Prospects of Additive Manufacturing in Pakistan

Dr. Waqas Ahmed

Associate Professor

NUST Business School

Global Overview

- Size of the global AM market (e.g., USD 20+ billion and growing)
- Key players and countries leading AM innovation (USA, Germany, China)
- Trends: Customization, Decentralized Manufacturing, Rapid Prototyping

Relevance to Pakistan

- Manufacturing sector's role in GDP (~13-15%)
- Need for innovation to stay competitive
- Young population and growing tech adoption

Current State of AM in Pakistan

- Pioneers: Research institutions like NUST, GIKI, and PIEAS
- Limited industrial adoption but growing interest
- Presence of service bureaus, 3D printing startups

Opportunities

- **Industrial Prototyping:** Fast and cost-effective prototyping for SMEs
- **Tooling & Jigs:** Reduction in lead time and cost
- **Healthcare:** Customized implants, prosthetics
- **Construction:** 3D-printed housing for disaster relief
- **Defense & Aerospace:** Lightweight parts, rapid iteration

Strategic Advantages for Pakistan

- Cost-effective skilled labor
- Strategic location for exports
- Emerging startup ecosystem
- Government incentives for innovation and digitization

Success Stories (Local & International)

- Local: NUST’s AM center, Pakistani startups offering 3D printing services
- International: GE, Boeing, Siemens adopting AM at scale

Challenges

- High initial investment cost
- Lack of skilled workforce
- Limited availability of raw materials
- Need for standardization and regulation

Way Forward

- Industry-academia collaboration
- Investment in R&D and pilot projects
- AM curriculum in engineering and technical programs
- Government support through policy and funding

Call to Action

- For Industry: Explore pilot projects and training
- For Academia: Develop talent and applied research
- For Students: Learn AM tools and software, pursue certifications

Open floor for questions and discussion