

Modular Course C: Design Engineering

UNIT C2: Digital Manufacturing Technologies

LC2.4 – Best practices



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DISHOLEA | Improving the digital
skills of workforce in Shoe and
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Palestine | GA 101129194



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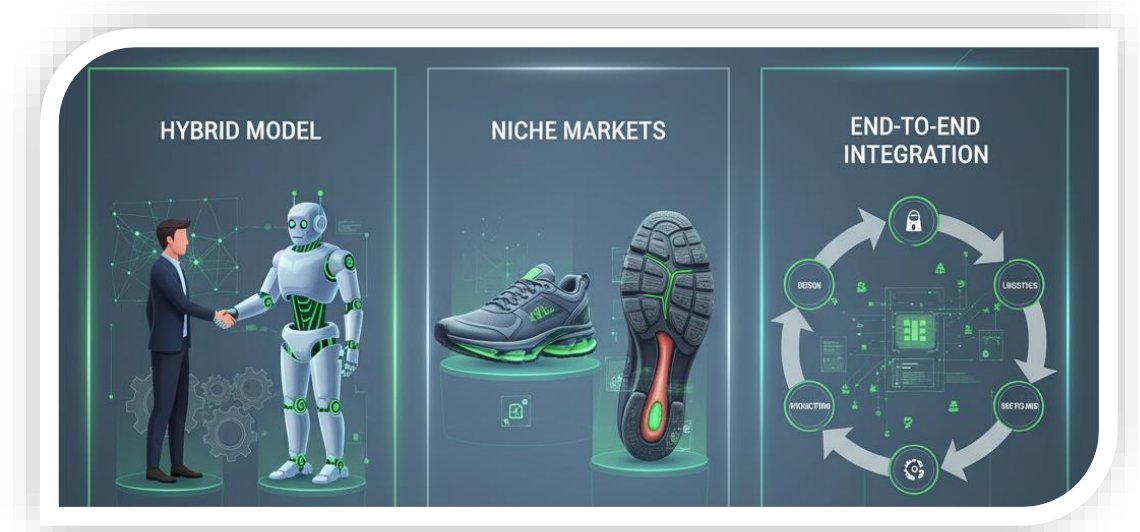
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Strategic Roadmap

- **Hybrid Model Adoption:**

Enhancing operational flexibility with human-robot collaboration instead of full automation.

While robots do repetitive and risky tasks, humans contribute to the process in the fields of creativity and problem solving. This approach provides operational flexibility and enhances employee safety.



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Benefits of Hybrid Model

- Increased Operational Flexibility
- Enhanced Workplace Safety
- Faster Adaptation to Product Variation
- Better Use of Human Cognitive Skills



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Alignment with Industry 5.0

- **Human-centric innovation:** Technology should empower—not displace—human workers.
- **Inclusive deployment:** Automation must be accessible and adaptable to diverse workplace contexts.
- **Resilience and sustainability:** Hybrid systems are more robust against disruptions and better suited to circular production models.



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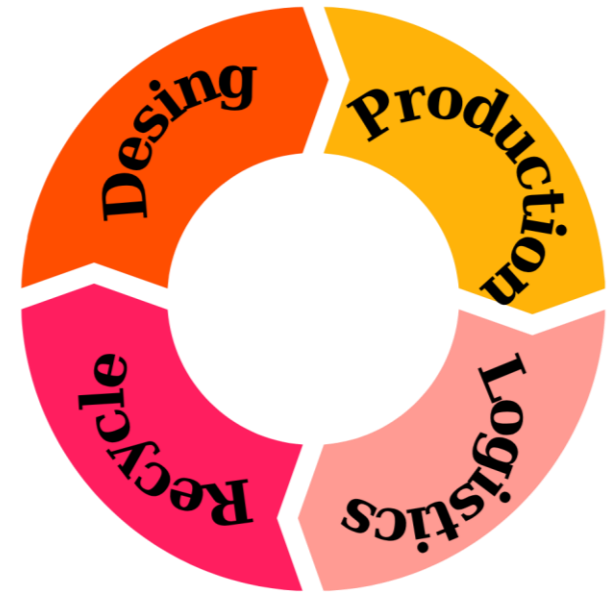
- **Focus on Niche Markets:**
Strategic Roadmap
Utilizing 3D printing technologies in high-margin niche markets or for rapid prototyping.
- 3D printing is still limited in mass production, but it is well-suited for high value-added niche markets.
- Most profitable uses of 3D printing:
 - Personalized soles for athletes,
 - Medical orthopedic shoes or
 - Limited edition collections



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Strategic Advantages

- Higher Profit Margins per Unit
- Stronger Brand Differentiation
- Lower Inventory Risk
- Enhanced Customer Engagement through Personalization



