Digital Transformation and Workforce Skills Development for Productivity Improvement in Pakistan's Manufacturing Sector

Dr. Amjad Hussain

Department of Mechanical Engineering

University of Engineering and Technology, Lahore

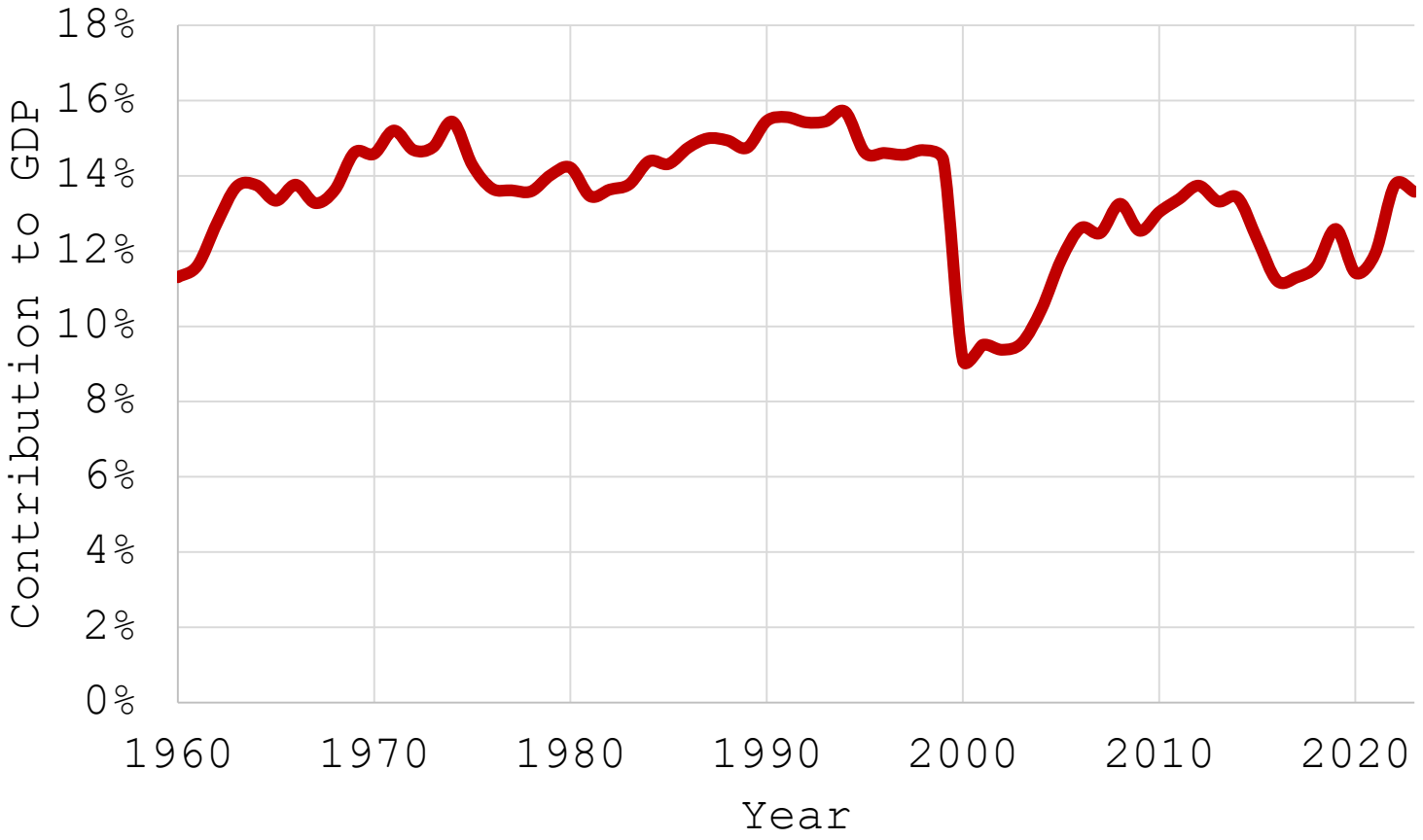
Social Protection Resource Center

UNCTAD

Agenda

- Need for Manufacturing Sector's Digitalization
- Key Digitalization Technologies
- Current State of Pakistan's Manufacturing Industry
- Effectiveness of Teaching-Learning Process for Digital Technologies
- Scope of Curricula of Relevant Disciplines
- Policy Recommendations

Contribution of Manufacturing Sector to the National GDP



Source: Trading Economics (2024)

