CASE STUDY PRODUCTION SYSTEMS

FINAL PRESENTATION

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COMPANY PROFILE

Overview :

Brown Corporation (BROWN) is a global enterprise with a diverse portfolio of products. The company operates manufacturing sites in Moldova, Germany, and the USA, and has recently expanded through a joint venture in China. BROWN is known for its strong brands and commitment to innovation, though it currently faces challenges related to operational efficiency, digital integration, and sustainability.

Industry : Manufacturing and Distribution.
Headquarters: USA
Global Presence: Moldova, Germany, USA, China (Joint Venture).

Vision:

Brown Corporation aims to become a leader in the manufacturing and distribution industry by leveraging its strong brands, adopting cutting-edge technologies, and committing to sustainable practices. Through digital transformation and operational excellence, BROWN seeks to enhance customer satisfaction and achieve long-term growth in a competitive and dynamic global market.

COMPANY PROFILE

Recent Developments:

1. ***Joint Venture in China:*** Expanded operations to tap into the Chinese market, aiming for increased market share and production capabilities.
2. ***Marketing Strategies:*** Enhanced focus on BROWN's brand strengths, but manufacturing struggles to keep up with demand and cost efficiency.
3. ***Operational Challenges:*** Manufacturing inefficiencies and long lead times are major concerns, impacting customer satisfaction.

Technological Focus:

1. ***Industry 4.0 Technologies:*** Exploring 3D printing and SaaS offerings to produce individualized products and improve efficiency.
2. ***Digital Maturity:*** Currently basic; systems are fragmented with three ERP systems (including a rudimentary one in China) and no common demand planning.

COMPANY PROFILE

Sustainability Goals:

1. Carbon Footprint Reduction: Committed to reducing carbon emissions by 20% annually over the next five years.
2. Sustainable Materials: Plans to use more eco-friendly materials for electronics and plastics to comply with upcoming regulations.

Strategic Goals:

1. Enhance Operational Efficiency: Streamline manufacturing and logistics to meet market demands and improve cost-effectiveness.
2. Digital Integration: Unify ERP systems and automate processes to increase efficiency and reduce errors.
3. Leverage Industry 4.0: Adopt advanced technologies to innovate product offerings and improve production capabilities.
4. Sustainability Commitment: Achieve significant reductions in carbon footprint and incorporate sustainable materials into product lines.

MAJOR CHALLENGES

- ***Adoption of Industry 4.0 Technologies:***

  Implementing 3D printing and SaaS offerings can help BROWN produce individualized products more efficiently. For instance, 3D printing can reduce production times and material waste, while SaaS can streamline operations and improve customer experience.

- ***Digital Transformation:***

  Integrating the disparate ERP systems into a single, cohesive platform can enhance demand planning, reduce manual errors, and improve overall efficiency. This transformation can also enable better data analysis and decision-making.

- ***Market Expansion:***

  The joint venture in China provides BROWN with access to a vast & growing market. Leveraging this opportunity can help increase market share and revenue. Tailoring products to meet local preferences & demands can further enhance success in this region.

- ***Sustainability Leadership:***

  By proactively reducing its carbon footprint and using sustainable materials, BROWN can position itself as an industry leader in sustainability. This can enhance the company's brand image, attract eco-conscious consumers and potentially lead to partnerships with other companies.

- ***Product Portfolio Optimization:***

  The marketing team's recent consolidation of the product portfolio can lead to more focused and effective marketing strategies. By highlighting the strengths of BROWN's brands, the company can differentiate itself from competitors & attract loyal customer base.

CHANGES SHOULD BE MADE IN MANUFACTURING AND SUPPLY CHAIN

- **Enhance Digital Integration:**

  Action: Integrate the disparate ERP systems into a single, unified platform.

  Example: Implement a cloud-based ERP system that connects operations across Moldova, Germany, the USA, and China. This would enable real-time data sharing, improve demand planning, and reduce manual errors.

- **Adopt Industry 4.0 Technologies:**

  Action: Invest in 3D printing and IoT (Internet of Things) for smart manufacturing.

  Example: Use 3D printing to produce customized products on demand, reducing lead times and inventory costs. IoT sensors can monitor equipment health and predict maintenance needs, minimizing downtime and improving efficiency.

- **Improve Quality Control:**

  Action: Implement advanced quality management systems (QMS) and automate quality checks.

  Example: Use machine learning algorithms to detect defects in real-time during the manufacturing process. Automated quality checks can ensure consistent product quality and reduce customer complaints.

- **Enhance Supply Chain Visibility:**

  Action: Implement supply chain management software that provides end-to-end visibility.

