# Cost-Saving Technologies for Manufacturing

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Manufacturing characteristics include such factors as long lead times, specialized machinery, skilled workforce and operators, maintenance requirements, production defects, and differences between as-sold and as-maintained product configurations. However, a survey conducted by National Association of Manufacturers (NAM) revealed that the **majority of those in the manufacturing sector (53%) expect COVID-19 to impact their operations**.

During this time of uncertainty and economic slowdown, safeguarding consumer and workforce health is of utmost importance among businesses and governments. Plant closures (full or partial) could continue to be necessary for manufacturers in certain regions for a prolonged period of time. For companies of this nature, this is a critical time to explore a proactive deployment of automation technologies (e.g., robotics, Augmented Reality/Virtual Reality (AR/VR), Industrial IOT, 3D printing) to decrease worker density throughout their processes as well as cut down their operational costs.

Increased competition between established firms and new tech savvier entrants, together with the ever mounting pressure to reduce costs, means that it is not longer a matter of hard work alone, but rather a matter of working smarter.  The chart below compares the characteristics and benefits of labor arbitrage and labor automation.

| Labor Arbitrage Characteristics | Labor Automation Characteristics |
| --- | --- |
| **15% - 30%** Cost takeout | **40% - 75%** Cost takeout for relevant functions |
| Model is scalable to the extend that you can scale labor. | Model is scalable and is largely inpdendent of labor growth |
| Custom/complex legacy “Your mess for less” | Transformative - new way of doing business |
| Access to low cost labor necessary to provide continuous value | Access to “rocket scientists” who can codify manual processes |
| Revenue/Profit correlated to people | Revenue/Profit correlated to people |

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## Augmented Reality and Virtual Reality

**Augmented Reality/Virtual Reality (AR/VR)** technologies can be used to virtualize the workplace, improving both safety and productivity of workers at the facilities. By using AR/VR, companies can train new hires in a virtual environment without having the risk and cost of putting new employees into the production environment. With AR/VR technologies, companies can also improve employees' productivity by showing them product information in the virtual space in real time, helping them find products quickly, and enabling them to collaborate remotely. The AR/VR technologies are matured enough with companies focusing on hardware and software and other companies focusing on content creation. Therefore, manufacturing companies can get a quick win by implementing the AR/VR technologies.

