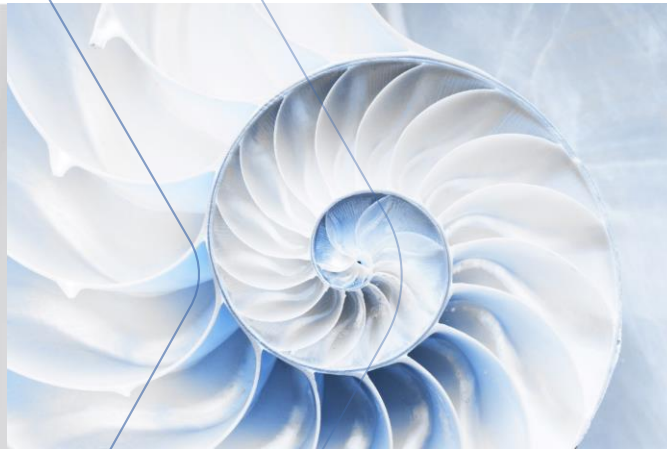# ModuleWorks

Get There Faster.

Digital Factory

Business Area Introduction

Fabian Tarara, Head of Business Development – Digital Factory

Agenda

- Contact Persons

- Introduction

  - ModuleWorks

  - Digital Manufacturing

- Digital Factory Vision

- Digital Factory Value Proposition

ModuleWorks

Get There Faster.

Contact Us

Digital Factory Presentation

Dr.-Ing. Sven Odendahl

Head of Technology
Digital Factory

Contact Us

Digital Factory Presentation

Fabian Tarara

Head of Business Development
Digital Factory

Develop the **Best Toolpath** and **Simulation Technology**

Accessible

Affordable

Usable

Visit Us

ModuleWorks Branches

Aachen, Germany

Bucharest, Romania

Kiev, Ukraine

Pune, India

ModuleWorks

Who Are We

Founded 2003

Dr. Yavuz Murtezaoglu

(Founder & CEO)

Shareholders

CEO

Key Employees

Strategic Partners

Annual Revenue

~ 21m EUR

Our Numbers

1500

Person-Years
Software
Development
(End of 2022)

500k

End users of
200+
Customers/
Integrators in
Manufacturing

20+%

AAGR of
Revenue

75%

Market Share
Industrial
CAM Market

200+

Total
Staff

175+

Staff in
Development

What we Believe

Our Philosophy

At ModuleWorks, we're passionate about manufacturing software and are committed to delivering precision and quality solutions that drive your success.

We believe in building long-term partnerships with our clients, working together to achieve shared goals and drive innovation.

Our software is adaptable and flexible, designed to fit seamlessly into your manufacturing environment and boost efficiency.

Trust in our proven track record, satisfied customers, and reputation for reliability to drive your success.

Become Our Partner

Become Our Partner

Meet Our Partners

SIEMENS

FANUC

DMG MORI

MITSUBISHI ELECTRIC
Changes for the Better

Johann Dietrich

Product Manager Motion Control

"Our ongoing partnership with ModuleWorks allows us to focus on our distinctive competencies to provide real user benefits more quickly, like releasing Protect My Machine/3D Twin to the market.

Dr. Wilfried Steiger

Team Leader Application Experts

"Over the course of the last years, the collaboration between FANUC Europe and ModuleWorks has developed into a true partnership creating mutual benefits towards the digitalization of manufacturing processes."

Dr. Daniel Niederwestberg

Divisional Manager Digital Twin

„With ModuleWorks, we have chosen a partner, in a unique position as a single source provider, that makes tool path and simulation components accessible, affordable and usable."

Matteo Giugno

CNC Application Engineer Team Leader

"To broaden our digital product portfolio and enhance operator interaction with the control, we have decided to work together with ModuleWorks."

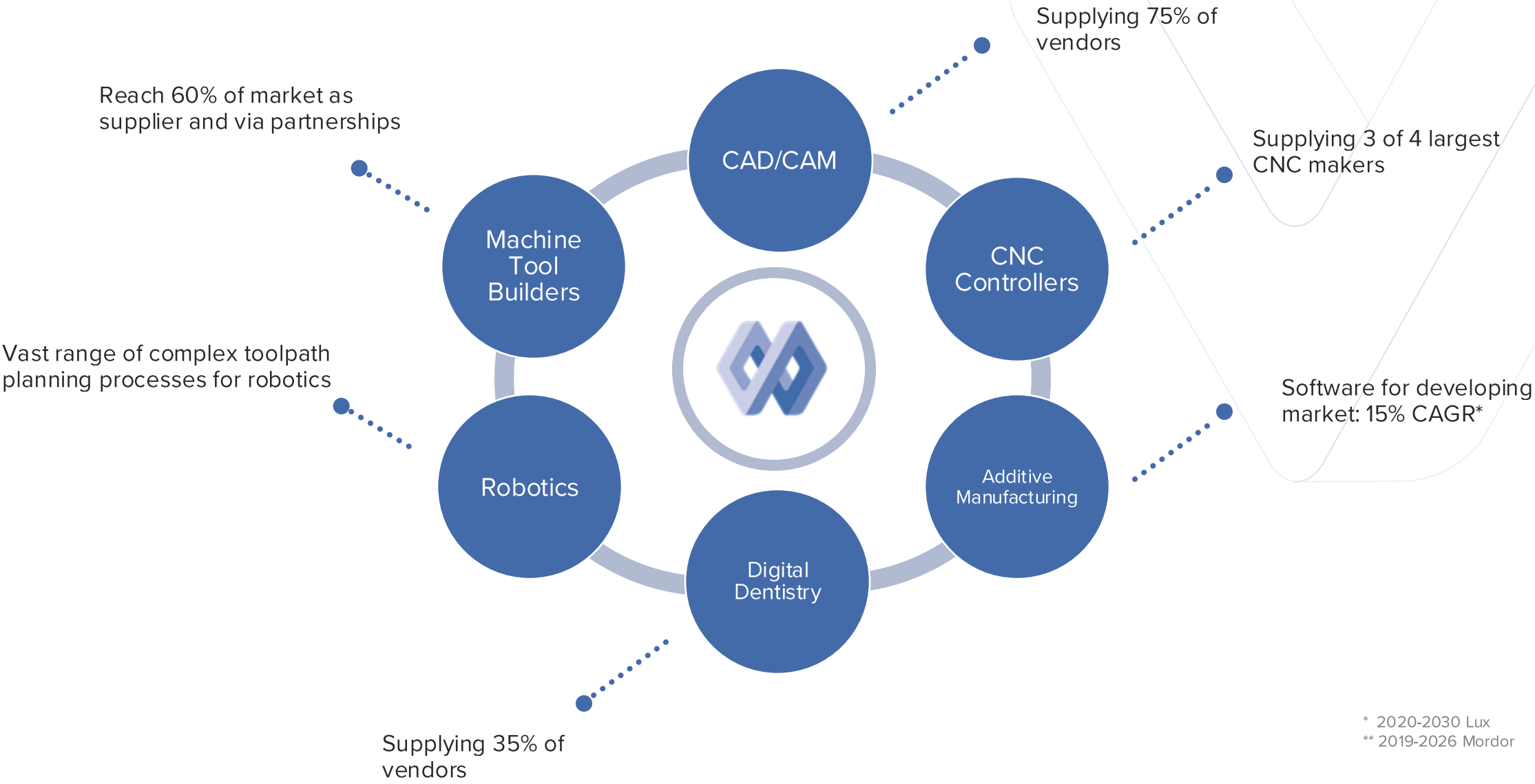# Long-Term Partnership and Value Co-Creation

