References industry consulting
Supporting processes
Version 04 (2019)
Industry consulting: Overview of the consulting portfolio of the WBA

- Market and customer potential
- Range of products and services
- Intelligent tools and services

External increase of customer benefits

Internal increase of efficiency

Analysis of competition and strategy

- Lean, process and project management
- Supplier selection and management
- Industry 4.0 and system support
- Operational and organizational structure

Supporting processes

Request

Distribution, development and design

- Customer acquisition and marketing
- Calculation and pricing

Manufacturing, assembly and try out

- Engineering, design and CAx process chain
- Additive manufacturing
- Planning and scheduling
- Technology usage
- Layout and location
- Manufacturing concept and automation

Supporting processes (internal)

Market and customer (external)

Core processes (internal)
### Industry consulting: The detailed consulting offer of the WBA (I/II)

#### Market and customer

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#### Competition and strategy

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#### Supporting processes

**Lean, process and project management**

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**Supplier selection and management**

| Definition of scopes and relevant processes for procurement |
| Identification, assessment and selection of suppliers |
| Initiation and development of strategic partnerships |
| Holistic assessment of options for national and international tool supply |

**Industry 4.0 and connectivity**

| Analysis and maturity assessment of the Industry 4.0 status quo |
| Development of objectives, concepts and roadmaps including investment budgeting for Industry 4.0 |
| Deduction of specific Industry 4.0 use cases including implementation support |
| Recording and analysis of machine and production data |

**Operational and organizational structure**

| Analysis of organizational structures and assessment of the degree of value creation |
| Procedural and organizational reorganizational |
| Conception and implementation of agile structures of organizational |
| Deduction of measures for the organizational change |
## Industry consulting: The detailed consulting offer of the WBA (II/II)

### Core processes

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<td>- Additive manufacturing integration in existing process chains with focus on subsequent processing</td>
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| - Conception and introduction of synchronised and agile product design processes |
| - Assessment and optimization of the standardization for tools and tool components |
| - Definition of requirements and selection of CAx systems |
| - Analysis and optimization of the CAx process chain |

| - Manufacturing process analysis and derivation of standard manufacturing processes |
| - Conception of a virtual/physical segmentation and clocking |
| - Conception of hard- and software for data capturing and provision |
| - Definition of requirements and selection of planning software systems |

| - Analysis and optimization of the material flow |
| - Basic and fine layout design and optimization |
| - Conception and further specification of logistics concepts |
| - Planning and support for relocation and transfer to existing and newly built locations |

| - Analysis of market and customer demands |
| - Development of strategies for distribution and marketing |
| - Identification and selection of relevant instruments for marketing |
| - Fine adjustments of selected analogue and digital instruments for marketing |

| - Analysis and optimization of the used methods of calculation |
| - Analysis of conducted calculations for cost optimization |
| - Development of solutions for data capturing and provision |
| - Definition of requirements and selection of calculation software |

| - Definition and improvement of the manufacturing performance |
| - Technology assessment and profitability assessment |
| - Analysis and optimization of manufacturing processes and methods |
| - Analysis and optimization of the operating times, idle times and set-up times |

| - Analysis of the actual and future range of tools |
| - Development of a manufacturing concept and technology road-mapping |
| - Analysis of requirements, specification and selection of machines |
| - Conception and selection of automation solutions |
Industry consulting: Within the consulting projects there are four different project focuses

Market and customer

Competition and strategy

Supporting processes

External increase of customer benefits
Internal increase of efficiency
Analysis of competition and strategy

Lean, process and project management
Supplier selection and management
Industry 4.0 and system support
Operational and organizational structure

Supporting processes

Customer acquisition and marketing
Calculation and pricing
Engineering, design and CAx process chain
Additive manufacturing
Planning and scheduling
Technology usage
Layout and location
Manufacturing concept and automation

SOP
Industry consulting: Within the consulting projects there are four different project focuses
Analysis of the milling process in large milling machinery of Audi tool and die shop to reduce non-productive times

Approach

- Process recording and documentation of the milling large machinery and establishing current distribution of main time and non-productive time
- Analysis of the current process of mechanical production in the milling area and comparison with competitors with regard to selected key figures
- Prioritization of optimization possibilities and derivation of the action plans with corresponding responsibilities

Results

- Determined competition comparison with regard to the main and non-productive times in the large milling machinery
- Identified fields of action and derived and prioritized action plans to reduce non-productive time
Optimization of project planning and scheduling in the internal tool shop of Otto Bihler Maschinenfabrik GmbH & Co. KG

Approach

- Performance of an in depth analysis of the order fulfillment and planning process as well as an evaluation of project-based order data
- Deduction of strengths and weaknesses in project planning and scheduling, as well as in the whole order fulfillment process
- Development and definition of a target state for a digital interconnected project planning and scheduling consisting of rough planning, detailed planning and scheduling
- Definition and prioritization of measures for the realization of the defined target state in project planning and scheduling
- Support and controlling of the operational implementation of measures

Results

- Developed and described target state for a digital interconnected project planning and scheduling
- Detailed measures with responsibilities and deadlines in order to achieve the target state
Centralization of the tool shop and design of the new layout at Böhler Schmiedetechnik

