About

- Product application and user research to inform the different offerings: software platforms, kits and systems as well as support and training services.

- Digital product and service design lead in a variety of industries: energy, manufacturing, education, robotics.

- Marketing communications & design consulting

I help companies collect and turn insights into powerful digital products and services, that solve real problems, and bring value to both users and businesses.
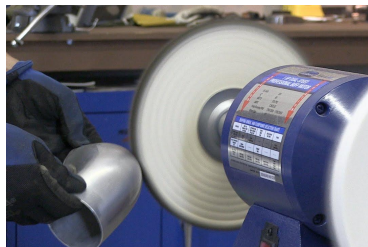
Dull,
dirty,
dangerous,
dear

Grinding

Sanding

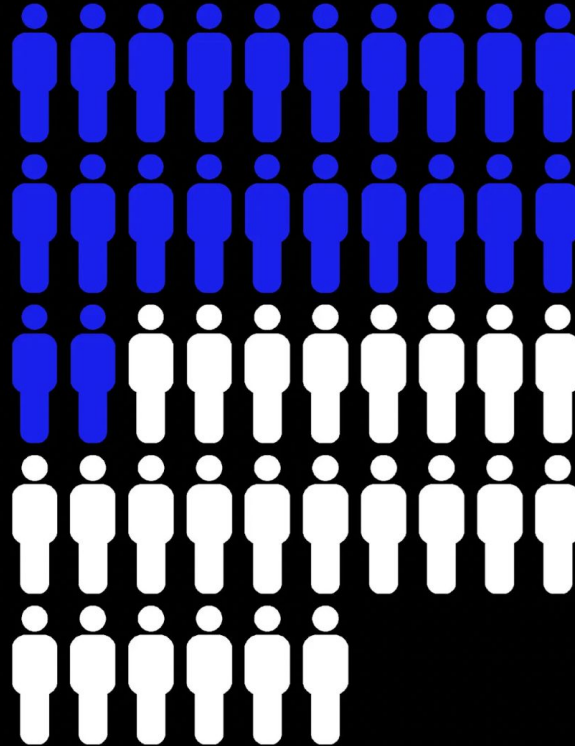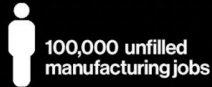**Quality Control**

Finishing

Deburring

Painting

Between 2018 and 2028, the study estimates, there will be 4.6 million US manufacturing jobs to fill.

This is how many will be left open.

100,000 filled manufacturing jobs
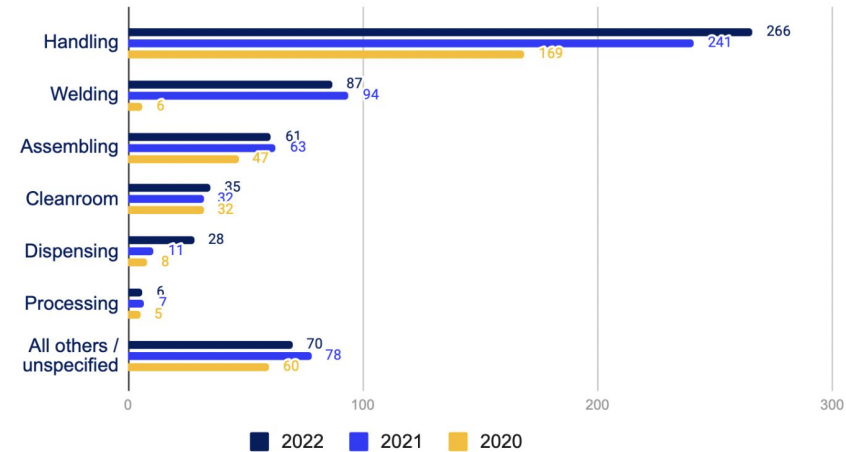
100,000 unfilled manufacturing jobs

Even though numbers for robotic installations are growing, dispensing and surface processing remain among the least automated application areas.

Manufacturing companies worldwide continue to struggle with finding and retaining skilled workers

Annual installations of industrial robots by application - World
1,000 units

Application	2022	2021	2020
Handling	266	241	169
Welding	87	94	6
Assembling	61	63	47
Cleanroom	35	32	32
Dispensing	28	11	8
Processing	6	7	5
All others / unspecified	70	78	60

ESG reporting obligations

Collecting, analysing, disclosing, and taking action on **environmental, social** and **governance data**

This data usually includes:
- Environmental data, such as a company's greenhouse gas emissions, pollution, water, etc.
- Social data such as worker conditions;
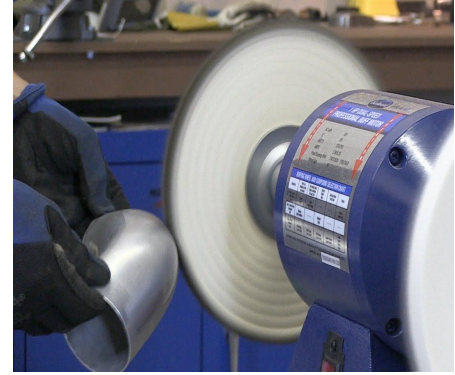- Information on business conduct and ethical practices.
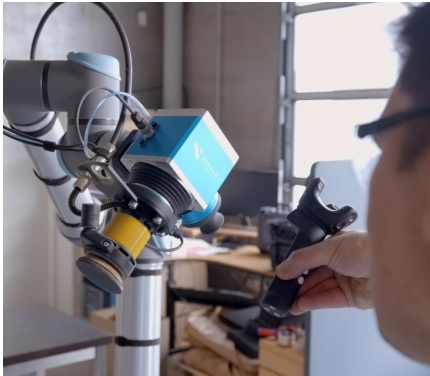
Application areas in focus

Painting

Sanding

Finishing

Robotic software as a fast programming tool

Tool in hand
Demonstrate the movement at a distance

Tool in hand
Guide the robot by hand

Part in hand
Guide the workpiece to the tool

Challenges

High-mix productions
There is high variance in the complexity of items as well as the batch sizes which often is seen as a barrier to automation.