ModuleWorks

ModuleWorks and Digital Transformation

ModuleWorks

ModuleWorks Technology Markets

Supplying 75% of vendors

Reach 60% of market as supplier and via partnerships

Supplying 3 of 4 largest CNC makers

CAD/CAM

Machine Tool Builders

CNC Controllers

Vast range of complex toolpath planning processes for robotics

Software for developing market: 15% CAGR*

Robotics

Additive Manufacturing

Digital Dentistry

Supplying 35% of vendors

* 2020-2030 Lux
** 2019-2026 Mordor

15

ModuleWorks Technology Chain

Feedback Loop

Toolpath
Simulation
Process Parameter
Sensor Data Acquisition
Machine Connectivity
Machine Demonstration and Operator Education
Machine Programming

CAD MODEL
INPUT DATA PREPA-RATION
CAM
POST PROCES-SING
NC-POST
CNC
MACHINE & ROBOT

Programm Verficiation
Machine Protection

Mesh Toolkit
Point Cloud Converstion
Kinematic Solver
Post-Processing Framework

NC G00 G01

IDEA
PART

Our Business Areas

Digital Manufacturing

Digital Factory

CAM-Automation and Digital Dentistry

Additive and Process Technologies

17

Who do we create Value for?

Training Academies

CNC Control Manufacturers

Machine Tool Builders

ModuleWorks and Digital Factory Market Research

ModuleWorks

The Lights-Out-Factory is at Least a Decade Down the Road!

Today

Industry relies heavily on Manufacturing Experts.

How to get there?