**Approach**
- Analysis of the actual availability and demand of resources at the current tool shops as well as the calculation of the future demand of resources
- Quantitative and qualitative assessment of the tool shops’ centralization within a business case and decision on the realization
- Development and design of a material flow oriented layout for the centralized tool shop
- Development of a detailed relocation plan for each resource
- Calculation of the saving potentials as well as the amortization of the centralized tool shop

**Result**
- Centralized and optimized tool shop in terms of resources as well as layout design in consideration of budget restrictions
Relocation coordination and employee training for internal tool shop of the Böllhoff company

Approach

- Development of step-by-step relocation plan with detailed responsibilities as well as timing of relocation-related activities to minimize interruption of production
- Definition and acquisition of required new equipment as well as transportation services
- Coordination of relocation
- Implementation of developed layout at new site
- Training and motivation of employees for the change to the newly introduced production concept of “industrial tool making”

Results

- Relocation of tool shop with minimal interruption of production to production-technology-optimized factory
- Trained employees with improved understanding of industrial tool making
Analysis of hot runner system providers for the internal tool room of Böllhoff

Approach

- Identification of hot runner system providers in the German-speaking region
- Creation of a company-specific requirement profile for the systematic evaluation of the suitability of the hot runner system provider
- Detailing and weighting of the defined requirements in terms of scope of services, use of technology, etc.
- Preparation and mailing of a questionnaire for the systematic collection of the relevant information from the hot runner system provider
- Validation of evaluation results through comparison with empirical values of selected partner companies and suppliers recommendation

Results

- Detailed profile of requirements for hot runner system suppliers
- Company profiles of the key players for hot runner systems in the German-speaking region
Technology roadmap and investment needs for the internal tool shop of Böllhoff

Approach

◼ Analysis of work pieces and the manufacturing data as well as strategic decisions concerning tool production
◼ Investigation of future developments within the product portfolio and the related production requirements
◼ Evaluation and selection of the suitable manufacturing technologies for future tool production
◼ Development of suitable manufacturing concepts for the internal tool shop in consideration of possible production strategies
◼ Derivation of a technology roadmap for the selected manufacturing concept including investment decisions for technologies and associated machines

Result

► Comprehensive technology roadmap including investment decisions regarding technologies and associated manufacturing resources to achieve the company specific manufacturing concept
Analysis and optimization of the order processing in the Böllhoff tool shop

**Approach**

- Quantitative analysis of the three dimensions speed, adherence to delivery dates and cost compliance in the form of a project- and tool type-specific order data analysis as well as comparison of the determined values with the competition
- Qualitative analysis of the order processing process to identify the causes of the quantitatively identified weaknesses and to identify further optimization potentials
- Definition of immediate measures to counter initial weaknesses in the short term
- Derivation of key figures for the future continuous tracking of the performance of the tool shop
- Development of an optimized target order processing process and derivation of an action roadmap

**Results**

- Detected vulnerabilities based on data and process analysis
- Developed immediate measures and derived target order processing process
Planning systematics and PPS software system selection in tool making

**Approach**
- Analysis of the planning system and derivation of a future planning system
- Creating specifications for a PPS software system
  - Identification of company specific requirements
  - Description of compulsory functions
- Selection of a PPS software system
  - Analysis of available PPS software systems
  - Definition of an evaluation scheme for PPS software systems
  - Evaluation of the analyzed PPS software systems

**Result**
- Selection of a PPS software system to design a system supported planning system to improve both performance and competitiveness
Implementation support for tool and process standardization at Braunform

Approach

- Analysis of the product and tool spectrum
- Execution of a macro- and microgeometric component analysis on the basis of 57 part lists
- Evaluation of the standardization potential of relevant components within a defined product and tool range
- Verification of the standardization potential by employees of different process steps such as design and work preparation
- Definition of fields of action for tool standardization:
  - Implementation of component standardization
  - Launch of identification numbers
  - Standardization for follow-up orders
- Cost and benefit evaluation of the overall tool standardization
- Derivation of a ‘Roadmap 2025’ in order to ensure and to synchronize the tool and process standardization

Results

- Identified standardization potentials for a systematic tool standardization
- Concrete implementation support with a derived roadmap until 2025
Realignment and industrialization of the internal tool shop at the location Traunreut

Approach
- Positioning and realignment of the internal tool shop within the company
- Standardization of tools, modules and components
- Standardization of process sequences and work plans
- Segmentation of tool manufacturing and derivation of a planning procedure
- Implementation of synchronous manufacturing characterized by the flow principle

Results
- Development and implementation of a sustainable tool manufacturing
- Continuous increase of productivity (20% over the period of four years)
Revealing cost potentials by modularization and standardization of the tool program

**Approach**

- Quick check state of modularization
- Analysis of the product range
- Analysis of tool types
- Identification of potentials:
  - Tool modularization and standardization
  - Enhancement of the tool procurement process
- Derivation of measures

**Results**

- Definition of 7 standard tool racks for thermoplastic molds
- Definition of tool modules valid for all variants
- Conception of an IT tool to support the procurement of modularized tools
Enhancing the degree of standardization in the construction of special facilities (carriage devices)

