3D Printing, Maker Space, and Education: The Experiences

2019.9.

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Principal member of Research Staff
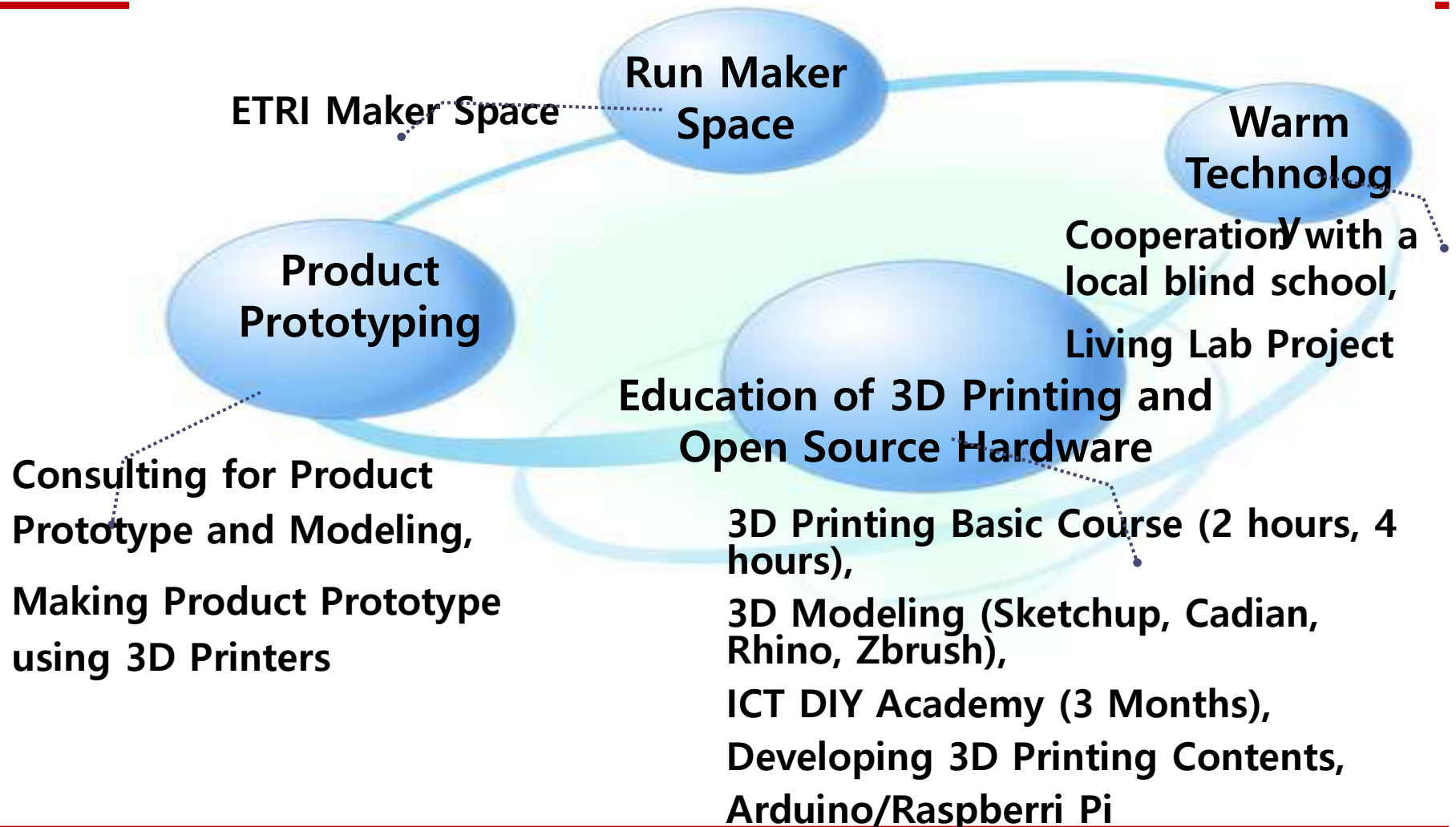
LI Networks

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Contents

- **LI Networks**
- **3D Printing**
- **Maker Space**
- **Maker Space Experiences**
- **Education**

