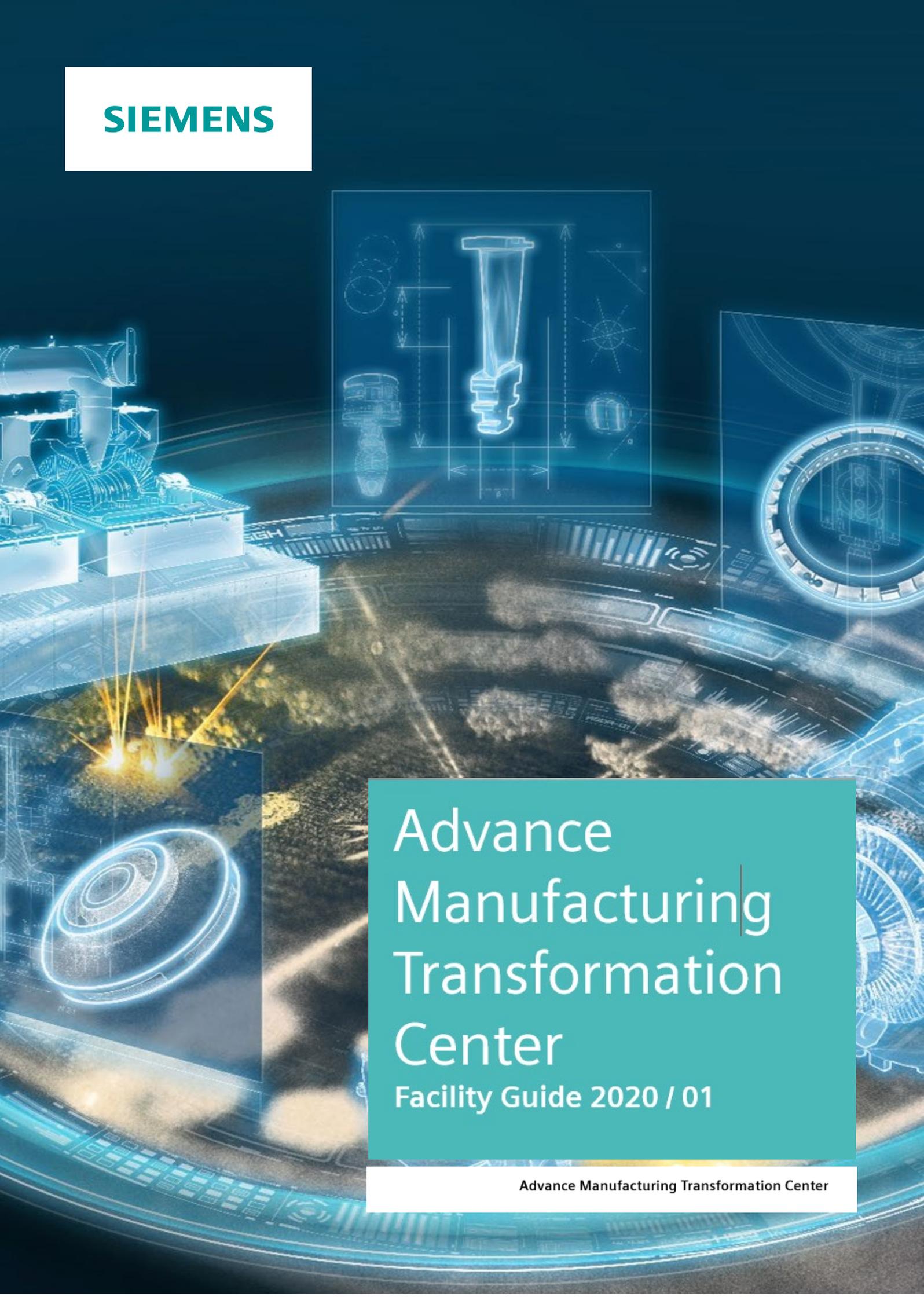


The Siemens logo is displayed in a white rectangular box in the top left corner. The word "SIEMENS" is written in a bold, teal, sans-serif font.

SIEMENS

The background of the entire page is a futuristic, high-tech manufacturing facility. It features a large, circular control room with multiple workstations and screens. In the foreground, there are various industrial components and machinery, including a large, glowing blue circular component on the left and a complex mechanical assembly on the right. The overall aesthetic is clean, modern, and industrial, with a color palette dominated by blues, greys, and metallic tones.