  Example: Use blockchain technology to track and verify the origin of materials, ensuring compliance with sustainability regulations and improving transparency.

CHANGES SHOULD BE MADE IN MANUFACTURING AND SUPPLY CHAIN

- **Sustainability Initiatives:**

  Action: Transition to sustainable materials and energy-efficient processes.

  Example: Replace traditional plastics with biodegradable alternatives and invest in renewable energy sources for manufacturing facilities. This would help achieve the 20% annual carbon footprint reduction goal.

- **Optimize Logistics and Distribution:**

  Action: Use data analytics to optimize distribution routes and warehouse management.

  Example: Implement a transportation management system (TMS) that uses AI to plan the most efficient delivery routes, reducing fuel consumption and improving delivery times.

- **Increase Manufacturing Flexibility:**

  Action: Adopt flexible manufacturing systems (FMS) that can quickly adapt to changes in product design and demand.

  Example: Use modular production lines that can be easily reconfigured to produce different products. This flexibility allows BROWN to respond swiftly to market changes and customer preferences.

- **Strengthen Supplier Relationships:**

  Action: Develop strategic partnerships with key suppliers to ensure reliability and quality.

  Example: Establish long-term contracts with suppliers who meet BROWN's sustainability and quality standards. Collaborate on joint innovation projects to develop new materials and processes.

IMPLEMENTATION ROADMAP

Year 1:

- Integrate ERP systems and implement basic digital tools.
- Begin adopting digital tools to improve efficiency.
- Begin transitioning to sustainable materials.

Year 2:

- Adopt 3D printing and IoT technologies.
- Implement advanced QMS and automated quality checks.
- Start using data analytics for logistics optimization.

Year 3:

- Achieve full supply chain visibility with blockchain technology.
- Continue sustainability initiatives, including renewable energy investments.

Year 4:

- Adopt flexible manufacturing systems.
- Strengthen supplier relationships through strategic partnerships.

Year 5:

- Full implementation of Industry 4.0 technologies.
- Achieve the 20% annual carbon footprint reduction target.
- Continuously improve and innovate based on data-driven insights.

OPERATIONAL CAPABILITIES AND ORGANIZATIONAL DYNAMICS

Current Situation:

- Fragmented ERP systems.
- Manual processes causing inefficiencies.
- Manufacturing struggling with volume and cost targets.
- Quality control issues and long lead times.

Required Changes:

ERP Integration and Automation:

Action: Integrate ERP systems across all locations into a single, unified platform.

Example: Implement a cloud-based ERP system that supports automation and real-time data sharing.

Lean Manufacturing Practices:

Action: Adopt lean manufacturing techniques to reduce waste and improve efficiency.

Example: Implement Just-In-Time (JIT) inventory management and continuous improvement processes.

Advanced Quality Management:

Action: Implement a robust Quality Management System (QMS) with real-time monitoring.

Example: Use AI and machine learning to predict and address quality issues before they occur.

SUSTAINABILITY STRATEGY EVOLUTION:

Current Situation:

- Need to reduce carbon footprint by 20% annually.
- Upcoming regulations requiring sustainable practices.

Sustainability Strategy:

1. Sustainable Materials and Processes:

Action: Transition to biodegradable and recycled materials.

Example: Use bioplastics for product components and recycled metals.

2. Renewable Energy Adoption:

Action: Invest in renewable energy sources for manufacturing plants.

Example: Install solar panels and wind turbines at production facilities.

3. Circular Economy Practices:

Action: Implement a circular economy model where products are designed for reuse and recycling.

Example: Design products that can be easily disassembled and recycled.

4. Carbon Offsetting:

Action: Invest in carbon offset projects to compensate for unavoidable emissions.

Example: Participate in reforestation projects and support renewable energy initiatives.

DIGITAL TRANSFORMATION:

Current Situation:

- Lack of synchronization in the supply chain.
- Manual data processing.

Digital Transformation Initiatives:

1. Unified ERP System:

Action: Integrate all ERP systems into a single cloud-based platform.

Example: Use SAP S/4HANA or Oracle ERP Cloud to unify operations and data.

2. IoT and Smart Manufacturing:

Action: Implement IoT sensors and devices to monitor and optimize production.

Example: Use IoT to track machine performance and predict maintenance needs.

3. AI and Data Analytics:

Action: Use AI and data analytics to optimize supply chain and production processes.

Example: Implement predictive analytics to forecast demand and optimize inventory levels.

4. Blockchain for Supply Chain Transparency:

Action: Use blockchain technology to enhance supply chain transparency and traceability.

