

## IMS CREATES WORLD MANUFACTURING FORUM FOUNDATION WITH PARTNERS POLITECNICO DI MILANO AND CONFINDUSTRIA



The World Manufacturing Forum Foundation was officially established on May 21, 2018 at the Aula Magna of the Politecnico di Milano, by founding members Confindustria Lombardia, Politecnico di Milano and Intelligent Manufacturing Systems (IMS) International, with financial support from the European Commission and the Lombardy Region. The Foundation will promote the creation and dissemination of an annual Global Report on Manufacturing through a Scientific Committee. The Foundation is also responsible for organizing the WMF Annual Meeting, an event which will be held permanently in Italy and will commence on the 27th and 28th of September, 2018 in Cernobbio and will organize international regional events.

The press conference, which provided a presentation of the Foundation mission, was attended by Ferruccio Resta, Rector of the Politecnico di Milano, the President of Confindustria Lombardia Marco Bonometti, Dan Nagy, Managing Director of IMS International, Professor Marco Taisch of the Politecnico di Milano,

and Alberto Ribolla, President of the World Manufacturing Forum Foundation and Vice President of the Lombardy Region Fabrizio Sala. During the event, the deed of incorporation for the World Manufacturing Forum Foundation was signed and Alberto Ribolla was nominated to serve as President of the World Manufacturing Forum Foundation.

### WMF VIDEO CONTEST



The 2018 World Manufacturing Forum is holding its first annual Video Contest. Participants are asked to create a short video clip to describe Manufacturing and the Digital Revolution. Freelance video makers, universities, schools (over 16 students), and operators of the creative industry from all around the world are encouraged to apply. Submitted videos must have a maximum length of three minutes and be in English (audio or subtitles are accepted). The three contest finalists will be invited to participate in the final selection. The final selection will take place during the World Manufacturing Forum 2018 (27-28 September, Villa Erba, Cernobbio – Italy), where the three videos will be projected in loop during the 2 day event. The videos will be voted upon by the World Manufacturing Forum audience. The winner will receive a prize of 5,000 €. Submissions are open from now until the end of July, 2018. For more information please visit:

[www.worldmanufacturingforum.org/video-contest](http://www.worldmanufacturingforum.org/video-contest)

“As a world class center for innovation, Lombardy is a perfect place to launch this new Foundation and international headquarters to advance manufacturing for all nations.” noted Dan Nagy, Managing Director of IMS International. “Since our first event held in 2011, it was our dream to expand the mission, reach and resources of the WMF.

Together with the additional resources of our new partners at Confindustria and Politecnico di Milano, we will make this dream a reality. Further, we intend to reach out for additional regional partners to create local events in order to highlight and seek solutions to local manufacturing challenges. Through the addition of the Steering Committee and General Assembly, we now invite global innovation leaders to join us in shaping the industrial landscape.”

For the President of Confindustria Lombardia, Marco Bonometti, “The World Manufacturing Forum will qualify Lombardy as the world heart of new generation manufacturing and will represent a model for the diffusion of industrial priorities of our system such as networking different productive specializations of the territories and the policies of industrial promotion through clusters, supply chains, etc.” For these reasons, adds Bonometti, “...the Confindustria Lombardia system has believed in the WMF since the beginning by promoting the Foundation and making human and financial resources available to the project. Our goal is to bring Lombardy to the forefront of the most dynamic and innovative regions of Europe and to bring industry not only Lombardy but to Italian and European centers for future manufacturing.”

The Vice President and Councilor for Research, Innovation, University, Export and Internationalization of the Lombardy Region, Fabrizio Sala, underscores that, “The internationalization of the Lombardy industrial and manufacturing sectors is no longer a choice but a necessity. The WMF offers, thanks to the links that it creates, the opportunity to look with simplicity beyond borders and develop the Lombard potential through enhancing our small to medium enterprises and efficient realities. It is necessary to support and promote small businesses and crafts, which need special measures for innovation, territorial and supply chain aggregation, and digitization. We will use technology to promote the creations of Lombards worldwide and, in today's world of work, stimulate employers to develop new ideas and technological applications and workers to act with flexibility and digital spirit.”