Lights-Out-Factory

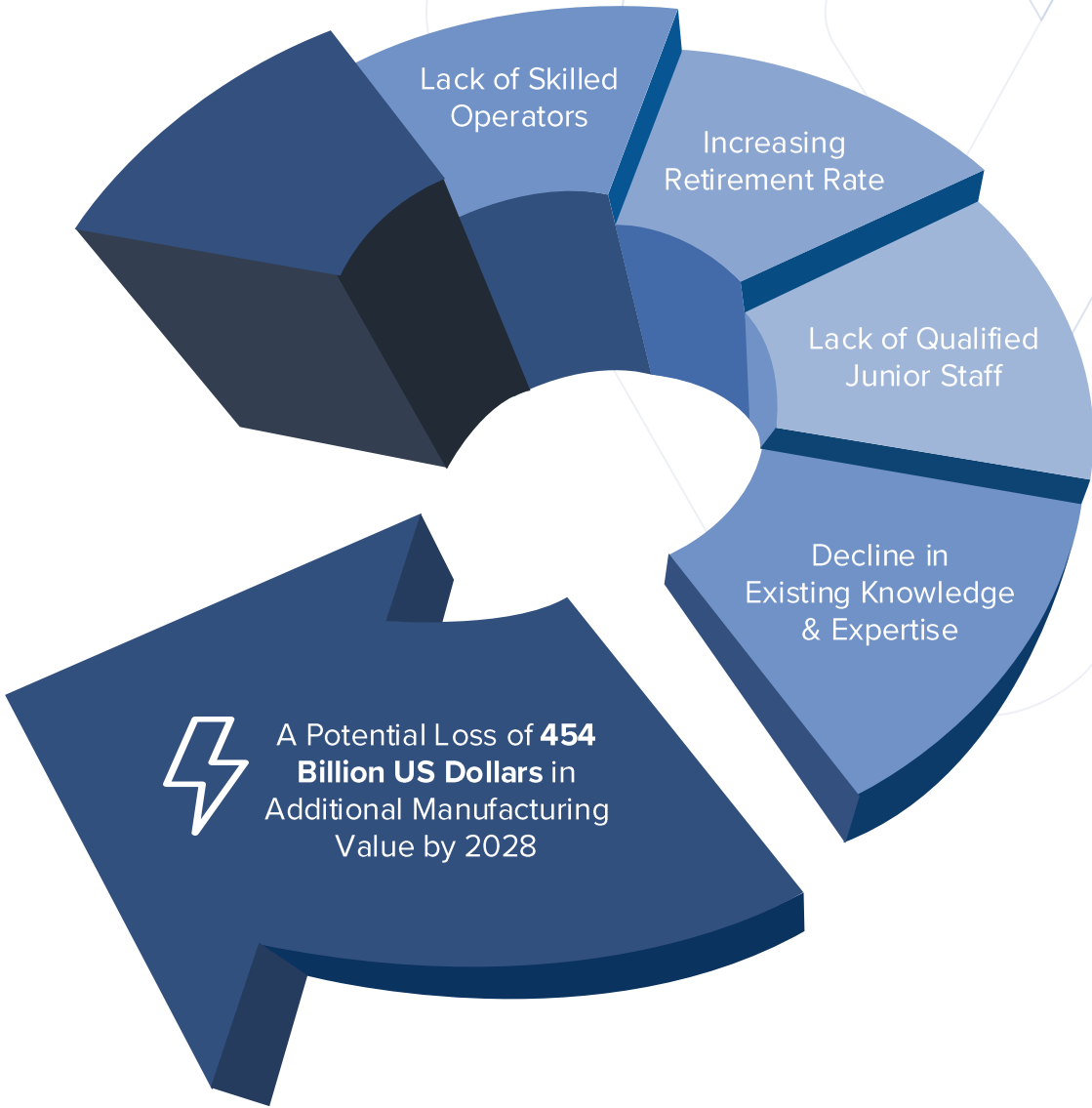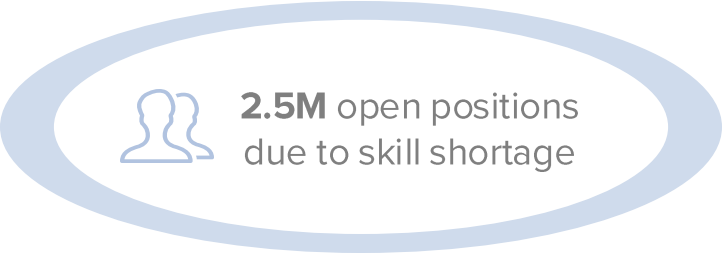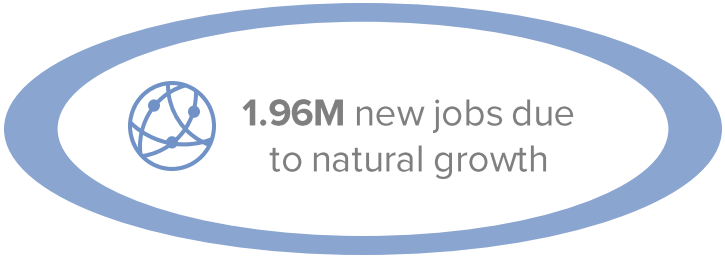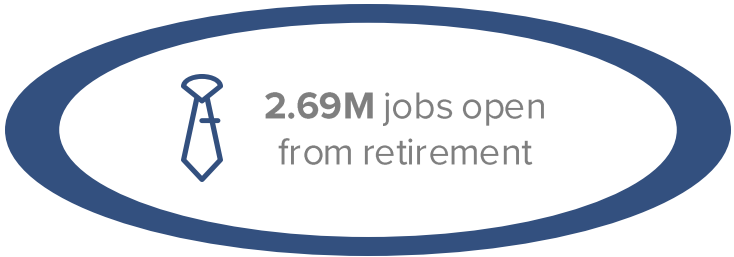The Manufacturing Processes are fully automated.

Discrete Manufacturing Production:
Demand Increasing[1]

What is **holding** us **back** from keeping up with **increasing Demand** at **current Capacities**?