Approach

- Evaluation of the current status quo regarding the degree of standardization in the manufacturing of special facilities
- Identification of standardization potentials based on similarities and requirements
- Development of approaches for standardization in the pilot group carriages
- Definition of measures and development of a target process
- Evaluation of efficient production lot sizes by an estimation of costs

<table>
<thead>
<tr>
<th>Function</th>
<th>Burner infeed</th>
<th>Burner infeed several positions, small distances</th>
<th>Burner infeed manually</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological realization</td>
<td>pneumatics, ball/roller-guide, small load rating</td>
<td>Servo motor, spindle, ball/roller-guide, small load rating</td>
<td>with spindle, roller-guide, small load rating</td>
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<tr>
<td>Simple definition of standards</td>
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<tr>
<td>Description of component</td>
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<tr>
<td>Base plate</td>
<td>Size 1b</td>
<td>Size 1b</td>
<td>Size 1b</td>
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<tr>
<td>Trolley plate</td>
<td>Size 1b</td>
<td>Size 1b</td>
<td>Size 1b</td>
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<td>Bottom plate</td>
<td>Size 1b</td>
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<tr>
<td>Head plate</td>
<td>Size 1b</td>
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<tr>
<td>Guide rail</td>
<td>variable</td>
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<tr>
<td>Carriage</td>
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<tr>
<td>Gear rod, spindle or Cylinder</td>
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<tr>
<td>Clutch/ Cylinder connection</td>
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<td>Z-Connector</td>
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<td>Engine and pressure unit</td>
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<td>Cylinder</td>
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<td>Clutch bell</td>
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Result

- Evaluation and execution of standardization options with a pilot group and definition of a module roadmap including a target process for a further standardization
Support of the Daimler-internal project “process analysis tool manufacturing for expanding the equipment department“

**Approach**
- Simulation of segmentation scenarios
- Definition of the manufacturing depth
- Distribution of resources/ factory layout
- Detailed development of the process steps
- Task description
- Integrating the segments in the context
- Definition of interfaces
- Industrialization of the tool introduction

**Results**
- Detailed concept draft for expanding and segmenting the tool manufacturing
- Concept for a standardized tool introduction
Optimization of the quotation preparation process and the calculation systematic at DMW

Approach
- Analysis of prepared quotes and realized orders regarding type of order and type of tool
- Definition of possible characteristics for a comparison
- Standardization of existing data and realized tool projects
- Derivation of a calculation systematic and implementation within the scope of a MS Access tool
- Status Quo analysis of the quotation preparation process including employee interviews
- Definition of a standardized quotation preparation process including the determination of milestones
- Derivation of a set of rules for the implementation

Results
- Detailed quotation preparation process including determined milestones and a defined set of rules
- Inquiry and project databank including a calculation systematic based on Microsoft Access
Analysis and scenario management of the CAx process chain

**Approach**

- Visualization and optimization of the order processing process and the CAx process chain
  - Analysis of the entire order processing process of the tool shop
  - Analysis of the CAx systems used along the process chain
  - Checking possible starting points for optimization in the sense of a continuous CAx process chain

- Scenarios for the CAx process chain
  - Presentation of suitable software solutions for the continuous CAx process chain
  - Development of a requirement profile for CAx systems
  - Preparation of a possible target scenario for the introduction of an optimal CAx system
  - Identifying the time and cost-determining factors

**Results**

- **Software scenarios to leverage potential in the continuity of the CAx process chain**
- **Target concept as a guideline for the introduction of a CAx system**
Comprehensive analysis and definition of processes, software, organization and sales in the fischer tool shop

**Approach**

- Analysis of the current order fulfillment process in the fischer tool shop
- Detailed analysis of the applied calculation methods as well as order data and deduction of root-causes for exceeded cost and missed deadlines
- Definition of an efficient order fulfillment process and derivation of necessary measures for its implementation
- Optimization of the planning process and systematic selection of suitable planning software
- Evaluation of different options for organizing the fischer tool shop as well as deduction of a recommendation for segmenting the tool shop for new and repair orders
- Systematic definition of the future sales focus of the fischer tool shop

**Results**

- Efficient and transparent order fulfillment process which is supported by a systematically selected planning software
- Systematic and sustainable alignment of the organizational structure as well as the sales focus
Systematic definition of the planning process and selection of a suitable planning software for the fischer tool shop

**Approach**

- Analysis of the ongoing planning process and identification of interface problems
- Deduction of requirements for the planning process as well as a supporting software for interconnected planning in rough and detailed planning as well as scheduling
- Identification of relevant planning software suppliers and pre-selection based on specifications
- Detailed comparison of the software solutions based on online and on-site presentations of the suppliers and evaluation according to the requirements defined by the fischer tool shop
- Elaboration of a recommendation for the selection of a planning software in consideration of the option to optimize an internally developed planning software

**Results**

- Improvement of cost and due date reliability by optimizing the planning process with the support of a systematically selected planning software
Optimization of the strategic direction and operational order processing at the Ford tool shop in Cologne

Approach

- Analysis of core competences of the Ford tool shop
  - Identification and analysis of existing competences based on interviews with employees and benchmarking data
  - Comparison of the competences of the Ford tool shop with market competitors
  - Derivation of measures in order to strengthen core competences and increase flexibility