Advance Manufacturing Transformation Center

Facility Guide 2020 / 01

Advance Manufacturing Transformation Center



Foreword



Benjamin Moey
Vice president Asia Pacific Siemens,
Digital Industries

02.04.2020

AMTC as your partner for Digital Transformation

It gives me great pleasure to welcome you to Siemens' Advance Manufacturing Transformation Center (AMTC) and our ecosystem of advance technology partners.

I am truly heartened that your company has decided to embark on this exciting journey of digital transformation. We sincerely hope your journey will be a fruitful and successful one.

Indeed, most companies understand the need for digital transformation. But because it requires additional investment and may cause business disruptions during the transition, many postpone the process. Those operating under the assumption of "If it ain't broke, don't fix it" usually procrastinate until it's dire.

What those businesses need to understand is that digital transformation is a gradual process and it need not happen all at once – but it does need to happen.

(Read my article: '**Digital Transformation: A Necessary Disruption**' here: <https://www.linkedin.com/pulse/digital-transformation-necessary-disruption-benjamin-moey-moey/>)

My team of industrial experts will help tailor and customize your transformation journey. Our ecosystem of technology partners and Siemens are fully committed to assisting you and your business to achieve higher levels of production efficiencies and yield throughout the various transition phases.

Once again, thank you for choosing Siemens' Advance Manufacturing Transformation Center as your partner in your quest to Digital Transformation.

I look forward to personally meeting you and working closely with you and your teams.

**'Accelerating the adoption of advance manufacturing technologies
through Simplification, Digitalization & Collaboration'**

Yours Faithfully,

Benjamin Moey,
Vice President Asia Pacific

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Website: www.siemens.com.sg/ATMC

Email: infoadvancemanufacturing.com.sg@siemens.com

About Us

Siemens

We are a technology company with core activities in the fields of electrification, automation and digitalization operating in nearly 190 countries worldwide and as of September 30th, 2019, employing around 385,000 people. With approximately 285 production and manufacturing sites all over the world, our corporate headquarters are currently still located in Munich, Germany, which is where Siemens was originally founded.

Our company consists of Siemens AG, a stock corporation under the federal laws of Germany, as well as its subsidiaries abroad. As of 2nd April 2019, our organization has been categorized into 3 Operating Companies, which include Gas & Power, Digital Industries, Smart Infrastructure, as well as our Strategic Units Siemens Healthineers, Siemens Mobility and Siemens Gamesa, which together form our Industrial Business.

Since the founding of Siemens, we have been actively supporting and advancing each Industrial Revolution through our technology. We continue to innovate and evolve with each industrial revolution and have been slowly transforming and transitioning from a predominantly hardware company to a more digital driven industrial software solutions company.

Today, Siemens stands as one of the top 10 industrial software solutions provider. Siemens continues to invest heavily in key topics moving into 2020 and beyond such as artificial intelligence, Internet of Things (IoT), additive manufacturing, augmented and virtual reality, blockchain, edge computing and many others.