Example: Track the origin and journey of raw materials to ensure sustainability compliance.

LEADERSHIP AND CULTURAL PERSPECTIVE:

Current Situation:

- Need for rapid adaptation to new technologies and processes.
- Cultural resistance to change.

Leadership and Cultural Changes:

1. Transformational Leadership:

Action: Develop leaders who can inspire and drive change.

Example: Leadership training programs focused on change management and innovation.

2. Change Management Programs:

Action: Implement structured change management programs to facilitate transitions.

Example: Use the ADKAR model (Awareness, Desire, Knowledge, Ability, Reinforcement) to manage change.

3. Fostering a Culture of Innovation:

Action: Encourage a culture that embraces innovation and continuous improvement.

Example: Create innovation hubs and cross-functional teams to explore new ideas and technologies.

4. Employee Engagement and Communication:

Action: Maintain open communication channels and actively involve employees in the change process.

Example: Regular town hall meetings, feedback sessions, and transparent communication of goals and progress.

INSIGHTS FROM THE INTERVIEW WITH CEO ZAK POWERS

Corporate Goal:

- Attain market leader position within 18 months of the merger.

Marketing Strategy:

- Most recent efforts have gone into the marketing strategy, which is seen as the key driver for the business going forward.

Product Mix and Distribution:

- The product mix is right, and the correct distribution channels are in place to support brand strength.

Sustainability Concerns:

- Strategic marketing has raised concerns on sustainability regulation.
- R&D is not open to implementing new innovative solutions.

Manufacturing Operations and Supply Chain:

- Current control over manufacturing operations and the supply chain is insufficient.
- The four plant directors are resistant to change, living in the past and not responding to market needs.
- Digital maturity could lead to more efficient operations.
- Competitors have already implemented many digital solutions with positive business cases (process control, collaborative planning).

CARBON FOOTPRINT REDUCTION STRATEGY FOR BROWN CORP.

Goal:

- Reduce carbon footprint by 20% per year over the next five years.

Key Actions:

- ***Year 1:***
  1. **Energy Efficiency Improvements:**
     1. **Action:** Conduct energy audits at all manufacturing sites to identify inefficiencies.
     2. **Example:** Implement energy-efficient lighting, heating, and cooling systems. Retrofit existing machinery with energy-saving technologies.
     3. **Impact:** Immediate reduction in energy consumption and associated carbon emissions.
  2. **Sustainable Materials:**
     1. **Action:** Begin transitioning to biodegradable and recycled materials.
     2. **Example:** Source bioplastics for packaging and components, use recycled metals.
     3. **Impact:** Reduce emissions related to raw material extraction and processing.

- ***Year 2:***
  1. **Renewable Energy Adoption:**
     1. **Action:** Invest in renewable energy sources for manufacturing plants.
     2. **Example:** Install solar panels and wind turbines at production facilities.
     3. **Impact:** Decrease reliance on fossil fuels, lower carbon emissions from energy consumption.
  2. **Supply Chain Optimization:**
     1. **Action:** Implement data analytics to optimize logistics and reduce transportation distances.
     2. **Example:** Use AI-driven route optimization to minimize fuel usage.
     3. **Impact:** Lower emissions from transportation and logistics operations.
- ***Year 3:***
  1. **Full Supply Chain Visibility:**
     1. **Action:** Achieve supply chain transparency using blockchain technology.
     2. **Example:** Track and verify the carbon footprint of each component from source to final product.
     3. **Impact:** Identify high-emission areas and opportunities for reduction across the supply chain.
  2. **Green Building Standards:**
     1. **Action:** Upgrade facilities to meet green building certifications.
     2. **Example:** Achieve LEED (Leadership in Energy and Environmental Design) certification for new and existing buildings.
     3. **Impact:** Improve energy efficiency and reduce emissions from building operations.