- Conception of an order processing with reduced interfaces
  - Identification of required process interfaces for order processing and analysis of existing interface problems
  - Definition of a target process including responsibilities and defined handover processes
  - Development of an optimized organizational structure to realize an order processing with reduced interfaces

Result

► Approach for an efficient, profitable and capable tool manufacturing based on a strong focus on core competences and a reduced number of process interfaces
Manufacturing conception of the external tool shop of Gebhardt Werkzeug- und Maschinenbau

Approach

- Systematic collection of all machined work pieces including detailed characteristics over a certain period of time
- Analysis of the technological capabilities in terms of applied manufacturing technologies and used machines
- Evaluation and selection of suitable manufacturing technologies for future work pieces
- Development and assessment of possible future manufacturing concepts in consideration of technology variety and machine utilization
- Derivation of an investment roadmap for the selected concept including defined technologies and machines
- Specification of the required machines in terms of technological performance and automation equipment

Result

- Development of a future manufacturing concept including specified technologies and machines in order to be suited for the production needs in the long term
Development of a shopfloor layout for the tool shop of a new production site at GIRA

**Approach**
- Sensitizing and mobilization of employees using an educational game
- Detailed analysis of manufacturing sequences
- Development of a roadmap for the standardization of manufacturing sequences for tool components within the entire tool spectrum
- Elaboration of rough and detailed layout options collectively with the employees
- Assessment of elaborated layout options with regards to defined target figures such as material flow and expandability
- Selection of a layout option for the GIRA tool shop

**Result**
- Collectively developed, detailed shopfloor layout based on defined target figures
- Elaborated, standardized manufacturing sequences and roadmap for process standardization
Revealing cost potentials by modularization and standardization in tool making

**Approach**
- Quick check state of modularization
- Analysis of the product range
- Analysis of tool types
- Identification of potentials for tool modularization and standardization
- Derivation of measures
- Prioritization of measures by costs and benefits

**Results**
- Profile about strengths and potentials of the status quo in tool and process standardization
- Definition of tool modules valid for all variants
- Development of an implementation plan for the measures
Development of a tool standardization concept for Hajdu Autotechnika in Hungary

Approach
- Analysis of the product and tool spectrum in terms of quantities, similarities and future developments
- Macro- and microgeometric analysis of internally and externally manufactured tool components for the entire tool spectrum
- Definition of design guidelines for internally manufactured tool components as well as future outsourcing potentials
- Standardization of tool frames, master forms for operation stages and individual tool components
- Development of a uniform nomenclature for all tool components
- Derivation of a holistic implementation roadmap including necessary measures and responsibilities

Results
- Standardized tool frame, operation stages and tool components for each type of tool
- Holistic implementation roadmap for the realization of the standardization

Characteristics of the components and the series process

Design guidelines based on macro- and microgeometric analyses

- No adaption of the modules
- Only adaption of the forming parts
Milling department reorganization by manufacturing concept, machine selection and recommendation for automation

**Approach**
- Analysis of product spectrum and subsequent data consolidation as well as derivation of requirements
- Derivation of requirements for milling machines, clamping systems, CAx process chain and automation
- Development of manufacturing concepts and final concept selection by value benefit analysis and financial analysis
- Evaluation of an efficient automation level and development of an automation concept

**Results**
- Selection of milling machines considering current part variety
- Reduction of required milling machines by 25%
Process analysis and process re-design for Hartmann Codier tool shop

**Approach**

- Quantitative analysis of order data regarding planned and actual values of lead times and costs
- Bottleneck analysis of current tooling projects in respect of processing status and delay
- Job structure analysis for a breakdown of activities in the tool procurement
- Analysis of the order fulfillment process in combination with employee interviews as well as an analysis of the role understanding in the tool shop
- Conception of an optimized future order fulfillment process

**Results**

- Identified potentials in the order fulfillment process in the tool shop
- Optimized future order processing process including defined milestones
Implementation coordination for process improvements in the tool procurement at Hartmann Codier GmbH

Approach

- Definition of six improvement projects:
  - Order fulfillment process optimization
  - Introduction of project planning and management
  - Supplier qualification
  - Unifying of quality assurance
  - Optimization of IT systems
  - Introduction of KPI tracking

- Introduction of an iterative project management procedure for the implementation of the improvement projects based on the Scrum approach

- Establishment of weekly coordination sessions within the project teams

- Conduction of monthly sprint reviews to review project progress and derive measures

Results

► Structured coordination of six improvement projects for process optimization
► Established system for continuous improvement in defined topics
Conception of a productive and competitive industrial tool making

**Approach**
- Status quo analysis of the internal tool making
- Standardization of tool components and definition of manufacturing blanks
- Recording and analyzing process chains
- Definition of main process sequences
- Segmentation of the tool manufacturing
- Development of a process oriented manufacturing control concept
- Development of shaping options for the layout
- Framing the implementation

![Diagram](image.png)

**Result**

- **Industrialization concept for the tool manufacturing with higher productivity and short processing times by a new manufacturing concept and higher degree of standardization**
Layout design and planning of the project management for a relocation of a tool shop

**Approach**

- Development of a project plan for the relocation with detailed tasks
- Precise definition of tasks, deadlines and responsibilities for over 70 sub-tasks
- Identification of sub-tasks on the critical path for the monitoring of the finish date
- Definition of measures to ensure the required infrastructure of the production facility on the relocation date
- Layout planning for an optimized process flow of all manufacturing segments