The Rector of the Politecnico di Milano, Ferruccio Resta, stated, “The birth of the World Manufacturing Forum Foundation is one of the initiatives that marks the pace of our University in the context of strong renewal. The challenges opened by Industry 4.0 and the digital potentials of advanced manufacturing are among our priorities.” Resta also commented, “Challenges that we will face by putting our skills and human capital into the system and inserting the Foundation into a broad and shared project will see the university increasingly as the center of change. With initiatives ranging from the Competence Center to redefine the Bovisio campus as a district of innovation, shared projects that call together research, businesses, public and private investments, will project Milan and Lombardy as protagonists in the international scene.”

The World Manufacturing Forum Foundation is an open platform that aims to stimulate and spread industrial culture in the world, as a means of ensuring economic equity and sustainable development. The WMF aims to stimulate awareness and to outline cooperative solutions in relation to global manufacturing challenges through dialogue and the sharing of best practices among the leading exponents of governments, industries and innovation.

**The World Manufacturing Forum annual meeting will be held in Cernobbio (Como), at Villa Erba, on September 27th and 28th 2018.**

## **IMS ON GERMAN INDUSTRY TOUR**

IMS was invited as a guest to tour German manufacturing companies and meet with industry, local economic development agencies and research institutions by the TransAtlantic Cluster Initiative. The tour was supported by the German Federal Ministry for Economic Affairs and Energy to promote dialogue and understanding of how industry 4.0 technologies are being integrated into small to large companies, and to expand their network through face-to-face meetings. The tour group included experts from industry and industry-related institutions who exchanged best practices, shared common challenges. The week-long tour visited companies in Hessen (Darmstadt), Baden-Württemberg (Stuttgart), and Niedersachsen (Hannover). Dan Nagy noted that personal highlights of the tour included state-of-the-art manufacturers (Festo, Zeiss), SME's in the process of integrating new technologies (Nass Magnet), augmented reality labs and holodeck (Fraunhofer, Daimler), a super-computing

facility (HLRS), and state-of-the art training labs (Technische Universität Darmstadt, Arena2036, Deutsche Messe). Outcomes from the meeting included expansion of the IMS network and possible support for future collaboration. The full schedule for the week-long event can be found on [www.ims.org](http://www.ims.org)

## WORLD MANUFACTURING FORUM REGIONAL EVENT: SOUTH AFRICA 2018

IMS is pleased to announce the first World Manufacturing Forum Regional event in Johannesburg, South Africa.

The event will take place on Monday June 18, 2018 at the Sandton Convention Centre. The topic of discussion will focus on how the industrial transformation inspires education, sustainable development, and societal impact. The event will introduce the new World Manufacturing Forum Foundation and the program will include two sessions: Policies Advancing Manufacturing Development and Global Cooperation and Solving the Manufacturing Skill Challenges. Please visit [www.ims.org](http://www.ims.org) for more information.

## UPCOMING EVENTS

### **PICASSO Transatlantic Symposium on ICT and Policy**

PICASSO is organizing its second and final Symposium on ICT and Policy "Leveraging People, Technology, and Information for a Smart and Connected Society". The event will take place on **June 18-19, 2018** in Washington DC (USA), at the Woodrow Wilson International Center for Scholars. Learn more [here](#).

### **WMF Regional Event - South Africa**

IMS will host a regional World Manufacturing Forum Event in Johannesburg, South Africa on **June 18<sup>th</sup>, 2018**. Registration will be available soon on [ims.org](http://ims.org).

### **Manufacturing Indaba**

The 5th annual Manufacturing Indaba will be hosted at Sandton Convention Centre, South Africa from the **19 - 20 June, 2018**. For more info on this event, or to register for the Indaba, visit [here](#).

### **German-American Business Forum**

The 5<sup>th</sup> German-American Business Forum will take place on **June 21, 2018** in Stuttgart, Germany. The event targets German companies that are seeking to establish and expand business relationships in the US, and focuses on consulting, discussions, as well as workshops addressing practical questions about doing business in the US. More information is available [here](#).

### **World Manufacturing Forum 2018**

The 2018 WMF will take place from **September 27-28, 2018** in Villa Erba, Cernobbio, Italy. Register now on our [website](#).

### Two Views of the Industrial Edge

(ARC Advisory Group – Michael Guilfoyle: 6-6-18)  
Despite all the market focus on the industrial edge, many companies struggle to identify precisely where (or even what) it is. This makes it difficult to deploy an effective operational analytics strategy. When considering an industrial edge environment, it is helpful to think about it from both operating and network infrastructure perspectives.

