Digital Transformation

The Industrial Internet Consortium (IIC) held its fourth-quarter member meeting of 2019 on November 18th ~ 21st in Sydney, Australia at the University of Technology, Sydney. It was as busy and productive as ever, with 35 working sessions, three breakout sessions, 12 testbed sessions and 96 people in attendance.

We also held a public Industry Day on 2019-11-21, with thought leadership from members and guest speakers including: Agency for Science, Technology and Research, China Academy of Information and Communications Technology, DXC Technology, Fujitsu, IoT Alliance Australia, Itron, Moxa, Real-Time Innovations, TOSIBOX, UTS and XMPro. There were four separate workshops that addressed the energy, healthcare, manufacturing, transportation and mining industries followed by a demonstration of the UTS Data Arena.

DIGITAL TRANSFORMATION

"It will take six to four months."

"Why didn't you say 'four to six months'?"

"Because they always remember the first number!"

"Digital transformation", in this sense, is misnamed. It should be "transformation, digitally". Transformation is the notion that should be remembered; digital technology is the enabler. It is about transformation of the entire business,[1] from the culture to the strategy to the goals. Legacy organizations like to produce reports; start-ups (or transformed organizations) prefer continuous snippets of information that engage the reader. No one reads below the fold, anyway.

So it is in industrial organizations. Start with culture. The culture of the offices of your IT department is worlds away from that on the shop floor. There, safety, compliance and long-term thinking are to the fore. Converging IT and operational technology (OT) is a key aspect of industrial IoT, and it is a cultural shift towards digital transformation (DX) for the entire business. This is so-called IT/OT convergence, and it is a key component of digital transformation. Mismanagement of this convergence (to include, culture, technology, strategy, goals and processes) can jeopardize the whole DX strategy, including investments and market opportunity.

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[1] Some commentators hold that for many industrial organizations the objective of their DX initiative is the optimization of production processes as opposed to their "transformation" and the transformation of the whole business. It may not be always about a caterpillar to butterfly transformation. It may simply be a caterpillar to a better (faster more efficient, cheaper to operate) caterpillar.

Digital Transformation

And it is difficult. "Security" to someone in IT means viruses and firewalls, while to an operational technology person it means locked doors and barbed wire. Culture is different; language is different; emphasis is different. You cannot maintain silos within your business or outside it. Consequently, IT/OT convergence must be managed across the organization and that means it must be led from the top. The CEO must lead in DX, and engage a CxO as sponsor and champion. That person can then muster a cross-functional team (and it must be cross-functional and cross-department) to drive the transformation over the long term. There must be commitment from the board, management team and then down throughout the organization to align culture, technology, strategy, goals and processes across all activities.

Information Technology (IT)   IIoT   Operational Technology (OT)
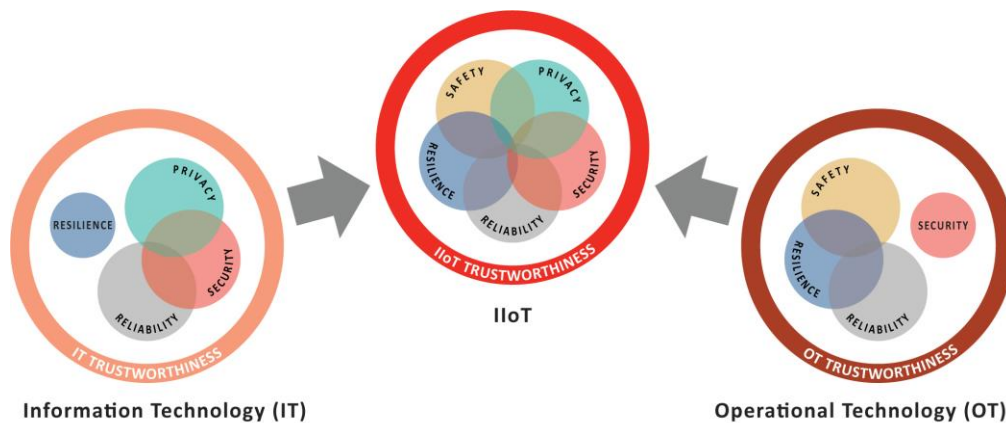
Transformation means change, and this organizational change must be managed. Large industrial organizations are accustomed to making large bets over long periods, but, frankly, we have no idea where industrial IoT will take us. We can already see improvements in asset utilization (predictive maintenance, for example) and new business models (pay-per-use and subscriptions), but these are only the beginning. Organizational leaders need to be thinking about changes in the market and the possibilities opened by technology[2] all the time.

