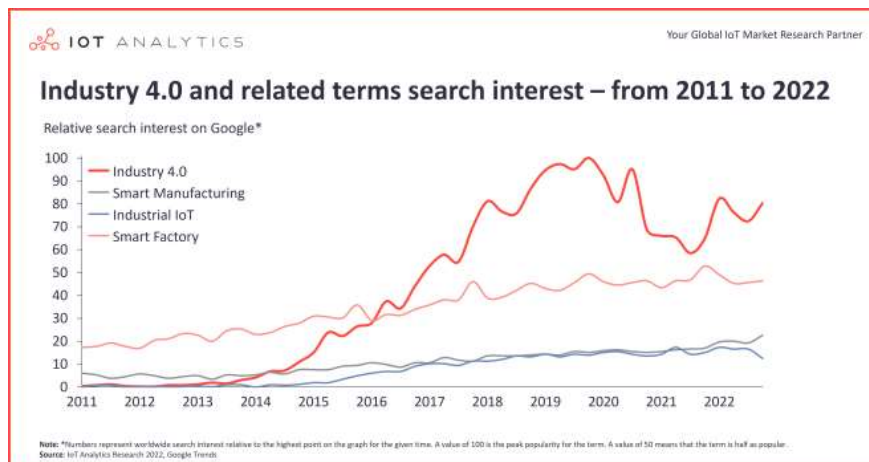


INSIGHTS RELEASE

THE RISE OF INDUSTRY 4.0 IN 5 STATS



Hamburg/Germany, October 20, 2022: IoT Analytics, a leading global provider of market insights and strategic business intelligence for the Internet of Things (IoT), AI, Cloud, Edge, and Industry 4.0, published a 217-page adoption report containing statistics on the current and future status of Industry 4.0 and smart manufacturing. This research is based on the feedback from 500 decision makers in manufacturing organizations.

Key insights:

- **A look at five key statistics shows that Industry 4.0 activity has risen since 2011, with COVID-19 and the 2022 slowdown presenting recent bumps on the road.**
- **The analysis considered five indicators: Public search interest, academic papers, start-up funding, M&A activity, and enterprise adoption.**

Dimitris Paraskevopoulos, analyst at IoT Analytics, says: "The concept of Industry 4.0 was introduced 11 years ago and first started as a vague concept to revolutionize manufacturing through "cyber-physical systems". It has since become a mandatory part of most manufacturers' strategy. Today, search interest has increased by 140 times and all signs point to the fact that interest in Industry 4.0 is still going strong."

Knud Lasse Lueth, CEO of IoT Analytics, adds: "Our latest research shows that industrial companies have further advanced on their digitization journey. The fact that 72% of manufacturers have an Industry 4.0 strategy in place is a clear indicator that adoption is happening, and Industry 4.0 is here to stay."

More than 10 years after its creation, it seems that Industry 4.0 is in full swing: Public search interest has risen 140 times since then, 50,000 research papers were published on the topic in 2021 alone, start-ups are now receiving a total of \$3 billion in funding each year (Q3 2021 to Q3 2022), and M&A activity has doubled.

The term “Industry 4.0” was first publicly introduced at Hannover Fair 2011 by German Chancellor Angela Merkel who (as rumor has it) picked up the term, sparking a number of interesting discussions as a result. (You can read our 2022 Hannover Fair analysis [here](#).)

What first started as a vague concept to revolutionize manufacturing through “cyber-physical systems” has since taken shape.

Some of the key advances since 2011 include:

- Much more powerful chipsets
- Widespread adoption of cloud services
- Containerization of software
- Creation of much-improved software middleware/tools
- Open interfaces to edge computing hardware
- New and improved communication standards/protocols
- Availability of relevant AI models and libraries

Few of these were obvious 10 years ago.

| “Industry 4.0” Definition

The use of modern I4.0 tech stack elements, or specific supporting technologies that enable manufacturers to integrate various data sources, achieve higher OEE, reduce costs, or improve other KPIs relevant to a production setup (manufacturing of goods, mining, oil, and gas) mostly in conjunction with rolling out new or improved use cases.