- ***Year 4:***
    1. **Adopt Flexible Manufacturing Systems:**
        1. **Action:** Implement systems that allow for rapid reconfiguration to meet demand efficiently.
        2. **Example:** Use modular production lines that can be adjusted for different products without extensive retooling.
        3. **Impact:** Reduce energy use and waste during production shifts.
    2. **Sustainable Procurement Policies:**
        1. **Action:** Develop and enforce policies for sourcing sustainable materials and services.
        2. **Example:** Prioritize suppliers with low-carbon practices and certifications.
        3. **Impact:** Drive sustainability throughout the supply chain, reducing overall carbon footprint.
- **Year 5:**
    1. **Full Industry 4.0 Implementation:**
        1. **Action:** Implement smart manufacturing technologies across all operations.
        2. **Example:** Utilize IoT sensors, big data analytics, and machine learning for real-time optimization.
        3. **Impact:** Maximize energy efficiency, reduce waste, and minimize emissions.
    2. **Carbon Offsetting Projects:**
        1. **Action:** Invest in carbon offset projects to balance remaining emissions.
        2. **Example:** Participate in reforestation initiatives, support renewable energy projects globally.
        3. **Impact:** Offset residual emissions, contributing to overall carbon neutrality.
    3. **Achieve the 20% Annual Reduction Target:**
        1. **Action:** Continuously monitor and adjust strategies to meet the annual reduction goal.
        2. **Example:** Regularly review carbon footprint data, implement best practices, and innovate as needed.
        3. **Impact:** Ensure consistent progress towards the long-term carbon reduction target.

PROGRESSION PLAN – PLANT DATA

•**Vision Statement**: Articulate a clear vision for the plant, focusing on what you aim to achieve in the next five years (e.g., becoming a leader in sustainable manufacturing).
•**SMART Objectives**: Set specific, measurable, achievable, relevant, and time-bound goals. Examples include:
    •Increase production efficiency by 20% in two years.
    •Reduce defect rate by 10% annually.
    •Achieve ISO 14001 certification by year 5.

Identify Key Performance Indicators (KPIs)

- **Production KPIs**: Output, cycle time, throughput.
- **Quality KPIs**: Defect rate, first-pass yield, rework rate.
- **Efficiency KPIs**: OEE (Overall Equipment Effectiveness), energy consumption per unit produced.
- **Maintenance KPIs**: Downtime, mean time between failures (MTBF), mean time to repair (MTTR).
- **Sustainability KPIs**: Waste reduction, recycling rate, energy efficiency improvements.

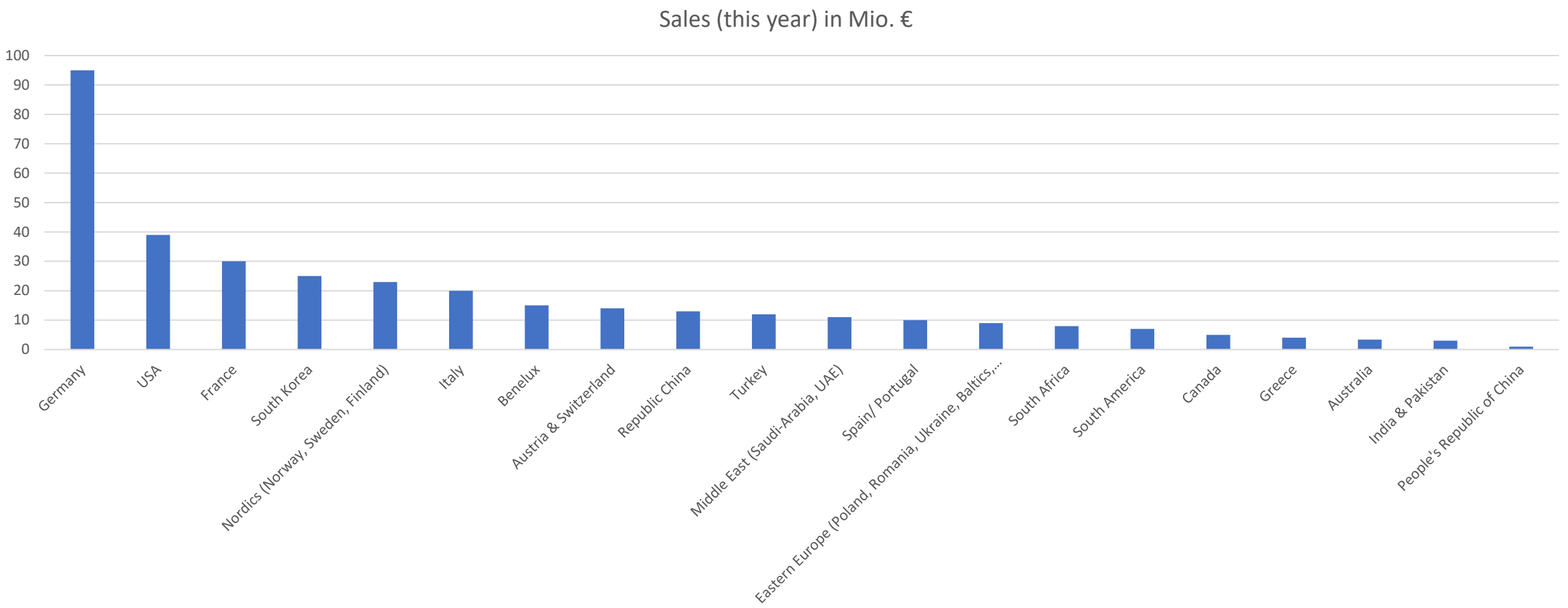
YEAR	OBJECTIVE	ACTION	KPIs
Year 1 Foundation	Establish a baseline and implement initial improvements.	• Conduct detailed plant audits. • Implement a robust data collection and monitoring system. • Train staff on new systems and data usage.	• Accurate baseline data collection. • Initial improvements in production and quality metrics.
Year 2 Optimization	Optimize existing processes and reduce waste.	• Implement lean manufacturing principles. • Optimize supply chain and inventory management. • Enhance preventive maintenance programs.	• Reduced downtime. • Improved production efficiency. • Reduced waste and operational costs.
Year 3 Expansion	Expand capabilities and increase production capacity.	• Invest in new technology and equipment. • Expand production lines or add new product lines. • Strengthen workforce skills through advanced training programs.	• Increased production capacity. • Higher output without compromising quality. • Improved employee skill levels.