The operational edge is the most straightforward of the two edge environments. It's the logical operating endpoint of a business and, as such, it is relatively easy to understand, though it can "shift," based on who within the organization is defining the edge (enterprise, customer, operations, etc.).

The logic transfers to industrial and infrastructure environments. A mining company considers a site, and equipment within it, to be the operational edge of its business. For oil and gas, it could be a platform or well and the related equipment, such as flare stacks, pipelines, and pumps.

### Smart manufacturing technology is changing business processes

(Business Applications Digest – Jim O'Donnell: 5-29-18) Imagine a scenario where a plane in midflight from Paris to Boston gets a signal from an embedded sensor in an engine fuel nozzle that indicates excessive wear. Once the plane lands, it will need to be taken out of service for hours or even days as the airline locates and installs a replacement part.

The entire process is time-consuming, expensive and inconvenient for passengers and crews. But thanks to [smart manufacturing](#) technology and AI-enabled business processes and systems, there is a better way, according to technology futurist and consultant Jack Shaw. The digital transformation to an [AI-enabled business ecosystem](#) is happening now, Shaw said in a presentation at the Smart Manufacturing Experience conference this month in Boston. ... Rather than the current costly and time-consuming process, the smart manufacturing technology ecosystem encompasses a self-contained and autonomous parts replacement process. To start the process, industrial IoT ([IIoT](#)) smart sensor circuitry in the engine's nozzle triggers the aircraft's autonomous maintenance system, which then messages the airline's global maintenance system that

the part will be needed when the plane lands in Boston Shaw said.

### Creating a Culture to Capitalize Innovation

(Innovation Excellence – Jay Morgan: 5-26-18) The story takes place in Memphis, TN. It begins in 2011. It began with struggle and a question: What are the barriers to innovation in your business that are keeping you from producing the desired results? In 2011, things were "pretty good, but not seeing great growth." We got a new CEO who had a very big vision. She wanted to double the size of the business in five years. Because we were not going to get double the people or double the budget, we had to think in new ways. Value engineering and being more efficient wouldn't double growth. First, we studied the situation. In Pharma style, we visited other more innovative companies and made a journey of discovery. The patterns of behavior and culture at these companies ran counter to our pattern. We lacked both ideas and execution—it was a cultural problem. We weren't getting the results we wanted. We broke the study into two camps: *Incremental Cultures* and *Innovation Cultures*. After a look into the mirror, we confessed we were an incremental culture and needed to change.

### Don't Fight Regulation. Reprogram It

(Strategy+Business -- [Alison Kutler](#) and [Antonio Sweet](#): 5-23-18) It's significant when an entrepreneurial leader argues for more engagement with government — especially when it's Microsoft cofounder Bill Gates, one of the most influential people in the history of the computer and software industry. In a [February 2018 interview](#), the technologist-turned-philanthropist asserted that tech companies may be too adversarial to their regulators. Gates warned firms to avoid "advocating things that would prevent government from being able to, under appropriate review, perform the type of functions that we've come to count on." The inventor of the world's most popular PC operating system is onto something. Gates sees his contemporaries paying the price for their entrenched opposition to public-sector scrutiny. But while Gates has identified the problem, the solution requires stepping back and looking more objectively at the relationship between business and regulation. Companies should think of government regulation as an operating system — a structure that determines how well they function. Rather than seeing regulation as a constraint on innovation and entrepreneurship, they should think of their government-relations strategy as



writing better code.

### **Global Economic Rebound Yet to Show as Manufacturing Weakens**

(Bloomberg – Jana Randow and Piotr Skolimowski: 5-23-18) The global economic rebound expected to happen this quarter is staying out of reach for now outside of the U.S. After policymakers around the world were quick to shrug off weakness at the start of the year as a temporary phenomenon, their economies are keeping them in suspense, with purchasing managers' indexes from Japan to the euro area hinting on May 23 at a more protracted slowdown. Add risks including trade tensions due to U.S. tariffs, controversy over Iran policies and Italy's struggles to form a government to the recipe of reasons for caution. The upside is the U.S. showed signs of robustness. Its manufacturing index rose to 56.6 in May from 56.5, Markit Economics reported. A gauge of services rose to 55.7 from 54.6. All these elements will play into the thinking among monetary-policy officials as they look to unwind crisis measures. At the European Central Bank, news of less optimistic businesses and weaker growth in new orders, hiring and backlogs of work may delay a decision to scale back unprecedented support until officials can better assess economic health. In Japan, dwindling manufacturing momentum underpins the central bank's commitment to add stimulus.