LI NETWORKS

Vision

- **Helping others through networking**
  - **Persons**
  - **Knowledge**
  - **Goods**
- **To be a stepping stone**

Business Domains

Run Maker Space

ETRI Maker Space

Warm Technology

Cooperation with a local blind school,

Living Lab Project

Product Prototyping

Education of 3D Printing and Open Source Hardware

Consulting for Product Prototype and Modeling,

Making Product Prototype using 3D Printers

3D Printing Basic Course (2 hours, 4 hours),

3D Modeling (Sketchup, Cadian, Rhino, Zbrush),

ICT DIY Academy (3 Months),

Developing 3D Printing Contents,

Arduino/Raspberri Pi

3D PRINTING

Output sample of 3D Printing with latest technology

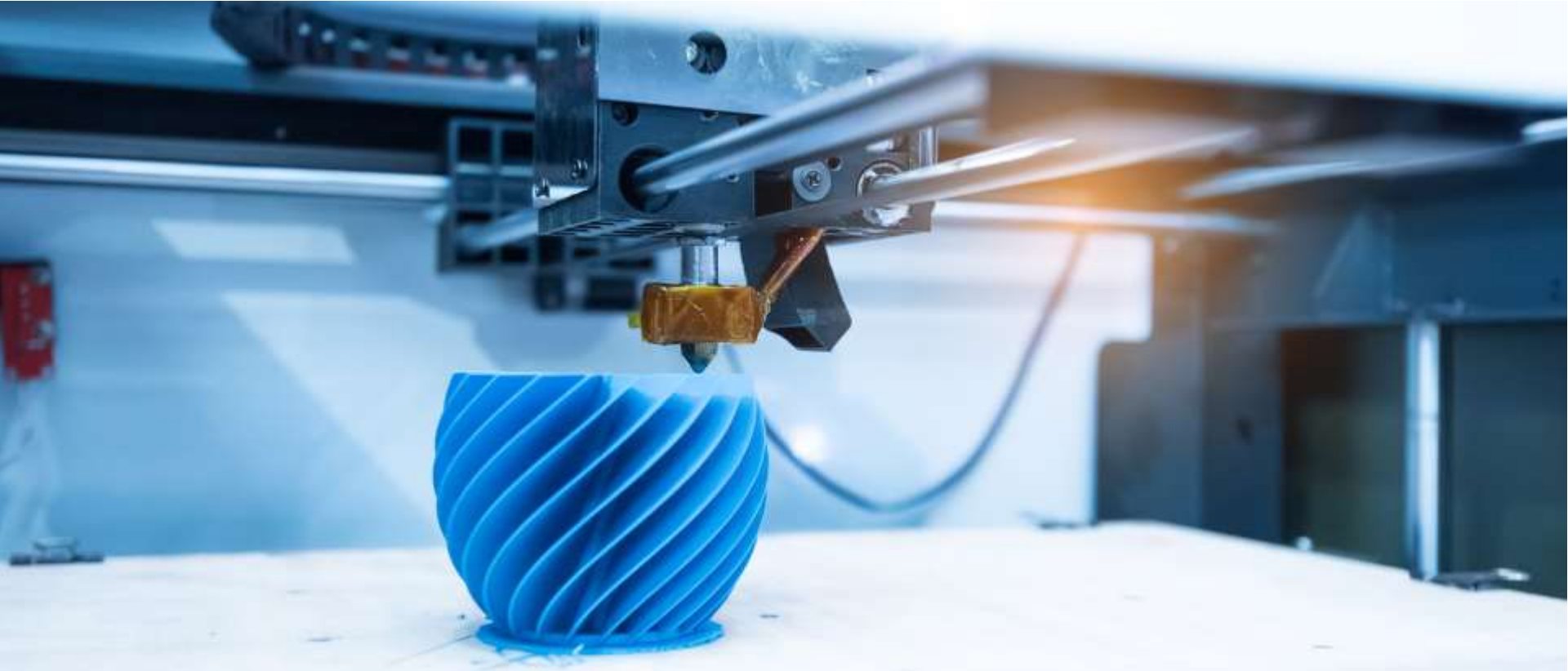# Output of 3D Printing with latest technology