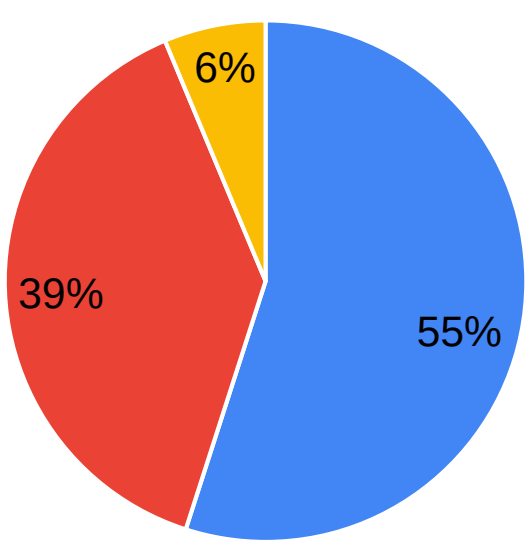
- Dependence on traditional sectors
- Lack of diversification
- Little involvement in global value chains
- Chronic energy shortfalls
- Subpar infrastructure
- Low pace of technology adoption
- Limited investment in R&D

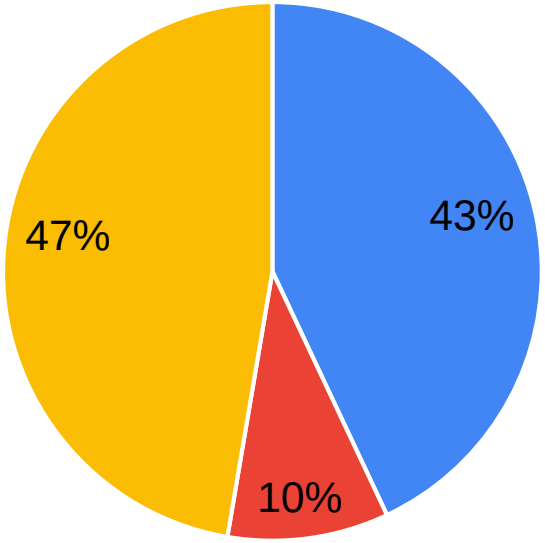
Key Digital Technologies

- Additive Manufacturing
- AI and ML
- Automation Technologies
- Blockchain Technology
- CAD/CAM
- Modeling and Simulation
- Cloud Computing
- Condition Monitoring
- Cybersecurity
- Data Analytics and Visualization
- Digital Marketing
- Digital Twin/Cyber-physical Systems
- ERP
- IoT
- RFID
- Sensor Technologies