### **The Drive to Survive: What Matters in Automotive's Age of Disruption**

(IW – Uli Muench: 5-23-18) Everywhere automotive manufacturers turn, there are signs suggesting the business models on which they have long relied are going the way of the 1970s-era classic Ford Pinto. Consider the following: Ride-hailing company [Lyft is partnering with Magna](#), North America's largest Tier 1 auto parts supplier, to build self-driving vehicles. ... Many virtually unknown Chinese manufacturers are leading the global electric vehicle movement, unencumbered by legacy commitments to internal-combustion vehicles. ... High-end vacuum cleaner manufacturer Dyson reportedly [plans to roll out not one but three electric vehicle models](#) starting in 2020 or 2021. 16.5% of car-owning [Millennials are rethinking car ownership](#) because services such as Lyft are available, according to a survey by [lendedu.com](#). 42.5% would give up manually driving themselves in favor of a self-driving vehicle. Half would prefer to buy a "green" car over a traditional vehicle. Signs like these are pointing some OEMs and automotive suppliers

toward new business models that bundle traditional products with digital products and services, and involve business alliances that would have been difficult to envision just a decade ago.

### **Ways to Cut Costs with 3D Printing**

(Machine Design -- Eric Utley: 5-20-18) 3D printing (aka additive manufacturing) has gone far beyond making prototypes quickly. It is now entrenched in manufacturing, and examples abound: The Juno spacecraft, built by Lockheed Martin and NASA and currently completing its mission in orbit around Jupiter carries a dozen 3D-printed waveguide support brackets ... Activated Research Co. used 3D Printing to develop a new design for its Polyarc gas chromatography catalytic microreactor, bringing it to market in just 15 months ... Raytheon uses 3D printing for rocket engines, fins, and control components for guided missiles, creating parts in hours rather than days ... Boeing set a world record in 2016 by building the largest 3D-printed item ever made, a fixture used in building 777 airplanes, reportedly cutting weeks off its manufacturing time ... Brunswick Corp. relied on 3D printing for air conditioning grills on its Sea Ray yacht eliminating the need for disposable tooling and speeding product development ... GE uses several innovative 3D printed parts in its LEAP jet engine. In these cases, results included greater functionality, lower weight, and reduced manufacturing costs, and oftentimes all three.

### **Smart Machine Innovations You Should Care About**

(Automation World -- Mitsubishi Electric White Paper 5-20-18) The last 10 years have brought about dramatic advances in technologies that OEMs had never realized would affect their designs or the sellability of their machines, much less impact business models and profits so dramatically. Standardization of network adoption across manufacturing operations, and convergence with office and operations systems have proliferated the need to enhance information flows from individual machine and lineups while improving the performance, intelligence, and communications of individual components. The following discussion will cover key advancements and recommendations all OEMs should be adopting in their design processes to stay current and competitive. Several trends have impacted production operations over the last decade, creating the need to enhance automation systems to accommodate a changing global landscape. The aging of manufacturing workers and the lack of qualified replacement workers coupled with globalization and automation adoption ha

pushed the envelope of human resources to fill ever more technically demanding roles to augment ever more technically complex machinery.

### [A Roadmap for Pushing Manufacturing Forward](#)

(IW – Tracey Massey: 5-16-18) A sector once thought to be on its last legs continues to surprise. The latest report from the Bureau of Labor Statistics notes that 24,000 manufacturing jobs were added in April. This suggests that despite the sea change happening for businesses today—driven by fluctuating commodities, tariff wars and trade standoffs—manufacturing remains a reliable economic engine. From my point of view, developed over decades spent on factory floors around the world, we'll continue to see growth in the sector. For guidance on how to stay competitive and weather market fluctuations, I invite business leaders to observe the dynamic and consistent growth of manufacturing industry.

First, let's talk about the elephant in the room. Yes, over the last 15 years, the number of jobs in manufacturing industry has declined in the United States, but it remains the largest economic sector. In fact, every \$1 spent in manufacturing [adds \\$1.81 to the U.S. economy](#): the highest multiplier effect of any sector. And globally, the manufacturing of goods is strong. Between 2000 and 2014, the World Trade Organization reports that global trade in manufactured goods has nearly tripled, from \$4.8 trillion to \$12.2 trillion.