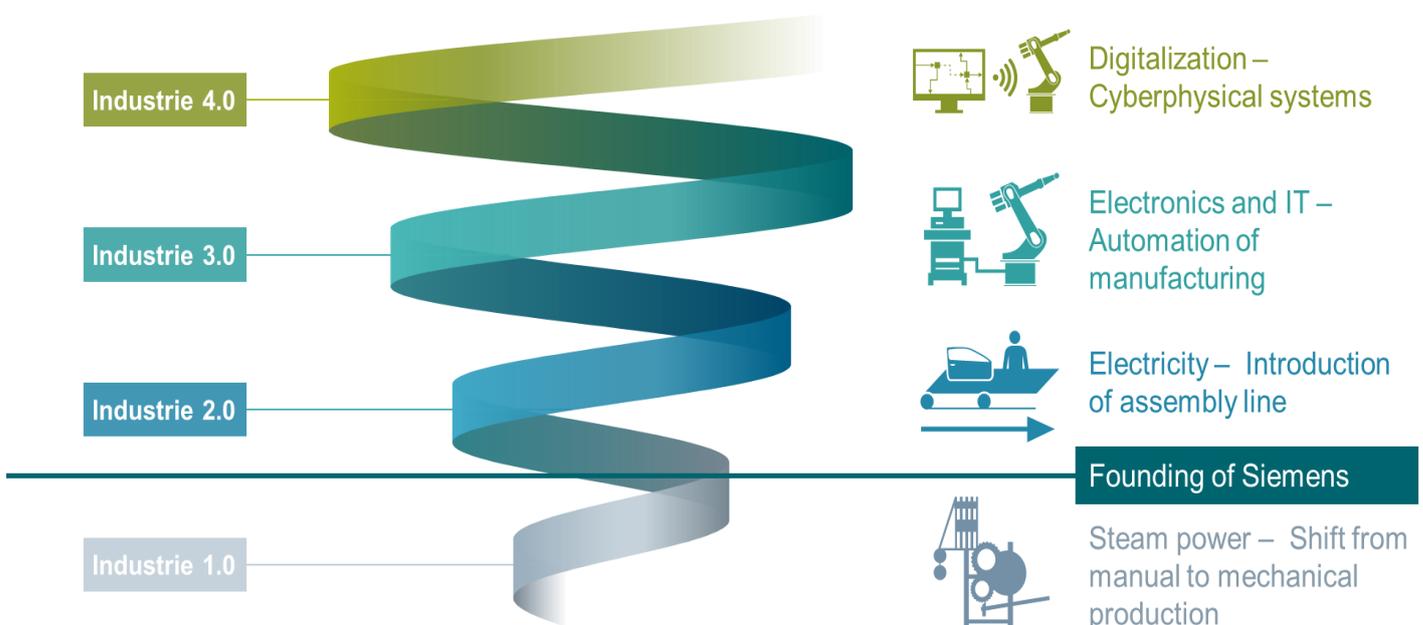


Figure 1 Siemens participation in Industrial Revolutions since founding

Digital Industries Division

We as Siemens want to help our customers in the manufacturing and machine building industry to digitally transform their business in order to analyze and optimize their processes in the most efficient way possible.

Our Siemens Digital Enterprises portfolio offers exactly that – a holistic solution for our customers to monitor their whole production process by integrating, tracking and analyzing data from each step of the production chain. This covers the conceptualizing and designing of a product, planning, engineering, executing and servicing including the supplier and is supported by our cloud-based open IoT operating system called MindSphere.



By being linked to the Internet of Things, MindSphere enables manufacturers to analyze their production facilities as a whole and to feedback their insight into the entire value chain. Simultaneously, our collaboration platform called TeamCenter allows experts from different production steps to connect, communicate and cooperate with each other, which helps increase the efficiency of the entire plant and shorten the time to market.



helps create a close connection between the world of digitalized planning and physical realization.

Accompanying this process, we also provide a Digital Twin as a virtual model for both product and production process. With the goal to trace development through-out an entire lifecycle, predict performance by simulating various set-ups and optimize processes through the incorporation of previous experiences, the Digital Twin as part of the Digital Enterprise Suite

Present Day: The 4th Industrial Revolution

As we step into the 21st century, many manufacturing companies including Siemens factories are embarking on their journey of digital transformation.

Today, digital transformation is a necessary disruption for organizations to leverage the benefits of technology, maximize efficiency and maintain a competitive edge.

What the Markets are saying?

Additive Manufacturing to generate US\$100 billion economic value in ASEAN by 2025 – *Thyssenkrupp 2nd July 2019*

White paper - Additive Manufacturing: Adding Up Growth Opportunities for ASEAN
By Thyssenkrupp



By 2028, ASEAN is expected to have **35 - 40% increase in manufacturing value** (US\$250 Bn to US\$275 Bn) by embracing 4th Industrial Revolution Technologies

– *AT&Kearney 2018*



4th Industrial Revolution can deliver a significant increase in profitability for manufacturers

– *McKinsey & Co 2018*

Figure 2 Summary of ASEAN Growth projections of 4th Industrial Revolution

Based on industry reports (specifically for the ASEAN region), the ASEAN regional economies are expecting a 35 – 40% increase in manufacturing value, (amounting to US\$250 to US\$275 Bn) with the adoption of advance technologies of the 4th Industrial Revolutions; technologies such as additive manufacturing.

According to a white paper by Thyssenkrupp, additive manufacturing will generate US\$100 Bn in economic value in the ASEAN block by 2025. There is a lot of potential upsides for companies taking the lead on this journey of digital transformation.

Challenges companies are facing

Indeed, most companies understand the need for digital transformation. But because it requires additional investment and may cause business disruptions during the transition, many postpone the process.

Especially companies in ASEAN are struggling to make Industry 4.0 a reality: they face a myriad of barriers encompassing economical, psychological and available talent pool, as follows:

- High cost of transition (equipment investment)
- Complex and unintegrated (Multiple Technologies & Solution Providers)
- Enduring low labor cost
- No immediate customer demands

- Difficulties in stepping up capabilities and accessing required experts
- Disruption to business continuity
- Insufficient partners in the region
- Cybersecurity (Data Security)
- Existing budget constraints
- Cash consumption with upfront investment

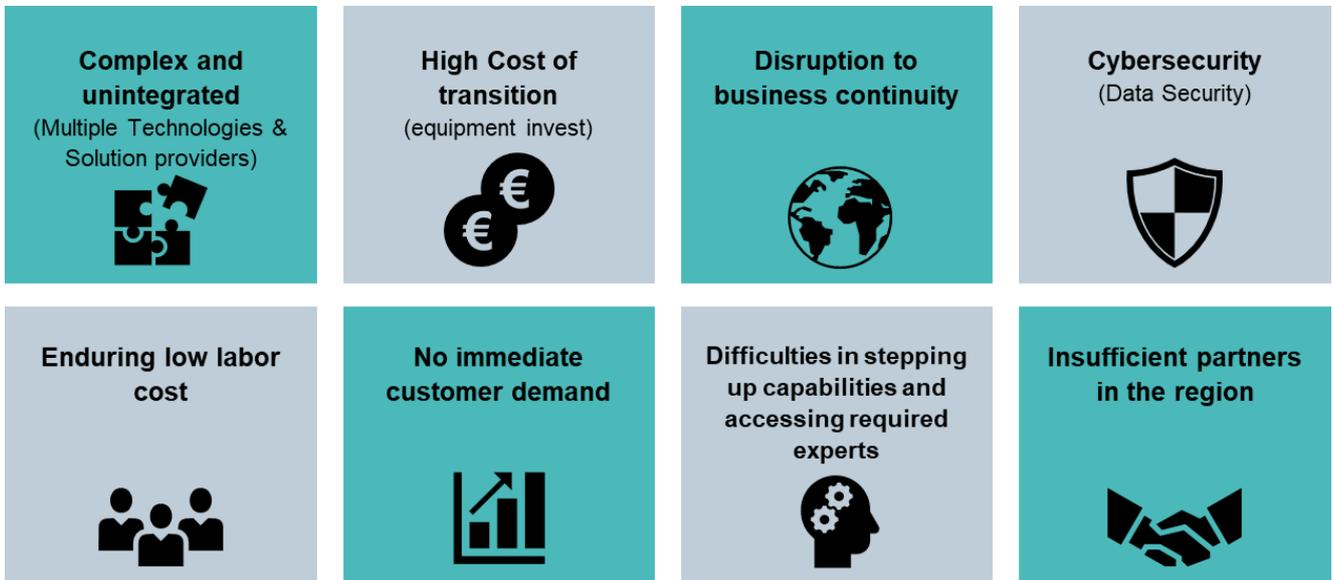


Figure 3 Barriers to embarking on transformation journey

Failure to embrace change in time leads to businesses not being agile and adaptable to change in a volatile marketplace. In these cases, failure usually resembles a slow deployment of resources. A company may ineffectively use its already limited resources, leading to an uncompetitive business that loses market share rapidly.

Failing to digitally transform also leads to businesses being slow to market. The markets of today value speed of delivery in any service. This is important both in terms of product and solution information and responsiveness as well as final delivery.

If we are not moving in-sync with the speed of this digital age, not only will the gap between us and our customers widen, but new competitors could also easily surpass us. Change is inevitable, and unless we recognize and embrace it, our businesses will fade into the distance.

Those operating under the assumption of "If it ain't broke, don't fix it" usually procrastinate until it is dire.

What those businesses need to understand is that digital transformation is a gradual process and it need not happen all at once – but it does need to happen.

Crossing the chasm. Bridging the gap.

How can companies cross the chasm and successfully transform? How do they bridge the gap between research and development, prototyping to industrial production? How can Siemens support companies in their transition into the 4th Industrial Revolution?

Singapore

In Singapore, the government led by the Economic Development Board (EDB) has been aggressively attracting advance technology companies to establish their regional hubs in Singapore, in order to push the technological boundaries.

Furthermore, the National Additive Manufacturing Innovation Cluster (NAMIC), which was established by the Singapore government in October 2015, has been instrumental in attracting and setting up of an ecosystem of over 120 additive manufacturing service providers in Singapore, making Singapore the ideal location for establishing Siemens Advance Manufacturing Transformation Center (AMTC).

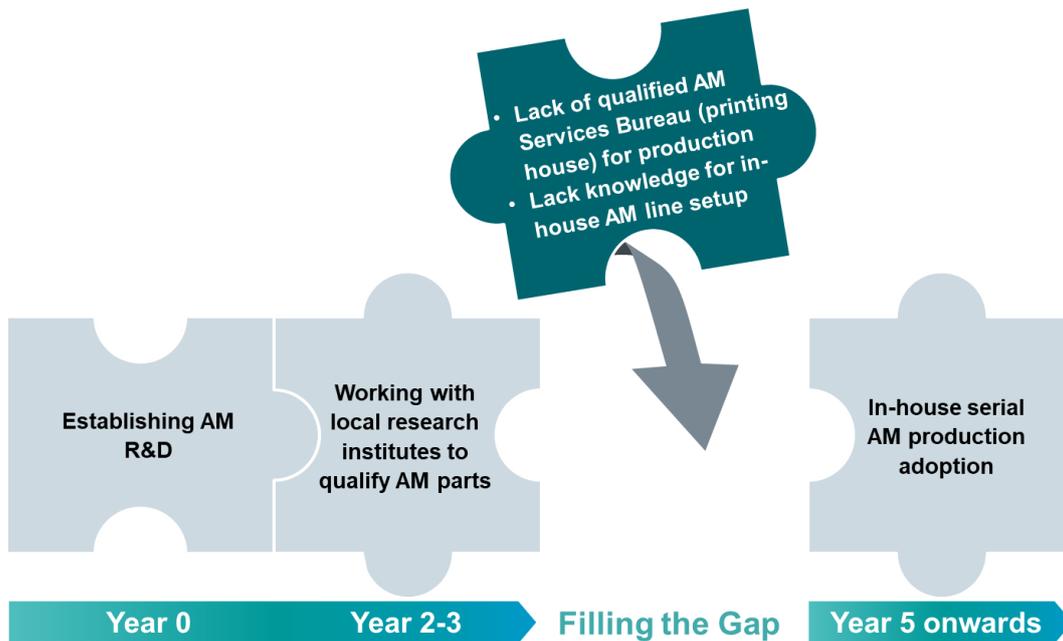


Figure 4 Bridging the gap between prototyping and serial production

Advance Manufacturing Transformation Center (AMTC)

Advance Manufacturing Transformation Center (AMTC) is being established in Singapore and is the first of its kind competence center that provides guidance, support and training to manufacturing facilities in ASEAN on their journey of adoption, transition and transformation towards advance manufacturing. The center will showcase state of the art Siemens Digital Enterprise solutions that enables companies to create digital twin models of their envisioned advance manufacturing plants; to simulate, optimize and evaluate manufacturing operations before constructing the actual manufacturing environment.

The center will house its first Additive Manufacturing Experience Center (AMEC) outside of Germany, where companies will have hands-on exposure to an advance end-to-end additive manufacturing production line supported by our ecosystem of technology partners.



Companies will be able to carry out prototyping and low volume production with the support of our on-site Additive Manufacturing experts, enabling a smooth transition and transformation to in-house advance manufacturing.

AMTC is more than just a training facility that supports research and development activities for additive manufacturing, it is an advance manufacturing ecosystem of technology partners with small-scale operational production capabilities.

We provide specialist consultancy, advance manufacturing trainings, and an ecosystem of technology partners for your research & development needs.

Vision of the Center

The objective of AMTC is to accelerate the adoption of advance manufacturing through simplification, digitalization and collaboration.

Simplification of complex technologies and processes through our advance industrial software solutions suite such as *NX CAD/CAM*, *OpsCenter*, *Technomatix*.

Digitalization of processes with the implementation of feedback sensors for IoT, VR/AR enabling higher efficiency and production yield through factory automation; and

Collaboration through the ecosystem of advance technology partners across the production value chain to support companies on their transformation journey.

'Accelerate the adoption of advance manufacturing through simplification, digitalization & collaboration'

Elements of AMTC

The Center combines 3 key elements – the Digital Enterprise Experience Center (DEX), the Additive Manufacturing Experience Center (AMEC) and Rental Labs, creating a one-stop advance manufacturing ecosystem to provide guidance and support for companies embarking on their digital transformation journeys.

Combined offering addresses the operational transition



Figure 5 3 Key Elements of AMTC

The Digital Enterprise Experience Center (DEX) and the Additive Manufacturing Experience Center (AMEC) provide technology showcases to companies wanting to explore the latest manufacturing technologies available and already implemented in advanced facilities around the world.

Beyond that, the Rental Labs provide affordable access to the latest industrial design software (NX CAD/CAM suite/HEEDS) and high-end Industrial Additive Manufacturing Printers as well as post processing equipment.

In addition, customers will be able to receive expert guidance from our industrial specialists in advance manufacturing design from product to part assembly to plant design. The customers will be further supported by our ecosystem of partners such as material suppliers, 3D printer OEMs, certification bodies and research institutions.

Our Approach: Let us help you transform your business

Understanding that each company is at different phases and stages of automation and digitalization, from the start, we will assess your operational business baseline through our MDC¹ consultants using the SIRI ²Assessment Matrix.

¹ Manufacturing Design Consultancy

² Smart Industry Readiness Index – a Singapore govt established matrix to qualify a company's level of digitalization

Once we better understand your business needs and goals, our consultants will customize a multi-stage transition roadmap for your business. We understand that the transformation is a gradual process, and that companies would be starting at varying points of the transition journey, we will tailor piece-meal milestones to enable small wins to continue to motivate companies to progress onward on their transformation journeys (see chart below).

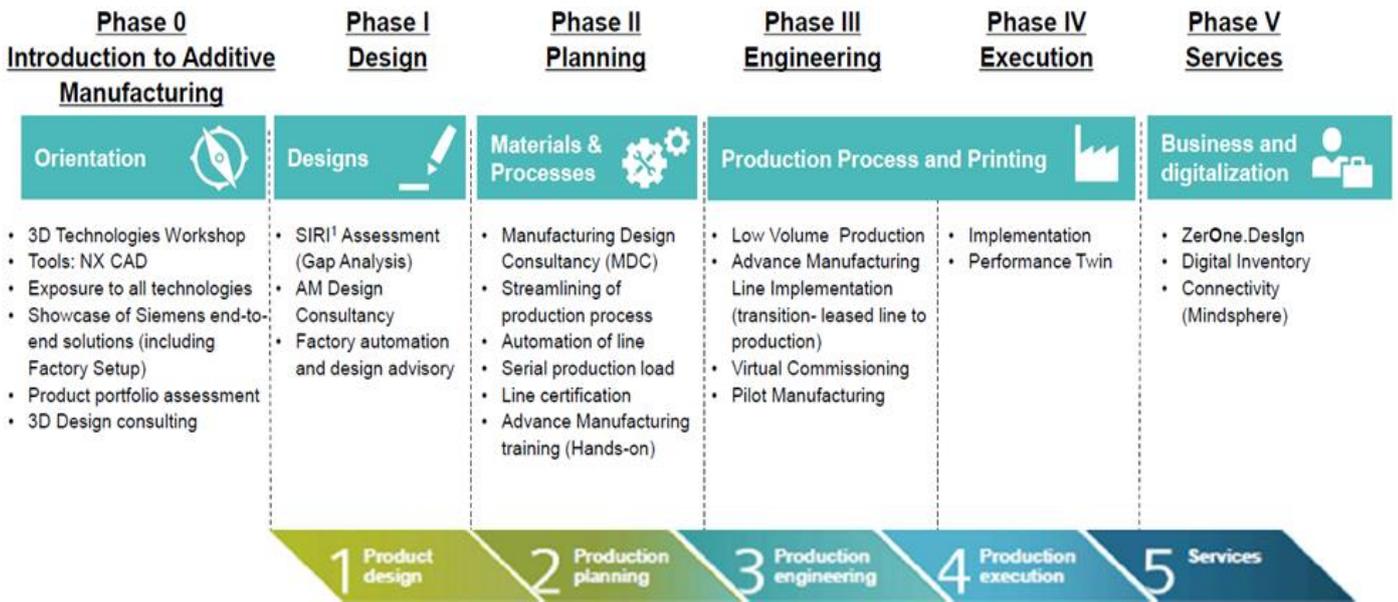


Figure 6 Transformation Journey

AMTC: Supporting your transformation journey

Through the various training courses and specialist consultants, based in an ecosystem of technology partners, we hope to support your company’s transformation journey. We want to upgrade workforce’ skillsets to enable them to effectively adopt and adapt to the latest manufacturing tools and systems. Thereby, allowing companies to remain competitive in the marketplace.

Advance Manufacturing applied to Additive Manufacturing Production Environment

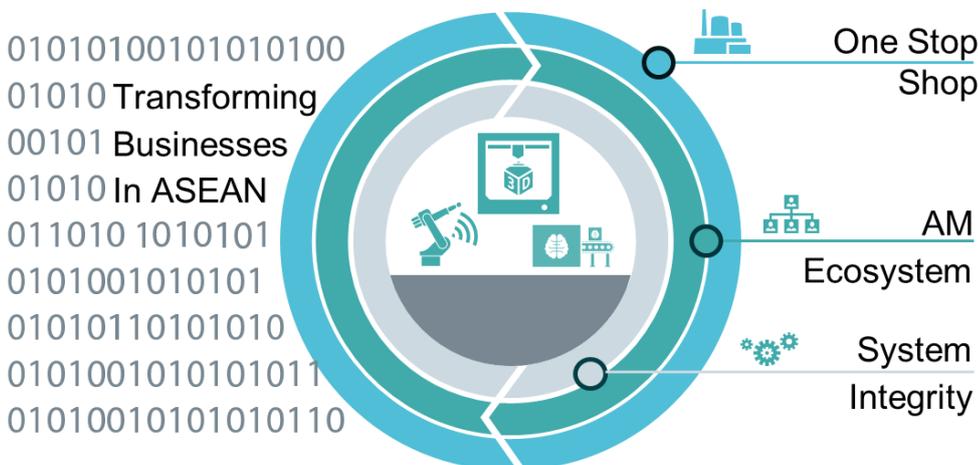


Figure 7 AMTC: The One Stop Ecosystem

Our Facility

Siemens' Advance Manufacturing Transformation Center (AMTC) is located in the western part of Singapore in Tuas. It is positioned in the heavy industry zone to support industrial customers.



Figure 8 Virtual view of AMTC

Address:
**Advance Manufacturing
Transformation Center**

Blk 16A, Tuas Avenue 1
Unit #06-27
JTC SPACE@TUAS
Singapore 639 533

For visits, please email us:
Infoadvancemanufacturing.sg@siemens.com

The Center covers an area of about 800 sqm and is divided into 4 zones, as follows:

- (I) **Digital Enterprise Experience Center**
 - Showcase of Siemens Industrial Software Solutions including Digital Twin, IoT, PlantSim
- (II) **Member's Lounge**
 - Design Labs equipped advance CAD/CAM tools (NX CAD/CAM, HEEDS, SolidEdge)
- (III) **Production Area**
 - Industrial Additive Manufacturing Printers in production environment managed by Siemens OpCentre solutions
- (IV) **Post Processing Area.**
 - Completing the end-to-end manufacturing process with key post processing equipment



Figure 9 Center floorplan

Past Events

During the Industrial Transformation Asia Pacific (ITAP) 2019 held in Singapore between the 22nd – 24th October 2019, there were several MOUs signed with AMTC and its key partners.



JID MOU Signing
22 – 24th Oct 2019



NAMIC MOU Signing
22 – 24th Oct 2019

Partner Ecosystem



In partnership with



Supported by



Contact us!

Advance Manufacturing Transformation Center (AMTC)
For general enquiry, please email: infoadvancemanufacturing.sg@siemens.com