That means taking smaller bets more quickly, moving swiftly to kill projects that fail, and to support projects that are providing a return. You need pilots and pre-pilots to see what works. You need mechanisms to learn from each success and each failure, and you need to cover:

- technology,
- solution deployment and
- identified use cases.

The IIC is well-known for its testbeds, but they test technology, mostly. Technology providers have solutions, but they need to be adopted and deployed by industrial organizations to prove their worth and drive further innovation. You won't be able to persuade department heads to

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[2] Thomas Siebel says that DX is the result of the contemporaneous emergence of IoT, AI, edge and cloud; Metcalfe's law emphasizes the network effect of connections. It applies to technologies too.

adopt transformative technology until they can see successes that make sense to them. Some, however, may already have identified use cases, but they don't want to be inundated by technology providers; they need a way to refine and define the problem and then find suppliers. For this reason, the IIC has shifted focus towards technology users and now provides:

- testbeds,
- test drives and
- challenges respectively.

Together, these make up the *accelerator program*. Contact our VP, Industry Programs for more.

Managing all these projects take time and energy. At a minimum, you need to:

- manage change,
- provide internal consulting,
- benchmark each project,
- provide training,
- identify new opportunities,
- build platforms for your business and
- manage this from an internal center of excellence.
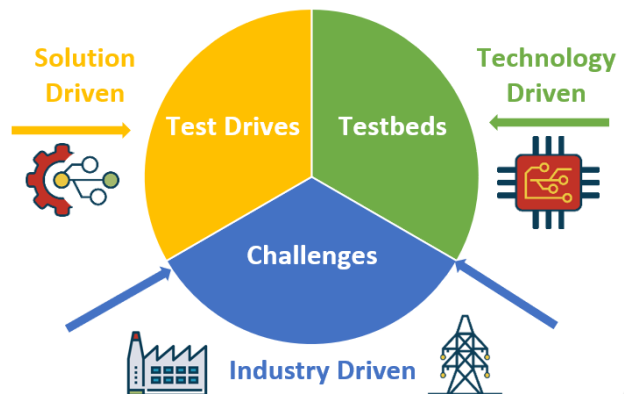
And you need to manage the portfolio actively. Digital transformation is continuous and ongoing. For more information see the Business Strategy and Innovation Framework.

