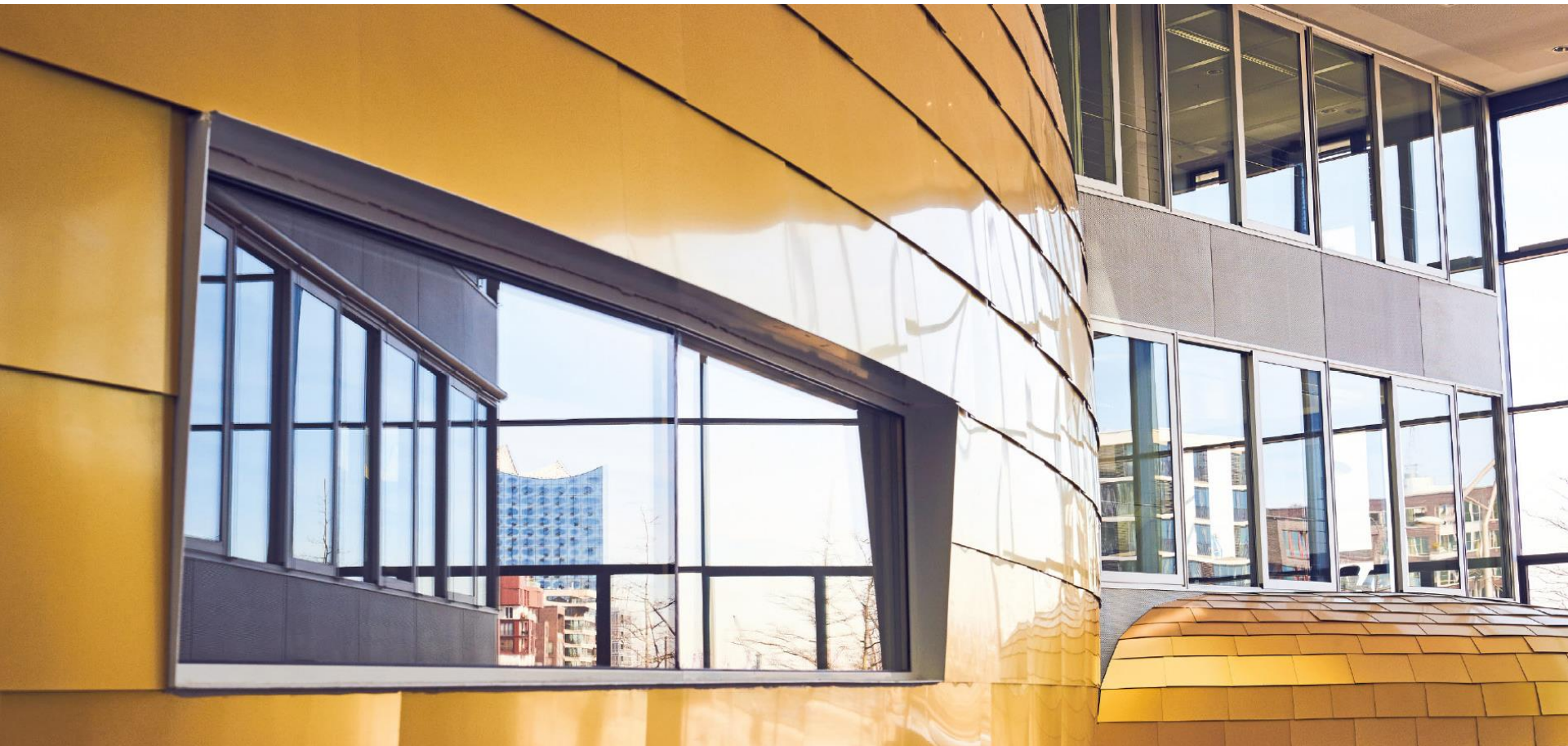


# CILT DIGITALIZATION WEBINAR SUPPLY CHAIN MANAGEMENT – WHAT DOES THE FUTURE HOLD?



# MANY GLOBAL ISSUES ARE FORCING EXECUTIVES TO RETHINK THEIR SUPPLY CHAINS



**Globalization** Interconnected societies and supply chains require better communications and information exchange services

**Demographics** Aging societies require greater automation and healthcare services while younger societies need consumer goods and education