### Startups addressing this topic

ario

*Ario's AR platform allows you to see and search your data in the real world*

STRIVR

*STRIVR utilizes VR to train individuals and improve performance*

visionLib

*Robust, precise and scalable tracking for industrial AR*

VISUALIX

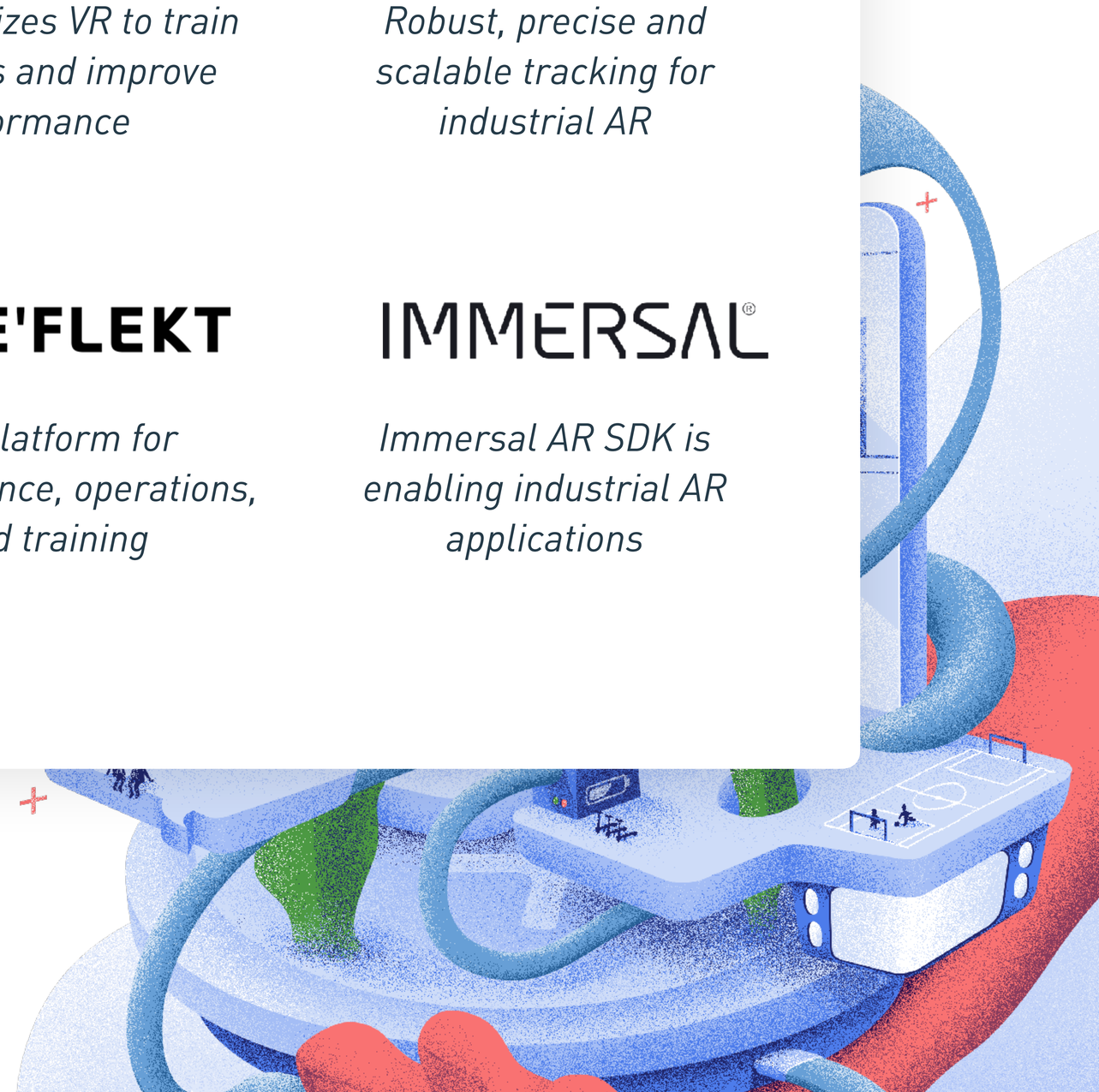
*Visualix is a computer vision company, enabling AR applications*

RE'FLEKT

*AR platform for maintenance, operations, and training*

IMMERSAL

*Immersal AR SDK is enabling industrial AR applications*



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## Robotics and Automation

Industries with mass production models can consider **robotics** to increase output and reduce process variability, thereby improving product quality. Manufacturing robots generally are able to automate repetitive tasks, reduce margins of error, and enable human workers to focus on more productive areas of the operation. Manufacturers do not need to fully upgrade their infrastructure to leverage robotics, as many startups can help companies to retrofit their existing machines by adding sensors and adding new software. Manufacturers can also start trying the technology from small robotics such as material handling robots.