Skills Gap in Manufacturing

2.69M jobs open from retirement

1.96M new jobs due to natural growth

2.5M open positions due to skill shortage

Lack of Skilled Operators

Increasing Retirement Rate

Lack of Qualified Junior Staff

Decline in Existing Knowledge & Expertise
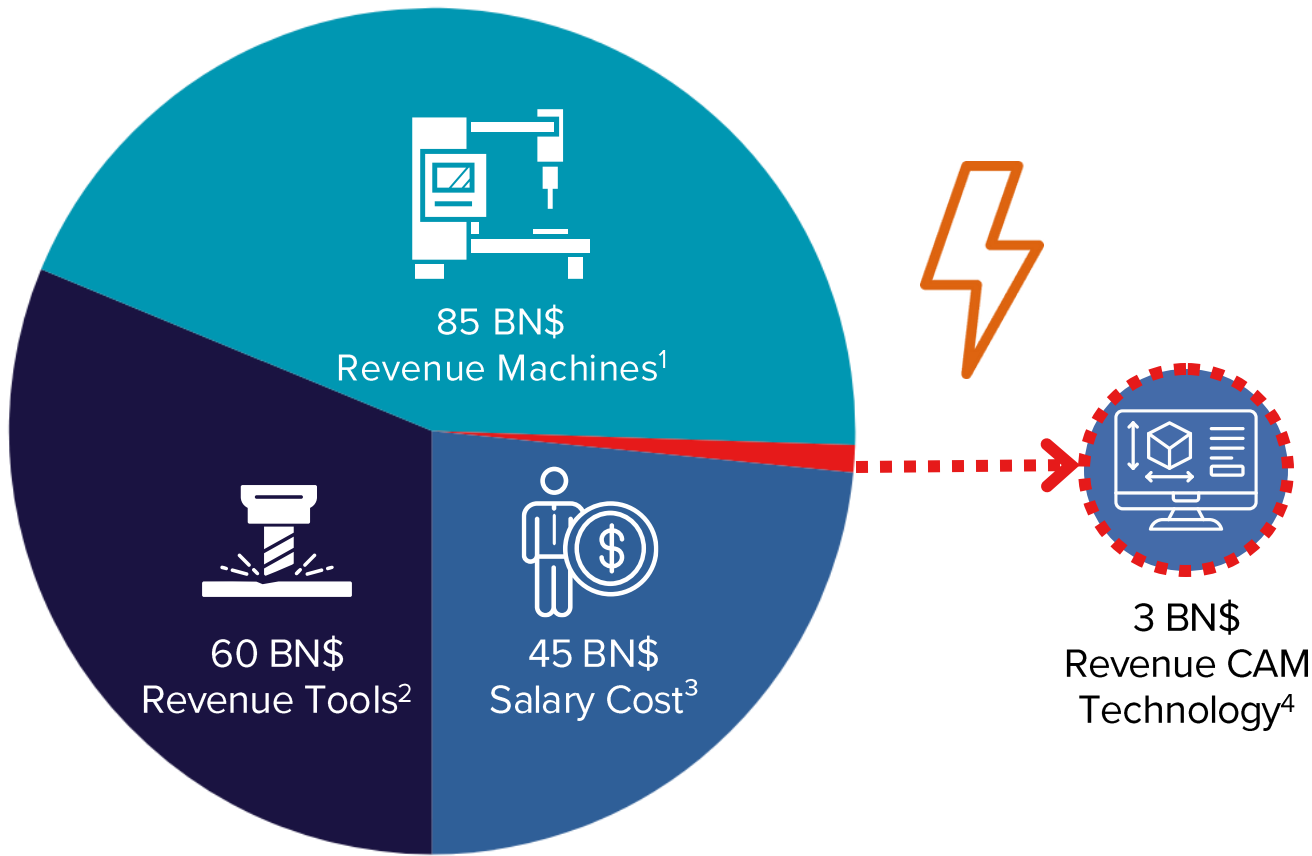
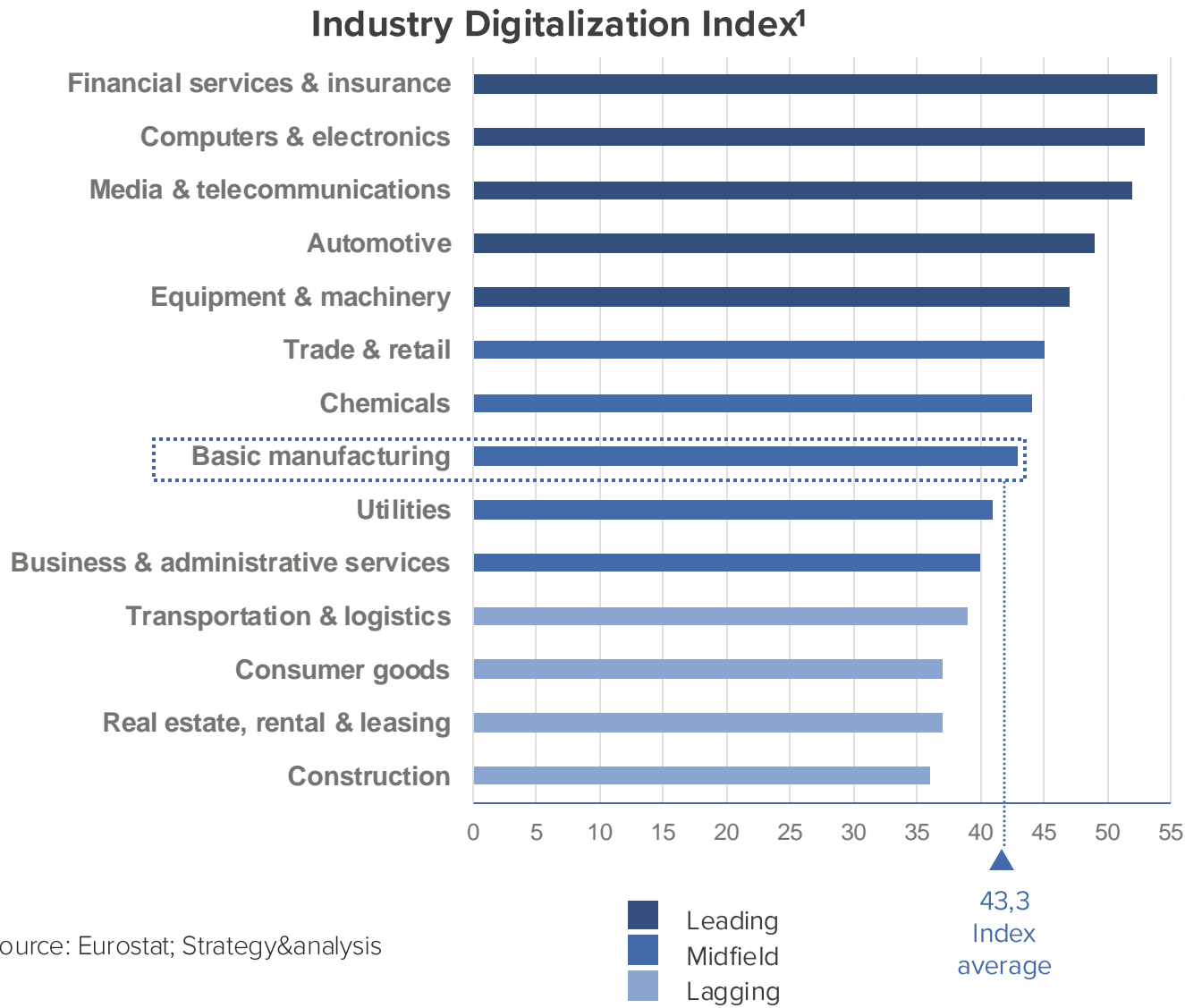A Potential Loss of **454 Billion US Dollars** in Additional Manufacturing Value by 2028

