

INDUSTRY 4.0

REVOLUTION OR EVOLUTION?



CIPHER

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It's time to answer the question: is it really different this time? Will machine intelligence automate most human jobs within the next few decades, and leave a large minority of people – perhaps a majority – unable to gain paid employment?

The Economic Singularity: Artificial intelligence and the death of capitalism, Calum Chance

How many revolutions can you have in 300 years?

Humans have been around for a long time, well over 2 million years, and homo sapiens for at least 300,000 years. Industrial revolutions date back to the 18th century with the shift to urbanisation. The second revolution (mass production) was 200 years ago. The third (digital revolution) began in the 1980s and is still disrupting and transforming.

The fourth industrial revolution is waiting in the wings. Often referred to as Industry 4.0, it will bring intelligent machines and factories communicating with each other, and collecting and analysing data. These capabilities will allow organisations fundamentally to improve and transform production and make processes faster, more flexible and more efficient.

This will have a dramatic impact on the vast asset-heavy industries such as manufacturing, chemicals and mining. Bain predicts that Industrial IoT will generate over \$300bn of revenues by 2020, and is already fuelling significant M&A and investment activity. This report analyses the impact of these changes through a patent lens for world's largest manufacturing and engineering companies.

Patents have always been important

Chart 1 analyses the patent portfolios of 10 of the largest manufacturing companies. There are significant differences across the board reflecting their corporate histories and the customers they serve. There are also significant areas of overlap, and specifically in areas such as engines, turbines and electronics.

Chart 1 Top 10, patent portfolio size by cluster

	Bosch	Siemens	GE	BASF	3M	ABB	Emerson	Mitsui	ThyssenKrupp	ArcelorMittal
Sensors, Imaging, Data processing and Auto	3994	14127	10923	431	2446	1772	1394	252	169	22
Electronics, Power & Energy storage	6997	6543	3039	670	739	4932	1580	447	262	14
Materials	631	668	1330	11521	3485	178	70	4353	670	243
Engine & Exhaust	11273	2568	2417	894	585	346	2000	375	373	11
Gas & Wind Turbines	747	4786	10493	354	485	317	284	107	317	45
Machines & Appliances	9875	1696	6248	241	468	477	486	207	274	18
Driver Assistance Systems	5771	1249	0	77	119	115	113	101	219	8
Automotive Components and Systems	3276	1492	715	49	74	160	88	35	764	23
Communication systems	883	1972	223	9	33	237	157	6	12	0
Miscellaneous	4864	3104	2260	880	1966	380	294	907	1191	22
TOTAL	48311	38205	37648	15126	10400	8914	6466	6790	4251	406

**“The value of an idea lies in the using of it”
Thomas Edison**

Industry 4.0 is not one thing but many

Industry 4.0 is not the consequence of one thing, but the rapid and simultaneous development of multiple technologies including IoT (Internet of Things, itself a set of sensor and communication technologies), robotics, 3D printing, cloud computing, augmented reality and the ubiquitous rise in AI.

In Charts 2a and 2b, we analyse the top 10 owners of patents in the areas Robotics and Sensors. What is striking is the limited overlap between the owners of these technologies and the top 10 in Chart 1.

Chart 2a Robotics, Top 10

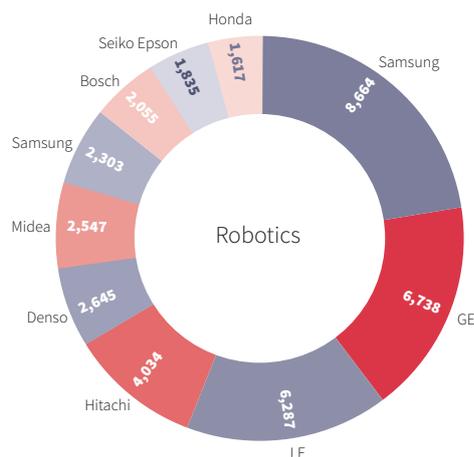
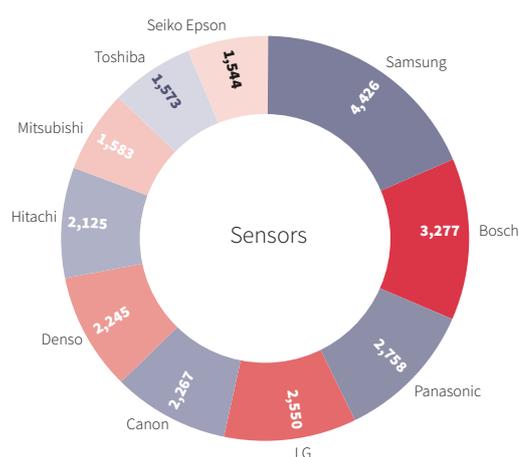


Chart 2b Sensors, Top 10



This suggests a world where it is more difficult to dominate across multiple business lines. For robotics, the levels of patenting across the automotive OEMs and Tiers 1s suggests that this community is going to take the lead. For sensors, Samsung, Panasonic and Hitachi all feature strongly. What seems like disruption for the incumbents is an opportunity for those strong of the foundational technologies.

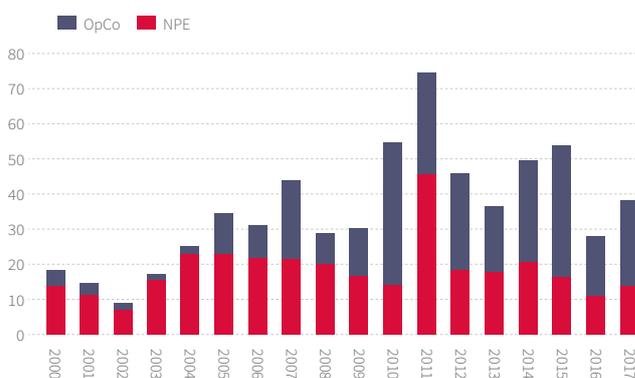
This expansion of the ecosystem and supply chains is a driving force behind many recent acquisitions and collaborations. GE’s AI and IoT acquisitions include wise.io, Bit Stew and its collaboration with TAMR. Mitsui has invested in PSiSoft and GRID and Siemens’ acquired of Mentor Graphics. The technologies also motivate significant internal investment such as Bosch’s plan to build a \$1bn factory to power the new wave of smart technologies. No one is ignoring the opportunity.

New technologies come with new risks

A valid concern is whether these trend will see an increase in patent risk. Chart 3 is the US litigation profile for the same cohort over the last 10 years. This is a familiar pattern of relative stability, spoilt only by the surge in NPE (aka patent troll) litigation. With this source of litigation in decline, the question is whether peace will prevail.

What seems certain is that there will be a need for greater collaboration between the tech sector and the major Industrials, with greater focus on the start-ups and many winners and losers. With technology and patents being currency in this equation expect to see a much greater awareness of and attention on intangibles.

Chart 3 US litigation against the Top 10 Industrials



The end of the beginning

Industry 4.0 will have a greater economic impact than its predecessors. It will also herald unprecedented increases in efficiency that will reduce cost and improve performance across all aspects of industrial performance.

This transition is fuelling new levels of innovation which disrupt and empower in equal measure. While this puts pressure on the leaders as they stand today, there is no doubt that they are up for the challenge. What is essential at these inflection points is the accessibility of the right information at the right time. This means enabling the patent system to do what it was intended - communication. In that way we can all stand on the shoulders of giants, and mitigate the risk of standing on each others toes.

To quote Thomas Edison “The value of an idea lies in the using of it.” There have been many debates over the years about whether patents aid or inhibit innovation. Cipher, our advanced analytics platform helps you rethink this question and value patents as an essential source of scientific intelligence, helping companies to make connections and build the relationships necessary to enable Industry 4.0 to be more evolution than revolution.



Cipher is revolutionising IP analytics. By harnessing the power of artificial intelligence, Cipher is able to aggregate, analyse and visualise technology and innovation trends derived from patent, litigation and licensing data.