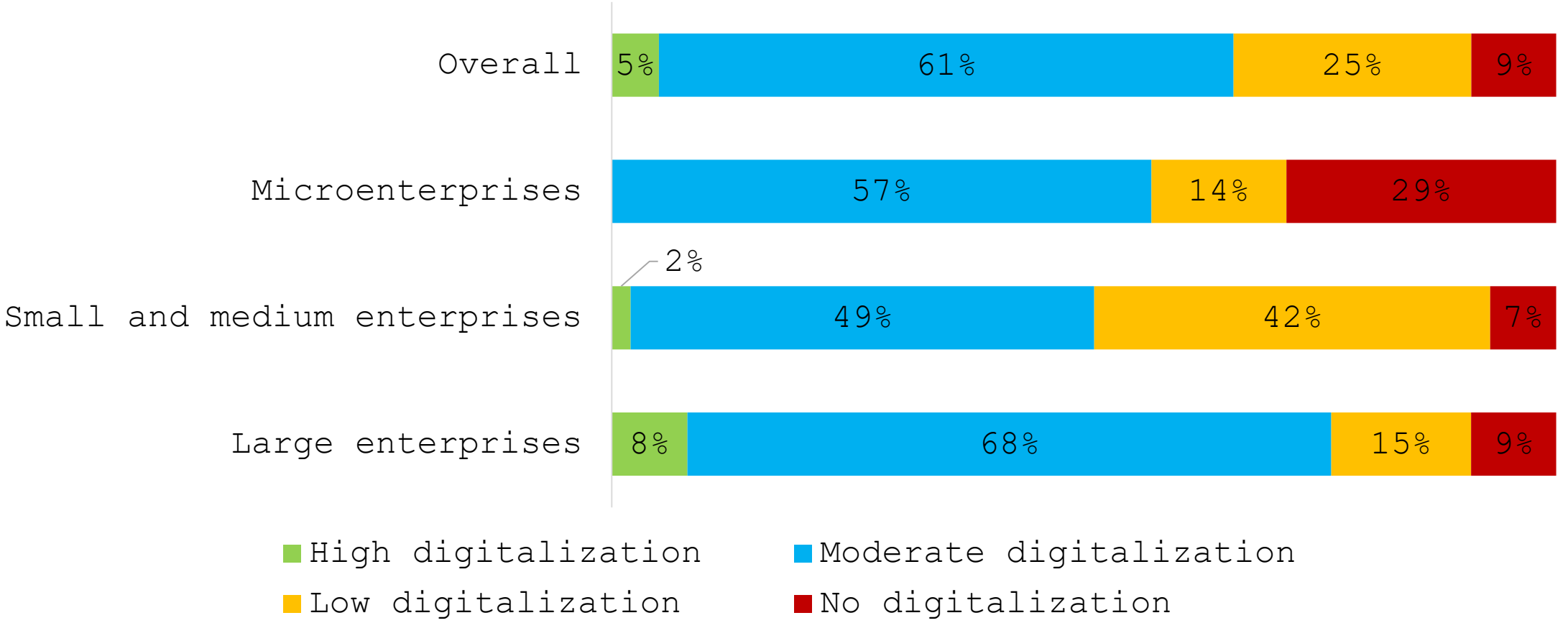
Demographics

Respondent Category	Number of Responses
Industry	237
Hiring agents	27
Faculty members	359
Graduates	1,101
Total	1,724