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Strategic Roadmap

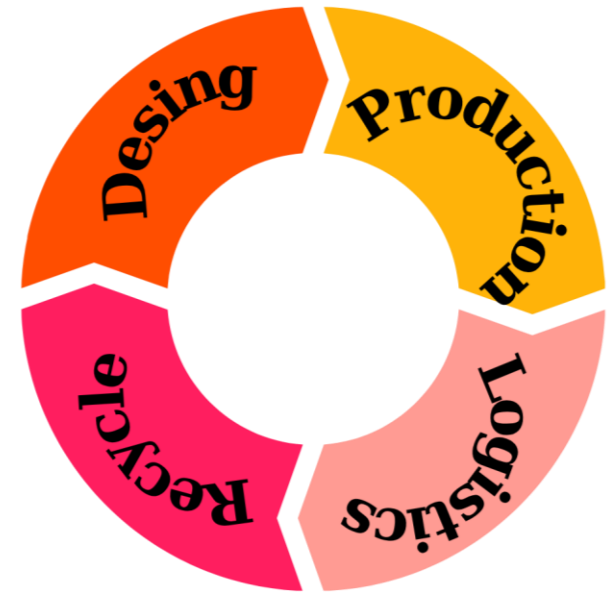
- **End-to-End Integration:** Extending digital transformation not only to production but to the entire life cycle (design, prototyping, production, logistics, recycling).
- Digitalization should not be limited to the production line. If design, prototyping, production, logistics, and recycling processes are all supported by digital data, both transparency and efficiency are achieved. This helps brands become more sustainable and competitive.



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Benefits of End-to-End Integration

- Greater Transparency and Data Continuity
- Improved Sustainability and Regulatory Compliance
- Enhanced Responsiveness to Market Changes



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- Shoe production of the

Strategic Roadmap

Future It will be smarter, more environmentally friendly and closer to the customer than ever before.

- With digital production technologies, automation and 3D printing, the distance between the consumer and production is now shortening. Personalized shoes will be produced according to demand, thus minimizing



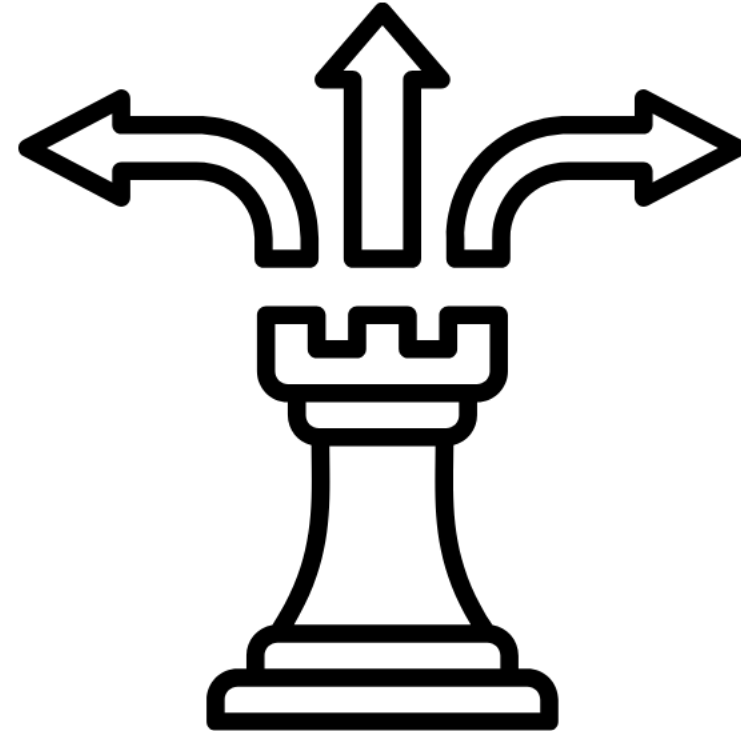
- LC2.4 – Best practices
Companies that overcome technological challenges, adapt to innovations, and prioritize sustainability will benefit the most from this transformation.
- The industry still has a long way to go in areas such as speed, cost, scalability and new material development. However, companies that can overcome these obstacles, adapt quickly to innovations and put sustainability at the center will be the most



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Strategic Roadmap

In short, the production of shoes of the future is redefining not only the product itself, but the entire production process. This means both a competitive advantage and a more environmentally friendly future in the industry.



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Strategic Roadmap Overview

Strategic Area	Best Practice	Benefit
Hybrid Models	Human-robot collaboration	Flexibility, safety, adaptability
Niche Markets	Focused 3D printing applications	High margins, low risk
Lifecycle Integration	Digitalization across design to recycling	Transparency, efficiency
Localized Production	On-demand, near-market manufacturing	Sustainability, responsiveness

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Expanded Insights

Hybrid Models – Human–Robot Collaboration:	<u>offer scalable flexibility</u>
Niche Markets – Strategic Use of 3D Printing:	<u>commercial viability and brand differentiation</u>
Lifecycle Integration – End-to-End Digitalization:	<u>supports circular economy goals and regulatory compliance</u>
Localized Production – On-Demand Manufacturing Near the Consumer:	<u>model supports sustainability, agility, and customer satisfaction</u>
Innovation Readiness – Overcoming Transformation Challenges:	<u>prioritizing adaptability and sustainability will lead the next wave of sectoral</u>

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Strategic Roadmap is DESIGNED TO:

- Support EU-aligned sustainability and circularity targets
- Enable agile, data-driven decision-making
- Foster inclusive, resilient production ecosystems
- Prepare learners and leaders to shape the future of the industry

