by innovation. The First Industrial Revolution, launched in the late 18th century, saw the introduction of mechanical production facilities.

The second, almost a century later, included development of the concept of an assembly line.

The third, again 100 years later, can be linked to the use of electronic and IT systems.

Not surprisingly, given the increasing pace of innovation, we have not waited a century for Industry 4.0 – sparked by the availability of cyber-physical systems.

Manufacturers are facing a need for change at unprecedented speed. Industry 4.0 means a focus on finding solutions for the challenges we face as advanced manufacturers:

Raising energy and resource efficiency as decisive competition factors;

Reducing time-to-market through shorter innovation cycles, ability to produce increasingly complex products and larger data volumes;

Increasing flexibility, through individualized mass production, adaptation to volatile markets and high productivity.

At Siemens, we are embracing Industry 4.0. We believe revolutionary innovation is the only way forward.

The manufacturing sector is once again leading the way to growth and stability on an international basis.

In the US, there is a “manufacturing renaissance” – as evidenced through the creation of the National Network for Manufacturing Innovation.
In Germany, an environment I know well, the country continues to maintain a leading international industrial position – but in spite of this success, this is the country that has most quickly embraced the new focus of Industry 4.0. Yet another example of the truth of the principle: "we’re successful… so we must change."

In China, we see rapid movement toward innovation and modernization, driven by the demand for quality.

And in Japan, the focus of business and of government is on growing the export market, already a huge strength in that national economy, generating about 20% of GDP.

'Industry 4.0' thrusts our organizations into a whole new era, and introduces a new level of control of the entire value chain across the life cycle of products.

This cycle is increasingly oriented toward individual customer wishes. It extends from idea, to order, to development and production, to delivery of a product to the end customer, through to recycling and related services.

The basis for Industry 4.0 is the availability of all relevant information in real time, through interconnection of all instances of value creation, and the capacity to derive from this data an optimal value creation flow at any point in time.

Through connection of people, objects and systems, dynamic, real-time-optimized, self-organizing and company-wide value creation networks develop. These can then be optimized according to varying criteria such as cost, availability and resource utilization.

That’s the definition from Germany's Platform Industry 4.0; essentially, we’re talking about moving to a completely integrated advanced manufacturing system that connects all our resources – human, mechanical, digital – to seamlessly progress from collaborative idea generation to production, delivery and evaluation.

Industry 4.0 represents the only successful path to the future for advanced manufacturing, in Canada, and around the world.

I want to share some key elements of this fourth industrial revolution with you today:

First, this has to start at the top. Industry 4.0 transforms the entire business. The immense scope of change it brings, and the level of investment required means that it belongs on the CEO’s agenda. It encompasses not only digitizing both horizontal and vertical value chains, but also revolutionizing corporate product and service offerings, with the final goal being to better satisfy customer requirements.

Second, Industry 4.0 requires investment. From now until 2020, German industry will invest 40 billion Euro annually in Industry 4.0 applications. Industrial firms surveyed say they will invest, on average, 3.3 per cent of their revenues in Industry 4.0 solutions over the next five years. This corresponds to nearly 50 per cent of all planned capital investments, more than 40 billion Euro, annually.

Third – this is really happening. Within five years, in Germany, over 80 per cent of companies will have digitalized their value chains. Already, a quarter of those surveyed have achieved a high level of value chain digitalization, although often only sections or stand-alone solutions
have been implemented. The companies expect that by 2020, 86 per cent of horizontal and 80 per cent of vertical value chains will achieve a high level of digitalization, and will thereby be closely interconnected.

Industry 4.0 really works. It leads to a higher production and resource efficiency, registering an 18 per cent increase in efficiency over five years.

We all recognize that industry must constantly produce greater product quantities with fewer raw materials and less energy. Industry 4.0 makes possible higher production, energy and resource efficiency, and thereby meets the requirements for sustainable, economical production. Across all surveyed sectors, companies expect an average annual increase in efficiency of 3.3 per cent through the digitalization of value chains. That amounts to 18 per cent over the next five years. And, they expect annual savings of 2.6 per cent.

This is all driven by a new core capability: integrated analysis and exploitation of data.

It becomes clear that digitalization of product and service portfolios is the key to sustainable corporate success.

The PWC study shows that digitalized products and services earn an additional 30 billion Euro annually for German industry. The firms which have already extensively digitalized their product offerings have demonstrated above-average growth over the last three years. Half of the surveyed companies also expect two-digit growth resulting from product and service portfolio digitalization. Every fifth company even predicts a revenue increase of over 20 per cent.

In total, this produces an average incremental revenue increase of 2.5 per cent per year. Across the sum of all industrial companies in the five core sectors in Germany, this corresponds to an annual revenue potential of over 30 billion Euro. That’s performance we certainly want to replicate – or, if possible, surpass – here in Canada.