Output of 3D Printing with latest technology
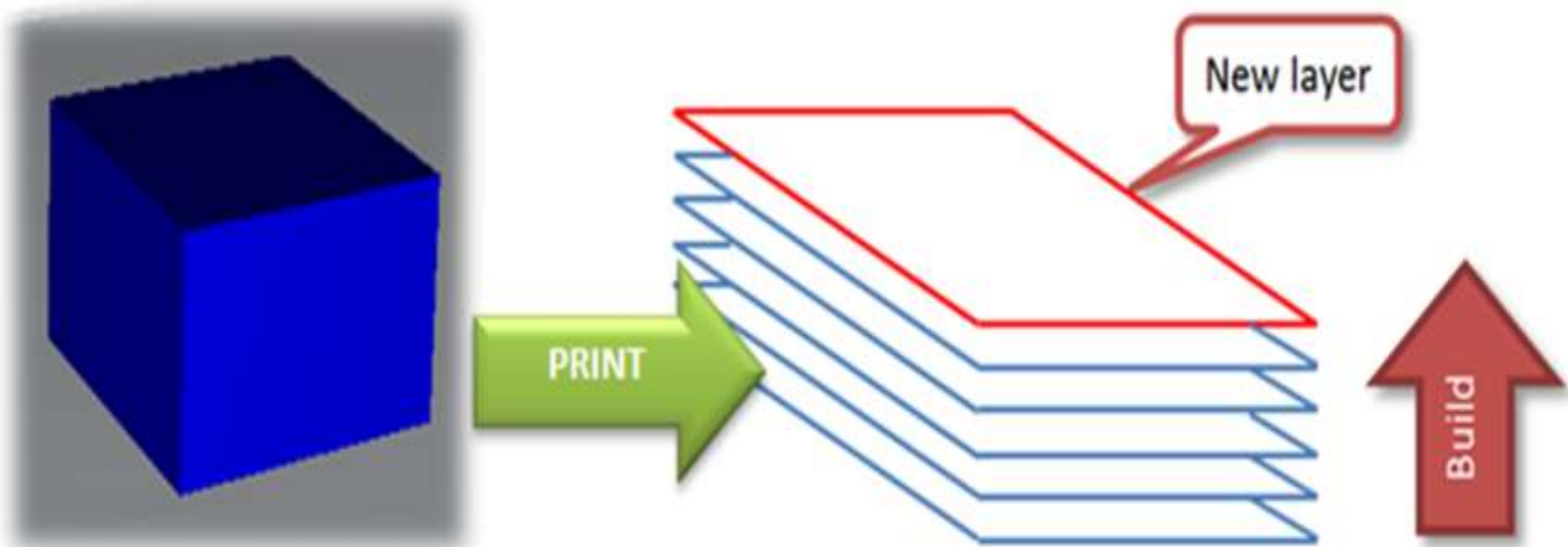
Output of 3D Printing with latest technology