### Startups addressing this topic

Litmus Automation

*Litmus Automation is an Edge Computing platform provider for Industrial IOT*

TEND

*Predictive Analytics for Industrial Robotics*

SOUTHIE AUTONOMY

*Southie Autonomy makes a no-code software platform for robot arms*

FREEDOM ROBOTICS

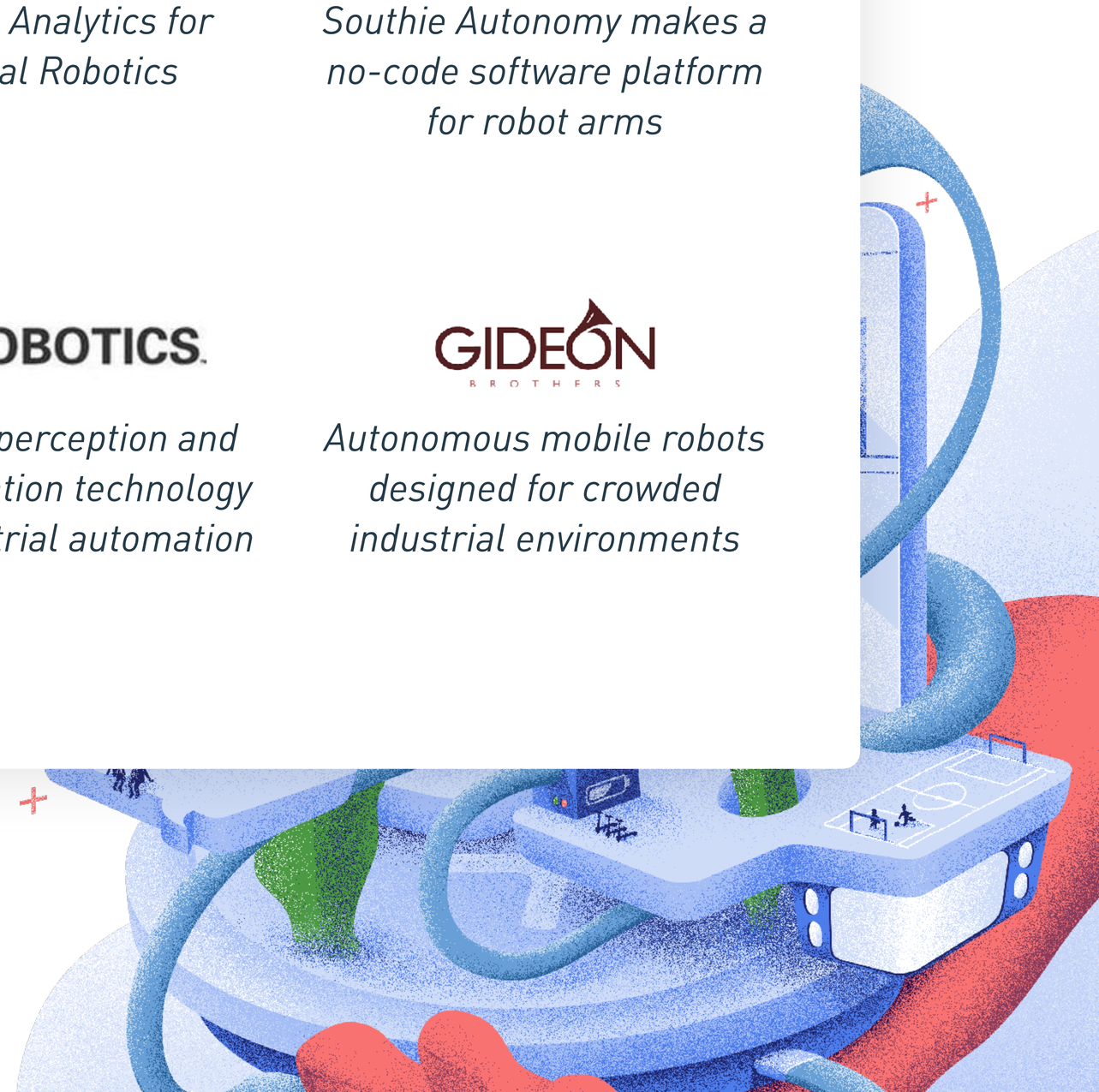
*Software infrastructure to enable the next generation of robots and robotic fleets*

ROBOTICS.

*Robotic perception and manipulation technology for industrial automation*

GIDEON BROTHERS

*Autonomous mobile robots designed for crowded industrial environments*



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## 3D Printing and Rapid Prototyping

**3D printing** can cut both costs and time of manufacturing processes and prototyping. *Volkswagen* estimated it saved them $377,000 by 3D printing fixtures and tools at its Portugal plant in 2017. The process of multiple weeks to get a part and that cost $200 to get the part was reduced to a couple of hours and $20 costs by leveraging additive manufacturing.