**Result**

► Detailed project plan for the systematic coordination of the individual tasks and progress controlling and development of an optimized layout for a new tool making site
Relocation of the tool shop and efficiency optimization of the tool supply

**Approach**

- Project and cost controlling of the relocation of the tool making
- Identification of dispensable inventory through a 6S-Workshop
- Process orientated arrangement of the manufacturing areas and validation with regard to the lean principals
- Risk management ensuring a continuous tool supply
- Detailed planning of the implementation sequence and coordination of external service providers

**Results**

- Reduction of the relocation period by 2 weeks through efficient project and risk management
- Reduction of the relocation costs by 21.5 % through stringent project and cost controlling
Conception and introduction of a pilot line for clocked manufacturing of tools for massive forming

**Approach**

- Specification of a concept for clocked manufacturing in the process sequence
- Detailed planning of the introduction and implementation of the pilot line along with a specification of required infrastructure
- Staff training for the new manufacturing concept with an educational game which simulates the new manufacturing concept and clarifies uncertainties of the staff
- Supervision of the implementation of the pilot line and controlling of the impact on the key figures for production

**Result**

- Introduction of a clocked pilot line for tool making to reduce secondary process time and reduction of order lead time from 7 to 3.5 days
Process examination and optimization in the quality control division in the massive forming industry

**Approach**
- Examination of the status quo process in quality control and bordering division
- Analysis of the capacity utilization along the process chain
- Analysis and assessment of the structure of activities
- Conception of a segmented quality control for standard and express orders
- Development and assessment of a set of measures along with an implementation plan for efficient execution of quality control

**Result**
- Development of 22 measures for process optimization in context of increasing the production quality, segmented examination concept and single measures for cost reduction
Layout design und relocation planning for the internal tool shop of Heinrich Huhn GmbH & Co. KG

**Approach**
- Analysis of tool range and manufacturing processes as well as verification of tool shop’s segmentation based on conducted tool projects
- Recording and analysis of the general set-up of the new tool shop location
- Development and design of layout scenarios and their holistic evaluation conjointly with employees on the basis of defined criteria
- Planning and execution of preparatory measures for the realization of the operational relocation
- Development of step-by-step relocation plan with detailed responsibilities, external support as well as costs respectively estimates

**Results**
- Material flow oriented layout for standardized and transparent order processing
- Detailed overview of necessary actions and activities including costs for the operational realization of the tool shop’s relocation
Increase of efficiency in the designing department by modularizing the tool structure

**Approach**
- Status quo analysis
- Structuring of the tool spectrum to standardize the design
- Determination of design standards and modules to maximize the number of identical parts
- Assistance of the implementation and change management

**Result**
- Reduction of lead time from 18 to 12 weeks, which results from the process standardization, subsequent to tool standardization
Manufacturing and automation concept design of a modern tooling production of the future at igus

Approach
- Recording of the requirements of the work piece spectrum in tool design
- Creation of specification sheets for the machines to be procured based on the recorded requirements
- Market analysis and pre-selection of machines on the basis of the defined specifications
- Recording and evaluation of the requirements for the introduction of automation in tool manufacturing
- Development of an automation concept incl. determination of machines to be integrated, handling units, clamping systems as well as further peripherals and identification of possible suppliers

Results
- Detailed specification sheets based on the requirements of the work piece spectrum
- Preselection of commercially available machinery based on the specification sheets
- Assessed requirements for automation and derived automation concept
Development of a rough scheduling process and selection of a scheduling system for the tool shop of Kunststofftechnik Jantsch

Approach
- Analysis and optimization of the order processing with a focus on cost calculation and rough scheduling
  - Analysis of the current approach on cost calculation and scheduling as well as identification of potentials regarding information exchange and documentation standards
  - Analysis of the cost calculation and scheduling performance by a comparison of KPIs with similar tool shops
  - Derivation of measures for the development of a scheduling process with increased efficiency
- Identification and evaluation of potential suppliers of software systems for calculation and planning
  - Presentation of relevant software systems for the support of cost calculation and scheduling processes
  - Evaluation of the systems based on the company-specific requirements

Results
- Analyzed status quo and derivation of concrete measures for increased efficiency in cost calculation and scheduling in the tool shop
- Pre-selection of suitable software systems for a systematic cost calculation and scheduling
Optimization of the internal order processing and tool calculation

**Approach**
- Analysis of the order processing and creation of strength/potential profiles for the individual divisions
- Development of a concept for the reorganisation
- Implementation of a new calculation system
- Redefinition of the manufacturing planning by the flow principle
- Standardization of the processes in the work preparation
- Optimized ERP system use

**Results**
- Significant enhancement of the productivity during the order processing
- Realization of a general planning and controlling system from the offer creation up to the produced tool
Analysis, standardization and design of an efficient tool procurement at Miele

**Approach**
- Analysis of the tool procurement process at different national Miele sites with the aim of synchronizing the processes in order to realize synergies
- Identification of existing tool competencies (e.g. market knowledge, tool design or simulation) and the future competence need in tool procurement through employee interviews
- Definition of a tool procurement target process for the standardization and optimization of procurement across sites
- Effective integration of existing tool competencies at different Miele sites through a detailed tool and die competence network

