**A White Paper on Integrating and Scaling of Artificial Intelligence in Manufacturing Industries in Wisconsin**

**Authors**

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**Introduction**

Manufacturing companies, large and small, have been and continue to be interested in using knowledge and ***tools*** to improve product quality, identify underperforming processes, increase reliability, reduce unplanned equipment downtime, and operating costs (including materials and energy consumption)1.

One such ***tool*** that has gained significant attention in enabling manufacturing companies to transform their operations is Artificial Intelligence (AI). According to Accenture’s2 report, [AI: Built to Scale](https://www.accenture.com/us-en/insights/artificial-intelligence/ai-investments), “84% of business executives believe they need to use AI to achieve their growth objective.” With tech companies including Google, Apple and Amazon spending billions on AI products and services, “AI is projected to have a lasting impact on just about every industry imaginable3.”

***Small and medium-sized businesses*** have also reported4 specific benefits of using AI; for example, “**improving sales and marketing with an AI-infused customer relations management (CRM), automating customer communications (with a Chatbot), streamlining human resource tasks, and acquiring competitive intelligence.”**

**Problem Statemen**t

Despite the recent explosion in data creation and computing advancements accelerating the use of AI5, many companies continue to struggle with integration and/or scaling of AI across their business. Key barriers to AI adoption and/or scaling include the following:

1. Failure to view AI as a potential source of business innovation and competitive advantage5
2. Excessive focus on ROI from AI initiatives6
3. Lack of trained professionals to work with AI systems6
4. Little to no training provided to current employees
5. Failure to identify the right AI use cases
6. Lack of collaboration with universities to help navigate the AI ecosystem effectively
7. Failure to understand and mitigate/eliminate perceived risks of AI

**Purpose**

The purpose of this white paper is to request funding from the National Science Foundation (NSF) for hosting a ½-day workshop (at the University of Wisconsin-Milwaukee) with “invited” manufacturing companies (from and around Wisconsin) to discuss their interest in adoption and/or scaling of AI. More specifically, the workshop topics will include:

1. Introduction of attendees **(15 min)**
2. Introduction to AI (with examples) **(30 min)**
3. Use case solution topics **(15 min)**
   * Intelligent supply chain
   * Robot process automation - automate business process management
   * Predictive Maintenance - Predict outcomes
   * Vision and audio-based quality detection
   * Automate machine action using reinforcement learning
   * Digital Twin
   * Remote monitoring
   * Knowledge mining - engineering and operations/manufacturing
   * Workplace safety
4. Organizations’ specific unmet/underserved needs and desirable gains; for example, identifying areas where AI can **(90 min)**
   * Improve productivity and efficiency
   * Minimize or eliminate waste
   * Decrease energy consumption
   * Safety can be increased
   * Increase remote collaboration
5. Strategy to implement AI (if it does not exist at the present time) and/or strategy to scale AI **(30 min)**
6. Training of the existing and next generation workforce **(30 min)**
7. Summarizing the workshop (key lessons learned) and Q & A **(30 min)**

**Companies/individuals to be invited**

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| **NAME** | **COMPANY** | **TITLE** |
| Bala Balakreshnan | Microsoft | Director/ Principal Cloud Solutions Architect |
| Paul Gogan | WEC Energy Group | Director, Electric Distribution Asset Management |
| Derrick Hesser | ANSYS | Senior Enterprise Account Manager |
| Adam Krug | Eaton | Director, Engineering |
| Kyle Crum | Rockwell Automation | Advanced Technology Manager |
| Stephen Memory | A.O. Smith | Director, Corporate Technology |
| Shane Guyette | Dell | Solution Engineer |
| Carlos Sanchez | Fortinet | Technical Lead |
| Peter Hellander | Heartland Business Systems | CEO |
| Don Busiek | PTC | VP of Strategic Alliances |
| Craig McDuffee | Revere Electric | Services Director |
| Peggy Gulick | Kohler Corporation | Director, Smart Factory |
| Jake Beihoof | MolsonCoors | Data Science Manager |
| Geoff Cooper | Mortgage Guarantee Insurance Corporation | VP, Product Development |
| Don Vu | Northwestern Mutual | Chief Data Officer |
| Guy Gutsche | Komatsu Mining | Senior Advanced Global Manufacturing Engineer |

**Anticipated workshop outcomes**

* Distinguishing companies that are just in their start of the AI journey from those struggling to scale AI across their business
* Clear articulation by companies in attendance of the areas where AI is **most** urgently needed
* Overall strategies for implementing or scaling AI (note that further discussions on strategies will need to occur with interested companies following the workshop)
* Continuous improvement projects to further integrate AI in manufacturing operations – this would involve identifying potential research projects in partnership with UW-Milwaukee faculty and their graduate students – either as “contractual research” or as NSF proposals (ex: via NSF GOALI)
* Opportunities for student internships (ex: via NSF INTERN)
* Curriculum development and opportunities for training (existing and next generation workforce)

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| **References** |  |  |
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