### Startups addressing this topic

MANTLE

*Mantle is an engineering company that builds a 3D metal printing technology*

3DEO

*3DEO makes 3D printed metal components*

AUTHENTISE

*AI-powered video analytics platform that reduces the risk of accidents*

FORTIFY

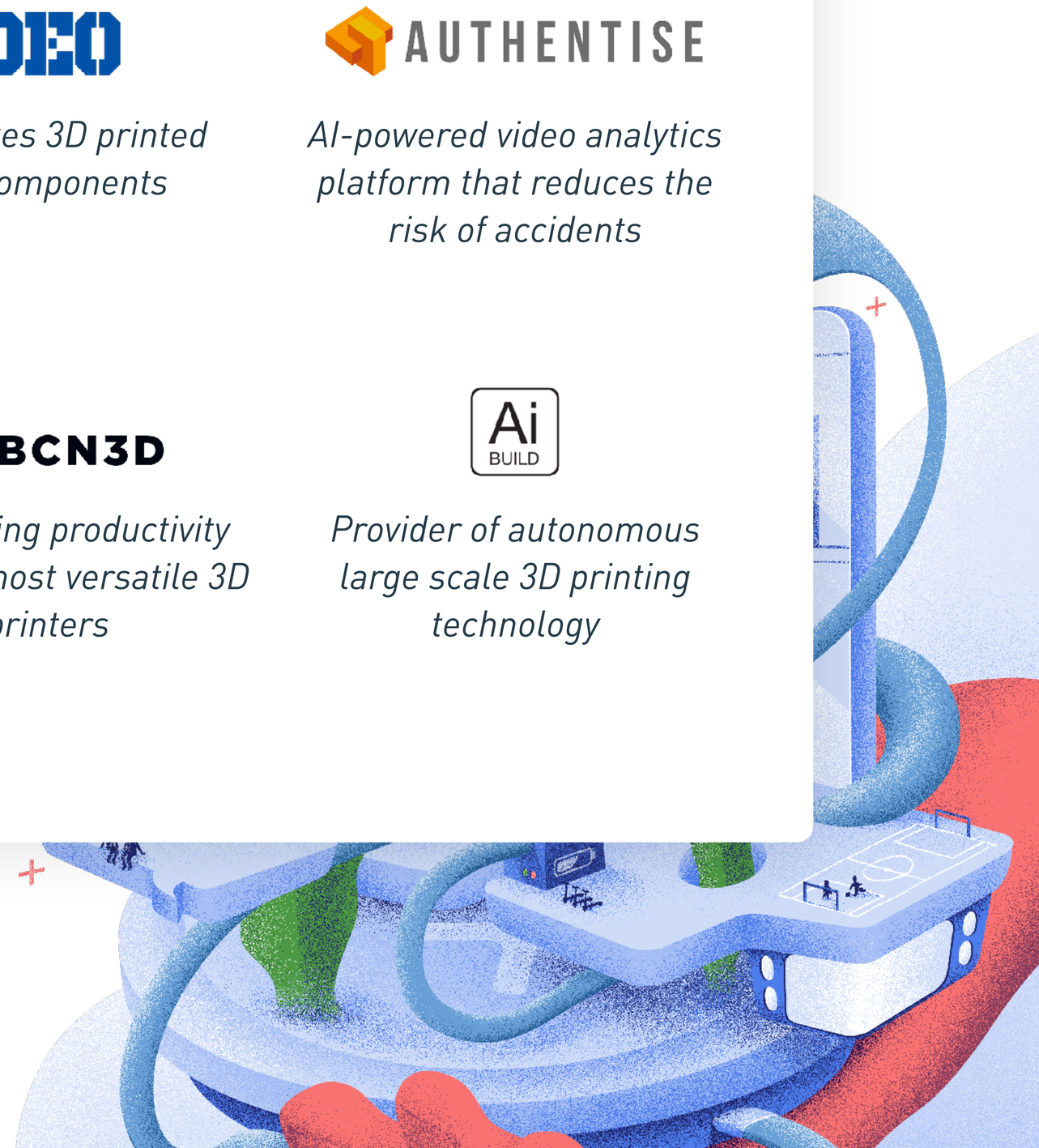
*Advanced manufacturing startup that aims to disrupt additive manufacturing*

BCN3D

*Maximizing productivity with the most versatile 3D printers*

Ai BUILD

*Provider of autonomous large scale 3D printing technology*



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## Accident Prevention and Operations Monitoring

With the development of **computer vision technologies**, the industry has found many great use cases in the manufacturing space such as safety/security monitoring, productivity monitoring, quality assurance, or simply object counting. Many of these jobs are still being done manually today, and implementing the computer-vision-based systems can save manufacturers a great amount of money by reducing downtime, reducing required labor, and reducing deficit components/products.