Moving on to digital technology now, it is commonplace that technologists are excited by the technology and TLAs. Those three-letter acronyms often require explanation, and often those explanations have TMI. Too much information by far. Besides, why should the business care?
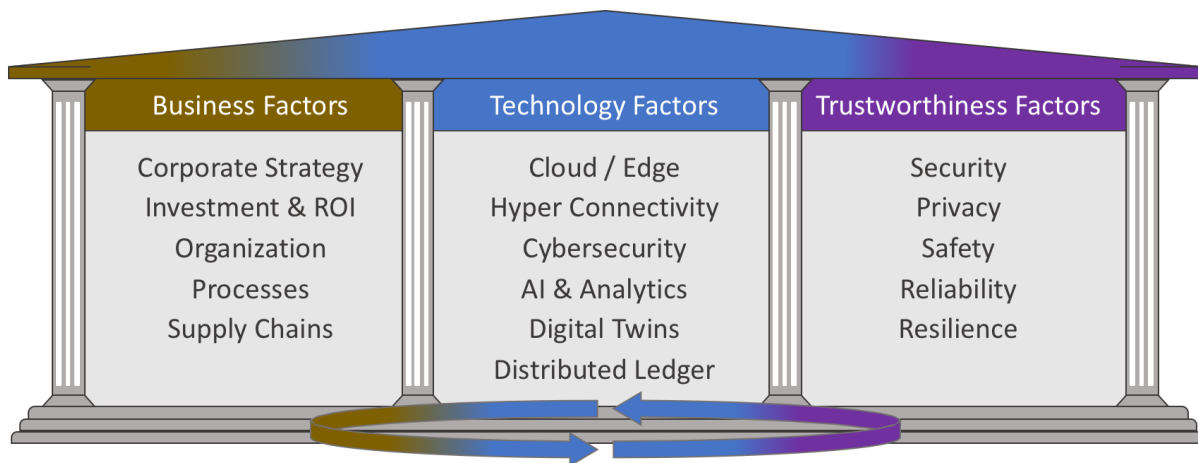
This is why it's important to focus on capabilities, not technologies. For example, people are excited about what they call "cloud computing", but what they really want are the capabilities it offers. These include virtualization, so you don't know (or care) what your application runs on, multitenancy (so many applications can run in the same place) and so on. Combined, these two capabilities reduce costs because each organization does not have to provide them themselves. They can be shared. Moreover, these capabilities in no way rely on a data center "in the cloud"; they can be deployed in your very own plant, at the "edge". (For a full discussion of this, see The Edge Computing Advantage.)

There are several technologies on which digital transformation rest, with many more to come. These begin with "big data": we can now collect, store and process large amounts of data. They can then be processed by artificial intelligence algorithms to yield information. In an industrial context, this leads to the internet of things (IoT) and processing in the plant, directly at the "edge". This increases efficiency directly and (perhaps) by taking the human out of the loop.

There is also risk. Internet-enabling and digitally-enabling industrial plants and their components (closing the "airgap", and more) means that your plant is potentially open and vulnerable to anyone in the world. Taking the human out of the loop could increase safety risk. (It could also decrease it. It depends.) It also has corporate cultural consequences as jobs change or are eliminated. All of this must be considered.

Because if it is not, the growth of the industrial internet would slow or even stop. Accordingly, this quarter, the IIC decided to expand the remit of its Business Strategy and Solution Lifecycle working group to cover these issues and to rename it to Digital Transformation.

Business Factors	Technology Factors	Trustworthiness Factors
Corporate Strategy	Cloud / Edge	Security
Investment & ROI	Hyper Connectivity	Privacy
Organization	Cybersecurity	Safety
Processes	AI & Analytics	Reliability
Supply Chains	Digital Twins	Resilience
	Distributed Ledger	

In the end, digital transformation is about delivering value to the customer. You must understand where they are having difficulties and address them by transforming your own business. In turn, that will deliver value to your business.

You will need to understand market context continuously, and be ready to disrupt yourself. If you don't, your competitors will. You also need to be looking for emerging technologies, and understand how they, in turn, can transform your business: distributed ledger, 5G, AI in an industrial context. There will always be change… The IIC is determined to drive it for social and economic benefit.

GROUP ACTIVITY

IIC groups continue to make progress on their various activities and deliverables. You can find a complete list of IIC publications on the Technical Papers, Publications and White Papers Webpage.

The Edge Computing Advantage white paper, published on 2019-10-24, addresses the steady growth of edge computing, which extends technologies used in data centers to support cloud computing closer to physical assets. The paper describes how it works, how it is realized, its benefits as well as the future opportunities and challenges it presents.

The Industrial Internet Vocabulary Technical Report v2.2, published on 2019-11-06, added definitions for 'digital twin' and related terms such as 'digital representation', refined the IoT actuator and IoT sensor definitions, and modified definitions related to the physical world including physical entity and physical entity of interest.

