

insight.

University of Edinburgh

Economics Magazine





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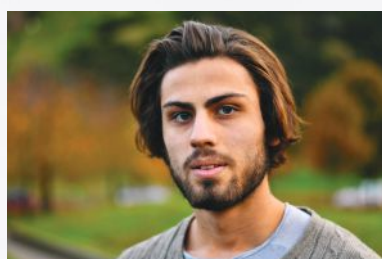
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hello_world!

The editorial team proudly presents our 15th instalment of the Insight Magazine, which addresses The Internet. Admittedly, our dear Tom Schueneman floated the theme ironically at first—along with 'Meatball Subs' and 'Exotic Sodas from the Far East.' But on the contrary I could not think of a more topical subject than what has come to define our generation like few other inventions, as it continuous to be a driving force for economic and societal developments.

Appropriately, we are also launching an online version of our magazine, which can be found at insight-magazine.uk. Please have a look if you are interested in any of our prior editions as well as information on how to become a writer or editor.

Best wishes,
Oskar Birol, Editor-in-chief

Contents:

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10/10/2016

chain of demand

Blockchain technology describes a distributed ledger which process and stores information without a central authority. It is analogous to distributed databases, except blockchains are politically decentralised. Jointly maintained through a peer-to-peer network of computers, it utilises advanced cryptographic algorithms to maintain an immutable record of data – thus the network can agree on a single truth. Since such consensus is obtained by design and does not require trusted intermediaries, blockchains are also referred to as trust-less systems, in the sense that trust is inherent to the system.





Alec Edgecliffe-Johnson

An opportunity for change?

In the wake of the 2008 financial crisis, an unknown person or collective under the pseudonym Satoshi Nakamoto released a decentralised, cryptographic currency into the digital space. Motivated by the failings of the financial system that became apparent after the 2008 crisis, the currency was intended as an alternative means of exchange, outside of the control of governments, central banks and financial service companies. Today, after a turbulent decade of price fluctuations, regulatory attempts and near-total crashes, a single bitcoin is worth thousands of dollars and this has motivated thousands of other cryptocurrencies.

Looking beyond their ideological underpinnings, cryptocurrencies hold enormous practical potential for the global citizenry. They can connect the unbanked, more than two billion people worldwide, to basic financial services such as saving and borrowing, allowing them to overcome some of the largest barriers to economic development. Cryptocurrencies also hold promise as an alternative store of value for those who have seen huge portions of their savings disappear as the value of their national currency rapidly depreciates.

All of this however, distracts from the most important consequence of the rise of cryptocurrencies - that they have forced us to confront the nature and function of money, thus prompting us to question how our monetary system shapes our institutions, our individual behavior and our society. And they have prompted us to consider alternatives.

If we direct our collective attention to our monetary system, we can perceive a system of interest-bearing debt wherein the total amount of money in circulation is always less than the amount owed. This creates a tightening in our chests, a feeling of scarcity and lack that drives competition and separation between individuals. We have allowed the creation of a system that necessitates indefinite growth and awards dividends to those who hoard rather than deploy excess wealth. Unfortunately, a significant portion of this growth 'strategy' is built on the back of natural resource extraction, an expansion of markets into increasingly destructive activities and the creation of desire for consumer products and services.

At a macro-level this is a system in which 97% of the current money supply is debt. One in which we ravage the environment at all points in the production process - extracting from it to produce more items to replace those which we carelessly pile into landfills. Through legal barriers, lack of education and social pressure we are continually commodifying products and services that were once performed by individuals and communities outside of the market - music, childcare, communication, food produc-

tion and home construction.

When this growth stops, or stalls as it did in 2008, the results are catastrophic, particularly for those at the lower end of the socio-economic scale. Our monetary structure has facilitated the growth of an enormous financial services sector that, among other things, manages flows of derivatives. These exotic financial figments of our collective imagination have an estimated total value of ten times the world's GDP, and do not directly derive their value from their underlying assets. Derivatives themselves are not necessarily problematic, but when they are integrated at such a colossal scale into a system that is rife with debt, they introduce a level fragility into the global financial market that greatly increases the chances of economic meltdowns.

At a more micro-level our monetary system has robbed us of our interdependencies on the people we know and love. Bonds of community are formed through the exchange of services and gifts and assistance in times of need. When we move these activities into a depersonalised market and pay for them with depersonalised tokens, we remove humanity from the exchange.

Consequently we have shifted our focus to accumulating ever larger quantities of money, not only to satisfy manufactured desires, but also to ensure our future security in a world that has been stripped of traditional community and family support systems. This reinforces certain aspects of our nature, in lieu of others - namely greed and competition rather than altruism and cooperation.

This is not condemnation for the sake of condemnation. We have to give our current system the credit it is due. It has enabled a century of unparalleled (if unbalanced) economic prosperity. However, in its current form supported by institutions it has fostered, it may have overstayed its welcome by its failure to adapt. The solution to a flawed system is seldom a complete dismantling of the system. We should conduct a frank and holistic cost-benefit analysis in which benefit is measured in well being as well as GDP and cost incorporates social cost.

That we haven't done so already highlights a fundamental and deeply disturbing disconnection between economics and sociology. By separating these disciplines, our ability to analyse monetary theory through a human-centric lens has atrophied. As a result, we have largely severed the connection between money and consciously imparted social values within our currency system. We have lost the power to consciously shape our society through this medium but it has not lost its capacity to shape our society.

This disconnection, however, is less severe at a local level. Over the past few decades thousands of communities have implemented complementary currency systems that operate alongside the national currency with significant impact on social objectives.

Chief among these systems are Time Banking systems like Japan's Fureia Kippu, where in people accept tokens representing hours of time for the help they give to others. The tokens can then be exchanged for other services, for example childcare, housework and skill-sharing. These are exchange networks grounded in connection that emphasise reciprocity and change the way the local economic system values time and relationships.