**Urbanization** Dense living requires innovative supply chain designs, healthcare services, and mobility solutions

**Global warming** Higher temperatures are changing weather patterns, how people work outside, where rain falls, and the risks of long supply chains

**Pollution** Plastic waste, cardboard waste, electronic waste, etc. is growing exponentially calling into question our consumer society

**Geo-politics and economics** Economic growth in the East and South is challenging old hegemonies creating opportunities and challenges for peaceful transitions of power

## THESE ISSUES ARE DRAWING INTO QUESTION SEVERAL “TAKEN FOR GRANTED” BUSINESS ASSUMPTIONS



- Locate where labor is the least expensive
- We are too big to fail
- We will always be able to find workers
- Trade barriers will always fall
- The atmosphere, ocean, etc. are so big that we don't need to worry about where we put our waste
- Oil will always flow
- Democracy is where everyone is heading
- People only want to buy what is least expensive
- We have made money doing “it” this way for years, we will continue to make money in the future
- We can always grow our way out of decline
- Etc.

# TECHNOLOGY IS ALSO RAPIDLY CHANGING CREATING MORE UNCERTAINTY IN THE BUSINESS COMMUNITY

**Increasing power of computers**

Enabling data to be analyzed in greater volumes, complexity, and velocity

**Advances in communications technology**

Enabling information to be transmitted at higher velocities, volumes, complex formats, from anywhere to anywhere

**Development of “cloud” based computing**

Removes location requirements for access and facilitates on demand resource allocation

**Miniaturization**

Creates the possibility for an Internet of Things through ubiquitous sensors

**Improved algorithms**

Enables AI, predictive analytics, autonomous vehicle operation, etc.

**Additive manufacturing**

Enables on demand construction of components and assemblies – alpha replicator technology

# BUSINESS EXECUTIVES ARE NOW CAUGHT BETWEEN TWO POWERFUL FORCES OF CHANGE

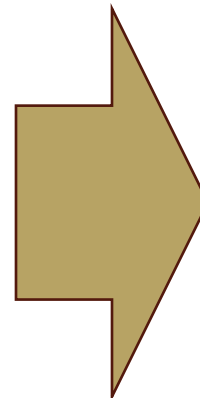


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- What should our business model be for the future?
  - How best can we leverage technology to address the needs of the environment?
  - How do we have to change to meet customer needs in a highly urban setting?
  - What does the rapid movement to online business mean for our logistics operations?
  - How can we address the increasing risks of our global supply chain models?
  - How do we address governmental regulations on security, privacy, and trust?
  - What does a switch from carbon-based energy sources mean for our business?
  - How can we operate when no one wants to perform the work that we do?
  - How can we keep our workforce safe in a world of rapid disease transmission?
  - Etc.

# INDUSTRY RESPONSE IS DIFFICULT TO PREDICT – BUT WE KNOW IT WILL BE PRAGMATIC



- A recent study by KLU and SAP on technology adoption identifies a clear business problem with defined and measured paybacks as essential for successful implementation of any new digital technology
- Businesses are profit driven enterprises, not research organizations




“We have not had any success “playing” with technologies like blockchain. Where we have had real adoption is when there has been a critical business issue that needed a solution. Here we have seen AI and data analytics really providing us with value.”

SC Director FMCG

## BASED ON SEVERAL STUDIES BY KLU PROFESSORS, WE BELIEVE THE FOLLOWING TECHNOLOGIES WILL SEE SIGNIFICANT UPTAKE



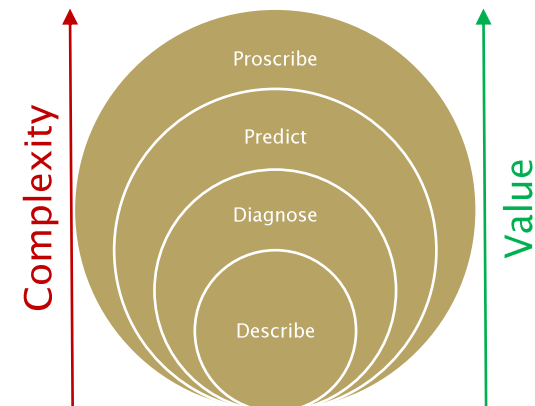
- Advanced analytics
- Additive manufacturing
- Internet of Things
- Artificial intelligence
- Robotic automation
- Virtual/augmented reality
- Autonomous vehicles

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- Note that other technologies (e.g., blockchain for security, privacy, and trust, digital twins, etc.) are not being ignored. However, our view is that they will fill niches and not be the driving force underlying digitalization in the supply chain.