3D Printing

Additive Manufacturing

is a form of Additive Manufacturing

Process of joining materials to make an object

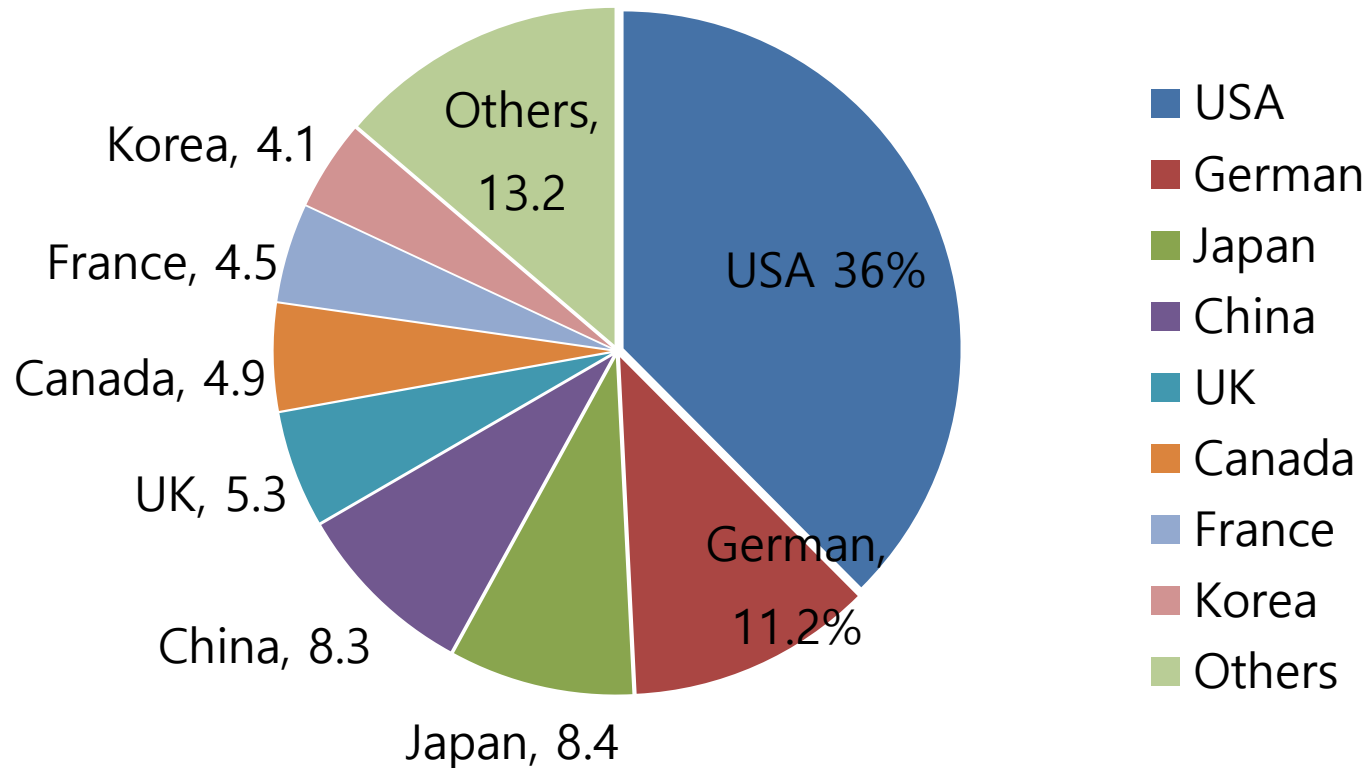**from 3D model Data; layer-by-layer process**