Complementary currencies have been created with a variety of additional intentions that reflect the ethos of the community. Currencies like the Totes Pound, in the transition town of Totnes, encourage local purchasing and exchange, reinforcing environmental sustainability as well as social cohesion. Another such currency, The "Bancos Palmas", is a microcredit initiative aimed at facilitating economic development in some of Brazil's poorest favelas. Unlike traditional microcredit lending, the system lends a geographically-bound community currency which increases money circulation and prevents money from leaking out of the local economy.

Cryptocurrencies too, are becoming an intentional medium for social change. Innovations like Carbon Coin use its retained share of the currency for a specific charitable purpose, in this case to plant trees, converting increases in value into the accomplishment of a particular mission. Other currency initiatives, namely humaniq, are designed specifically to accomplish the goals that other cryptocurrencies boast as periphery - namely financial inclusion in the developing world.

For some though, these local and crypto-currency initiatives are not drastic enough. Recently there has been a resurgence in thought about redesigning the monetary system, not just with complementary currencies but with an entirely new monetary paradigm. Financial economists and activists alike are advocating the introduction of national currencies with negative interest rates. This, they claim, would incentivise faster circulation of currency, remove rewards for hoarding and accumulation of excess and would begin to treat money as the commodity it was meant to facilitate. In turn, this would alter the nature of debtor-creditor relationships, reduce inequality and slow our reckless pursuit of growth at all costs.

Until recently the cost of creating, implementing and maintaining complementary and alternative currencies has been prohibitive. As a result, an estimated 80% of community currencies

fail. Furthermore, the history of monetary system alternatives is filled with instances of successful local currencies disrupted by national governments when they begin to challenge the efficacy of the national currency.

For better or worse, decentralised, internet-enabled exchange systems, cryptographic or otherwise, sit outside of regulatory boundaries and greatly lower barriers associated with cost and maintenance. Of course, this can enable unscrupulous behaviour and initiatives with less-than-pure intentions, but it will also enable an era of innovation.

This may be the true promise of cryptocurrencies: they can function as tools in a laboratory of monetary experimentation outside of governmental influence. They can dissolve some of the traditional barriers to creation and implementation of new monetary systems. They can allow us to test and refine different currency ideas before implementing and might allow us to build in an element of adaptation that is missing in our current, stagnant, system.

If we can leverage the pow-



er of cryptocurrencies and internet-enabled currencies we can move from the theoretic to the practical through experimentation and iteration. Community and alternative currencies can be designed and redesigned to reflect the character of microcosms of society. National and supranational currency can be complemented and integrated with alternative systems. Perhaps in the future our monetary system will not impose values and behavioural responses, it will constantly adapt to reflect them. We have ready access to tools to create blueprints for a new monetary system and with it, a values-driven society.

No money, no problems

Imagine a world without physical money, where you go to a shop and touch a device to transmit your hard earned 'cash' through the infinite expanses of the internet. You have heard of the Dollar, the Euro and the Pound. But lately, the hot topic is Bitcoin. Cryptocurrencies have become the subject of utopian praise and criticism alike, with Bitcoin and its \$8,000 value at its forefront. It's a whole new world with a whole new set of benefits and problems.

In terms of security, both private and national, society should be safer. If people no longer trade in physical currency, they will naturally feel more secure knowing that they are less likely to be mugged or targeted, seeing as their money is now in the safety of codes and passwords. Students will be less likely to wake up in the morning (or afternoon) trying to discover the whereabouts of their wallet. The same principle applies nationally. In our future utopia, governments that adopt cryptocurrencies will crack down on illegal financial crime and injustices by tracking money to ensure its legitimacy. Of course, no system is perfect. There is a threat to society should someone hack into the central system. This is, essentially, a significant issue of having all your eggs in one basket. All it takes is one smart individual, who wants a large breakfast, to break down the currency. Do we really want to risk it?

Every transaction you make will be watched! The fact of the matter is that while cryptocurrencies are private now, once governments get

involved, one's spending and income patterns will be easier to track as everything is digitalized. This is positive in the sense that there will be greater monetary transparency in society and economic policy making would become more accurate with the availability of more precise data at hand. The flipside is that personal freedom and privacy is infringed. Would you really want someone tracking and verifying your every move? The internet would create a monetary connectivity in society to the extent that people can feel uncomfortable or even violated. The key debate here will be whether the benefits of transparency are worth the costs of sacrificing privacy.

In the recent decade, Venezuela has been confronted with extreme inflation rates, soaring as high as 800% in 2017. This has resulted in the people of Venezuela to mine Bitcoin, a process in which you lend out computer processing power in return for cryptocurrencies. This, combined with recent policies rendering electricity virtually free, has resulted in many Venezuelans dropping the national currency in favor of Bitcoin. The popularity of cryptocurrency is thus no mere fantasy. For Venezuelans it is seemingly a good thing, and the case also highlights the potential for cryptocurrencies to thrive in an unregulated environment.

Bitcoin has the potential to revolutionise how we pay for everyday purchases and transfers. Given its relative success in Venezuela it should have a promising future, but only time will tell.



Theodor Beutel

In algorithms, we trust

Initially proposed in 2008, Bitcoin is both the oldest and the highest capitalised cryptocurrency (more than 100 billion USD as of November 2017). Bitcoin was the first modern currency to establish itself as a trusted medium of payment without intermediaries such as banks, central banks and governments. This independence appeals to many, which helps explain Bitcoin's high valuation. In many ways, however, this success has caused people to overlook the many other applications of the blockchain technology than cryptocurrencies.

Could it be that Bitcoin is to blockchain, what email was to the Internet? Similarly to how it took almost two decades to develop the internet after the first email was sent, can we expect blockchain technology to mature and eventually become the foundation of a whole new field of innovation? Possibly. The evolution of blockchain technology is underway and progressing at a high pace. In 2014, it became apparent that there may be more to blockchain than securing payment transactions when Vitalik Buterin proposed the Ethereum blockchain. He applied the blockchain technology to contracts. These smart contracts consist of coded contractual terms that instruct computers to automatically process certain steps of a digitized contract. Because of their distributed architecture, meaning there is no single entity that can validate a fulfilled contractual obligation and store information. Therefore, smart contracts are virtually immutable and tamper proof, as it is validated from a distributed, decentralised network instead.