My next point will not surprise you: this is all about change. Industry 4.0 involves the creation of new, often disruptive business models whose customized solutions will offer significant additional value to our customers.

I’m a big fan of disruption. I believe we need to continually clear the decks for something better.

We will be able to better meet the needs of our customers through an increasing range of value-added solutions. I say “solutions” instead of simply “products”, because an increased interconnection of customers and partners stands at the centre of this development. This leads to big-picture thinking, effective problem-solving – in short, solutions.

The particular quality of the digital revolution lies in the rapid acceleration of the pace of change and the fact that disruptive innovations lead to rapid, permanent transformations in sectors such as, for example, information and telecommunication.

Industry 4.0 is a win-win – for us, and for our customers. Horizontal cooperation makes improved satisfaction of customer requirements possible. Around half of all the companies in the PWC study are convinced that deepened cooperation with value-creation partners, combined with reinforced horizontal interconnection, are of great importance.

With an increasing digitalization rate, the importance of partnerships as part of Industry 4.0 will again increase significantly, especially where construction of new digital business models is
concerned. Over 80 per cent of surveyed companies expect that within five years, deepened cooperation and more intensive horizontal interconnection will have an important significance.

Finally, this involves everyone in this room, today. Industry 4.0 presents numerous challenges, and government, educational institutions and industrial organizations all can help.

Companies must overcome numerous challenges on their way to becoming Industry 4.0-Champions.

 Adopting this essential solution requires great investments. There are also risks – Industry 4.0 applications are new, and therefore, sustainability of a particular adaptation is sometimes unpredictable.

We have to ensure employees are trained to meet the requirements of the digital world. Binding standards must be defined, and functions in the realm of IT security must be resolved.

Government and industrial organizations can especially help with the last of these challenges, insofar as they can intervene for the implementation of unified industrial standards for Canada and on an international level, to promote efficient regulations for data security and data protection.

I am convinced that Industry 4.0 is the future of advanced manufacturing, and this is why I have gone to such lengths to introduce the concept to you.

At the core, it is simple:

The core capability is data and analysis, which drives digitization and integration of our value chains.

That inevitably produces innovation and transformation, from product development to customer service.

The new networks, partnerships and cooperation inspired by this holistic approach produce an entirely new business model – our model for the future.

I believe that the Canadian advanced manufacturing sector does have the capacity to innovate and adapt – but right now, “capacity” doesn't necessarily mean “reality”. I’m here today to urge every one of you to take a hard look at the reality of your business – are you staging for the future, or are you hoping that doing what you have always done will bring success?

I urge you to become Revolutionaries: get involved in the Fourth Industrial Revolution.

A key to developing home-grown core capabilities is creating world-class training and education for the young people who will be the future of our industry.

Face it – we are failing in this area. The manufacturing sector has turned away from investing in training and education. We have cut our investment almost in half. Five years ago, we were spending $1,000 per employee; today, just $600.

You probably don't need to think about this for a long time to come to the conclusion that this is a very bad idea.
Our employees are not well-trained, because we have cut back on investment in training; college and university grads are not well-trained, because they emerge with no real knowledge of the advanced manufacturing world.

This is a fundamental problem. One definition of “advanced manufacturing” states that the industry “is supported by the access to a highly skilled, educated workforce of technicians, trades workers and engineers.”

Without skilled workers, we don’t have advanced manufacturing. Without advanced manufacturing, we soon won’t have manufacturing at all.

But there is a solution. And I’m proud that Siemens Canada is taking leadership in this area.

We have developed a training and education solution that establishes a model that can be effective right across the advanced manufacturing sector.

Siemens Canada has launched SCETA – Siemens Canada Engineering and Technology Academy.

SCETA creates partnerships between educational institutions, government, and industry. It builds on the positives of apprenticeship programs, and incorporates best practices from countries around the world.

It prepares new employees who are expert in their field, and also familiar with the workplace environment of their employer.

This model offers a solution to some of the key problems we face as Canadian manufacturers.

That’s why we are inviting industries like those represented here today to join us, to launch similar programs across the country. We now have five schools as partners, including McMaster – we’d love to see more get involved, offering more disciplines and training schemes.

We are calling our colleagues and our competitors – across the entire Canadian community of advanced manufacturing – to step up and invest in the healthy future of our industry. Get involved, again, in training and education. Invest in Industry 4.0. Embrace disruptive opportunities. Do what you must do, to become what you must be.

The opportunity is ours to take. Ours, not only as individual companies, or educational institutions, or government departments or ministries. It’s ours, as the entire community invested in the success of the Canadian manufacturing sector.

Many of us are poised at the starting line. Well, the starter’s gun has sounded. It’s now time to move, to join the challenge and shape the future of manufacturing in Canada.

Thank you.