3D Printing

• Digital Fabrication

    - it takes a model

          └a digital design
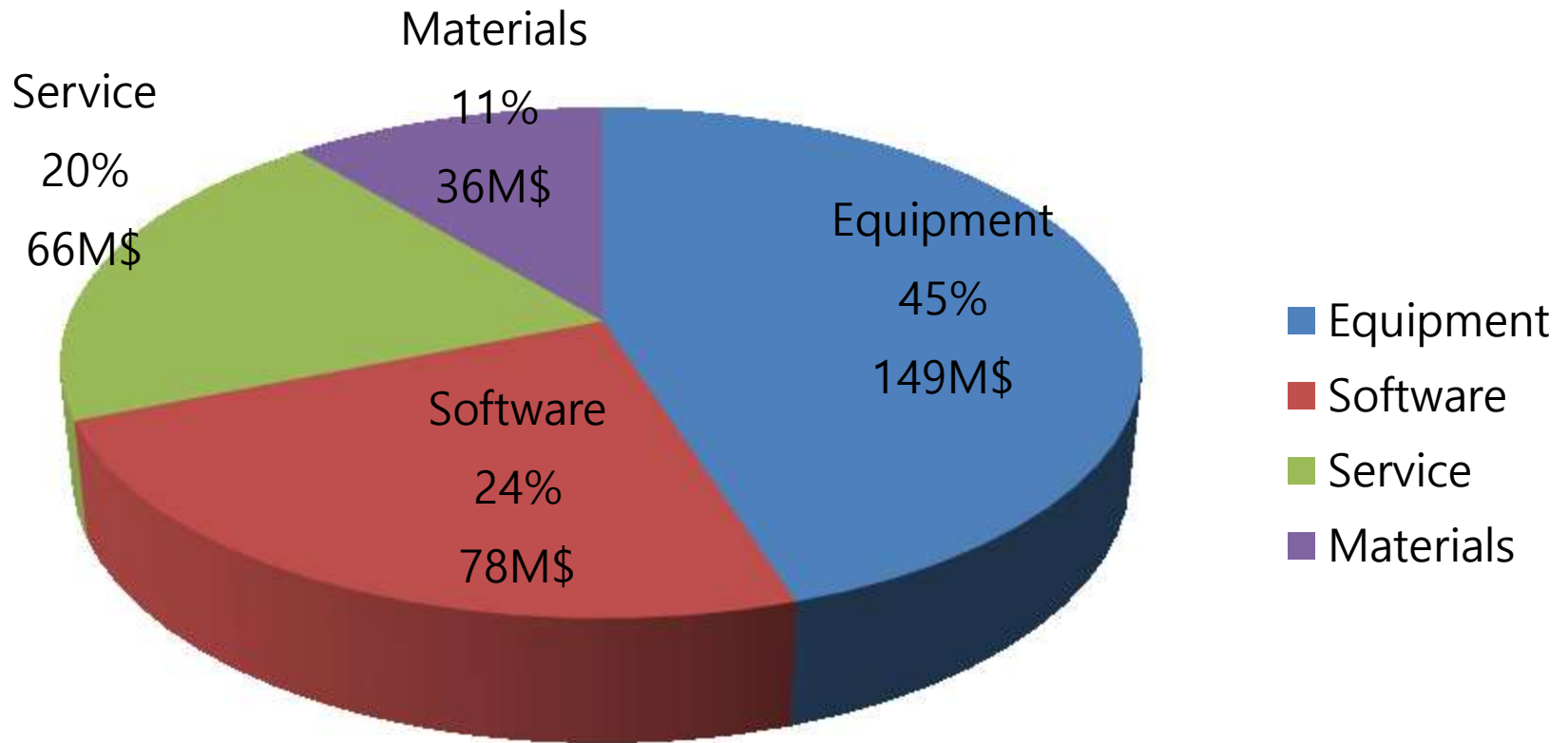
            └turn into real, physical Object

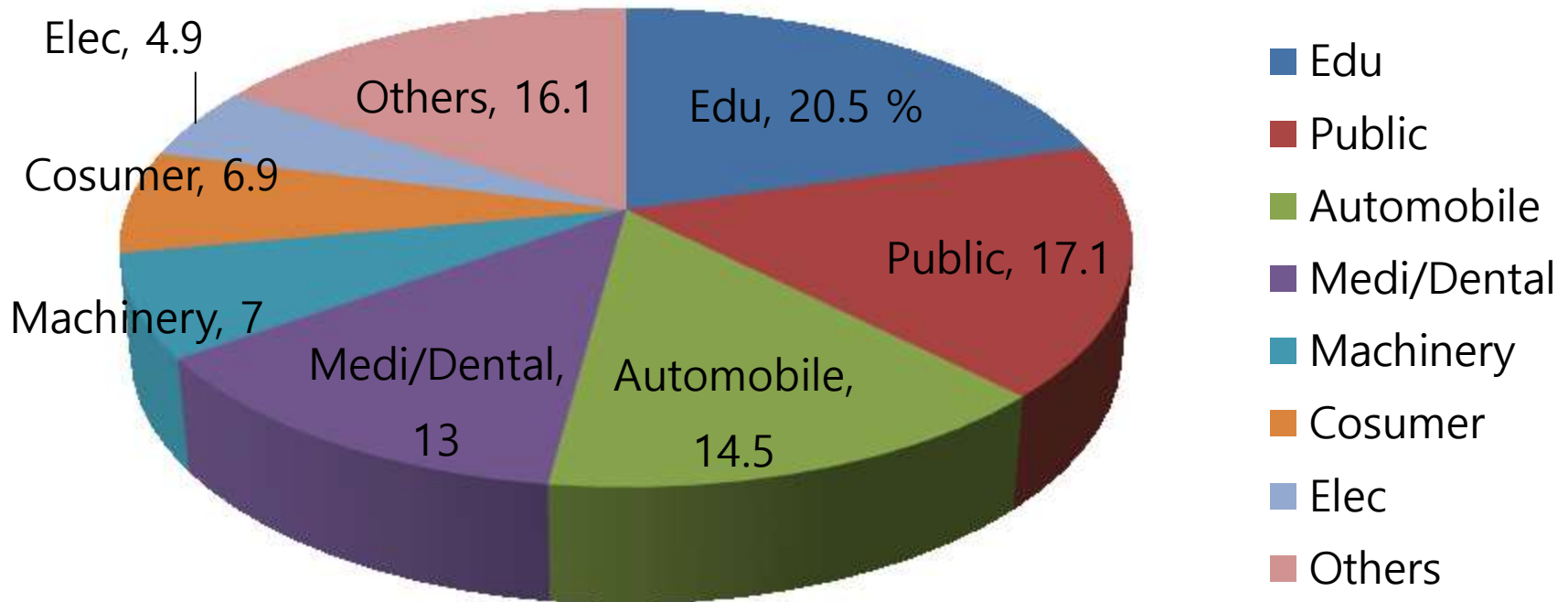# Intl. 3D Printing Market Share
(Markets & Markets '18)