It is clear that the technology is still in its infancy. We see Bitcoin and many other cryptocurrencies being highly volatile in their valuation due to its absence of intrinsic value, its mathematically ensured scarcity, and plenty of speculation. Adoption wise, it has yet to 'cross the chasm' between early adopters and early majority of users and still a long way to go until mass adoption. As a result, early adopters struggle to find everyday use for any cryptocurrency they may own. Similarly, organisations and institutions are hes-

itant to adopt cryptocurrencies due to their unpredictable volatility and the insufficient scalability of blockchains. For instance, it takes up to 20 minutes (or over an hour in the early days) for a Bitcoin transaction to be validated – which seems unthinkable compared to the few seconds it takes an average card transaction to complete.

Furthermore, cryptocurrencies and blockchain applications are still highly unregulated in most regions of the world. While some countries (including Bolivia, Ecuador, Kyrgyzstan, Bangladesh, and Nepal) declared Bitcoin illegal, most regulatory bodies chose to observe the technology for now. Meanwhile, the U.S. Securities and Exchange Commission (SEC) recently declared certain kinds of decentralised blockchain applications including ICOs as securities. These so-called initial coin offerings have provided an interesting alternative for firms to raise capital; especially for smaller organisations that can't afford to list on conventional stock exchanges. At the same time, due to its decentralised nature and widespread accounts of fraud, China and South Korea banned ICOs entirely with other nations considering similar measures.

Meanwhile, the blockchain industry is starting to find innovative applications in traditional industries. Many major organisations from tech, finance, and other sectors are joining blockchain startups to form consortiums (such as EEA, R3, and Hyperledger), that currently compete for setting industry standards. In other cases, industries reached a consensus for what the standard should be like (such as with the ERC20 standard for Ethereum smart contracts). However, efforts for standardisation and struggles for power will surely continue to be present for quite a while.

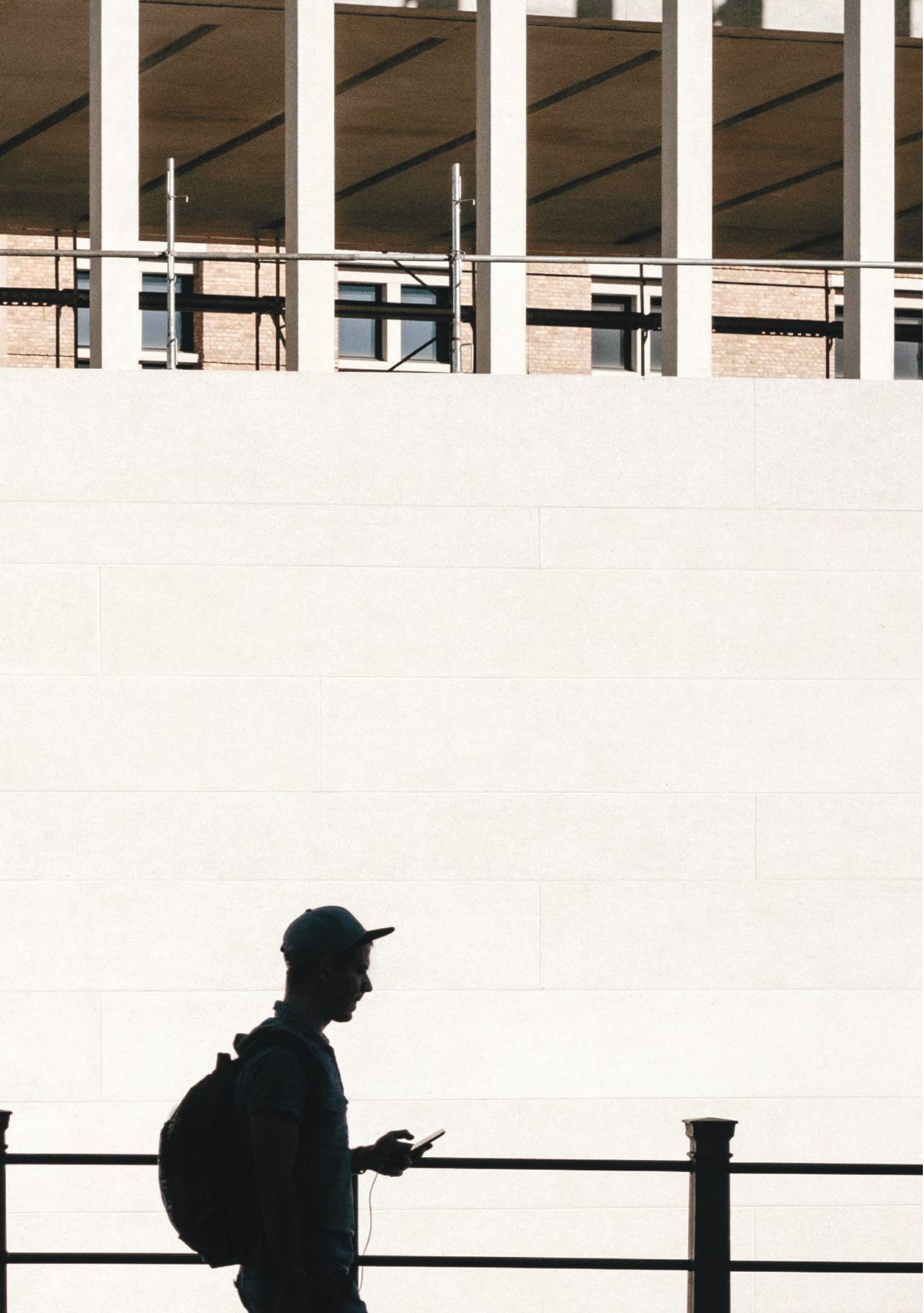
Despite present barriers and scepticisms, it seems hard to believe that blockchain technology will not fundamentally affect businesses and societies in the long term. It remains to be seen, however, if blockchain will be as transformative as the Internet.