YEAR	OBJECTIVE	ACTION	KPIs
Year 4 Innovation	Foster innovation and continuous improvement.	• Implement advanced analytics and AI for predictive maintenance and process optimization. • Encourage a culture of continuous improvement and innovation. • Develop partnerships with research institutions and technology providers.	• Reduction in unexpected downtimes. • Several innovative ideas were implemented. • Performance improvement through advanced analytics.
Year 5 Sustainability	Ensure long-term sustainability and operational excellence.	• Implement sustainable practices (e.g., energy efficiency, waste reduction). • Achieve certifications (e.g., ISO 14001 for environmental management). • Regularly review and adjust strategies based on performance data.	• Energy consumption reduction. • Achievement of sustainability certifications. • Continuous improvement in all operational metrics.

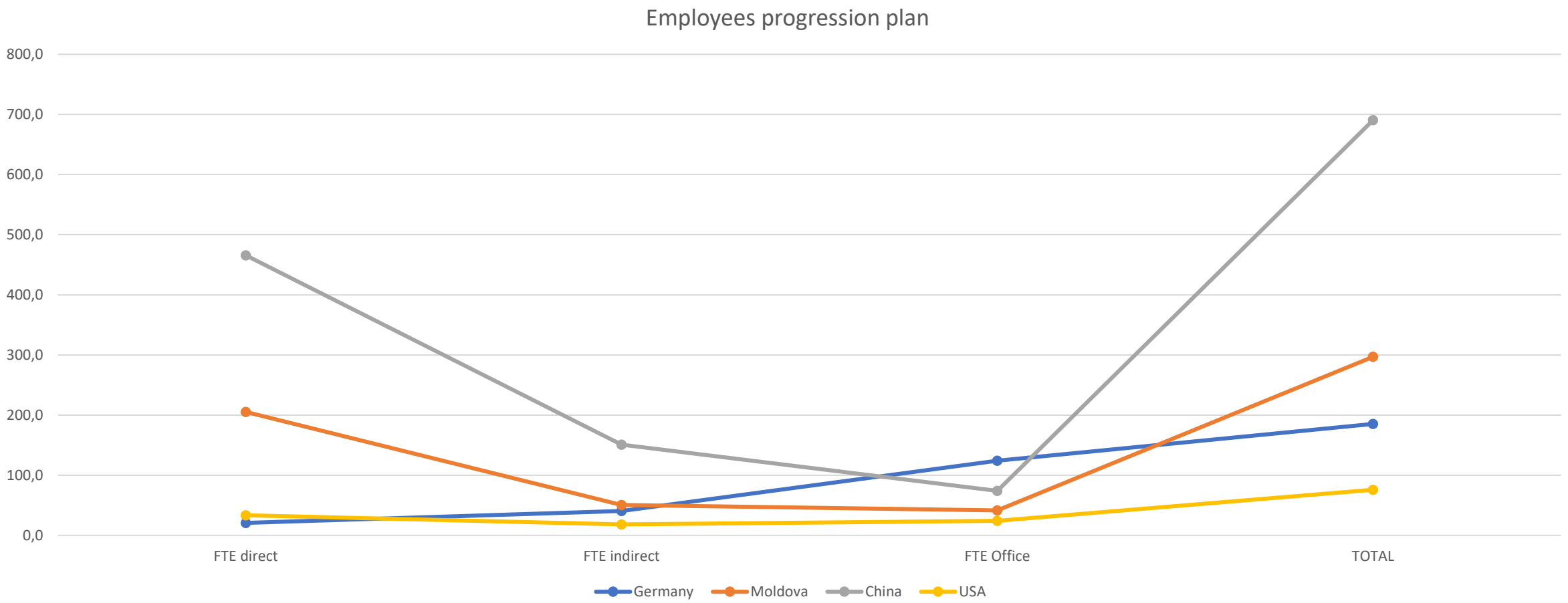
PROGRESSION PLAN

Progression Themes			Progression Cycles for next 5 year				
			1	2	3	4	5
1	Plant Data		Net Labor Time	Labor cost reduction	Automation levels	Automation productivity gains	Market share growth
			Absenteeism rate	Efficiency improvements	Quality metrics	Continuous improvement impact	Profit margins
			Customer incidents	Customer incidents	Operational cost reduction	Cost reduction	Sustainability metrics
			Sales growth	Regional sales growth	Customer satisfaction	Sales growth.	Employee retention
Theme KPI							
2	Sales	People's Republic of China	1	1.5	2	2.5	3
		India & Pakistan	3	3.5	4	4.5	5
		Australia	3.4	4	4.5	5	5.5
Theme KPI							
3	Employees		Reduce FTE Office hours by 5%	Increase FTE direct productivity by 10%	Decrease FTE indirect hours by 15%	Increase OEE by 10%	Increase production capacity by 10%
			Reduce overtime costs by 10%	Increase production capacity by 5%	Reduce defect rate by 20%	Decrease labor costs per unit by 5%	Achieve 30% reduction in waste
4	Area	Germany Target (%)	80.10%	78.10%	76.10%	74.10%	72.10%
		Moldova Target (%)	44.90%	42.90%	40.90%	38.90%	36.90%
		China Target (%)	73.40%	71.40%	69.40%	67.40%	65.40%
		USA Target (%)	51.40%	49.40%	47.40%	45.40%	43.40%
5	Inventory	Target Turns (Germany)	6.5	7	7.5	8	8.5
		Target Turns (Moldova)	6.5	7	7.5	8	8.5
		Target Turns (China)	6.5	7	7.5	8	8.5
		Target Turns (USA)	6.5	7	7.5	8	8.5
Theme KPI							
6	Energy	Germany Target (€)	4,05,310	3,84,044	3,64,842	3,46,600	3,29,270
		Moldova Target (€)	2,10,955	2,00,407	1,90,387	1,80,867	1,71,824
		China Target (€)	1,37,288	1,30,424	1,23,902	1,17,707	1,11,822
		USA Target (€)	2,34,373	2,22,654	2,11,521	2,00,945	1,90,898
Theme KPI							
7	Product & Transport	Gross Margin Improvement (%)	1%	2%	3%	4%	5%

