# 30 Dilemmas in Digital Transformation

Digital technologies are transforming industry at all levels. From safety to supply chain management, steel has the opportunity to lead all heavy industries as an early adopter of specific digital technologies to improve our sustainability and competitiveness. This column is part of AIST's strategy to become the epicenter for steel's digital transformation, by providing a variety of platforms to showcase and disseminate Industry 4.0 knowledge specific for steel manufacturing, from big-picture concepts to specific processes.

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For the past three years throughout my journey of digital transformation, I have been involved in many decisions and have thus faced many dilemmas. Some of these dilemmas are obvious; anybody involved in digital transformation will experience them. Other trade-offs might be more specific to my interpretation. When undergoing a digital transformation, you may face similar decisions, probably more than are listed here, but this set includes some I have identified based on my experiences. Keep in mind that these are dilemmas, trade-offs or balancing acts, between two seemingly opposite concepts, and yet there is no absolute right or wrong positioning. More often, a blend of the two concepts will prove to be the right combination to bring the most value to your organization and clients. I cannot know where the right compromise is for you. However, I do believe that wherever you position yourself between the two concepts, it will have a significant impact on your company.

## Products vs. Services

This is obvious. We all know that today's economy requires moving from products to services. In our case, our plants are big, heavy and expensive, built at customer sites and not mobile; hence not so easy to rethink of them as services. We will probably still sell products for a long time. Nevertheless, defining an assortment of new services to offer alongside the physical products is the right direction to take.

## Ownership vs. Access

We can all name companies that have experienced exponential growth using business models based on access rather than ownership. Think of Airbnb or Uber. This transition is not so easy in our industry, and yet every time we think of a big investment that results in ownership, we should consider how to capitalize on new or existing assets and sell access to them rather than focusing solely on ownership.

## IoT and Sensors vs. Digital Strategy

When we started on our digital journey, we focused on individual technologies, mostly on Internet of Things (IoT) and sensors, launching several pilot projects. We soon realized that the transformation underway was bigger than any sum of individual technologies, and that we really needed a digital strategy that would affect the whole company. We then developed a strategy and built a team. Having an overall strategy was key to bringing awareness and focus.

## Exciting Technologies vs. Customer Value

People like me get excited about technology, but focusing on the technologies themselves can be distracting. New technologies redefine what is possible, but what is possible is not necessarily useful. Maintaining focus on customer value will indicate the right direction to take. Nevertheless, keeping up with new technologies can give technicians an idea of tomorrow's needs even when today's customers cannot yet perceive them.

## Return on Investment vs. Leap of Faith

In the initial phase of a big project, it is natural to set about predicting the potential return on investment. On our own digital transformation journey, we found this to be very challenging. We quickly became aware of how difficult it is to determine the return on investment with any reasonable accuracy. For instance, we do not yet know what price our customers will be willing to pay for completely new services. Despite this, we took a leap of faith and invested anyway.

## Cost of Investing vs. Cost of Not Investing

A leap of faith may feel uncomfortable. It is easier to face, though, when you weigh the potential costs of not investing. By neglecting to explore the possible returns of a digital transformation, a company risks waking up late to discover its market has evaporated while it clung to old business models. In short, the winning strategy is to balance the cost of investing with that of not investing.

## Culture vs. Operations

Companies quickly focus on changing operations, but a digital transformation is primarily a cultural evolution. People need to learn to think differently, share, collaborate, experiment and risk. I believe this is as much about humility, openness and generosity as it is about efficiency, processes and technology. You can copy processes and buy technologies, but there are no shortcuts when it comes to human growth. It takes commitment, effort and time.

## Hard Metal vs. Software

Our company has a traditional engineering culture focused on the tangibles of mechanics, steel, machinery and plants. A digital transformation requires a flexible and novel way of thinking about solutions, similar to what is common practice in the software world. Think, for instance, of agile methodologies. These new approaches and a focus on software might feel uncomfortable at first, but the shift is necessary.

## Predict and Control vs. Learn and Adapt

Another way in which corporate culture must evolve is by shifting from the management style of "predict and control" to that of "learn and adapt." In today's digital reality, we learn as we go, which requires us to adapt and change direction quickly as we apply new knowledge and

correct mistakes. Agile iterative processes are useful for establishing discipline while also allowing flexibility.

## Expectation of Success vs. Openness to Failure

It is normal to strive for success when we undertake projects. However, we must tolerate and even welcome mistakes along the way since mistakes are at the very heart of the human learning process. Corporate culture must allow for mistakes and see them as opportunities for growth, not as something to punish, or employees will not take necessary risks or think outside of the box. True innovators are ready to fail fast, learn and change direction.

## Hierarchy vs. Autonomy

In our industry, many companies have strict hierarchical structures in which decisions and assigned tasks usually flow from the top down. This model worked well in repeatable and predictable environments. However, in today's rapidly changing world, a facilitated bottom-up flow of ideas and decisions generated by autonomous teams is much more efficient and can scale much better.

## Coordination vs. Cooperation

In a top-down approach, the focus is on coordination. Managers are responsible for running processes and managing people. In a bottom-up approach, it is much more important to cooperate and collaborate. Teams need to be able to self-organize to make decisions and achieve their goals. This is not an easy transition for managers used to running the show, but is usually welcome by smart employees who enjoy the autonomy and accountability.

## Focus Inside vs. Focus Outside

In the corporate world, we often overestimate the value of internal contributions while demonstrating skepticism toward what is developed elsewhere. However, in digital transformation, an optimal use of external resources is mandatory. Look outside. Attend conferences. Learn from customers, suppliers and even competitors. Investigate startups and open innovation. Consider crowd sourcing, remote working and hackathons.