# ADVANCED ANALYTICS

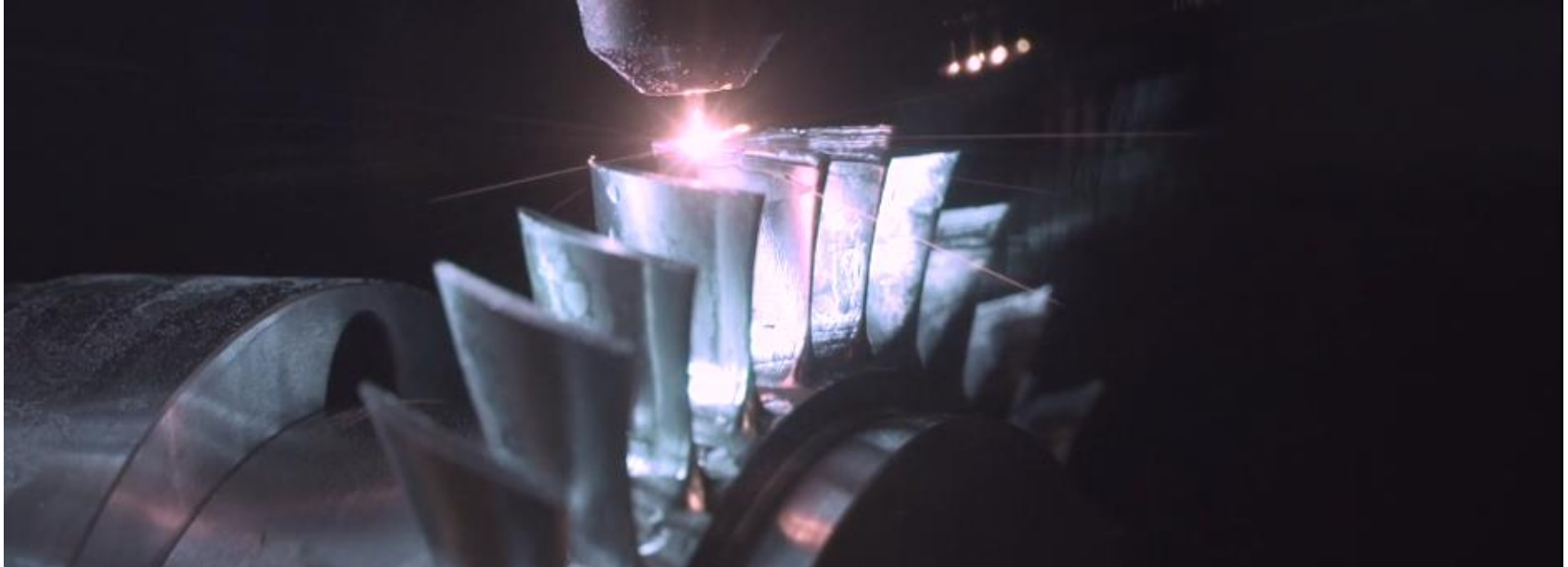


- Advances in computing power, algorithms, machine learning techniques, and data acquisition will drive analytics into higher levels of predictive accuracy improving forecasting and the ability of supply chain processes to “sense and respond”

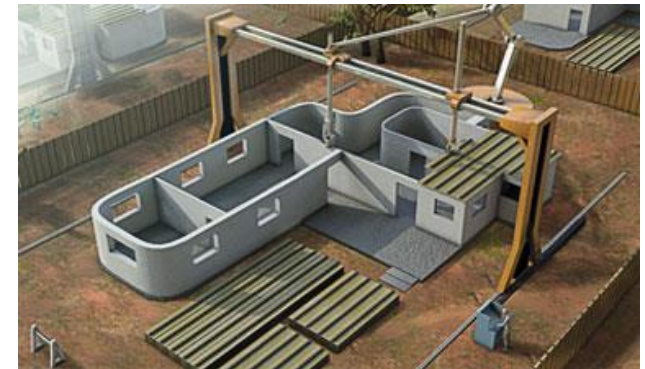




# ADDITIVE MANUFACTURING



- Additive manufacturing is advancing quickly and promises to make on demand parts production a scalable and financial reality
- Additive manufacturing also has the potential to change how housing, bridges, buildings, etc. are constructed bringing on demand construction to a wide audience