### [Does Industry 4.0 Mean the End of Lean?](#)

(TXM -- Tim McLean: 5-15-18) In the last couple of years, I have been asked a surprising question. "Does Industry 4.0 mean the end of Lean?" In manufacturing, we all love the "next big thing" and this question naturally implies that Lean is "the last big thing" and Industry 4.0 the next. So should you be parking your Lean initiatives and bringing in an Industry 4.0 expert to assess your readiness for the next wave of manufacturing? ... Industry 4.0 is a term developed by German government to describe its high technology strategy for manufacturing. Essentially the German program promotes the idea of a "fourth industrial revolution". This is based on technologies such as advanced robotics, the "internet of things", big data analytics, 3D printing and advanced sensors. This idea has now been adopted by governments and experts around the world. It is being vigorously promoted by a growing army of consultants and experts. ... Arguably, both Lean and Industry 4.0 are manufacturing philosophies or frameworks to design a manufacturing

operation around. However, they are very different.

### [Why Robots Won't Inherit the Plant](#)

(IW – Prasad Akella: 5-15-18) In 1993, I saw the future. It was in Japan. At the foot of Mt. Fuji, to be exact. I was on a two-year assignment as a National Science Foundation fellow in Tsukuba, Japan, and I'd arranged a tour of Fanuc's "lights-out" plant: the one where robots make more robots. I left that tour convinced I'd glimpsed the future of manufacturing: that humanity was on the path to transcend plant labor. I thanked my lucky stars I'd chosen to go into robotics. A year later, parlayed my passion into a role leading the industry/university team at General Motors that developed the world's first cobots: robots that work closely with humans, combining the best of both, now predicted by Barclays investment bank [to be a \\$12 billion market by 2025](#). 25 years later, Fanuc's lights-out plant is still going strong. But in just about every other plant, humans remain dominant. According to research from the Boston Consulting Group, [robots perform about 10% of tasks in a typical factory](#). They expect that number to rise to 25% by 2025—a fast growth pace, but hardly enough to lead to human obsolescence in manufacturing. Human beings are the primary creator of value inside the factory, and will remain that way for many years.

### [Intel's Secret Weapon for Automation Success: Standardization](#)

(IW – Karen Field: 5-10-18) Steve Meyer might just be the biggest cheerleader of standards on the planet. But when your company builds huge wafer fabs that cause whole countries to run out of concrete during construction and fill them with \$100M machine tools, you obviously need to find a way to get incredible utilization out of that equipment. Standards were the path that Intel took to achieve that goal. "If we hadn't doubled down on standards, we'd probably have gone bankrupt," explained Meyer, speaking to a roomful of manufacturing executives at the M&T Conference this week in Raleigh. A Senior Principal Engineer in Manufacturing IT at Intel, Meyer has spent the last 22 years helping Intel evolve its operations from what were essentially manual processes to its current state that is approaching 100% automation. His enthusiasm for standards stems from the tangible benefits Intel has reaped from a strict adherence to over 900 standards developed by the semiconductor industry with the distinct goal of increasing industry efficiency and improving customer satisfaction.

## Intelligent Wearables Guide Industrial Field Workers

(Automation World -- Aaron Hand: 5-4-18) In a continuing push to make all plant staff the best plant staff, Honeywell has released hands-free wearable technology that provides industrial workers easy access to live data, documents, work procedures and video, as well as connections to remote experts while they are out in the plant or field. As part of Honeywell's [Connected Plant](#) suite, *Skills Insight Intelligent Wearables* respond to voice commands, making it easy for workers to get whatever knowledge they might need to get their tasks completed. "This new Honeywell Connected Plant technology offers industrial workers the information they need when they need it, wherever they are," said Youssef Mestari, program director for Honeywell Connected Plant. "That means workers carry with them decades of relevant expertise that is accessible at any time by simple voice activation." Honeywell was demonstrating the new technology at the Offshore Technology Conference (OTC) this week in Houston. It uses guided work instructions, for example, to walk field operators through their tasks.