Pie chart with legend: USA, German, Japan, China, UK, Canada, France, Korea, Others

- USA 36%
- German, 11.2%
- Japan, 8.4
- China, 8.3
- UK, 5.3
- Canada, 4.9
- France, 4.5
- Korea, 4.1
- Others, 13.2

2017 7.34B$ -> 2023 27.3B$, CAGR 27.5%

Korea Domestic 3D Printing Domain Markets (NIPA '18)

Pie chart showing: Materials 11% 36M$, Service 20% 66M$, Equipment 45% 149M$, Software 24% 78M$. Legend: Equipment, Software, Service, Materials.

Korea Domestic Industry Applications

Elec, 4.9
Others, 16.1
Cosumer, 6.9
Edu, 20.5 %
Machinery, 7
Public, 17.1
Medi/Dental, 13
Automobile, 14.5

Edu
Public
Automobile
Medi/Dental
Machinery
Cosumer
Elec
Others

3D Printing and Jewelry Design

With 3D printing, able to produce designs that would be incredibly difficult to hand carve in the traditional manner.

MAKER SPACE

Maker Space in Korea (2018)

- **The Government supporting**
- **60 Maker Spaces and**
- **5 Speciality Maker Spaces**
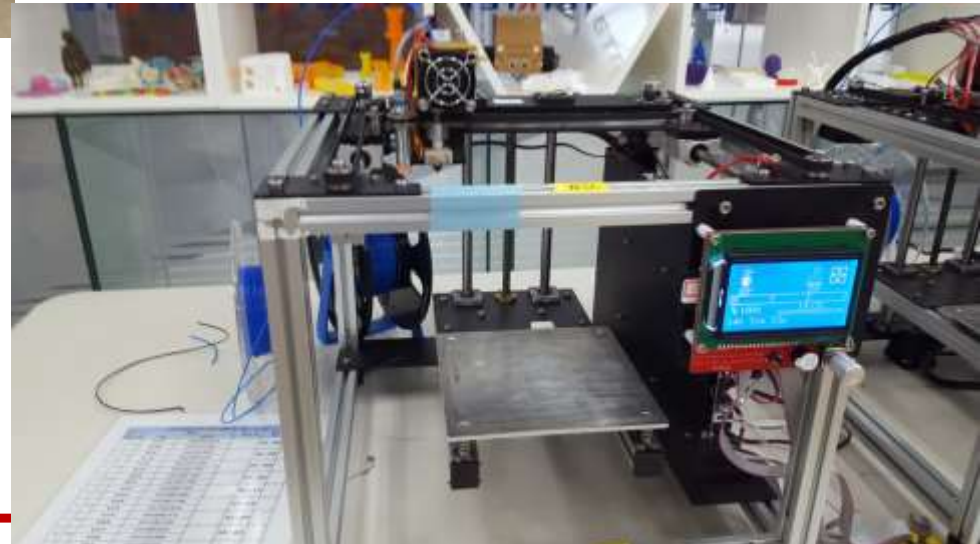
ETRI Maker Space