**Result**
- Defined group-wide target process for a synchronized tool procurement
- Detailed tool and die competence network to support tool procurement
Redesign of tool shop of Murrplastik Medizintechnik GmbH

Approach
- Creation and implementation of an optimized order fulfillment process including defined milestones
- Development of a consistent system for rough and detailed planning as well as for production steering
- Implementation and visualization of planning and steering system in all departments involved and especially on the shopfloor
- Development of an optimized layout concept
- Design and elaboration of shopfloor management tools
- Conduction of trainings for employees
- Preparation of a detailed implementation roadmap

Result
- Redesigned tool shop with optimized order processing, planning and steering as well as production organization for economical and efficient tool production
Development of an Industry 4.0-concept for tool shop of Musashi Grolsheim

Approach

◼ Analysis of the order processing and identification of core potentials
◼ Derivation of action fields based on the compiled core potentials
◼ Research and elaboration of various Industry 4.0-solutions
◼ Development of an overall Industry 4.0-concept in order to comprehensively address the action fields and to increase the Industry 4.0-degree of maturity
◼ Assessment of the quantitative monetary potential of the Industry 4.0-concept with regards to cost and benefit
◼ Definition of an implementation roadmap including roles and responsibilities

Results

► Viable Industry 4.0-concept based on current action fields
► Monetary assessment of the Industry 4.0-concept including an implementation roadmap
Process Analysis & Selection of manufacturing concept and resources for internal tool room of Adam Opel AG

**Approach**
- Analysis of order fulfillment process, technological performance, work piece requirements and process chains
- Derivation of technological and organizational action fields and definition of improvement measures
- Analysis of future capacity demand and development of four different manufacturing concepts regarding machine utilization and number of in-house manufacturing technologies
- Evaluation of the derived concepts and selection of the concept with the best fit for the tool room of Opel
- Derivation of necessary machinery for the year 2021 under consideration of all strategic restrictions
- Derivation of a roadmap for execution of necessary changes in machinery and investment recommendations for specified machinery

**Results**
- Identification of action fields for improvement of organizational and technological performance
- Investment roadmap for realization of a future oriented machinery selection until year 2021
Layout and process design for OPUS Formenbau

**Approach**
- Analysis and optimization of the entire order fulfillment process
- Recording and analysis of the tool manufacturing process steps
- Identification of the material flow and development of a flow-oriented layout design
- Identification of the information flows and conception of an administrative building
- Definition of KPIs and elaboration as part of a leading on-site concept
- Development of a visual management in course of a shop-floor management

**Results**
- Material flow oriented layout design and information flow oriented administrative building
- Optimized order fulfillment process and individual shop-floor management
Layout detailing for the tool shop of Otto Fuchs KG

Approach

- Design of the rough layout based on the manufacturing workflow and the frame conditions given by the plant structure planning
- Development of the detailed layout considering the footprint for shelves, workbenches, goods receipt, goods issue, meeting points as well as the positioning of media connections
- Arrangement and specification within designated areas, such as assembly and warehouse areas as well as areas for tooling issuance
- Verification of the detailed layout by involving a large number of employees

Results

- Comprehensive and future-proof rough and detailed layout of the new tool manufacturing hall as supporting input for the final construction planning
- Inventory and purchase list enabling a structured relocation to the new tool manufacturing hall
Analysis of the mechanical production in the internal tool shop of Phoenix Feinbau GmbH & Co. KG

Approach

- Recording of the actual process in the mechanical production starting from the construction up to the delivery of the tool to the customer
- Conducting employee interviews with the individual departments
- Evaluation of the technological performance of existing machines
- Recording and evaluation of the detailed work piece analysis at machine level over a representative observation period
- Derivation of strategic and operative fields of action for mechanical manufacturing

Results

- Analyzed actual process in mechanical manufacturing and determination of requirements from the work piece spectrum
- Operational and strategic fields of action on the basis of the analysis results
Development of an efficient order fulfillment process in the internal tool shop of Procter & Gamble

**Approach**
- Analysis of the status quo analysis in different areas of order processing:
  - Projects
  - Tools and tool components
  - Order fulfillment processes
  - Planning & scheduling
- Development and definition of the central fields of action planning, scheduling and order fulfillment process
- Support for operational implementation, e.g. development of a tool for rough planning of projects
- Derivation and evaluation of measures for future implementation

**Results**
- Systematic for the planning and scheduling in the internal tool shop incl. rough planning tool and implemented scheduling approach alongside the process chain
- Detailed overview of measures to be executed for an efficient order fulfillment
Identification of the automation potential of the tool shop in Lohne

Approach

- Status-quo analysis of the automation requirements
  - Identification of existing preconditions for automation of the tool shop
  - Identification of the consequences for the automation concept
  - Analysis of the mechanical production in relation to the areas process mastery, standardization and data consistency
  - Derivation of fields of action for the attainment of technologically essential requirements

- Workpiece analysis
  - Collection, analysis and validation of a representative samples with regard to macro and micro geometric properties, material technological characteristics and process-related key figures