vague new world

From social media messaging to anonymous forums, the communication afforded by our online presence holds a huge place in our lives. This availability of instantaneous communication means communities form more easily, as even those from isolated areas can message each other and post online. The geographical boundaries of sports supporters and niche hobbies disintegrate as it is no longer necessary to be close by to stay up to date on all the latest goings-on. Unique local traditions can become global news via social media shares. Information about anything you could possibly want to know more about is only a click away. The internet's place in our economy even affects city development and the future of the job market. Ahead, you will find a collection of articles discussing what the internet means to us as a society, and how it may affect our social future.



of memes and men

Our world is largely informed by the jokes, and commentary that our friends and influencers make on social media. Thus, memes are native to the language of social media. In the broadest sense, a meme is 'an idea, behaviour, style or usage that spreads from person to person within a culture' and Internet memes form a subset of that behaviour that takes place online. As memes grow in cultural significance, they become more commercially significant, reeling in companies seeking to incorporate them in their promotional campaigns. In addition to being free, their instant recognizability is easily leveraged to create a connection between the consumer and the business' brand resulting in less overt promotions and more of the humorous 'internet conversations' that millennials already have. For example, Gucci created a meme based campaign called #TFWGucci in May to promote its Le Marché des Merveilles watch collection and Denny's Pancakes took to twitter, where users were directed to an area on a photo with tiny text that leads them to another area of the photo, and so on, until a joke or text is revealed.

However, by using memes to advertise, companies could be violating intellectual property protections. In a 2013 lawsuit, Charles Schmidt, the creator of the Keyboard Cat meme and Christopher Orlando Torres, creator of the Nyan Cat meme, claimed that their works were unlawfully used in various Scribblenauts games and sought damages for trademark and copyright infringement. Plenty of these cases have followed suit. Proponents of copyrights argue that copyrights allow creators recognition and compensation for their product. This is particularly important when big brands use memes in their marketing campaigns, which can lead to potential profit for creators.

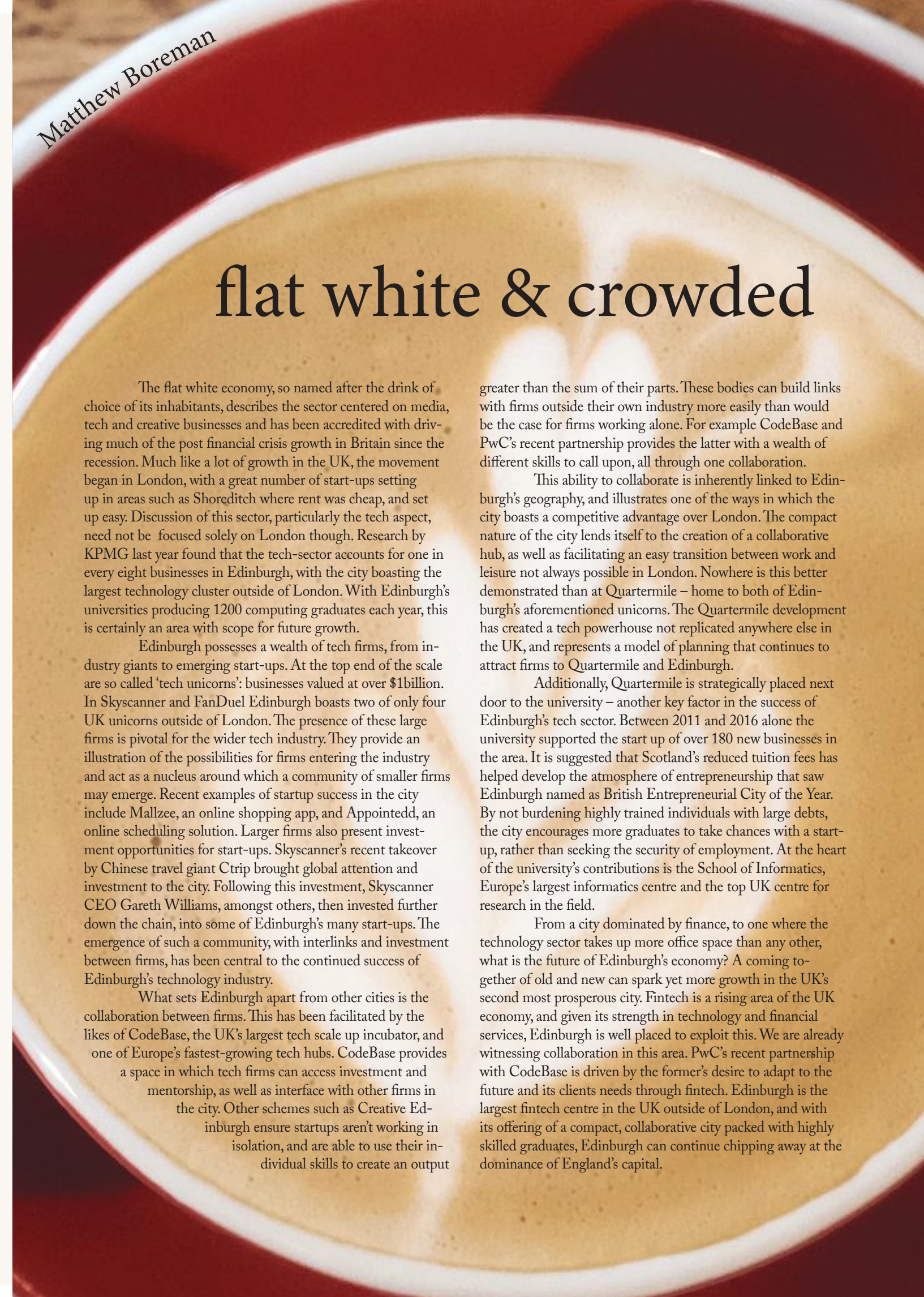
Additionally, copyrights serve to prevent the misuse of a creator's meme. Matt Furie originally created Pepe the Frog for his Boy's Club comic, but it later developed into an internet meme, and during the 2016 US presidential election, the alt-right movement appropriated the frog in various grotesque and malignant memes. Furie has since issued Digital Millennium Copyright Act (DMCA) takedowns targeting prominent alt-right creators among others who are directly profiting from Pepe's image. Copyrights not only provide recognition,

but also utility in allowing control over how the creators intended their initial product to be used in the first place.