### Startups addressing this topic

cogniac

*Cogniac enables automation of any visual task using the latest in AI*

INSPEKTO

*Inspekto is a developer of Autonomous Machine Vision platform*

ATOLOGY

*Developer of a platform to turn physical operations into data*

drishti

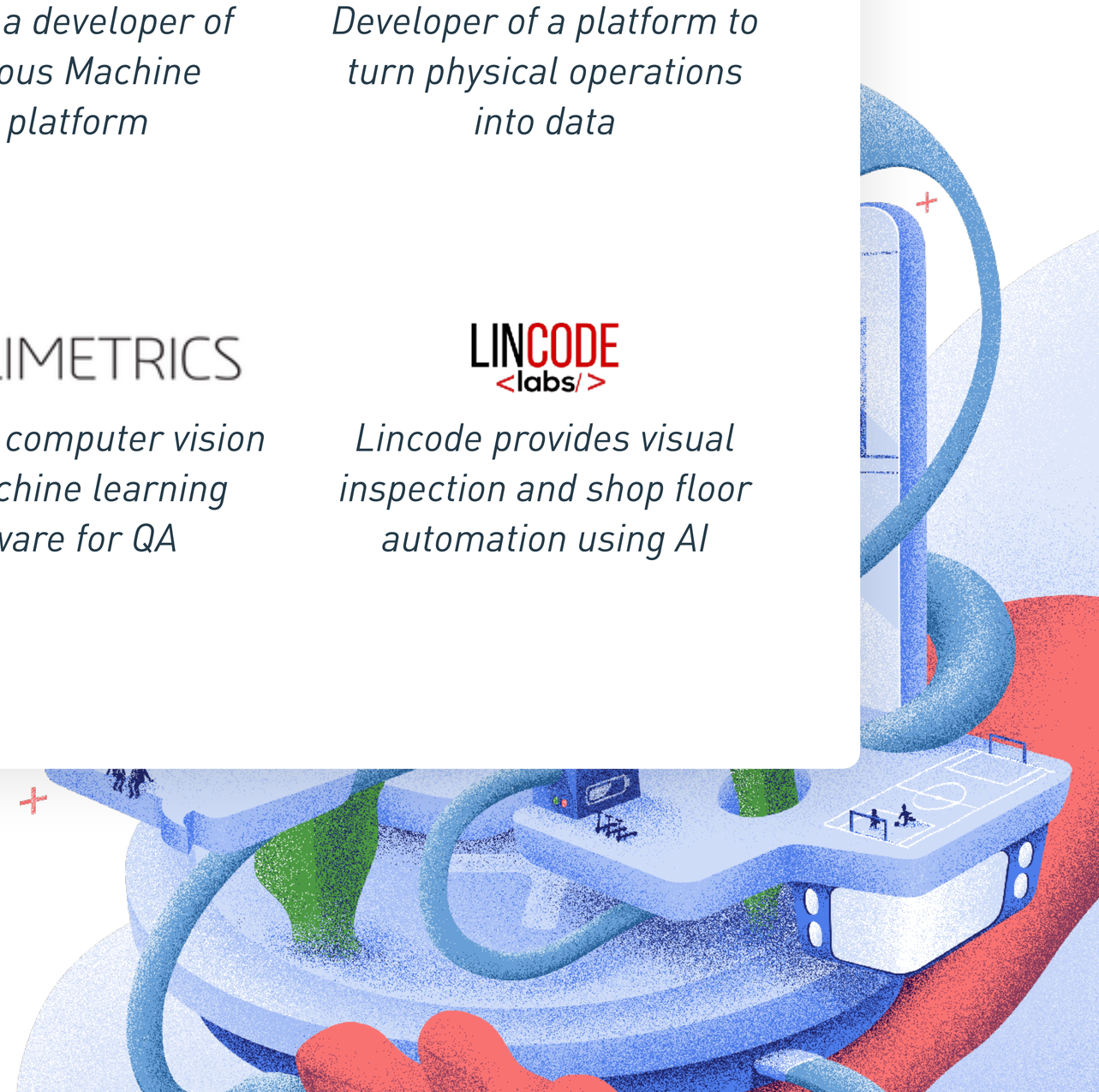
*Drishti's technology digitizes human actions inside the factory*

RELIMETRICS

*Full stack computer vision and machine learning software for QA*

LINCODE <labs/>

*Lincode provides visual inspection and shop floor automation using AI*



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# Cost-Saving Technologies for Manufacturing

## Predictive Maintenance

Machine downtime costs manufacturers a lot for the overall impact it brings to the entire system from the production line to the supply chain. To avoid machine downtime, it is good to be proactive by implementing **predictive maintenance** techniques. By leveraging the machine-learning-based computer vision  and acoustics techniques, startups can help manufacturers to collect data from machines, analyze the abnormalities, and identify the potential problems before they really happen. These predictive maintenance technologies can be applied to a wide range of industrial assets - from robotics, machines, pipelines, to vehicles.

### Startups addressing this topic

fēro labs

*Actionable ML software for improving processes and increasing production quality*