Source: Data from BLS and Oxford Economic Model, Deloitte and Manufacturing skills research initiative, 2018

ModuleWorks

Manufacturing Market Shares

85 BN$
Revenue Machines[1]

60 BN$
Revenue Tools[2]

45 BN$
Salary Cost[3]
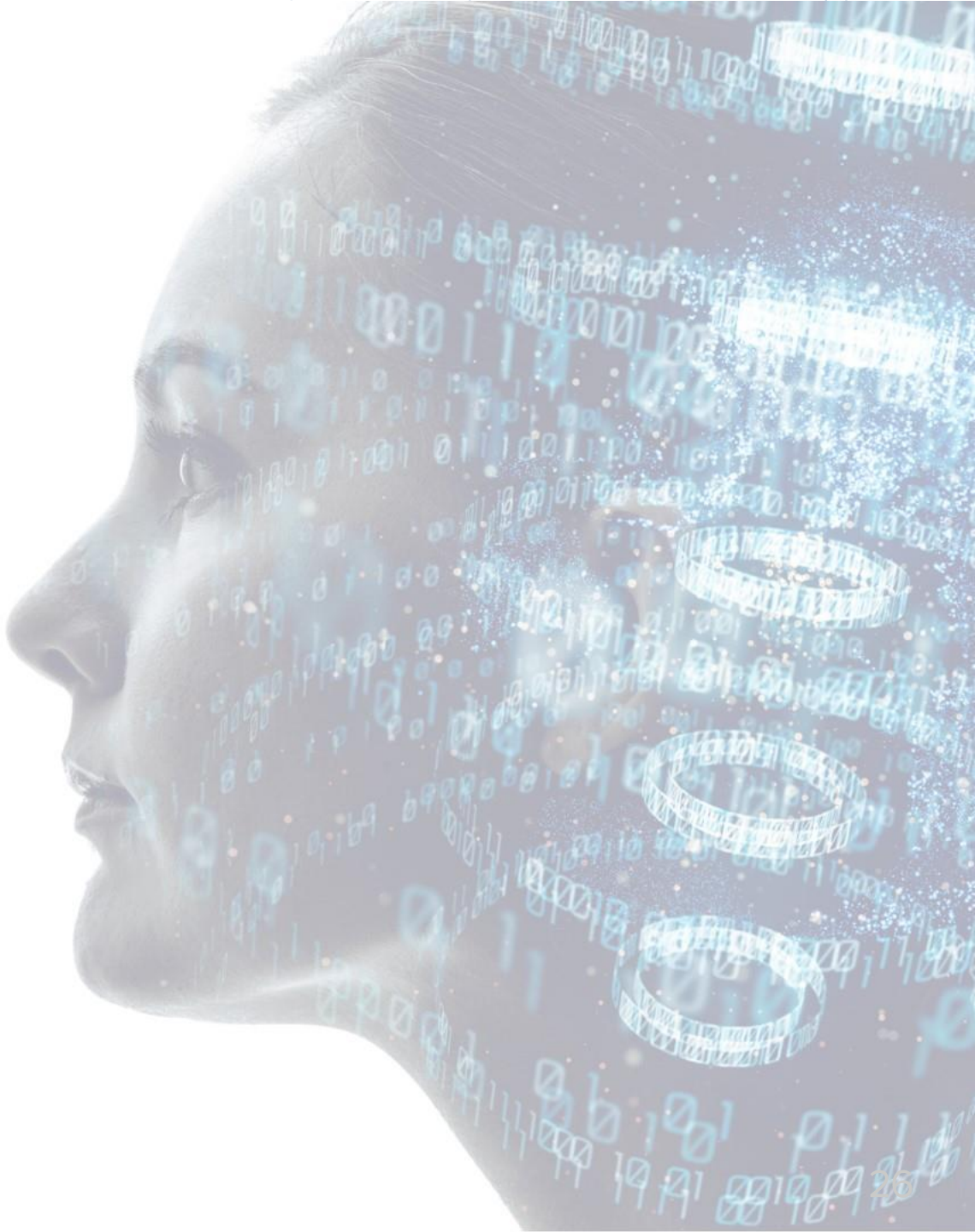
3 BN$
Revenue CAM
Technology[4]

1) Source: VDW Marktbericht 2022 p.43 2) Tooling: Allied Market Research 3) Glassdoor 4) Source: Cimdata report 2023

ModuleWorks

Manufacturing Market Digitalization

Industry Digitalization Index[1]

Financial services & insurance
Computers & electronics
Media & telecommunications
Automotive
Equipment & machinery
Trade & retail
Chemicals
Basic manufacturing
Utilities
Business & administrative services
Transportation & logistics
Consumer goods
Real estate, rental & leasing
Construction

0   5   10   15   20   25   30   35   40   45   50   55

■ Leading
■ Midfield
■ Lagging

43,3
Index average

Value Potential from Digitalization

ModuleWorks

Driving Factors
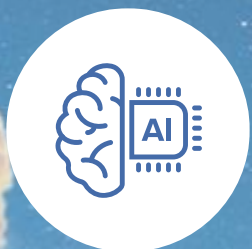
Enabling Tech

Skills Gap[1]

Cost

Supply Chain

Digitalization Potentials[2]

Forecasting Accuracy Improvement

Machine Downtime Reduction

Inventory-Holding Cost Reduction

Labor Productivity Increase

Cost-of-Quality Improvement

Throughput Increase

(1) Source: Deloitte, The Manufacturing Institute; (2) Source: McKinsey

ModuleWorks

Value Potential from Digitalization

A relatively small investment in Digital Capabilities leverages the greatest return across all our existing investments.