Result

► Detection of technological-economical rationalisation possibilities within the industrialized tool making through automation in production
Industrialization of tool making and set-up of structures for transfer from cost- to-profit-center

**Approach**
- Analysis of processes and responsibilities along the entire process chain
- Derivation of strengths and potentials with regard to all organizational and technological aspects
- Definition of future concept of strategic positioning and organizational structure
- Set-up of a detailed plan of measures for development towards the future concept
- Support of the execution of measures

### Results
- Established structures to develop from a cost-center towards a profit-center
- Increased competitiveness through process efficiency, due date reliability, and capacity utilisation

#### Future concept

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<tr>
<th>Organizational structure</th>
<th>Quick-win</th>
<th>Mid-term</th>
<th>Long-term</th>
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<td>Quick-win measure n</td>
<td>Mid-term measure n</td>
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</tbody>
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Enhancing the order processing efficiency by modularizing the tool design

**Approach**
- Analysis of the tool range for the single customer groups
- Selection of a main customer as a reference
- Modularization and standardization of the main customer’s tool type
- Employee training about the construction standards
- Development of standard work plans by the work preparation

**Result**
- Significant reduction of the processing time for drawing tools by modularization and standardization
Initiating the industrialization of tool making through product and process standardization

**Approach**
- Selection of a pilot tool
- Analysis of tool spectrum
- Identification of standardization potential in regard of the pilot tool
- Process standardization for the pilot tool
- Process synchronization for the pilot tool

**Result**
- Successful product and process standardization for manufacturing of a pilot tool, providing the foundation for industrialized and synchronous tool making

[Diagram of Tool X with labeled parts: Movable side (MS) and Fixed side (FS), showing components such as Backing plate, Transport iron, Frame plate, etc. with Alienate pilot tool at the bottom.]

- Alienated pilot tool
Automation and layout design for the implementation of a modern production at ruwido austria gmbh

Approach

- Identification of the current technological performance of tool making by benchmarking and work piece analysis
- Derivation of requirements from the company strategy to the manufacturing technology of internal tool making
- Definition and elaboration of three fields of action:
  - Technology roadmap
  - Automation concept
  - Layout (new plant)
- Support of the operational implementation phase

Results

► Technology roadmap and automation concept based on the product spectrum and the strategic goals
► Layout concept for the new production plant and support in the machine selection
Increase of efficiency by tool-standardization

**Approach**

- Analysis of 4,895 components, 11,914 spare parts and 3,584 standard components
- Evaluation of 218 different component groups
- Identification of the standardization potential and definition of measures for the standardization of single component groups
- Definition of standardization processes for long-term implementation
- Development of an implementation road map and definition of a suitable tool nomenclature

**Results**

- Lead time and production cost reduction by the standardization of components
- Standardization processes for sustainable long-term implementation of standardization
Reconception of the internal tool shop of Selectrona

**Approach**
- Analysis of the internal order fulfillment process
- Conduction of a benchmarking
- Analysis of the existing product portfolio
- Definition of main process sequences
- Development of an individual planning approach
- Design of a flow-oriented shopfloor layout
- Development of a detailed implementation plan

**Analysis of status quo**
- Order fulfillment
- Branchenvergleich
- Product portfolio
- Material flow

**Planning**
- Planning approach

**Shopfloor layout**
- Flow-oriented layout

**Implementation**
- Action plan

**Results**
- Standardized processes and an individual and aligned planning approach
- Process-oriented shopfloor layout including a detailed implementation roadmap
Siebenwurst: CAx process and interface optimization in mechanical manufacturing

**Approach**
- Detailed analysis of the status quo with qualitative and quantitative methods:
  - Process recording with modeling language "aixperanto"
  - Interviews to collect individual employee perspectives with a focus on CAx system usage
  - Recording of the activity structure in a defined period of time
- Identification of improvement potentials based on technical requirements in individual process steps and at department interfaces
- Derivation of recommendations for action for example:
  - Technical reassignment of employees
  - Design of target process
  - Detailed action plan
- Documentation in a roadmap to define responsibilities and scheduling

**Results**
- Recommendations for action to improve processes and interfaces in mechanical manufacturing
- Roadmap with recommendations for action and assigned responsibilities and scheduling
Determining the potential of an agile tool development and supply process at Vorwerk

**Approach**

- Analysing the actual state of the tool development and supply process supported by a quantitative process data analysis
- Development of a target state with detailed action fields for a synchronized tool development and supply process that is coordinated with the product development process:
  - Definition and development of action fields with regard to increasing process flexibility and decreasing lead time of product development
  - Quantification of the identified potentials with regard to the reduction of development lead times and cost reduction
  - Development of technical concepts for the use of prototype tools for early process assurance

**Result**

- Detailed analysis and evaluation of the actual situation as well as derived and rated fields of action to reduce lead times for tools and revise procurement more flexible
Technical investment planning in the manufacturing area and optimization of planning and scheduling at weba

**Approach**

- Detailed analysis of the component spectrum as well as of the process sequences and lead times
- Investigation of technological potentials and definition of future manufacturing technologies including automation and Industry 4.0 concepts
- Analysis of future capacity requirements and comparison with currently available machine capacities for deducing an investment roadmap
- Mapping and assessment of the planning and scheduling process
- Definition of a target state for planning and scheduling including an action plan for realization