Acerta

*AI-enabled platform that detects manufacturing defects of parts*

AUGURY

*AI platform that diagnoses machines based on the sounds that they make*

senseye

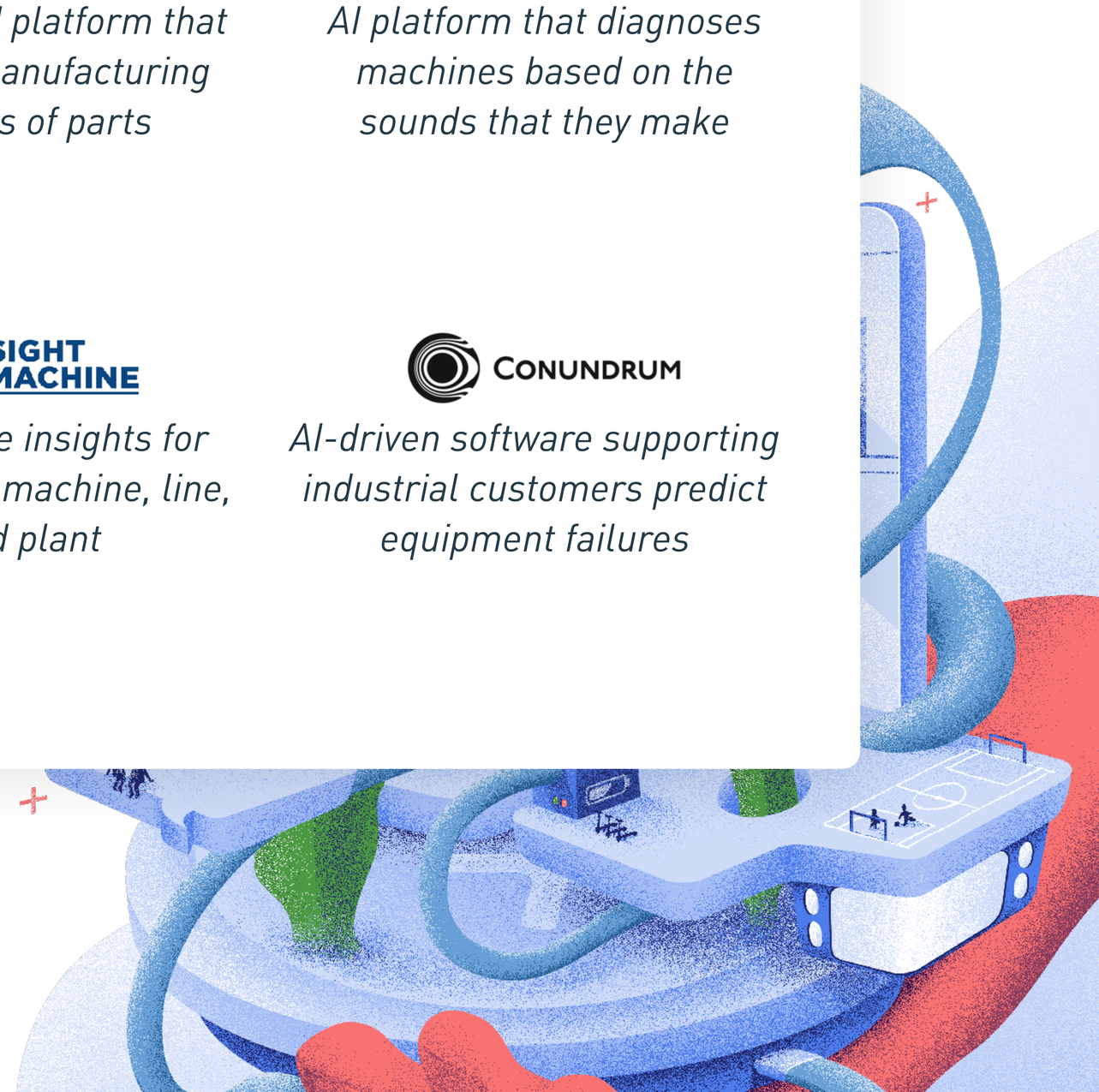
*Predictive maintenance platform which helps avoiding machine downtime*

SIGHT MACHINE

*Actionable insights for every part, machine, line, and plant*

CONUNDRUM

*AI-driven software supporting industrial customers predict equipment failures*



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# Cost-Saving Technologies for Manufacturing

## Legacy System Modernization

Many companies are still relying on **legacy IT systems** and not utilizing the rich data that their machines/facilities generate every day. This is a great space where manufacturers can save a great amount of money by picking up the new technologies from APIs to AI and machine learning. Startups also realize that there is a gap between the availability of the technologies and the capabilities to leverage those technologies. Therefore, many startups are here to provide simplified tools and platforms to enable manufacturers to build internal API tools, AI/ML models, and other monitoring tools without having a big developer team.