## Internal Digital Team vs. Outsourcing Digital Projects

One way to strike an internal/external balance is by deciding whether to build an internal digital team or outsource digital projects. If you have enough resources to build a team to develop competencies internally, it is an excellent option. After all, the digital evolution will continue and a dedicated team could facilitate its progress as needs arise. Even so, some projects will still likely need to be outsourced. Finding the right mix is key.

## Alone vs. Partnership

Even if you build a strong digital team, that team will still require support. Today it is fundamental to select good partners for key areas. One benefit of having an internal digital team is that the team members can effectively evaluate candidate partners, select them, manage the interaction with them, learn from them and bring competencies in-house for future projects.

## Build vs. Buy

Whether with partners or without them, do not expect to be able to build the entire digital infrastructure. Technology is moving too fast. What you decide to build and what you decide to buy will have big implications. Again, there is no right or wrong balance. We chose to control key parts of our solutions by building them with our partners' help, while focusing on open-source software and standard market solutions in other areas.

## Copy vs. Invent

Copying has a bad reputation, but in these rapidly changing times, it is a valid option. There is no shame in copying ideas. We looked to industries that are further ahead in the game, like aerospace and automotive, to "copy" ideas and solutions. Assume that what worked for others may work for you. You can still be innovative in your industry, while saving time and lowering risks by borrowing valuable ideas already tested by others.

## Hire vs. Train

We all need data scientists and we know that they are expensive and difficult to find and retain. Hiring young talent is important, of course, but if you already have curious, disciplined people with a background in software development, they can be trained in data science rather efficiently using online resources. This way you get data scientists with domain knowledge. Hire talent, but facilitate training and continuous learning too.

## Learning vs. Doing

It is indisputably valuable for us to embrace lifelong learning. That said, opportunities to learn are endless. There are too many to all be undertaken. As a rule of thumb, I believe dedicating around 10% of work time to various forms of learning should be encouraged, but we really need to study during our free time as well. If we are curious, it is quite enjoyable and even fun.

## Human Talent vs. AI Talent

We all agree on the importance of talent, but it is not obvious to all that artificial intelligence (AI) is also a form of talent. Just as companies today struggle to survive without human talent, tomorrow they will struggle to survive without AI. We need to develop both forms of talent and maintain a healthy balance between them. Too much AI and automation can also be problematic, as demonstrated by recent failed attempts to completely automate automotive factories.

## Backlog vs. Innovation

Data scientists are useful, but you also need domain experts to come up with valuable solutions. Unfortunately, domain experts are frequently engaged in backlog projects, which are usually more urgent, so these technicians struggle to find time for innovation. This can be a big obstacle where compromise is necessary. We have found that domain experts and data scientists often enjoy working together; the key is enabling them to commit time to the effort.

## Experience vs. Experiment

Sometimes the most experienced managers can also be the most resistant to change. In today's business world, managers must adopt and cultivate the valuable attitudes of being willing to experiment new approaches, challenge the status quo, and suspend judgment until obtaining results. Experience is useful when determining meaningful experiments, but it should not hinder innovation.

## Digital Team vs. Business Units

At times, we realized that the digital team was waiting for input from business units, while business units were waiting for output from the digital team. In particular, the digital team was waiting for ideas, problems to solve and data to analyze, while business units were waiting for new solutions, digital products and services to sell to their clients. This deadlock must be identified and broken up by working together. Openness and communication are fundamental.

## Share vs. Hide

This is tricky in our industry; we do not usually want to share data and information as we assume it gives us a competitive edge. This mindset can slow down innovation and become a handicap. When the benefits outweigh the risks, as is often the case with technology, we must be open to sharing. Learn from companies like Microsoft and IBM, who after initial opposition decided to invest heavily in open-source software.

## Cloud vs. On-Premise

Many of our customers are not ready to allow their plant data to be stored on the cloud, preferring an on-premise solution instead. We do provide on-premise solutions, but we encourage clients to consider the many benefits of cloud services while reassuring them of their security. Closing the door to the cloud might become too costly for our clients in time, as their competitors start reaping benefits of cloud services while they miss out.

## Big Data vs. Good Data

There is a lot of talk around big data, but "big data" is really more data than many of us realize. We found that in our projects, the challenge was to find any reasonable amount of data. There is a lot we can do with good data even if it is not so much to warrant the use of a Hadoop cluster. Start with the data that you have or can find easily, gather experience and insight while analyzing it and modeling with it, and prepare to scale up later.

## Simplicity vs. Security

It is very easy to ignore security for the sake of simplicity at the beginning of an IoT or cloud project. This is a mistake. Security is fundamental in an IoT and cloud world, although not all applications require the same level of security. Keep simplicity in mind, but start thinking about security from the very beginning. Involve your company's I.T. department early and rely on market leaders in the field.

## Hype vs. Value

Technology has always been surrounded by hype, but hype sometimes stands in the way of understanding. For instance, I have been in meetings where everybody was talking about "digital twins," each one with a different understanding as to what a digital twin actually was. In these cases, leaving the hype behind and focusing on what value you are actually trying to provide usually helps everybody to understand and focus.

## China vs. Rest of the World

Many regulations, especially those regarding cloud technologies, are fundamentally different in China. What works elsewhere might not work in China and vice versa. If you have a cloud platform supporting your customers, it will most probably need to be redefined for China. Keep this in mind as you select where to invest.

## Disrupt vs. Be Disrupted

You have certainly heard this one before; it is often quoted and a bit scary. We certainly do not want to be disrupted, but we also tend to dislike disrupting, especially in industries with long-established traditions like ours. Unpleasant as it may be, we must step out of our comfort zones, ask difficult questions and be open to finding unconventional answers. It is not an easy task, but it is rewarding… and unavoidable.  ✦