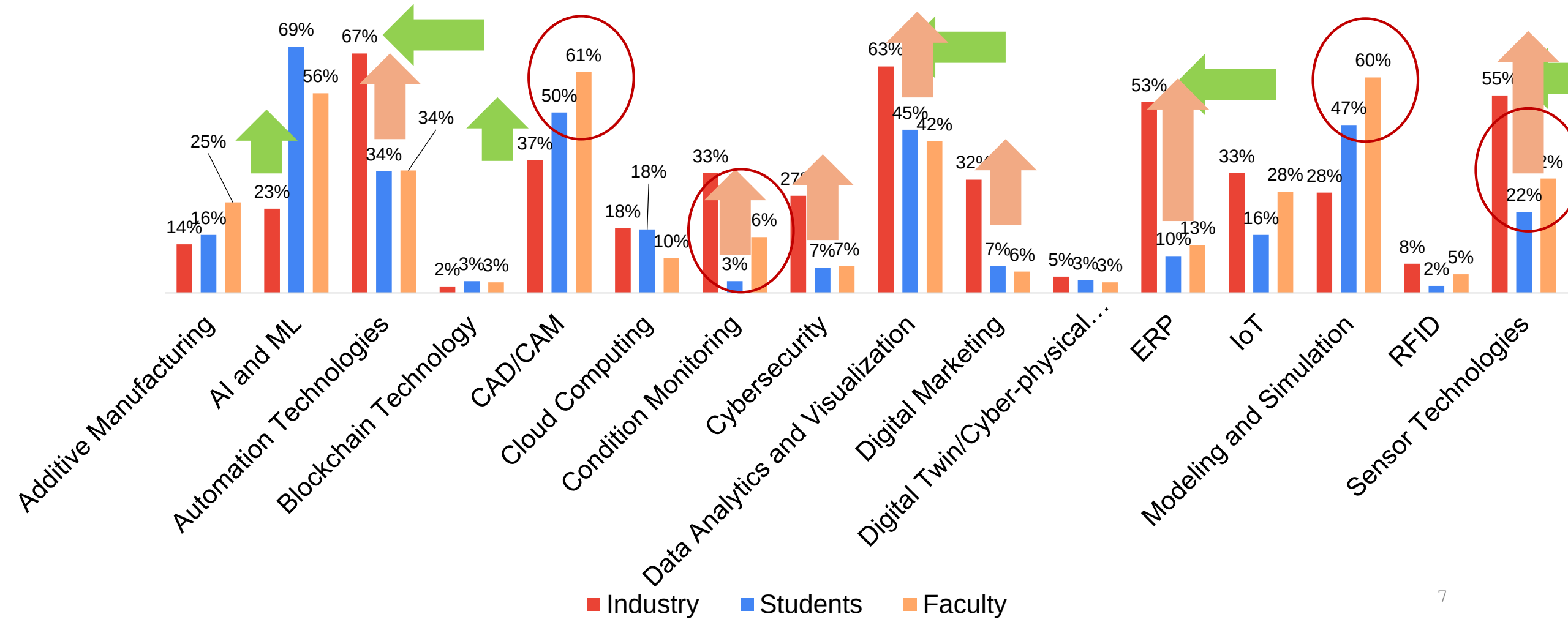




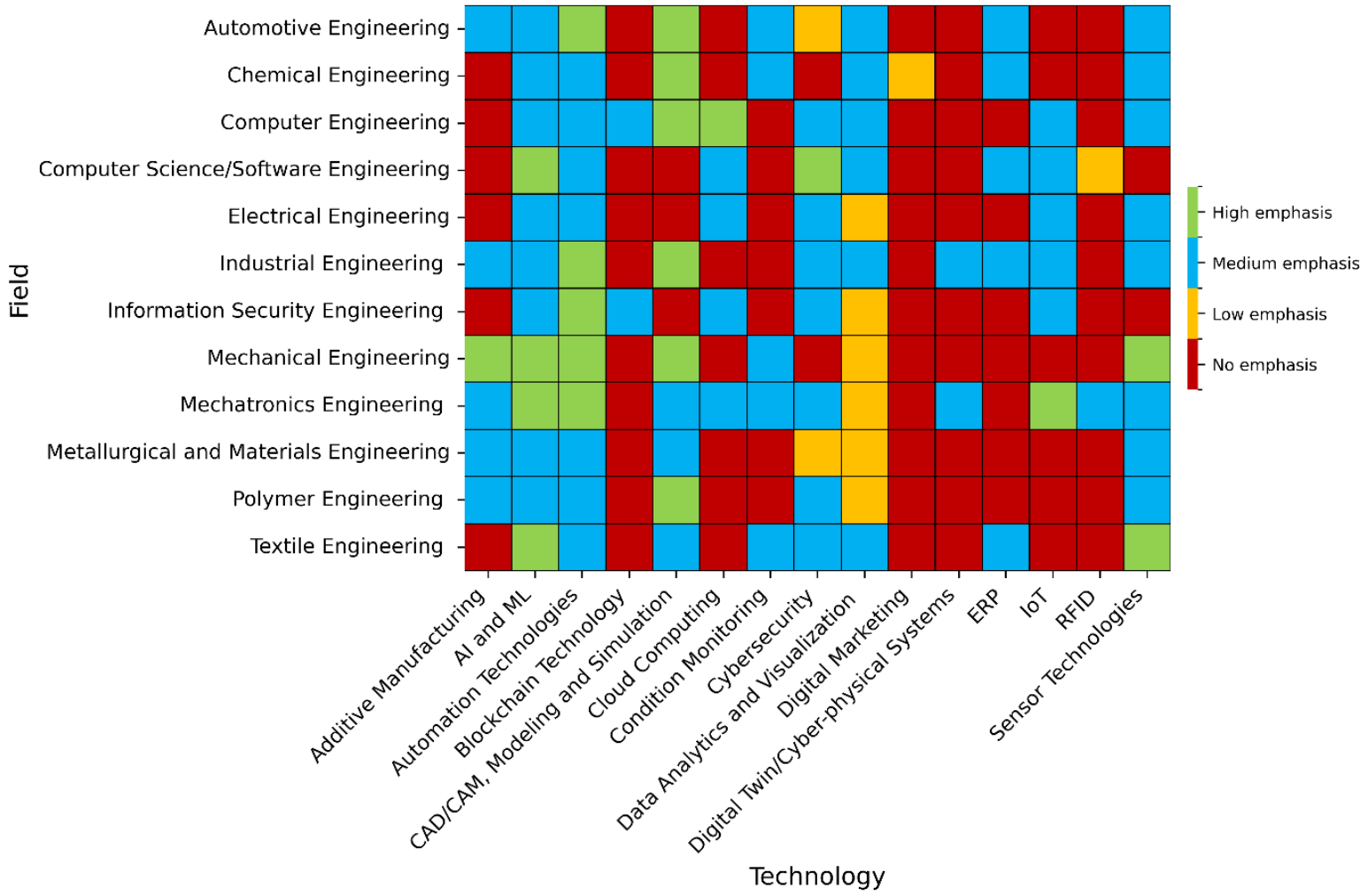
Perceived Level of Digitalization of the Manufacturing Sector