3D Printer Room

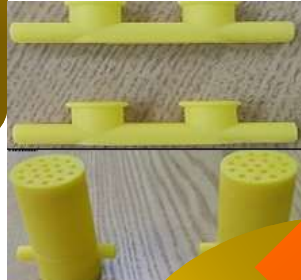# Post Processing Room

Outputs Display

Educational 3D printers

ETRI MAKER SPACE EXPERIENCE

Activities

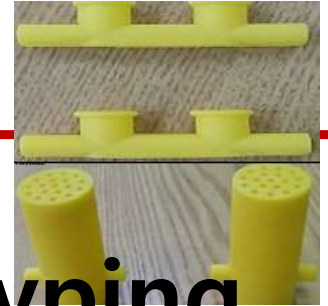Product Prototyping

Run Maker Space

ETRI Make Space

Vitalize Smart Workspace

Customized ICT DIY Edu

Product Prototyping

- **Consulting of Product Prototyping for Startups**

- **Product Prototyping using 3D**

  Printer and Open Source Hardware

- **Link support to New Business Creation and Commercialization**

Run Maker Space

Operation Hours:
9:00 AM to 6:00 PM

link to other Maker Spaces

Vitalize Smart Workspace

- **Support University and Community Activities**

- **Provide Consulting and Work Space**

- **Dig out business items through mentoring**

- **Link support to Business Startups**

Customized ICT DIY Education

- **3D Printer Education**

- **3D Modeling Education**

- **Open Source Hardware**

- **Education with Tool-kits**

- **ICT DIY Academy**

Modeling of Reader Helper for Low Vision Students

Cognitive Learning Tool for Low Vision Students

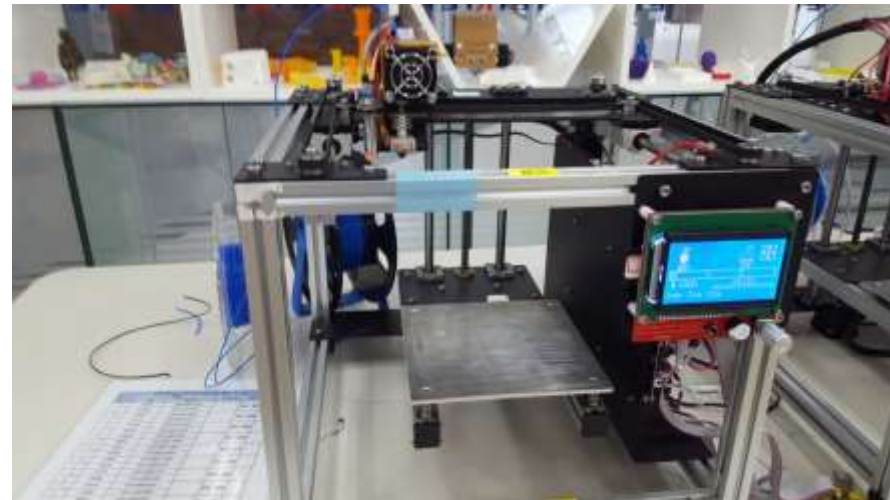- **Touch and Match by Plug-in**

Basic

Middle

EDUCATION

Education Themes (1)

- **3D Printing and Modeling**
  - **3D Modeling:**
    - **Sketchup**
    - **Fusion360**
    - **Zbrush**

  - **3D Printer Assembly**

Education Themes (2)

- **Block coding**
  - **Scratch**
  - **AppInventor**
- **Physical computing**
  - **Arduino**
  - **Raspberry Pi**
- **Internet of Things**
- **Cloud Services**

Education Themes (3)

- **Python Programming**
- **Deep Learning**

Class Spectrum

- **Middle School**
- **High School**
- **University**
- **Middle Ages**
- **Teachers**
- **Industry**

Education

- **no longer focus on transfer of knowledge**
- **More**
  - **Coaching**
  - **Encouraging Creative Activities**
  - **Help to find User's Needs thru Design Thinking**
- **In order to make narrow the digital divide between generations, Education is important.**
- **Education has the power to renew people and the world.**

Thank you very much
and
God bless you.