### Startups addressing this topic

VIZRU®

*Zero-code environment to develop AI-based applications and processes*

falkonry

*Platform for predictive analytics to be run on existing operations data*

RealityAI

*AI platform that diagnoses machines based on the sounds that they make*

intenseye

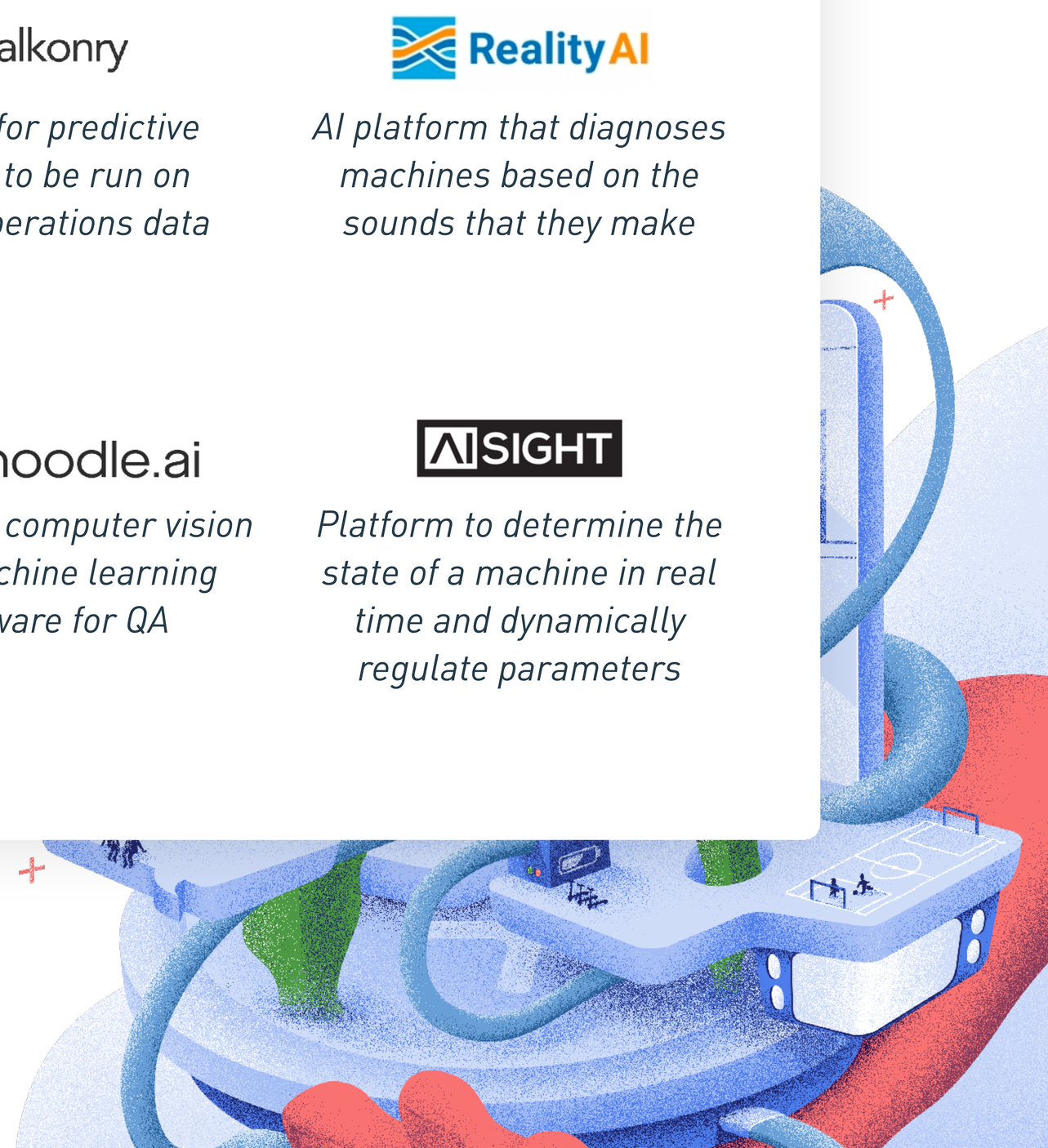
*AI-powered video analytics platform that reduces the risk of accidents*

noodle.ai

*Full stack computer vision and machine learning software for QA*

AISIGHT

*Platform to determine the state of a machine in real time and dynamically regulate parameters*



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# Cost-Saving Technologies for Manufacturing

## Robotic Process Automation

**Robotic Process Automation (RPA)** deals with simpler types of tasks. It takes away mainly physical tasks that don't need knowledge, understanding, or insight the tasks that can be done by codifying rules and instructing the computer or the software to act. RPA and cognitive automation strategies can drive cost reduction and operational improvement in such areas as procurement process, formulation, invoicing, pricing etc.