# INTERNET OF THINGS



- Miniaturization of computing technology, new materials, better communications technologies, and improved sensors will make the realization of end-to-end supply chain visibility, M2M/V2V communication and coordination, and the “Physical Internet” a reality

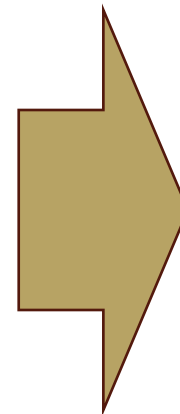


If everything has a sensor attached to it and can communicate in 360°, then we can conceive of a world that is linked together as if everything was a virtual datagram traversing the digital Internet – a true Physical Internet

# ARTIFICIAL INTELLIGENCE



- Huge datasets, advanced computing technologies, new algorithms, and the ability to incorporate state-of-the-art sensor technologies will provide businesses with a broad range of digital assistants (bots, control systems, etc.)
- AI will replace many manual and repetitive tasks improving quality and speed



The term “artificial” may need to be modified if the advances that are coming in this area are realized. The potential for supply chain operations is large, as are some of the questions concerning the impact of AI on jobs and work.

# ROBOTIC AUTOMATION



- AI, better sensors, lighter materials, improved manipulators, and longer lasting batteries are all driving improvements in robotic automation technologies
- These technologies promise to improve production accuracy and speed, remove humans from repetitive and/or dangerous jobs, and address worker shortages



# VIRTUAL/AUGMENTED REALITY



- V/A reality can help warehouse personnel identify goods to pick, help maintenance personnel repair equipment, enable engineers to “see” how items fit together, and provide supply chain personnel with digital views of their supply chain via simulated twining environments



# AUTONOMOUS VEHICLES



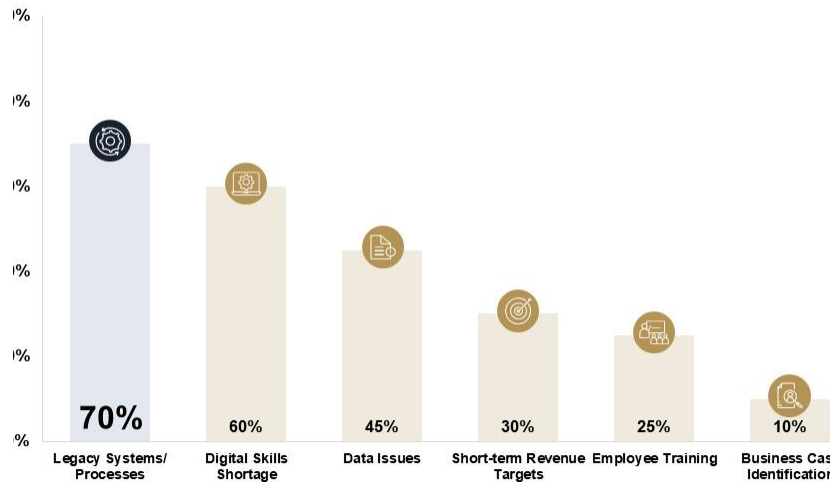
- Autonomous transport systems promise to overcome operator shortages, productivity constraints, and safety issues
- Autonomous mobility solutions also hold the long-term potential to eliminate urban congestion and pollution problems



Autonomous trucks, rail engines, aircraft, and ships all are being tested. Because of the economics of these types of vehicles it is most likely that these will be the first autonomous vehicles commercially available.