## Supply Chain Technology: It's Not Just for Big Businesses Anymore, but is it Enough?

(Supply Chain Management Review – Jon Slingerup: 4-30-18) Reaping the benefits of a technology-based supply chain used to be a luxury reserved only for the biggest enterprises. But buoyed by IT advancements and increasingly complex market conditions, businesses large and small are now getting in on the game. As digital transformation forces nearly every industry to re-examine its business practices, shippers of all sizes recognize the importance of an agile, digitized supply chain. Supply chains are complex by nature, and the rise of e-commerce is creating even more complexity that requires precise planning and automated processes. Raw materials and products now take myriad paths from sourcing to fulfillment, and customers have little patience for delays, regardless of the challenges vendors face in getting product to them. As a result, supply chain optimization is no longer a nice-to-have – it's table stakes for survival. Spending on supply chain management software hit an estimated \$13 billion in 2017, up 11% year-over-year, according to Gartner. Total software revenues in the supply chain management market will rise by an additional \$6 billion by 2021, the firm estimates, as business look to keep up in the digital age.

## The Opportunity Cost of Not Innovating

(Innovation Excellence – Shelly Greenway: 4-28-18) Business history is unfortunately plagued with examples of companies that have paid a high price for not innovating. Such as AT&T missing the mobile phone; Kodak missing the digital camera; Yell was disrupted by Google; Borders by Amazon; Blockbuster Video (and now even our traditional TV channels) by Netflix ... the list goes on. Once household names have vanished or had their rock solid leadership eroded. Why? Because they stayed still, acknowledging the changing world around them, but refusing to act ... or act quickly enough. ... Businesses too often overlook or deliberately choose to walk away from an opportunity because they're bound up in their current processes and not really geared to doing something different, for whatever reason. Yell got digital wrong because the inherent wisdom of the management at the time is that they 'had' to protect their print business first and foremost. Rumor has it that the employees on the digital side of the business had the vision and knew what needed to be done. They also had the skills and competencies to make it happen. But the acceptance and pace of change was unacceptably slow, so new enterprises took their business away – almost within the blink of an eye.

## Pressure to innovate pushes change agents toward mixed reality pilots

(Tech Target -- [Jaimy Szymanski](#): 4-25-18) From immersive virtual reality training to interactive augmented reality product experiences, mixed reality experiments are making their way from pockets of innovation within corporations to full-fledged programs — that is, if they don't fall prey to "innovation cannibalism" first. The Internet of Things (IoT) world may be exciting, but there are serious technical challenges that need to be addressed, especially by developers. In this handbook, learn how to meet the security, analytics, and testing requirements for IoT applications. Companies are under increasing pressure to constantly innovate, often guided by a digital transformation or corporate innovation charter that is mandated by the C-suite, supported by middle management guidance and executed by grassroots "intra-preneurs." This mounting pressure can serve as both a blessing and a curse for survival. Change agents strive to not only brainstorm the next big idea that will push the company into a new era of technology revolution, but also simultaneously hide their efforts



from colleagues and other departments in order to get the glory of being the smartest person in the room.

### **Economic Impact of the Manufacturing Extension Partnership (MEP) Program in 2017**

(NIST Press Release: 4-23-18) A recent study by the W.E. Upjohn Institute found the National Institute of Standards and Technology's (NIST) Hollings Manufacturing Extension Partnership (MEP) Program generates a substantial economic and financial return of nearly 14.5 to 1 for the \$128 million annually invested by the federal government. Using the national REMI® model, along with the results from the FY2017 NIST MEP client impact survey conducted by Fors Marsh, the W.E. Upjohn Institute for Employment Research study finds that economic returns are substantially higher than previously reported by the MEP Program due to broader economic effects. The study uses a conservative approach in estimating the broader economic impacts of the program by examining the competitive interactions between firms. NIST MEP contracted with Upjohn to create the study estimating the broader national impacts of the NIST MEP program. The study and subsequent report, [The National-Level Economic Impact of the Manufacturing Extension Partnership \(MEP\): Estimates for Fiscal Year 2017](#), is posted at the Upjohn Institute website.

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### **MANUFACTURING FACT OF THE MONTH**

#### **Manufacturing contributes significantly to research and development efforts.**

Manufacturing contributes a significant amount of private sector R&D investment leading to new technologies and bettered practices. In the United States, Manufacturing contributed 3.9% of all sales back into R&D efforts while non-manufacturing industries only contributed 2.3%.

(Source: Manufacturing Institute and the National Science Foundation)

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For More Information on IMS and its services please contact IMS Inter-Regional Secretariat Managing Director, Dan Nagy ([dnagy@ims.org](mailto:dnagy@ims.org)) or IMS ISC Chairman, Jack Harris ([jack.harris@ims.org](mailto:jack.harris@ims.org)).