But not all of Furie's DMCA takedowns are as straightforward. The key criteria for whether a work constitutes fair use (the concept underpinning DMCA legitimacy) of an existing copyright is that it is 'transformative'. Thus, by leaning on the DMCA to pursue makers of art he doesn't like, Furie is taking regressive steps in interpreting what fair use is and what it means for anyone who creates original work.

Applying a moral limitation to the idea of fair use is risky. For one thing, fair use limitations are already ambiguous, even without introducing a moral component. For another, pursuing a DMCA takedown, even where the use is clearly an infringing for-profit use, sets a precedent for allowing the kind of countercultural ideas that flourish in meme and remix culture to be threatened purely due to a creator's disapproval.

According to researchers Michael Soha and Zachary McDowell, a meme cannot be owned or 'authored' like a song due to its seemingly accidental, collective creation. For example, the Harlem Shake meme is a collectively produced cultural phenomenon. Although YouTube considers Baauer the 'author', the force behind the virality of the phenomena came from the likes of Filthy Frank, TheSunnyCoastSkate, Redditors, and everyone else who contributed to the collective formation and sharing of the meme. Thus, the memetic nature of digital culture highlights the processes of production, rather than a finished, authored product. Ultimately, there's still a large grey area surrounding what constitutes fair use. The clause is frequently enforced in a way that pressures remixers to defend the edited qualities of their works, rather than copyright holders acknowledging that the remixers' works are examples of fair use. While copyrights are unlikely to be less restrictive in the near future before advertisers take advantage of this brave new world— and reign triumphant like Success Kid — they need to understand meme ownership and how to gain permission for usage. While we might hope that all meme creators are Good Guy Gregs, there could be a lot of trouble if the meme you use belongs to a Scumbag Steve.



flat white & crowded

The flat white economy, so named after the drink of choice of its inhabitants, describes the sector centered on media, tech and creative businesses and has been accredited with driving much of the post financial crisis growth in Britain since the recession. Much like a lot of growth in the UK, the movement began in London, with a great number of start-ups setting up in areas such as Shoreditch where rent was cheap, and set up easy. Discussion of this sector, particularly the tech aspect, need not be focused solely on London though. Research by KPMG last year found that the tech-sector accounts for one in every eight businesses in Edinburgh, with the city boasting the largest technology cluster outside of London. With Edinburgh's universities producing 1200 computing graduates each year, this is certainly an area with scope for future growth.

Edinburgh possesses a wealth of tech firms, from industry giants to emerging start-ups. At the top end of the scale are so called 'tech unicorns': businesses valued at over \$1billion. In Skyscanner and FanDuel Edinburgh boasts two of only four UK unicorns outside of London. The presence of these large firms is pivotal for the wider tech industry. They provide an illustration of the possibilities for firms entering the industry and act as a nucleus around which a community of smaller firms may emerge. Recent examples of startup success in the city include Mallzee, an online shopping app, and Appointedd, an online scheduling solution. Larger firms also present investment opportunities for start-ups. Skyscanner's recent takeover by Chinese travel giant Ctrip brought global attention and investment to the city. Following this investment, Skyscanner CEO Gareth Williams, amongst others, then invested further down the chain, into some of Edinburgh's many start-ups. The emergence of such a community, with interlinks and investment between firms, has been central to the continued success of Edinburgh's technology industry.

What sets Edinburgh apart from other cities is the collaboration between firms. This has been facilitated by the likes of CodeBase, the UK's largest tech scale up incubator, and one of Europe's fastest-growing tech hubs. CodeBase provides a space in which tech firms can access investment and mentorship, as well as interface with other firms in the city. Other schemes such as Creative Edinburgh ensure startups aren't working in isolation, and are able to use their individual skills to create an output

greater than the sum of their parts. These bodies can build links with firms outside their own industry more easily than would be the case for firms working alone. For example CodeBase and PwC's recent partnership provides the latter with a wealth of different skills to call upon, all through one collaboration.

This ability to collaborate is inherently linked to Edinburgh's geography, and illustrates one of the ways in which the city boasts a competitive advantage over London. The compact nature of the city lends itself to the creation of a collaborative hub, as well as facilitating an easy transition between work and leisure not always possible in London. Nowhere is this better demonstrated than at Quatermile – home to both of Edinburgh's aforementioned unicorns. The Quatermile development has created a tech powerhouse not replicated anywhere else in the UK, and represents a model of planning that continues to attract firms to Quatermile and Edinburgh.

Additionally, Quatermile is strategically placed next door to the university – another key factor in the success of Edinburgh's tech sector. Between 2011 and 2016 alone the university supported the start up of over 180 new businesses in the area. It is suggested that Scotland's reduced tuition fees has helped develop the atmosphere of entrepreneurship that saw Edinburgh named as British Entrepreneurial City of the Year. By not burdening highly trained individuals with large debts, the city encourages more graduates to take chances with a start-up, rather than seeking the security of employment. At the heart of the university's contributions is the School of Informatics, Europe's largest informatics centre and the top UK centre for research in the field.

From a city dominated by finance, to one where the technology sector takes up more office space than any other, what is the future of Edinburgh's economy? A coming-together of old and new can spark yet more growth in the UK's second most prosperous city. Fintech is a rising area of the UK economy, and given its strength in technology and financial services, Edinburgh is well placed to exploit this. We are already witnessing collaboration in this area. PwC's recent partnership with CodeBase is driven by the former's desire to adapt to the future and its clients needs through fintech. Edinburgh is the largest fintech centre in the UK outside of London, and with its offering of a compact, collaborative city packed with highly skilled graduates, Edinburgh can continue chipping away at the dominance of England's capital.

the_future of_sports

Peter Ly



Every sport has a star: Cristiano Ronaldo for football, LeBron James for basketball, Andy Murray for tennis, and the list goes on. These household names play an integral part to their respective sports, socially and economically. Yet in the depths of the internet there has developed a new brand of sports: eSports, short for electronic sports. It consists of popular games such as: League of Legends (LoL), Counter-Strike GO, DOTA 2 etc. Within the landscape of eSports exists its own stars such as Lee 'Faker' Sang-Hyeok for League of Legends, and Jarosław "Pasha" Jarząbkowski to name but a few. Yet despite the numerous supporters of e-sports, the demographic still remains as a niche in the west; is it about time we discover and mine the gem that is eSports?