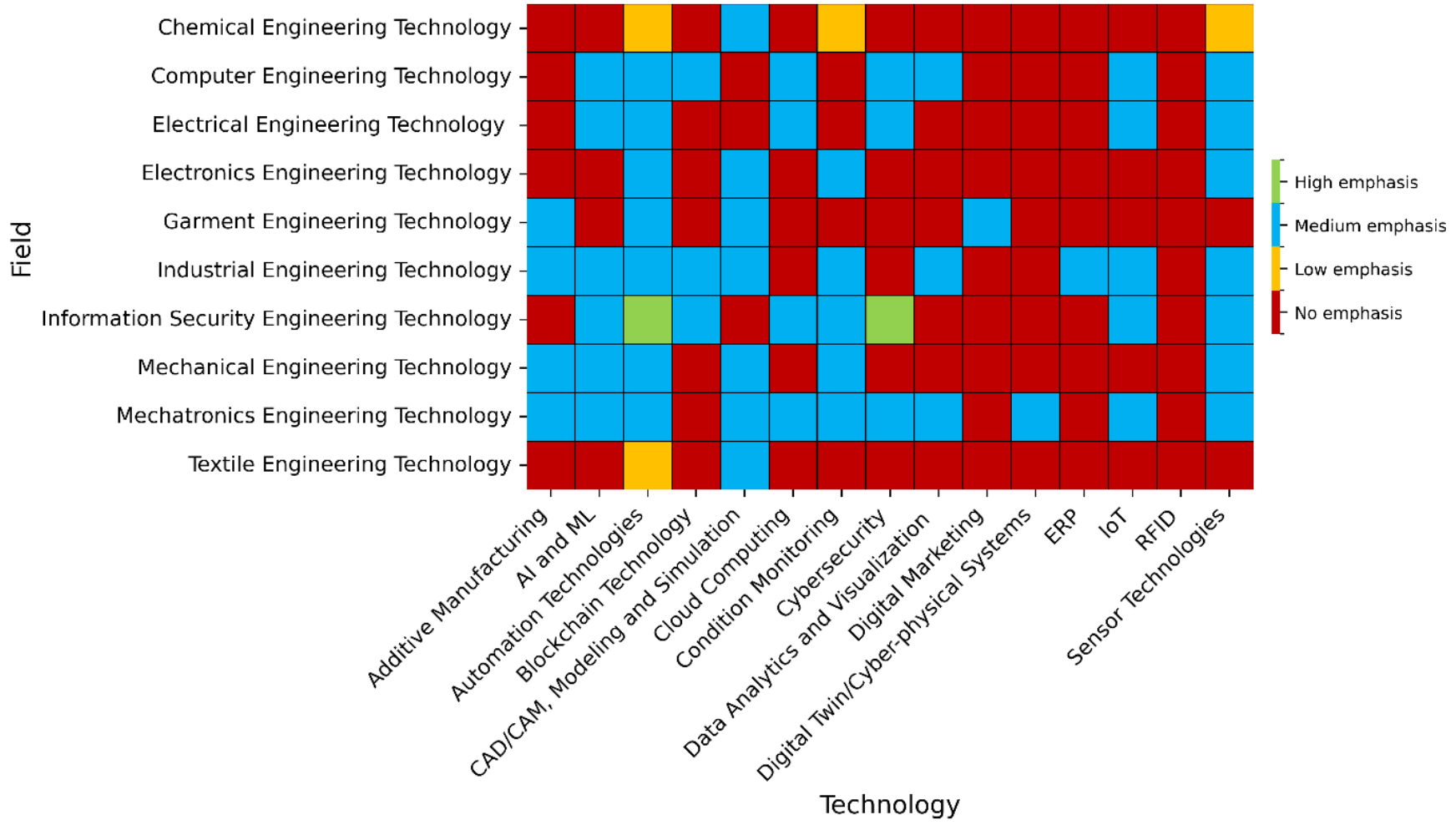
Gap Analysis of Digital Technologies Landscape