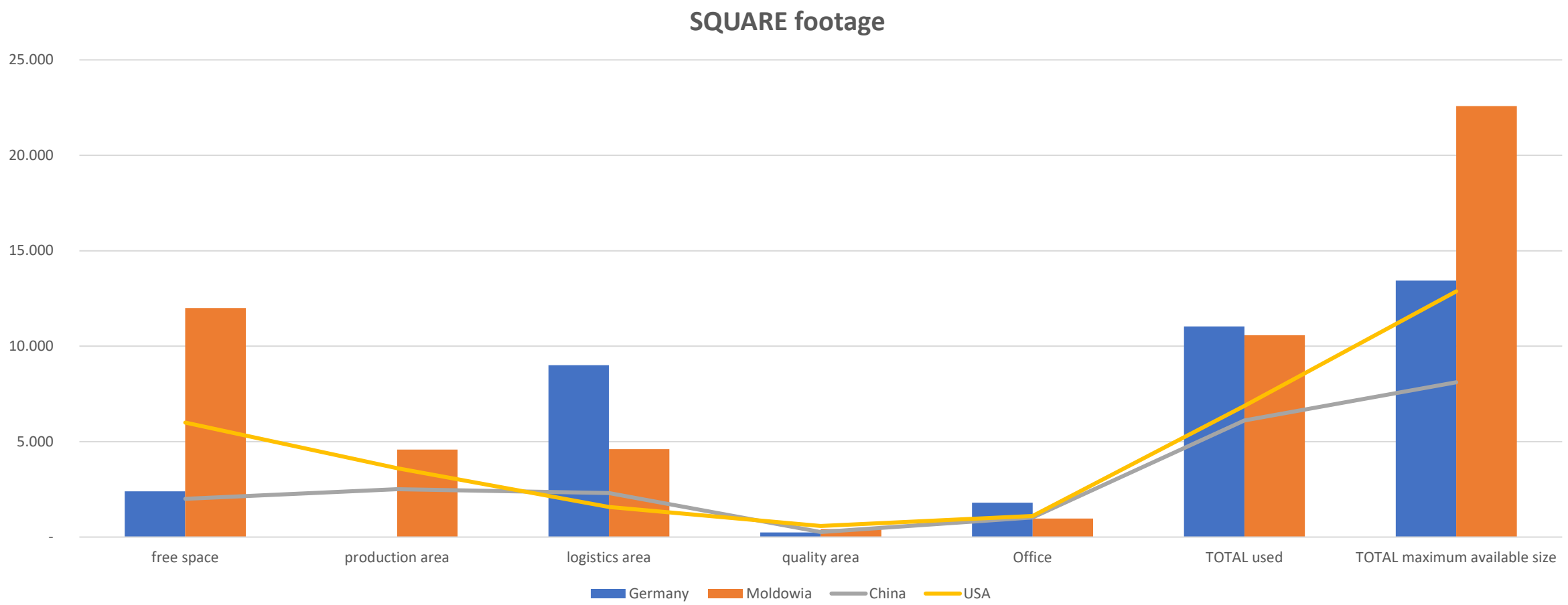
SALES


Sales (this year) in Mio. €
100
90
80
70
60
50
40
30
20
10
0
Germany
USA
France
South Korea
Nordics (Norway, Sweden, Finland)
Italy
Benelux
Austria & Switzerland
Republic China
Turkey
Middle East (Saudi-Arabia, UAE)
Spain/ Portugal
Eastern Europe (Poland, Romania, Ukraine, Baltics,...