The internet has allowed gaming to become a competitive platform. This gave an astronomical rise in the popularity of eSports. Since the early 2000s, there has been a host of incredible eSports events. The Staples Centre in Los Angeles has hosted World Championships for League of Legends in 2016, which drew crowds of 20,000. Such large following means equally large prize pools, which have reached \$24 million for a single tournament in DOTA2 this year. Comparing this to the 2016 Super Bowl, where each winning New England Patriots player took home \$110,000, the prize pool is dwarfed by the \$9 million awarded to Team Liquid, split amongst 5 players. A defining moment in eSports history was when it was aired on broadcasters ESPN and TBS in 2015, in an attempt to broaden viewership. Said viewership peaked at 14 million viewers reported by ESPN for the LoL world tournament. Even professional sporting entities such as European football giants, Paris Saint-Germain and Manchester City, are entering the eSports sphere with their own players and teams. Yet, as the west continues its endeavour to introduce eSports, a working model already exists in the east.

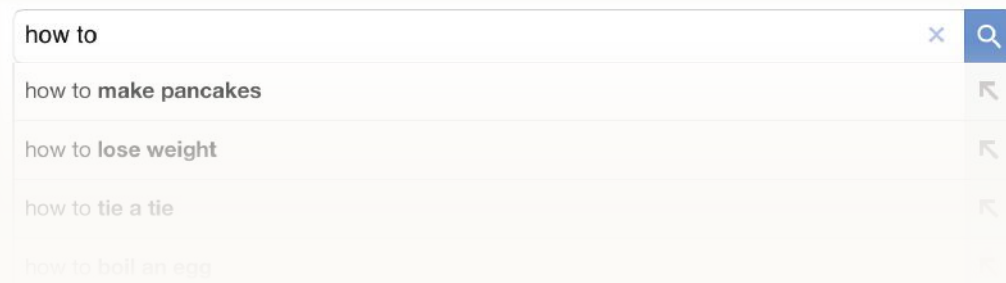
Consider South Korea, where professional eSports gaming is integrated in the culture, and is regularly televised on national TV. The country's eSports stars are treated like celebrities and there is even a government body, the Korean eSports Association (KeSPA), managing the sport. KeSPA's affiliation with the Korean Olympic committee and its parent organisation, the Ministry of Culture, Sport and Tourism, proves its importance in South Korea. The glob-

al market for eSports is constantly growing with an expected value of \$1 billion by 2019. South Korea and China alone generated \$106 million in 2016. Revenue is generated through merchandising, ticketed events, sponsorships, online advertising and media rights. In 2015, ticket sales from 112 major eSports events generated \$20 million. South Korea and China are prime examples of how to make the most out of professional gaming. South Korea has nurtured the gaming culture with the explosion of government support and the world's fastest internet. High Stakes

Yet the largest winners behind eSports are the gaming companies who reinvest every year into eSports. Riot Games, the creators of LoL, was bought by Chinese investment holding company Tencent. In 2013, it was estimated that LoL made over \$600 million in revenues and continue to impress; last year they reported \$1.7 billion in revenues. Activision, known for its Call of Duty series, merged with Blizzard, known for World of Warcraft, in 2008. The merger has proven profitable for both, because Blizzard dominated the online gaming landscape and Activision was the powerhouse in the single player scene. The rise in eSports' popularity has contributed to the growth of Activision Blizzard shares, going from \$10 in 2008 to \$60 today. Meanwhile, Electronic Arts have entered the field of eSports with 3 games: the FIFA franchise, Madden, and Battlefield. Some argue that these games do not have the competitive edge of LoL or DOTA 2 because the prize pools aren't large enough to attract competitive play. Despite this, it is estimated that FIFA's Ultimate mode has still made \$800 million in net revenue last year, a value that has grown year on year and still has potential going forward.

Online video gaming has long been a staple of consumer entertainment. With the inclusion of a social aspect, competitive edge, and the expansion of the internet, eSports have gone from strength to strength each year. The eSports culture has been embraced in parts of the east and is making a slow, but sure, introduction into the west. Many companies have benefited massively from the eSports boom, and others are beginning to partake in the opportunity. With such large organisations largely profiting from eSports and a proven integration of eSports in the east, does this spell a bright future for eSports?

Rhiannon Martin



In 2016, the British public's 'how to' Google searches sought to achieve happiness and humor, and enhance kissing and flirting abilities. However, despite a valiant effort to learn how to 'go live on Facebook' and 'make slime', all searches pale in comparison to a 5-year veteran: how to lose weight.

The internet is often credited as the instigator and facilitator of this infatuation with weight loss. Yet the author, like US data scientist Seth Stevens-Davidowitz, views Google's search engine as a data store of untainted and honest human curiosity. That we take steps to keep it untainted is essential. Using our search data, we can learn how successfully we engage with and shape the weight loss outcomes in Great Britain.

Colin Strong, author of *Humanizing Big Data*, has addressed the ability of businesses to 'datafy' consumer emotions, coining it the 'emotification' of consumer behaviour. As individuals put their questions to the cloud, businesses 'scrape' the internet to build portfolios of consumer sentiment and can forecast with increasing accuracy the trends of consumer culture. Amongst them, is the two billion pound British diet industry, which thrives on understanding and exploiting human sentiment and concern. Tapping into raw human emotion is not easy. Social desirability bias plagues social media and interviews – yet an online, un-administrated and isolated search bar allows us to ask the questions we would never do anywhere else. The emotification of google searches, Davidowitz explains, just might be 'the most important dataset ever collected on the human psyche'.