ModuleWorks and Digital Factory Vision

Digital Factory - Manufacturing Challenges

Skills Gap → **Machine Complexity** → **Machine Availability** → **Machine Connectivity** → **Digitally Enabled Business**

The manufacturing skills gap is forcing machine shops to quickly and cost-effectively train operators on the next generation of machine tools while maintaining tight profit margins and production schedules.

Modern multi-tasking machines open a wealth of new application possibilities, but extended functionality means extra programming complexity and additional time and costs for machine shops. The solution is a new and easy-to-use programming methodology.

Machine tools are becoming increasingly sophisticated and extending production horizons. This places extra demands on engineers and operators to ensure production safety and continuous machine availability.
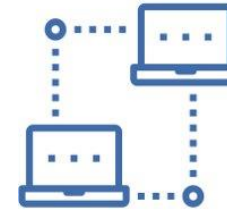
IoT/Industry 4.0 is the target vision of manufacturing companies. Getting there requires the intelligent and effective connection of heterogeneous hardware and software systems.

A well-designed online presence of hardware product portfolios has become vital to success. Companies require new and powerful ways to convincingly demonstrate their products online.

ModuleWorks

DIGITAL FACTORY VISION

Digitalization

Digitalization is the driving source to make machines smarter, empower operators and ensure interoperability between systems.
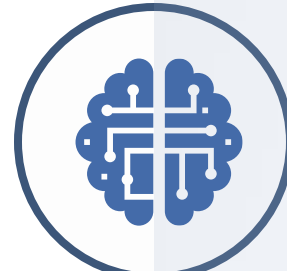
Smart Machines

Empowerment

Manufacturing experts are critical for production. Empowering them to become more productive benefits everyone.

Interoperability

Interoperability between systems, upstream and downstream is a powerful way of increasing productivity.

Why Choose Us

Our Vision

Digitalization of machines and processes generates value by empowering cnc machine operators and making hardware- and software-systems more interoperable. ModuleWorks believes that strong, long-term partnerships between software and hardware companies are the key to success.

Through our mutual goals and our flexibility to provide truly embeddable software components, we create real value for our partners.

ModuleWorks is an ideal partner that is perfectly tailored to your needs.

Tailored, go-to partner for manufacturing digitalization and precision
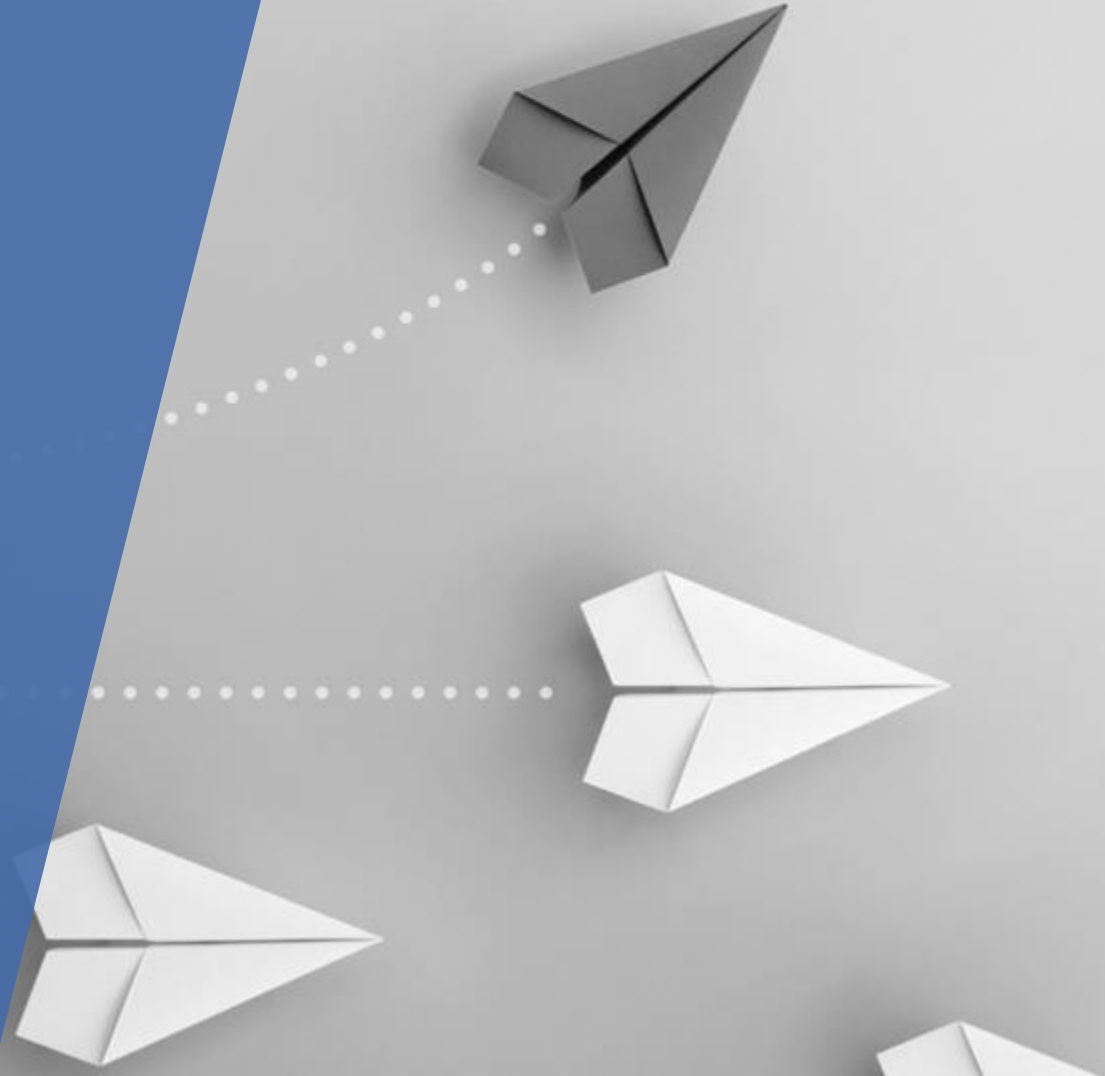
Why Choose Us