South Africa
South America
Canada
Greece
Australia
India & Pakistan
People's Republic of China

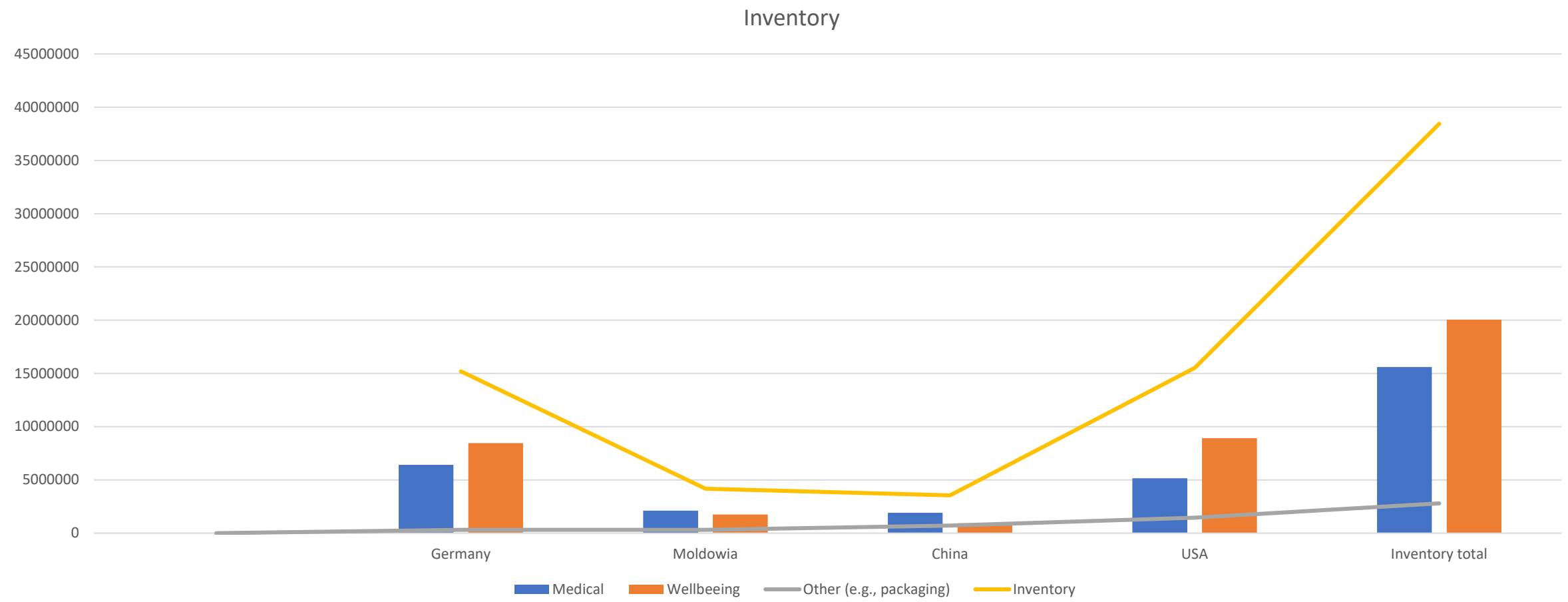
EMPLOYEES


Employees progression plan
800,0
700,0
600,0
500,0
400,0
300,0
200,0
100,0
0,0
FTE direct
FTE indirect
FTE Office
TOTAL
Germany
Moldova
China
USA