**Results**

► Concept for future-oriented, efficient manufacturing including defined investment roadmap
► Optimized planning and scheduling including an action plan for realization
Increasing the effectivity of the order processing by synchronizing the single manufacturing steps

**Approach**
- Analysis of the order processing and creation of strength/potential profiles for the individual divisions
- Development of a concept for the reorganization
- Establishment of a milestone process to structure a comprehensive order processing
- Analysis of the process chain in manufacturing
- Definition of a pilot synchronized production line and determination of the synchronization

**Results**
- Realization of a continuous production flow and increasing both transparency and predictability of the completion dates
- Reduction of the required manual control
Development of a flow-oriented tool room layout

**Approach**

- Analysis of organizational and technological performance as well as deduction of strengths and potentials
- Display of current layout as well as mapping of current material flows and surface area utilization
- Definition of standardized target processes and deduction of ideal material flows
- Design of a flow-oriented tool room layout capable of further growth
- Allocation of machine resources, demarcation of storage areas and spaces for goods in- and outwards
- Continuous recording of employee requirements and suggestions with regards to the layout design

**Results**

- Flow-oriented tool room layout capable of further growth
- Optimized material flows as well as internal logistics and standardized machining sequences
Development of the tablet-application “IDA – Information Digitalization Application“

**Approach**
- Joint analysis of requirements regarding a knowledge transfer application
- Definition of a concept for the application and determination of the operational environment
- Programming of the application and development of a back-end for the app configuration as well as a server infrastructure
- Testing of a pilot by participants of the consortial project
- Application adjustments and finalization as well as handover to the participants

**Project consortium**

**Results**
- Tablet-application for error recording and knowledge transfer
- Server-infrastructure and back-end as configuration environment for the application
Determination of potentials in an internal tool department and design of value creation process, planning and tool standardization

**Approach**

- Conduction of different analyses for identifying potentials in the tool manufacturing department
- Design of a target process for the value creation process based on defined milestones
- Development of a concept for the future planning of tool projects
- Conception and quantification of measures for tool standardization
- Derivation of implementation measures and development of an implementation roadmap
- Conduction of change management activities

**Potential analysis**

- Value creation process
- Order data
- Benchmarking
- Job structure
- Planning process
- Tool components

**Concept development**

- Target process and milestones
- Planning concept and processes
- Tool standardization

**Design of implementation**

- Measures and implementation roadmap
- Educational games and change Management

**Results**

- Identified and quantified potentials in different areas of the tool manufacturing department
- Developed and detailed concepts for value creation process, planning and tool standardization
Check-up of the status quo of industrialization within an external die shop

**Approach**

- Analysis of the status quo analysis in different areas within the die shop:
  - Analysis of project data and execution of comparisons for several KPI’s
  - Analysis of order fulfillment process
  - Analysis and evaluation of tools, tool components and manufacturing processes
  - Analysis of planning and scheduling
  - Visualization of material flow on the shopfloor

- Definition of the current degree of implementation in the different fields of industrialization

- Development of five action fields to implement a holistic industrialization in the die shop

**Results**

- Status quo within the eight fields of industrialization in tool and die making incl. a description of strengths and potentials alongside the order fulfillment process
- Action fields incl. an overall roadmap for the holistic implementation of industrialization in the die shop
Development of a holistic concept for the reduction of lead times in machinery and systems engineering

**Approach**
- Status quo analysis in different topics of the order processing by:
  - Process analysis
  - Procurement analysis
  - Assembly analysis
  - Planning and scheduling analysis
- Development of a holistic, detailed concept for the reduction of lead times and definition of essential action fields
- Elaboration of an implementation road map for each defined action field, consisting of detailed measures, responsibilities as well as necessary investments
- Support of the operational realization of measures

**Results**
- Development of a holistic concept for the reduction of lead times
- Elaboration of a roadmap for the implementation of the planned concept
Flexibilization of fix costs in the production of a well-known company within the construction equipment sector

**Approach**
- Conduction of a detailed comparison of the fix cost structure of the plants of a well-known company within the construction equipment sector with plants of similarly positioned companies
- Identification of Best Practices for the flexibilization of fix costs in production
- Preparation of a concept book with detailed explanations of flexible machine concepts
- Development of a systematic procurement and investment process that includes defined criteria for a flexibility check
- Derivation of an overall strategy for the flexibilization of fix costs in production

**Results**
- Holistic strategy and detailed procurement process for the flexibilization of fix costs
- Concept book with 43 approaches for increased flexibility in production machinery
Execution of a portfolio and lifecycle analysis for milling tools

**Approach**

- **Milling tool standardization**
  - Determination of all milling tools listed in stock and allocation of essential technological and economic parameters
  - Proposals for adjustments of the milling tool portfolio and exemplary calculations of alternatives to "high-runner" milling tools

- **Milling tool life cycle**
  - Documentation of the tool life cycle with the modeling language aixperanto
  - Comparison of the tool lifecycle with partner companies as well as identification and discussion of weaknesses
  - Derivation of an ideal life cycle as well as the development of practical solutions for implementation

**Result**

▶ An ideal lifecycle for milling tools to support companies in process standardization and consolidation of milling tool portfolios
The WBA Tooling Academy

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