Material waste
Paint material waste from over-spraying and re-work. Success of the paint job depends on whether or not they succeeded the first time.

Extensive training
It can take up to 3 months to train a worker in achieving quality painting.

Inflexible setups.
Stopping production while integrating and teaching the robots.

Inconsistent quality
1) It is hard for human workers to keep the spray gun at the same distance, speed and angle when painting, which are key parameters defining the quality of a paint job.

2) Low repeatability due to manual painting increases the time spent on quality control at several steps of the process.

It's a challenge nearly every fabricator faces — **balancing the need to meet strict OEM specifications** for finished-product durability and appearance while **minimizing finishing line cycle times, labor and equipment costs, and materials and energy consumption.**

https://www.thefabricator.com/thefabricator/article/finishing/new-powder-coatings-processes-increase-profit

Painting

Manual

Semi-Automatic

Automatic

Sustainable industrialisation & innovation

Application: Powder Coating, touch-ups

Material: Metal

Products: Outdoors furniture

Sustainable industrialisation & innovation

Challenges

High-mix productions
There is high variance in the complexity of items as well as the batch sizes which often is seen as a barrier to automation.

Training
There are no standards, therefore hard to replicate the finishing

Inconsistent quality
It is hard for human workers to keep the position and angle of the tool at the same speed and force while sanding.

Programming skills vs grinding skills
Combined know-how of programming and application crafts is rare.

In-flexible and expensive
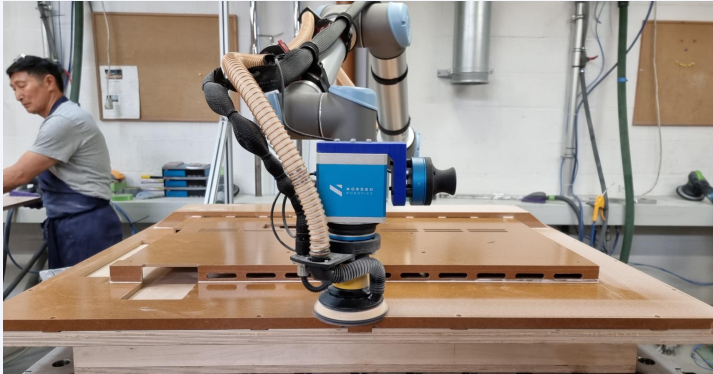Conventional programming is rigid by nature and involve high number of engineering hours.

Sustainable consumption & production

Application: Sanding

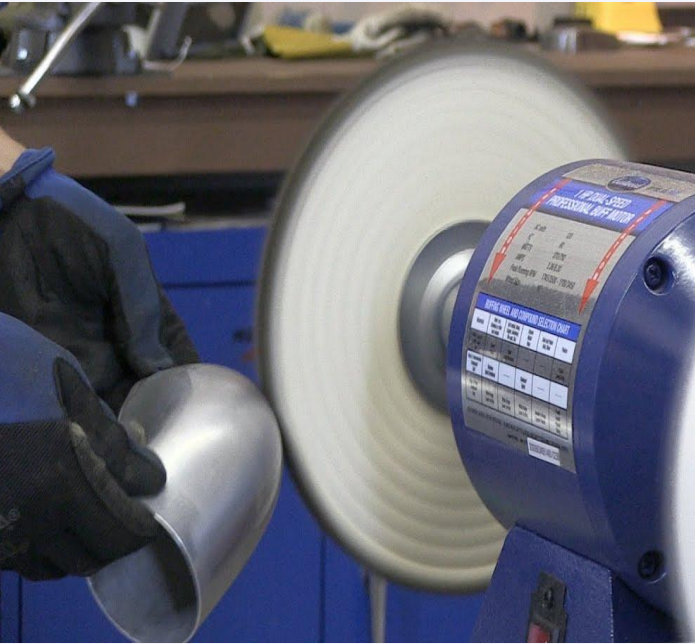**Material**: Wood

Products: TV frames

Sustainable consumption & production

so it makes sense to automate even the small series.

Challenges

High-mix productions
There is high variance in the complexity of items as well as the batch sizes which often is seen as a barrier to automation.

Training
There are no standards, therefore hard to replicate the finishing

Inconsistent quality
It is hard for human workers to keep the position and angle of a workpiece at the same speed, applying the same force.

Programming skills vs grinding skills
Combined know-how of programming and application crafts is rare.

Inflexible setups
Stopping production while teaching new programs

In-flexible and expensive
Conventional programming is rigid by nature and involve high amount of engineering hours.

Economic growth & decent work

Application: Buffing and polishing

Material: Metal

Products: Watches, phone parts, airpods, etc.

Economic growth & decent work

Thank you.

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