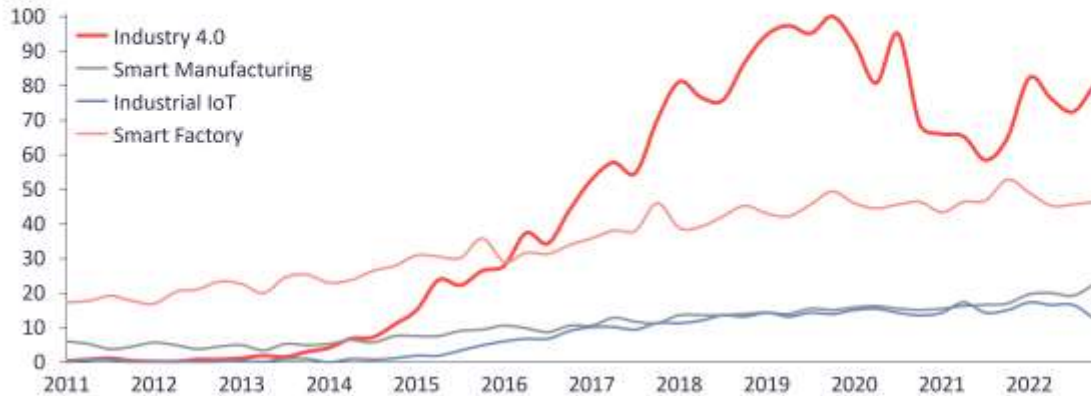
Here is a look at five key stats that show how “Industry 4.0” activity has changed since 2011:

#1 PUBLIC SEARCH INTEREST: 140 TIMES HIGHER

Searches for Industry 4.0 on Google in 2022 are 140 times higher compared to the year it was first introduced and made public (2011). In addition, related terms such as Industrial IoT and Smart Manufacturing grew quite fast in the same time frame as well (32 times and 3.5 times more searches respectively).

Industry 4.0 and related terms search interest – from 2011 to 2022

Relative search interest on Google*

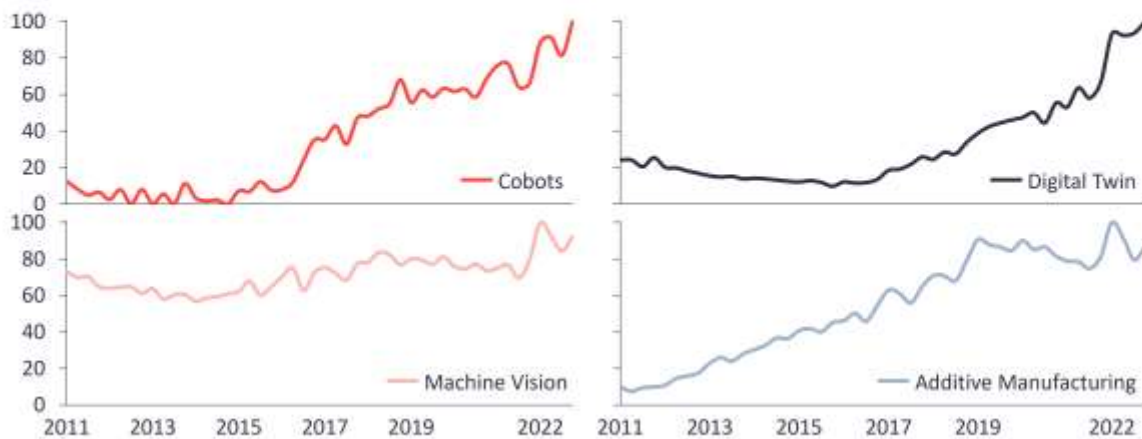


Note: *Numbers represent worldwide search interest relative to the highest point on the graph for the given time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular.
Source: IoT Analytics Research 2022, Google Trends

Industry 4.0 is an umbrella term that describes several advances in the manufacturing industry. The below picture shows how four of the supporting technologies for Industry 4.0 have also risen in popularity in the same time frame:

Industry 4.0 technologies search interest – from 2011 to 2022

Relative search interest on Google*

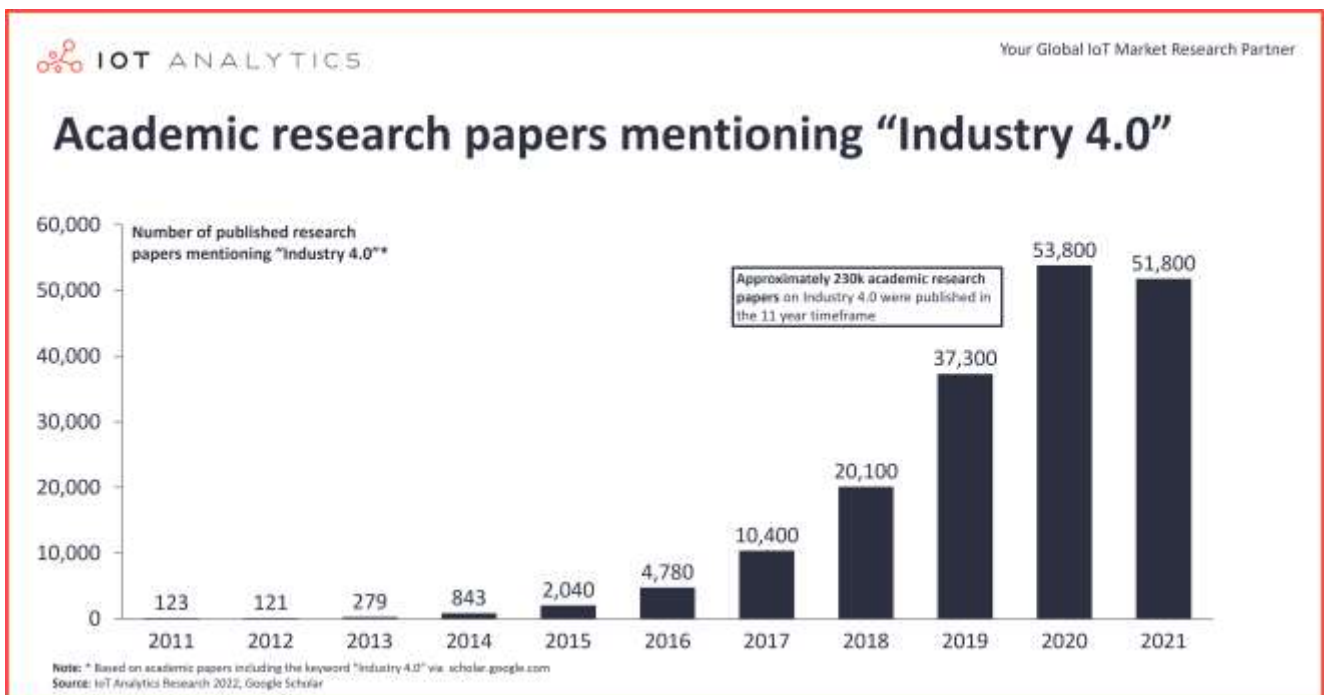


Note: *Numbers represent worldwide search interest relative to the highest point on each graph for the given time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular.
Source: IoT Analytics Research 2022, Google Trends

Search interests for “Cobots” increased more than 10 times since 2011, “Additive Manufacturing” almost nine times, “Digital Twin” more than four times, and “Machine Vision” 1.3 times. These supporting technologies are also representative of the interest in several other Industry 4.0-related technologies. (Note: IoT Analytics is set to publish reports on Digital Twin and Machine Vision in the coming weeks.)

#2 ACADEMIC PAPERS: 200,000+ PAPERS PUBLISHED

More than 50,000 academic papers on Industry 4.0 were released in 2020 and 2021, and more than 200,000 have been published in total within the last 10 years. It is safe to say that a lot of research is being done on Industry 4.0. One of these ideas can be the “next big thing” that will move the topic forward.

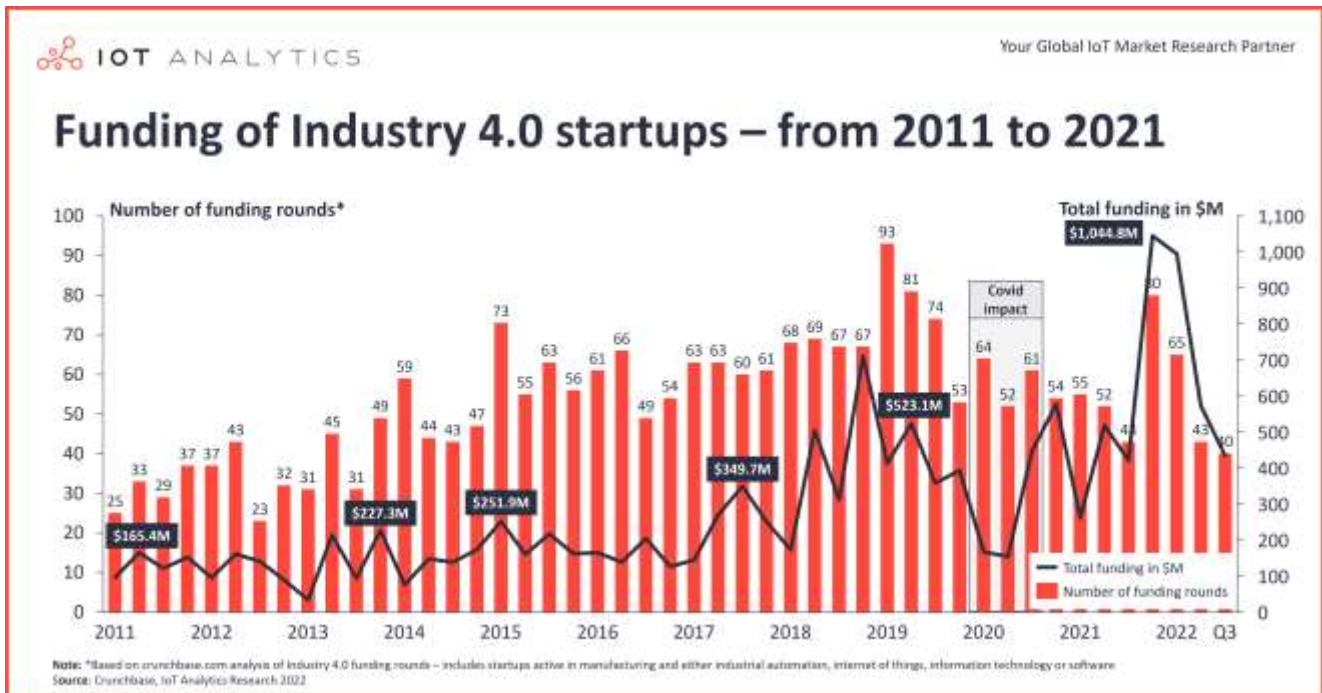


Based on Google Scholar, the three most cited papers relating to Industry 4.0 are:

	Title	Publishing year	Number of citations	Journal	Key authors
#1	Industry 4.0	2014	4167	Business & Information Systems Engineering	Lasi, Heiner, et al.
#2	Industry 4.0: State of the art and future trends	2018	2185	Intl. Journal of Production Research	Xu, Li Da, Eric L. Xu, and Ling Li
#3	Industry 4.0 technologies: Implementation patterns in manufacturing companies	2019	1466	Intl. Journal of Production Economics	Frank, Alejandro Germán, Lucas Santos Dalenogare, and Néstor Fabián Ayala

#3 FUNDING: 2,513 DEALS SINCE 2011

The annual funding of start-ups that are active in Industry 4.0 has increased by +319% from 2011 to 2021. 2021 saw a total of \$2.2 billion of funding spent on upcoming companies that develop technology related to Industry 4.0. A total of 2,513 deals were announced in the 11-year time frame. The total number of funding rounds decreased when COVID-19 hit in 2020 and has also taken a hit as of late with the inflation and war-related slowdown.



Notable investment rounds included a \$179 million Series A for BrightMachines in 2018, a \$100 million Series C for Tulip Interfaces in 2021, and a \$75 million Series E in Xometry in 2020.

#4 M&A ACTIVITY: DOUBLED FROM 2011 TO 2021

The annual number of Industry 4.0-related acquisitions reached a peak of 132 in 2021. This marks a 116% increase in the past 10 years. In the first three quarters of 2020, there were less than half acquisitions compared to the usual average in the rest of the years. COVID-19 had a clear impact on the M&A activity as well.

