

Gamechangers: Ideas Worth Scaling

Submitted by Summit attendees and MForesight Leadership Council members

Peter Friedman, Ford

Installation of a recharging network within the United States to enable rapid adoption of electric vehicles.

One of the major barriers to widespread acceptance of electric vehicles is the lack of a credible infrastructure to support refueling/recharging. A public-private partnership to deliver a network of charging stations would be a clear signal to OEMs that the technology will be supported with the requisite infrastructure. Additionally, this investment will give consumers the confidence that if they purchase these vehicles a credible solution will be available for recharging. The longer term implications of this investment would be both the increase in manufacturing and construction jobs to install such a network as well as major push in research in the area of energy storage.

Glenn Baker, Deere and Company

Additive manufacturing has significant potential for improving functionality, cost, quality and speed to market for many small and medium volume manufacturers. There are two significant pain points that need to be addressed that could change the game for many manufacturers. The first is there needs to be a dramatic improvement in the processing speed for additive parts and second, there needs to be broader dissemination of “as built” material properties.

Glenn Daehn, The Ohio State University

Metamorphic Manufacturing (AKA Robotic Blacksmithing)

We've had two manufacturing revolutions: CNC material removal and CNC material addition. Any blacksmith (or metallurgist) will tell you that if you don't deform the material, you don't get optimal properties. Also, if you can shape material you can have far less waste than additive or subtractive manufacturing. With the advent of robotics, sensors, almost-free computation and precise machine tools the time has come for robots that can mimic blacksmiths, and make complex parts, but with very predictable and reproducible properties.

Metamorphic Manufacturing reduces lead time and cost for low-volume parts, and because sensors can be integrated the 'digital-thread' can be used for validation and quality control. This can be a true game changer for low and variable volume high-quality parts, as are required by the US warfighter.

This technology is almost inevitable. It is the next obvious digital manufacturing technology. It can see significant growth in the next decade. There is an opportunity for this to be a US-led industry.

Gamechangers: Ideas Worth Scaling

Submitted by Summit attendees and MForesight Leadership Council members

David Woessner & Nikki Jones, Local Motors

How co-creation and micro-manufacturing will disrupt the biggest System in the World!

Local Motors uses co-creation and micromanufacturing to bring products to market more quickly and at a lower cost than ever possible before. It's a game-changing combination that has created some of the most innovative vehicles ever made. The latest is Olli, a self-driving electric vehicle designed to streamline shared transportation systems around the world.

Co-creation and micromanufacturing changes the landscape of US manufacturing competitiveness by allowing the community to co-create our products. We utilize an open platform that allows community members to share design and engineering concepts focused on vehicle innovation. While we hire intelligent people, we believe some of the most brilliant minds are outside of our doors.

In creating our products, we use 3D printing to produce vehicles at record speed. It takes traditional vehicle manufacturers approximately seven years to design, build, and release vehicles to consumers. Our technology allows us to decrease production time and increase speed to market by delivering products within months.

Our co-creation and micromanufacturing concept has already come to life, changing the way the world looks at vehicle manufacturing. 3D printing isn't a new concept, but we're changing the way 3D-printed vehicles are viewed and look forward to continuing to collaborate with our community to lead the way in producing innovative products.

Ken Jarboe, National Academy of Engineering

Game changer: Shift from making things to making value

Business activity is already shifting from an emphasis on making things to creating value by identifying and addressing customers' needs. Manufacturing can no longer be considered separate from the value chain of R&D, product design, software development and integration, and lifecycle service activities. While companies have always been involved in a range of activities that cross economic sectors, it is increasingly difficult to recognize clear dividing lines between manufacturing, the production of software, and the provision of services in a company's product offerings.

Some have called this the "servitization" of manufacturing where companies develop service-type business models. For example, Rolls-Royce offers "power by the hour" where customers rent the use of a jet engine with a service contract.

But the shift goes beyond servitization. The key is how the elements, including making things, are combined into an integrated whole to make value. Apple captures value by combining product development, management of production, software and on-line services. Security companies offer "piece of mind" through a combination of hardware and monitoring services.

This shift upends the ingrained notion that "goods" and "services" are distinct and separate. This has major implications for business strategy and economic policy.

Gamechangers: Ideas Worth Scaling

Submitted by Summit attendees and MForesight Leadership Council members

Scott E. Miller, The Innovation Machine

“The Greatest Demo on Earth”

A Product Development System Showcase

Problem: Technology Transition

There is no place or platform to experience an entire Product Development System (Digital and Physical). Therefore, it is exceptionally difficult to put technologies in context and understand an entire Product Development System. This lack of understanding impedes technology transition, especially for Small to Medium Size Enterprises.

Solution: “The Greatest Demo on Earth”

A physical place and digital platform that enables all Americans to experience an entire Product Development System. This learning experience will provide a unique opportunity for researchers and vendors to showcase their products and services. A national advertising campaign supported by government and trade organizations will ensure widespread awareness and adoption of the next digital industrial revolution.

We will use a golf club as the showcase example because:

- Golf club equipment \$123M trade deficit (perfect reshoring example)
- Broad age group product familiarity
- Many complex design and manufacturing technologies showcased
- Company willingness to demonstrate (non-classified)
- Golfer demographic matches well with organization’s C-Suite, people who implement change

Likelihood: Very High

The infrastructure is in place (mHub, Digital Manufacturing Commons, DMDII, MEP centers, and industry) to prototype and scale. Implementation is less than six months and \$250K.