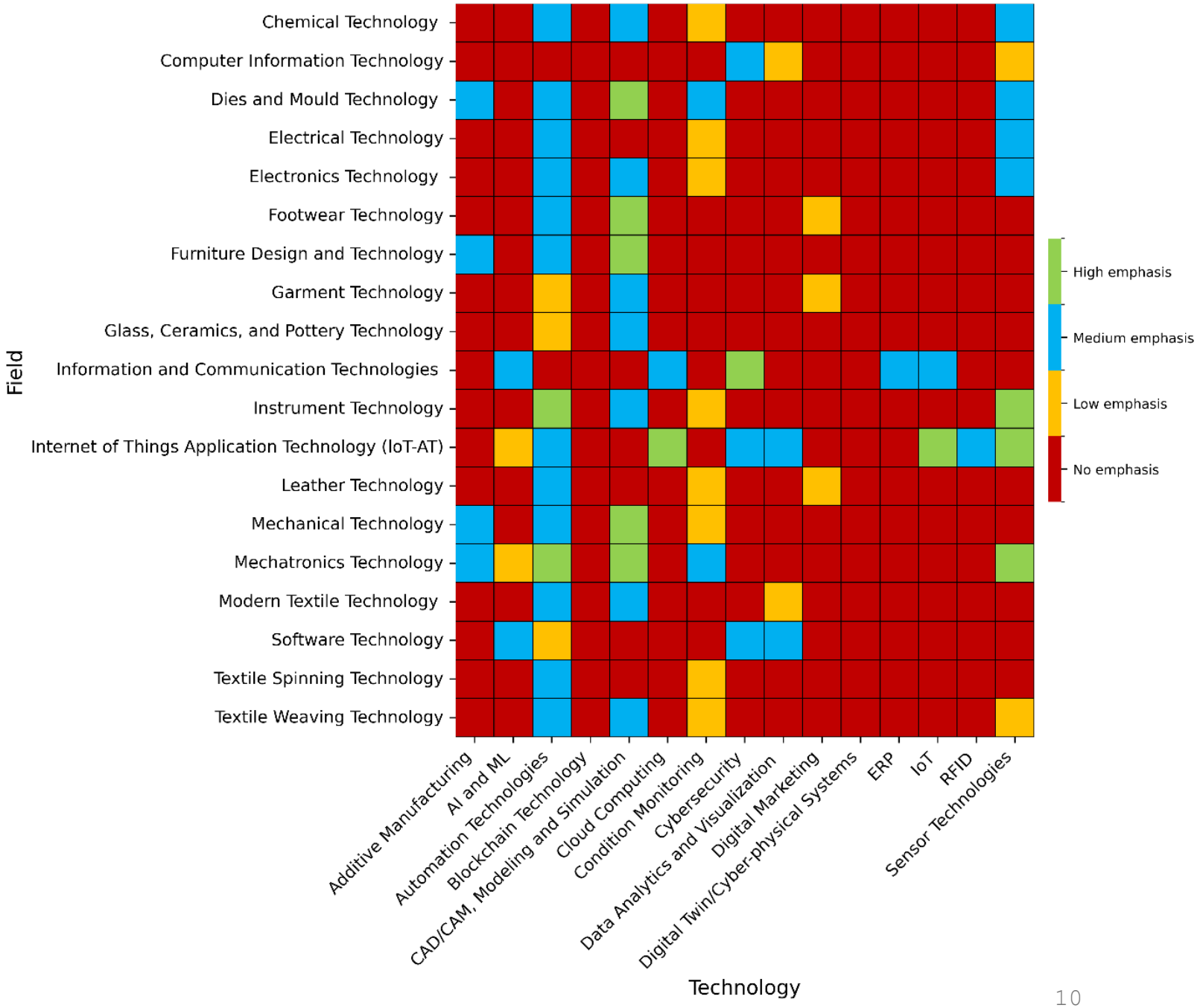
Inclusion of Digital Technologies in BSc Engineering Curricula



Inclusion of Digital Technologies in BSc Engineering Technology Curricula



Inclusion of Digital Technologies in DAE Curricula



Policy Recommendations

- Adoption of Digital Technologies
  - SME-friendly incentives
  - Digital transformation roadmap
  - Developing digital leadership
- Lack of Skills and the Readiness of the Workforce
  - National digital skill development framework
  - Industry-academic collaboration
  - Tailored training programs
  - Inclusion of digital skills into the curricula

Policy Recommendations

- Policy and Regulatory Challenges
  - Improving policy coordination
  - Financial incentives to adopt new technologies
- Physical Infrastructure to Become Digital Ready
  - Investment in digital infrastructure
  - Establishment of innovation hubs
  - Development of data-driven decision-making capabilities
  - Strengthening cybersecurity measures
- Promoting an Innovative and Lifelong Learning Culture
  - Online learning platforms
  - Employee training incentives

Thank you!

SPRC Social Protection Resource Center

University of Engineering and Technology Lahore

UN trade & development UNCTAD

TMIntegratix