Often the data found on people's emotional curiosities are disturbing. Type 'how to lose weight?' and Google provides approximately 128,000,000 answers. Add 'fast' and you get 22% of that return; but add 'healthily' and this falls to 1.1%. With the exception of the NHS, nine of the top ten results are links to popular news and magazine articles each reporting rapid, visible results. This serves to frustrate medical professionals. One notable point of contention is Google's autocomplete suggestions. With 'how to lose weight', you are suggested to consider doing so 'in 7 days' and 'without exercise'. Behavioral researcher Robert Epstein is adamant that search offerings can manipulate the preferences of searchers, particularly the vul-

nerable members of society. In his study of bias detection in search rankings and the 2016 US presidential election, Epstein managed to demonstrate the tendency of candidates to favor autosuggestions, causing shifts in voting preferences of undecided voters by up to 80% in certain demographics.

With negative suggestions getting more selections by users of search engines, it is a worrying possibility that weight loss business activities could manipulate autocomplete options, convince consumers to adopt them as their own thoughts, and sell 'solutions' to the insecurities they plant. Fortunately, autosuggestions are programmed, and can be programmed differently. This option must be considered, for the sake of our unbiased data.

The 'untainted' data we get from search engines also affords us many interesting insights into public perception of certain events and speeches. Politicians, corporate candidates and influencers can learn what works – and often what does not – by looking at our google trends. For example, following the San Bernardino mass shooting, President Obama attempted to reassure an enraged American nation by challenging them to consider Muslim Americans as 'our sports heroes and, yes, they are our men and women in uniform'. Since 2013, the top Google noun searched with 'Muslim' had been 'terrorist', but following this speech it became 'athlete' and 'soldier'. Further, Davidowitz argues that search data teaches us the detriment of lecturing the insecure and angry, but exemplifies the success of evoking curiosity and proposing new alternative imagery. This lesson is making waves in the weight loss industry. 2016 became the year of body positivity with Ashley Graham, the first plus-size model to appear on *Vogue* and *Sports Illustrated* swimsuit issues, and media mogul Oprah Winfrey resurrecting the *Weight Watchers* Brand.

Google was created so individuals can learn about their world, not so researchers could learn about the individual. Nevertheless, providing we can keep our data free from bias, Google provides us with some of the most truthful – if sometimes disturbing – insights into human preoccupation. With these insights, we may learn how to successfully communicate messages inspiring positive thoughts and actions, and watch them as they ripple across the keyboards of society.

beauty & the hypebeasts

The world of trainers and street-wear has undergone a revolution over the past decade. The drivers of this upward trajectory have been technology, the Internet, and social media. They have altered the way in which brands interact with consumers, and how consumers purchase products. Perhaps the most significant development has been the growth of the secondary market for trainers and clothing. With brands limiting production in order to boost interest, demand has forged a market in which goods sell for far more than their retail price.

These markets have birthed several Facebook communities that now boast memberships equivalent to a large town. Groups such as Crepe City (40,000 members), SupTalk UK/EU (100,000), and The Basement (75,000) have all grown considerably. The last of these, The Basement, has grown to a point of such cultural significance that this year saw it release a shoe with Nike – a shoe then sold within its own secondary market. This is fairly remarkable for a group initially born out of another (SupTalk), simply created for discussion and inter-selling of clothes and trainers. This rise highlights the Internet and social media's substantial impact.

Groups like these were partly created to facilitate reselling – the selling of clothes and trainers above retail price. Reselling has grown to a point where becoming a 're-seller' is now a legitimate career choice. The practice is in many ways akin to a trader, albeit on a smaller scale. This is reflected in the development of 'value-added' predictions, as witnessed on the self-pronounced 'stock market of things' – StockX. Values rise primarily due to demand exceeding supply. Fluctuations occur

due to alterations in these two factors, predominantly demand changes, such as increased demand following a celebrity appearing in a model. Supply changes also have an effect, with firms restocking models, or releasing close substitutes that reduce market value. Interestingly, supply increases can have a double effect on price, as the increased supply reduces demand due to consumer's desire for exclusivity. The significance of the resell industry is such that it has begun to influence the behavior of the industry that birthed it. It is now common for trainer companies to release a limited version of a model to create 'hype' and a high resell value, before a wider release of the same model.

The cynicism aimed at profiteering off street-wear culture is deteriorating, particularly amongst younger generations, causing pieces to increasingly be seen as investments rather than items to enjoy. This development is another illustration of the Internet's impact. Previously, reselling required a significant time outlay, with dedicated forums being the prime point of exchange. This meant profits from reselling were rarely worth the effort. Social media and the growth of secure payment methods have reduced the time 'cost' significantly, causing sellers to flood into reselling.

An analysis of resell groups provides interesting economic insight. Groups such as SupTalk act as microcosms of perfectly competitive markets. There are many buyers and sellers, none of whom can hope to influence prices, whilst anyone can enter at any time. Thanks to the ease of price comparison, and verbal price regulation by members, the knowledge of members is near perfect. Though there are a variety of products, each has its own market value, above which it will likely not sell.

These groups highlight the significance of perfect information to perfect competition, primarily through what we witness outside of them. Whilst discerning members and ease of comparison leads to high levels of knowledge online, outside the bubble of Facebook this often isn't the case. Contrasting Crepe City's market at its London events with the market in its online group demonstrates this. Prices at events are higher than the market value online. Whilst it may be argued that seller's costs are higher (petrol, accommodation, etc.), thus necessitating higher prices, this can be countered by savings on postage fees, and time, which are incurred online. It is clear that sellers are exploiting asymmetric information between themselves and buyers. A more naïve clientele are less likely to refuse a pair above market value, so sellers increase prices, knowing that bartering is possible with more knowledgeable buyers in any case.