Our Vision

Empowerment and **Interoperability** are key to addressing the challenges of the manufacturing world.

Empowering cnc machine operators and the ability of hardware- and software systems to interconnect is necessary to respond to the increasing market challenges.

At ModuleWorks we are passionate about developing manufacturing software and making manufacturing processes more interoperable, stable and versatile.

Goal: Efficient, stable, and environmentally conscious manufacturing.

ModuleWorks and Digital Factory Value Proposition

Our Solution Portfolio

Solutions

Skills Gap	Machine Complexity	Machine Availability	Machine Connectivity	Digitally Enabled Business

Operator Education

Machine Programming

Program Verification

Digital Thread

Machine Demonstration

Intuitive Programming

Process Analysis and Automation

Machine Protection

ModuleWorks and
Digital Factory
Services and Outlook

Our Service Levels

From off-the-shelf software components to a full consultation on the digitalization strategy connected to those products.

Off-the-Shelf Components
Enhance your manufacturing and get to market faster with our ready-made components.
We offer cost-effective solutions for increased efficiency and quality.

Customized Solutions
We provide customized manufacturing solutions and work with you to design features that streamline your process and focus on specific industry needs.

Turn-Key Solutions
As your strategic partner, we manage comprehensive development projects, ensure seamless integration, and enable you to focus on your core competencies. Benefit from our expertise gained in research projects to achieve exceptional results.
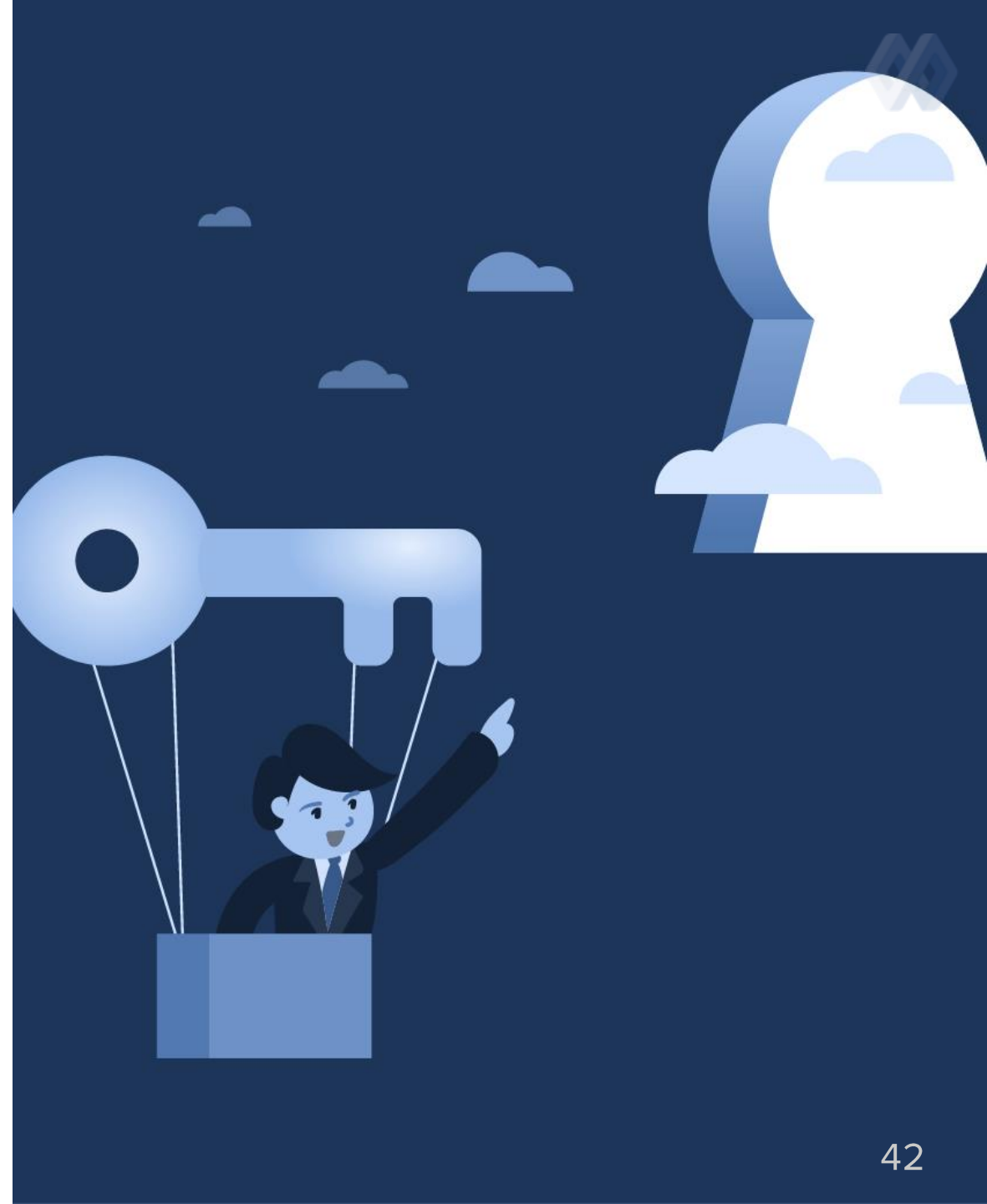
Our Solution Outlook

Want to stay ahead of the curve in manufacturing?