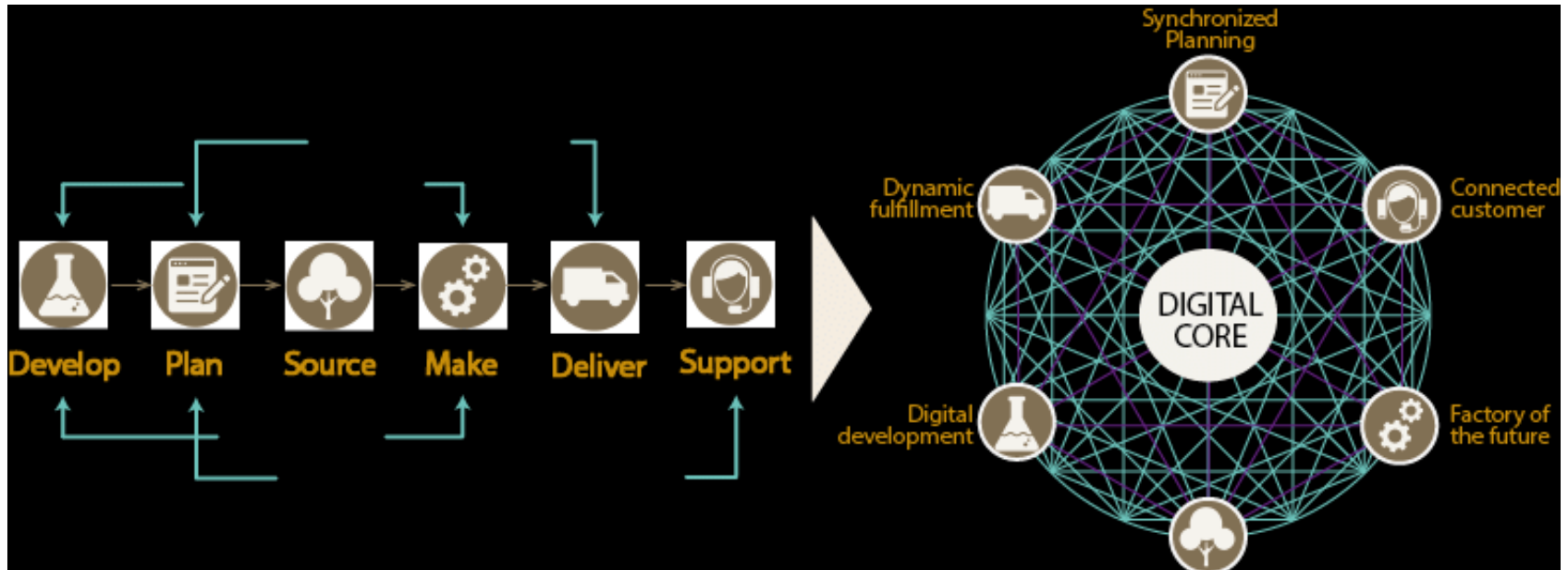
# MY PRESENTATION THUS FAR HAS BEEN OPTIMISTIC ABOUT DIGITALIZATION – THERE ARE CAVEATS

## Barriers to Digital Transformation



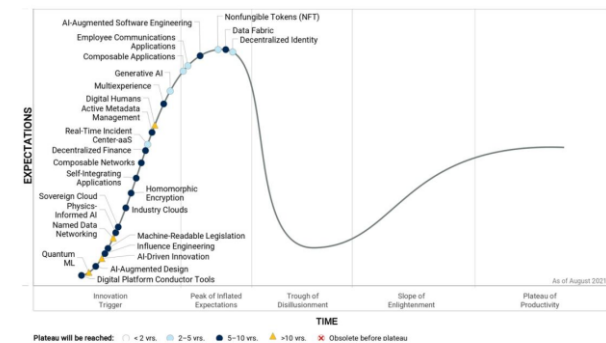
- Digitalization requires resources, financial and technical, that are extremely difficult to find these days
- Digitalization requires a paradigm shift in how companies operate, therefore facing significant push back from entrenched personnel
- Digitalization requires infrastructure that does not currently exist in many parts of the world
- As noted earlier, digitalization requires a solid business case to be accepted by management, no experiments please;-)
- Digitalization requires standards, which are pretty rare today
- Digitalization requires lots of reskilling and retraining – something that companies seem to ignore when they say their employees are their most important assets

# THE DIGITAL FUTURE APPEARS REAL – ALL THAT IS NEEDED ARE A BUSINESS CASE, COMMITMENT AND RESOURCES



- Certainly, digitalization is in everyone's future
- To make it real, however, will require resources, talent, and commitment
- It will also require a pragmatic approach so that expenditures address real business problems
- A good dose of reality, not hype, is necessary

Hype Cycle for Emerging Technologies, 2021



Source: Gartner (August 2021)  
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