The 12th edition of the Journal of Innovation, published on 2019-11-13 addressed multiple facets of Digital Twin.

The Advancing the IIoT: IIC and oneM2M joint white paper, published on 2019-12-12, demonstrates how two IIoT organizations can collaborate on a robust, interoperable, flexible and efficient IIoT and address IoT solutions.

TESTBEDS

Our Testbed program has 25 approved IIC testbeds with five more in the pipeline. The Resource Hub's Testbed Webpage has detailed testbed information. The Test Drives program has approved three test drives: Connected Worker Safety, Intelligent Video and IoT Sensor Implementation. The Outcomes, Insights and Best Practices from IIC Testbeds: Smart Factory Machine Learning for Predictive Maintenance Testbed article was published in the November 2019 Digital Twin edition of the Journal of Innovation.

IOT SOLUTIONS WORLD CONGRESS

The IIC and Fira de Barcelona partnered again for the 5th Annual IOT Solutions World Congress, the largest international event devoted to the industrial internet, held October 29th ~ 31st. IOTSWC has always focused on accelerating digital transformation across industry sectors.

There were over 200 sessions in nine thematic areas: IoT enabling technologies, connected transport, manufacturing, energy and utilities, healthcare, buildings and infrastructure, open industry, artificial intelligence and blockchain. Each session focused on a real-world use case, with customers sharing their stories about project implementations, lessons learned, results achieved and more. The IOTSWC once again provided excellent networking opportunities and widespread learnings on key technologies that are providing measurable results.

There were over 300 speakers from IIC members and executives from 451 Research, AASA Digital Light Comms, ABB, Accenture, ARM, Bosch, Cisco Systems, Dell Technologies, Ericsson, Foghorn, Fraunhofer IOSB, Futurewei Technologies, GE Transportation, Hitachi, IBM, IGnPower Inc., Kaspersky Labs, LHP Engineering Services, Microsoft, MOXA, NetApp, NetFoundry Inc. (a Tata Communications business), NIST, PTC, Real-Time Innovations, SAP, SAS, Siemens, Toshiba Corporation, Wipro and Zyfra among the roster of speakers.

We have already begun programming for IOTSWC 2020 (2020-10-27 ~ 29) with many exciting changes in store. Members and leaders will again be able to become keynote presenters,

speakers, program committee members, advisory board members, member pavilion and independent Exhibitors. For more information please contact Bonnie Gordon, Program Director.

UPCOMING PUBLIC EVENTS

Our next public event will take place in March 2020 in Athens, Greece. Keep an eye on the Events Webpage as agendas and speakers for multiple upcoming events are finalized.

NEW MEMBERS

Please welcome new members this quarter:

- Konkuk University
- Tolaga Research

The Industrial Internet Consortium is the world's leading organization transforming business and society by accelerating the Industrial Internet of Things. Our mission is to deliver a trustworthy Industrial Internet of Things in which the world's systems and devices are securely connected and controlled to deliver transformational outcomes. Founded March 2014, the Industrial Internet Consortium catalyzes and coordinates the priorities and enabling technologies of the Industrial Internet. The Industrial Internet Consortium is a program of the Object Management Group® (OMG®).

Visit www.iiconsortium.org.

IIC members gain experience they could never have as a non-member. They experience member meetings unlike any local meet-up groups. Here are some key benefits of membership:

- *Networking*—Make the connections; find the needed expertise.
- *Information & News*—A fast pass to newsworthy industry developments.
- *Competitive edge*—Stay ahead of the competition or take advantage of changes and developments that might otherwise have passed you by.
- *Create a market*—Join a collective voice supporting a single mission; create the disruption in the market and develop the business opportunities.
- *Establish a vision* –Members work to define future architectures and innovate technologies for IIoT.
- *Success*—Members are building businesses and dedicating their professional lives to IIoT. They want to be successful, and they want others to succeed.