Discover how ModuleWorks can help you stay ahead of the trends and succeed in the industry.

We're here to consult on **cutting-edge topics** like

- Artificial Intelligence
- Virtual and Augmented Reality
- Industry 4.0/IoT
- Cloud/SaaS

ModuleWorks

ModuleWorks and
Digital Factory
Portfolio Details

Skills Gap

Operator Education

ModuleWorks training tools give operators an ultra-realistic training experience on fully simulated machines to bridge the skills gap while optimizing machine availability and eliminating the risk of damage to production equipment.

Visual Trainer

Originally designed as a sales and marketing demonstrator, our Visual Trainer (Visual Twin for education purposes) lets you train your operators on a real or virtual control with the full "As Real As It Gets" experience of running a machine without the risk of causing real damage to the tools, machine components or the workpiece.

Skills Gap

Intuitive Programming

Our easy-to-use programming approach helps your operators to program parts on the CNC in an intuitive manner and enables you to maximize the productivity on the shop floor.

Next Generation Shop Floor Programming

Next Generation Shop Floor Programming is an innovative and highly automated embedded CNC programming solution for on-machine programming on the shop floor. It empowers operators to program a wide variety of prismatic parts more easily, faster, safer, and in a more cost-effective manner than before.

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Machine Complexity

Machine Programming

Extend the shop floor programming capabilities of your CNC with our wide variety of milling and turning strategies combined with a flexible post-processing solution.

Machine Complexity

Toolpath on Control

With toolpath on control, you can use all the ModuleWorks 2D and 3D roughing and finishing strategies for milling and turning directly on the controller. The more complex 4-axis and 5-axis cycles are also available, depending on the type and complexity of the part.

Post Processor Framework

Depending on the capabilities of your CNC to receive toolpaths generated by other components, there is often the requirement to generate NC code on-the-fly for the programmed toolpaths. Our Post Processor Framework lets you write and quickly adapt a Post Processor which takes into account the machine kinematics and other characteristics of your CNC and your machine.

Machine Complexity

Process Analysis and Automation

ModuleWorks fully automated on-control programming and analysis tools empower operators to optimize multi-tasking machinery and increase shop floor productivity.

Machine Complexity

Advanced Simulation

Our simulation components, originally designed for toolpath verification, also offer the possibility to analyze the cutting conditions and engagement situation during a machining process with high geometric detail. This information already provides more insights into the cutting process, but can also be utilized as a basis for a full process simulation to model cutting forces and process dynamics

TemplateCAM

TemplateCAM is a software framework that enables you to develop customized applications for automated manufacturing workflows. These workflows can be scripted to directly access our various toolpath and simulation components, use pre-defined workflow steps, or develop customized steps that can also interface with external software components. A customizable UI generated within the script allows your user to visually interact with the provided workflows.

Machine Availability

Program Verification

Our solutions also help to maintain stability and avoid interruptions in manufacturing processes by verifying programs before they are executed on the machine.

Machine Protection

From tool path verification to real-time collision avoidance, our intelligent, automated solutions support operators in all safety-critical processes to ensure production stability and continuous machine availability.

Machine Availability

Simulation

We offer different types of toolpath-verification components depending on the data available and on the way the component will be integrated into your platform. Regardless of what kind of simulation component is required, we have the ideal solution for you: from workpiece-based toolpath verification to a full machine simulation based on axis data or even a ready-to-use simulation solution with a user interface.

NC-Editor

NC Editor is a powerful and easy-to-use application for editing, simulating, back plotting and verifying G-code for CNC machining. With an intuitive interface that provides instant 3D simulation while you edit the program, you can detect potential collisions and errors at a glance and quickly optimize the performance and safety of your machining process.

Machine Availability

Collision Avoidance System

Our Collision Avoidance System is a full end-user product, which offers protection against different kinds of collisions during machine operation. It also lets the operator enter all relevant setup data, like tools, fixtures and stocks, with a modern UI designed for touch operation directly on the screen attached to the CNC. With this system, we offer a plug-and-play solution that can easily be integrated into CNC machine tools.

Collision Avoidance Core

With Collision Avoidance Core, the core business logic of our own system is made available to integrators who want to develop their own, customized Collision Avoidance solution. The Collision Avoidance Core is a software component that contains all known features for processing control data, detecting collisions based on a virtual representation of the physical machine tool and reacting to the detected collisions.

Machine Connectivity

Digital Thread

To make 3D geometry data efficiently available without manual input, ModuleWorks offers Data Provisioning tools that streamline data up- and downstream.

MDESlib - Equipment

MDESLib – Equipment is a library component for the description of manufacturing equipment, such as tools, tool holders or fixtures. It follows the specification of our new MDES initiative for an open exchange format. Using the component, you can quickly transfer data between different software systems and have full interoperability with other ModuleWorks products.

Digitally enabled Business

Machine Demonstration

ModuleWorks Machine Demonstration tools help to create persuasive marketing material on demand to efficiently demonstrate the machines' unique benefits to potential partners.

Visual Twin

Visual Twin allows you to simulate a full machine tool for sales demonstrations and marketing purposes. We help you create a visually appealing, authentic representation of your machine tool that gives your audience an "As Real As It Gets" experience of your machine and the implemented machining process.

Visit Us!

www.moduleworks.com
info@moduleworks.com

Also follow ModuleWorks on: