

## Will robots take our jobs?

Rapid technological advances are changing the way people work. Now, machines are able to do complex tasks once thought impossible. We've been here before – think what the car meant for horse handlers and harness makers. But have we reached the point where machines can do jobs once performed exclusively by humans?

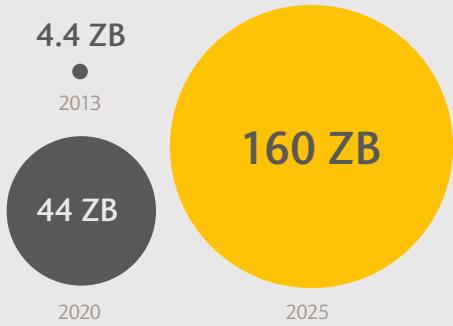
# Why the future of work is at a tipping point

In recent years, three conditions have converged to make technologies like Artificial Intelligence and robotics more commercially viable, raising new questions about the implications for workers.

## 1. An explosion of data

The digitised economy is generating more data than ever – from global imports to medical implants to social media.

Size of the global datasphere



1 zettabyte = 1 trillion gigabytes

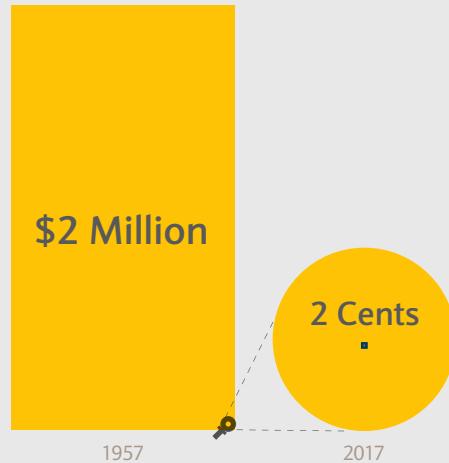
About 200-250 average-length songs usually equal one gigabyte of data.

Source: IDC, 2017.

## 2. Plummeting data storage costs

Data processing and storage capacity now seem limitless, while costs continue to drop.

Cost to store 1 GB of data

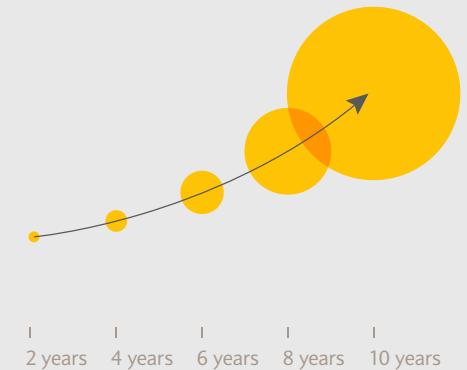


Source: Mearian, Lucas. *Computerworld*, 2017.

## 3. Increasingly powerful machines

Thanks to Moore's Law, computing power doubles roughly every two years, while costs essentially halve.

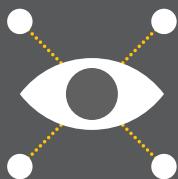
Growth in computing power over time



Source: Moore's Law.

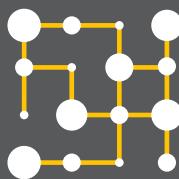
## Are machines catching up to humans?

Computers follow rules, while people learn and evolve through experience. However, with Artificial Intelligence, machines are learning to do things only humans used to do.



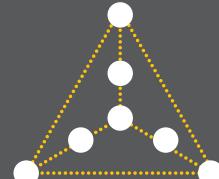
### Managing logistics

Robotics, machine vision and sensors are being deployed to manage global manufacturing and supply chains.



### Crunching big data

Neural nets are running simulations on massive amounts of data to spot rules and patterns just like humans can.



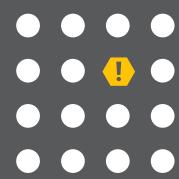
### Learning from each other

Computers can now sync new findings across networked machines, accelerating the pace of machine learning.



### Making recommendations

When it comes to making purchases, predictive analytics reveals a customer's needs and desires with astonishing accuracy.



### Learning from mistakes

Always-improving email spam detection shows how machines can get better at a task over time.

# Humans still have the upper hand

There are certain skills and innate abilities that still give us an advantage over machines:

## Sensorimotor skills

People use their senses to process what they see, hear or touch and act accordingly – often subconsciously. Most robots remain far clumsier than a young child.



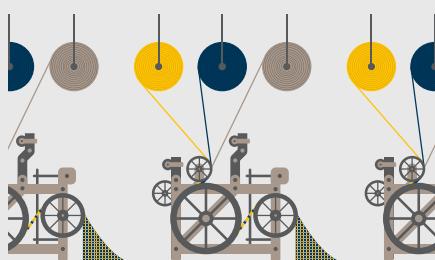
## Cognitive functionality

Much of what humans do daily depends on a capacity to perceive context, learn from experience and make decisions based on incomplete information. Machines can't, yet.

## New technologies bring new opportunities

While new technology has often been perceived as a threat, historically it hasn't led to a permanent reduction in the total number of jobs. Actually, it often drives increased demand and creates new professions.

1818



1918



2018



### Power loom operators wanted

Textile jobs in Britain boomed from 1810-1840 because of the power loom. Why? Mass-produced textiles were cheaper, causing demand to explode.

### Car mechanics wanted

While motorised transport led to the decline of jobs related to horse transport, it created jobs to manufacture and service cars and trucks.

### Mobile app developers wanted

The smartphone changed how we use and create software. Now there are millions of app developers – a career that didn't exist 15 years ago.

# What will jobs look like in the future?

Tomorrow's jobs will likely be in areas where humans retain an advantage over machines:



## Highly unpredictable circumstances

Think plumbers or lawyers, where the ability to adapt on the spot is crucial.



## Complex personal relationships

For example, relationship managers, doctors and nurses – where trust, comfort and connection are important.



## Real creativity

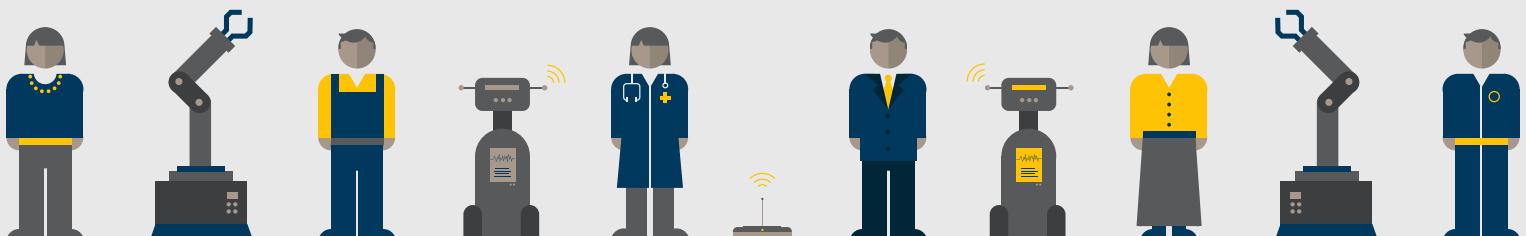
Machines have yet to replicate personal expression, emotion, opinion and imagination like an artist.

But even these jobs might have some vulnerable tasks, like robots performing microsurgery.

Source: Ford, Martin. 2017.

## Jobs are changing, not disappearing

Cheaper and more powerful technologies continue to raise a lot of questions. But as work evolves, machines are unlikely to fully replace humans any time soon.



Stay on top of this and other topics at [barclays.com/ib](http://barclays.com/ib)

# Disclosures

## Personal Use Only

All information contained herein shall only be used by the recipient for his/her own personal reference. Any other use, including any disclosure or distribution to or of any information to any third party, requires the express written permission of Barclays.

## For Information Purposes Only

This information has been prepared by the Research Department within the Investment Bank of Barclays Bank PLC and is distributed by Barclays Bank PLC and/or one or more of its affiliates (collectively and each individually, "Barclays"). The views, written or otherwise, expressed in this publication are those of the author(s) alone and are subject to change without notice.

Barclays has no obligation to update this publication. This information is intended for informational purposes only and should not be regarded as an offer to sell or a solicitation of an offer to buy the products or securities to which it applies. Barclays makes no representations as to accuracy, completeness, timeliness, suitability or validity of any information presented herein and will not be liable for any errors, omissions, or delays in this information or any losses, injuries or damages arising from its display or use and no representation is made that any returns will be achieved through its use.

## Information Provided May Not Be Accurate Or Complete And May Be Sourced From Third Parties

All information, whether proprietary to Barclays or a third party, is provided "as is" and Barclays makes no express or implied warranties, and expressly disclaims all warranties of merchantability or fitness for a particular purpose or use with respect to any data or information included herein. Other than disclosures relating to Barclays, the information contained in this publication has been obtained from sources that Barclays believes to be reliable, but Barclays makes no representations that the information contained herein is accurate, reliable, complete, or appropriate for use by all investors in all locations.

Further, Barclays does not guarantee the accuracy or completeness of information which is obtained from, or is based upon, trade and statistical services or other third party sources. Because of the possibility of human and mechanical errors as well as other factors, Barclays is not responsible for any errors or omissions in the information contained herein. Barclays is not responsible for, and makes no warranties whatsoever as to, the content of any third-party web site accessed via a hyperlink contained herein and such information is not incorporated by reference.

## Information Provided Is Not Indicative Of Future Results

Any data or information on past performance, modelling or back-testing contained herein is not necessarily indicative of future results. All levels, prices and spreads are historical and do not represent current market levels, prices or spreads, some or all of which may have changed. The information referenced herein or any of the results derived from any analytic tools or reports referenced herein are not intended to predict actual results and no assurances are given with respect thereto.

The value of and income from any investment may fluctuate from day to day as a result of changes in relevant economic markets (including changes in market liquidity).

## No Liability

To the extent permitted by law, in no event shall Barclays, nor any affiliate, nor any of their respective officers, directors, partners, employees or third party licensors have any liability, direct or indirect, including but not limited to (a) any special, punitive, indirect, or consequential damages; or (b) any lost profits, lost revenue, loss of anticipated savings or loss of opportunity or other financial loss, even if notified or advised of the possibility of such damages or potential loss, arising from any use of the information provided herein.

## No Advice

The information provided does not constitute investment advice or take into account the individual financial circumstances or objectives of the clients who receive it. You should consult with your own accounting, legal or other advisors as to the adequacy of this information for your purposes. This document is not advertising or marketing any financial investment product, service or transaction.

## Not for retail

This communication is being directed at persons who are professionals and is not intended for retail customer use.

## No Use For Valuation Purposes

No data or price information should be used for any valuation, trading, settlement, accounting purposes or other related functions.

## Not Available In All Jurisdictions

Not all products or services mentioned are available in all jurisdictions. No offers, sales, resales, or delivery of any products or services described herein or any offering materials relating to any such products or services may be made in or from any jurisdiction except in circumstances which will result with compliance with any applicable laws and regulations and which will not impose any obligations on Barclays.

## Tax Disclaimer

Barclays does not provide tax advice and nothing contained herein should be construed to be tax advice. Accordingly, you should seek advice based on your particular circumstances from an independent tax advisor.

## Intellectual Property

Barclays offers investment banking products and services to its clients through Barclays Bank PLC. Barclays Bank PLC is authorised in the United Kingdom by the UK Prudential Regulation Authority and regulated by the UK Financial Conduct Authority and the UK Prudential Regulation Authority and is registered in England No. 1026167. Registered Office: 1 Churchill Place, London E14 5HP, United Kingdom. Barclays undertakes its US securities and investment banking business in the name of its wholly-owned subsidiary Barclays Capital Inc., an SIPC and FINRA member.

©2018 Barclays. All rights reserved. Barclays is a registered trademark of Barclays PLC, used under license.