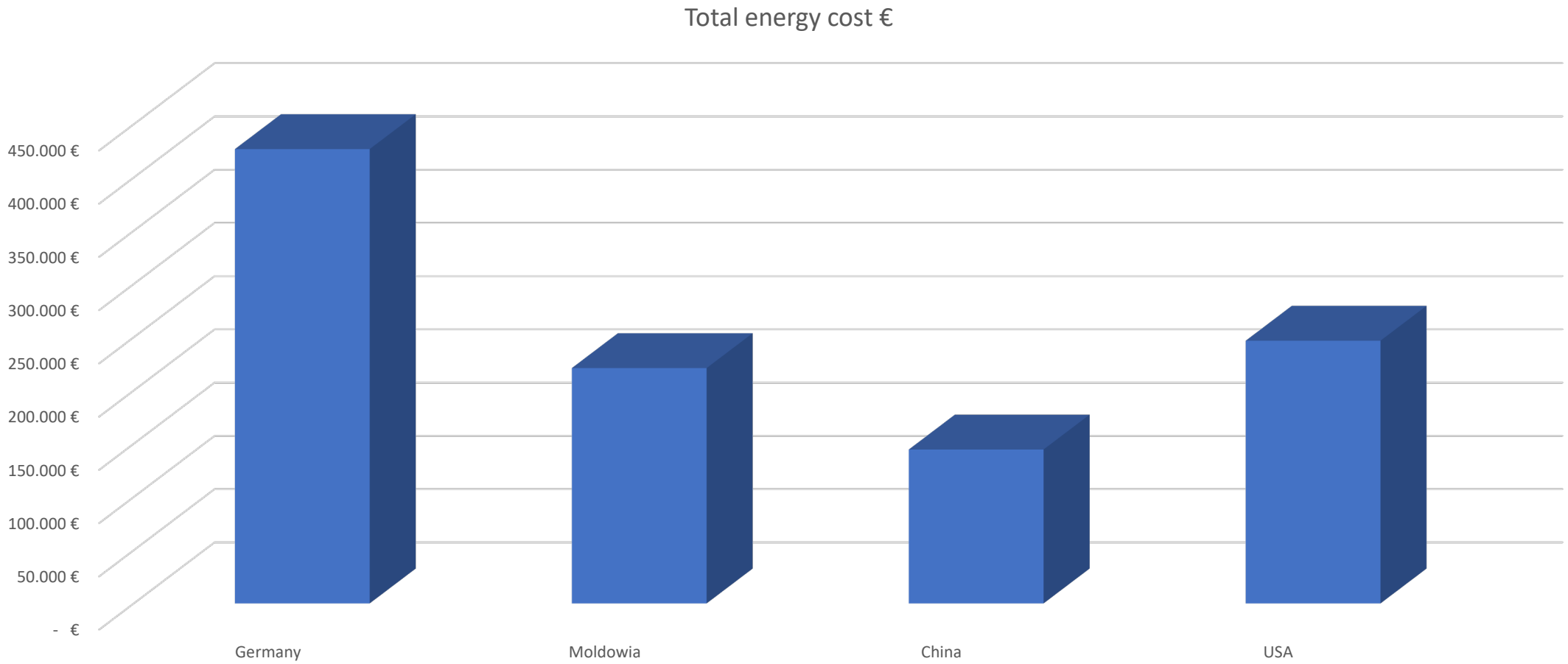
SQUARE FOOTAGE



INVENTORY


Inventory
45000000
40000000
35000000
30000000
25000000
20000000
15000000
10000000
5000000
0
Germany
Moldowia
China
USA
Inventory total
Medical
Wellbeeing
Other (e.g., packaging)
Inventory

ENERGY


Total energy cost €
450.000 €
400.000 €
350.000 €
300.000 €
250.000 €
200.000 €
150.000 €
100.000 €
50.000 €
- €
Germany
Moldowia
China
USA