### Startups addressing this topic

lectroNeek

*On-premise RPA platform with unlimited bots and additional SaaS capabilities*

Ople

*End-to-end platform to harness the power of AI*

automation hero_

*RPA combined with AI to form an intelligent process automation platform*

AUTOMATION ANYWHERE

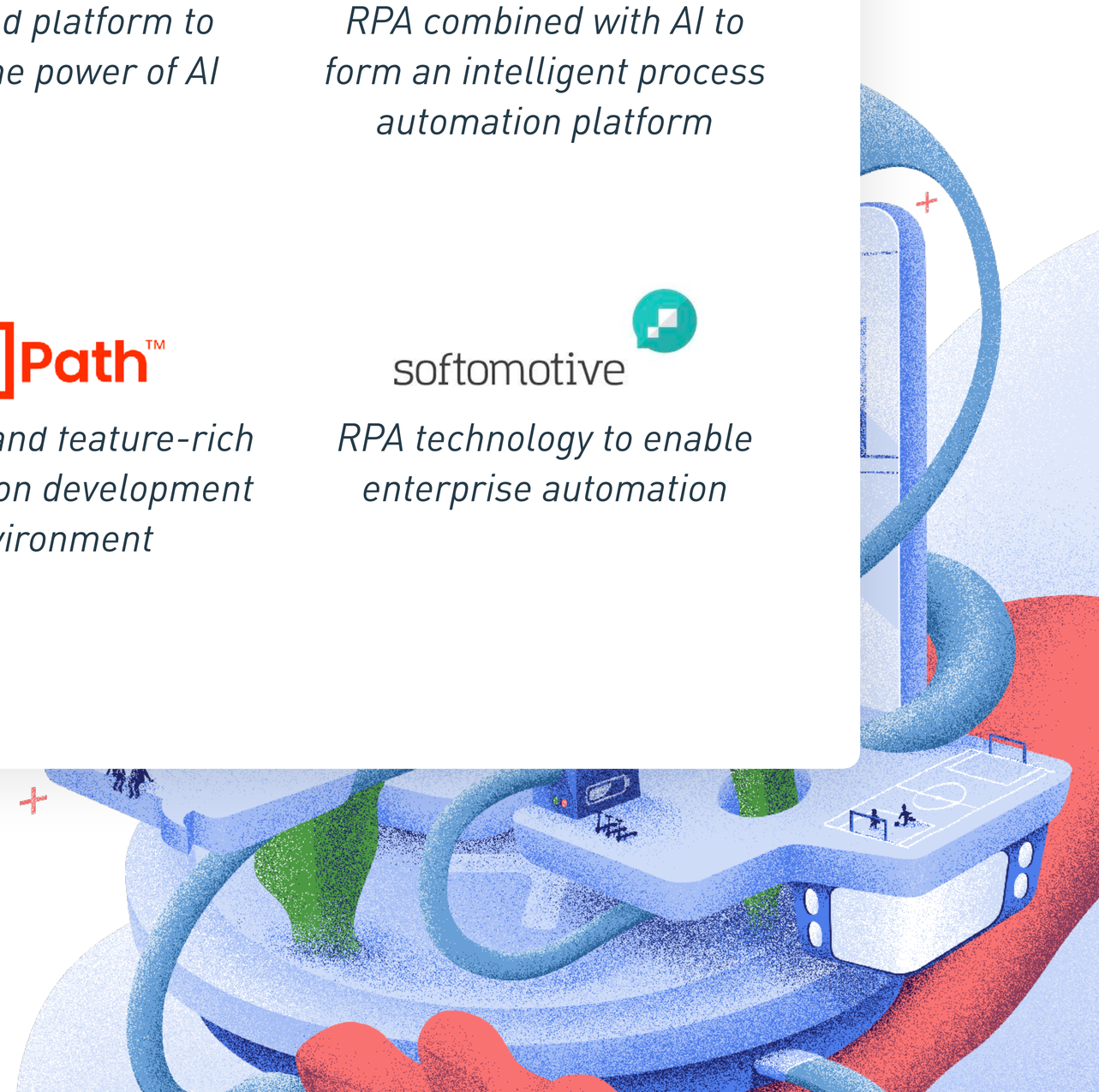
*Advanced, enterprise-grade, cognitive RPA platform*

UiPath™

*Intuitive and feature-rich automation development environment*

softomotive

*RPA technology to enable enterprise automation*



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