With features in Forbes, GQ and the Financial Times, the once niche worlds of limited trainers, clothing, and reselling have undoubtedly hit the big time. What then is the future for this sector? For years, enthusiasts disgruntled with ever-higher prices and increasingly unattainable items have insisted the bubble will burst, allowing them to enjoy their subculture in quiet serenity once more. It is difficult to see this as anything other than wishful optimism. Whilst the overall trajectory has been constantly upward, fluctuations within the sector suggest a rise more sustainable than early adopters expected. The era of trainers and street-wear as an obscure subculture is gone – resell is here to stay.



a look into the future

Do people think their hard-earned job could be replaced by the work of a machine? The status of having a job would no longer be a major distinguishing factor between people; rather, the workforce would be separated into two major groups, highly paid, skilled workers and low-paid, unskilled workers, by their routine-or-not characteristics. This phenomenon is widely discussed as 'job polarisation'. While AI could take jobs from middle-skilled workers, the extra wealth generated could incentivize consumer demand, increase consumption, and create jobs elsewhere. Transitions in the labour market will also occur to meet the new demand in other areas. Thus, it's easy to understand why optimists claim there will not be a serious unemployment issue in the long run. The only problem is that this conclusion is only valid if the speed of jobs being generated is at least as fast as that of them being taken away. If not, it would increase the unemployment rate and create a discouraged worker effect, which is a bigger problem in the long-run since it reduces the labour force participation rate, and could be an obstacle to healthy economic growth.

Moreover, data and common-sense show that with deep learning — a technique that allows systems to learn and improve by analysing data and examples rather than being explicitly programmed — AI can evolve more quickly than humans, who need time to learn and improve. Therefore, AI could replace a greater proportion of the workforce in a shorter time, and lower the value of human labor in many sectors. This could discourage young people from developing skills that they haven't already acquired, which will be especially problematic for those from lower income backgrounds. As people with lower income are more risk-averse, have lower budget constraints, and face a more elastic part of the indifference curve between income and leisure, they are very sensitive to uncertainty and the common belief of future income. Rapidly changing technology makes it harder for people to predict which skills they may need or to understand the prospective labour market. Such uncertainties about future industrial practices, make it seem rational to maximise utility by reducing the cost of time, money, and effort in higher education.

The economy could potentially diverge to a point where only a minority of exceptionally talented people

earn super high wages while others only earn a pittance in comparison. Income inequality not only matters for the growth, sustainability and economic stability; it also negatively affects productivity by inefficient capital-labor matching. Furthermore, it can concentrate political and decision making power in the hands of a minority, causing a biased understanding of people's need and subsequently unrepresentative governance.

Cross-country inequality is another potential issue. Most of the money made from artificial intelligence will go to the United States, China, and other nations with successful AI businesses that are conducting further research and investment. These countries are already using AI and expanding operations to other

countries, and could potentially monopolize the AI market. At the same time, globalisation has expanded the scale

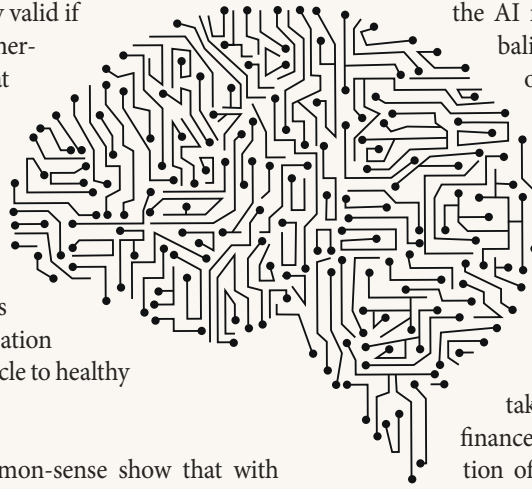
of these winner-takes-all markets, enabling vast salaries and profits to be shared among a narrow set of employees and shareholders such as Google, Amazon, and Alibaba.

By using these technologies, citizens of these nations can move between jobs and gain skills more easily. They can also take greater advantage of increased

finances — earned by efficient adaptation of new technology — to further

increase their income and earnings potential. On the other hand, those nations without this technological background must sacrifice trade liberty to negotiate and essentially determine their choice of geopolitical alliances by becoming economically dependent on their AI supplier—potentially altering the global balance of power.

The development of AI technology is exciting and scary. While understanding the technological development is important, we must also consider potential gender parity issues in a workplace dominated by the STEM industry, and immigration policy in a technologically stratified world among other important sociological topics, to help us better estimate and prepare for the future. Yet, no matter how the workplace may change, having a solid foundation of basic literacy and numeracy skills and other 'character skills', such as perseverance, sociability, and curiosity will be crucial for us to switch from routine, unskilled jobs to non-routine, skilled jobs. Doubtlessly, an upgraded educational system and flexible government policy to make it easier for workers to acquire new skills and switch roles, are necessary for long-term development.





INDUSTRY

The digital age has dramatically shifted how industries of all kinds operate, disrupting traditional ways of working and paving the way for new ones. This disruption, however, does not favour all. Companies that fail to adjust to this new environment will lose customers or go out of business entirely. This has the potential both to propel fresh and innovative businesses to the top of industry or, alternatively, to thrust the concentration of market power into the hands of a few goliaths.



Some industries such as retail, entertainment or transport have undergone a deep transformation over the last ten years, others are only now beginning to realise the potential of the internet. In part, this is simply a lagged reaction by some of the more sleepy industries in the economy. However, more intriguingly, the momentum of fledgling artificial intelligence and computation capabilities, as well as data accessibility, are completely reorienting business models.

This section looks into the healthcare and policing industries and their deepening ties with information technologies. As we shall see, the advancements in technology are not only remoulding the fabric of industry, but raise some serious ethical questions, which are fast becoming practical considerations. How much do we trust our algorithms? Is our privacy a worthy sacrifice for wellbeing betterments?

the crystal ball

One day the police come knocking on your door and tell you that you are under suspicion. Not because they suspect you have engaged in illegal activities, or because they have evidence that you are planning to commit a crime. Instead, an algorithm has calculated that you are a 'high risk' individual, likely to be involved in a crime in the near future. Is this an elaborate role-play, enacting the plot of the Minority Report? Or some dystopian vision of a technology-driven security state? Neither. This scenario is a reality under pre-crime policing, a predictive crime prevention strategy that is on the rise in countries like the UK and the US. With the increasing popularity of pre-crime software, the question becomes: do these strategies really prevent crime, and at what cost?

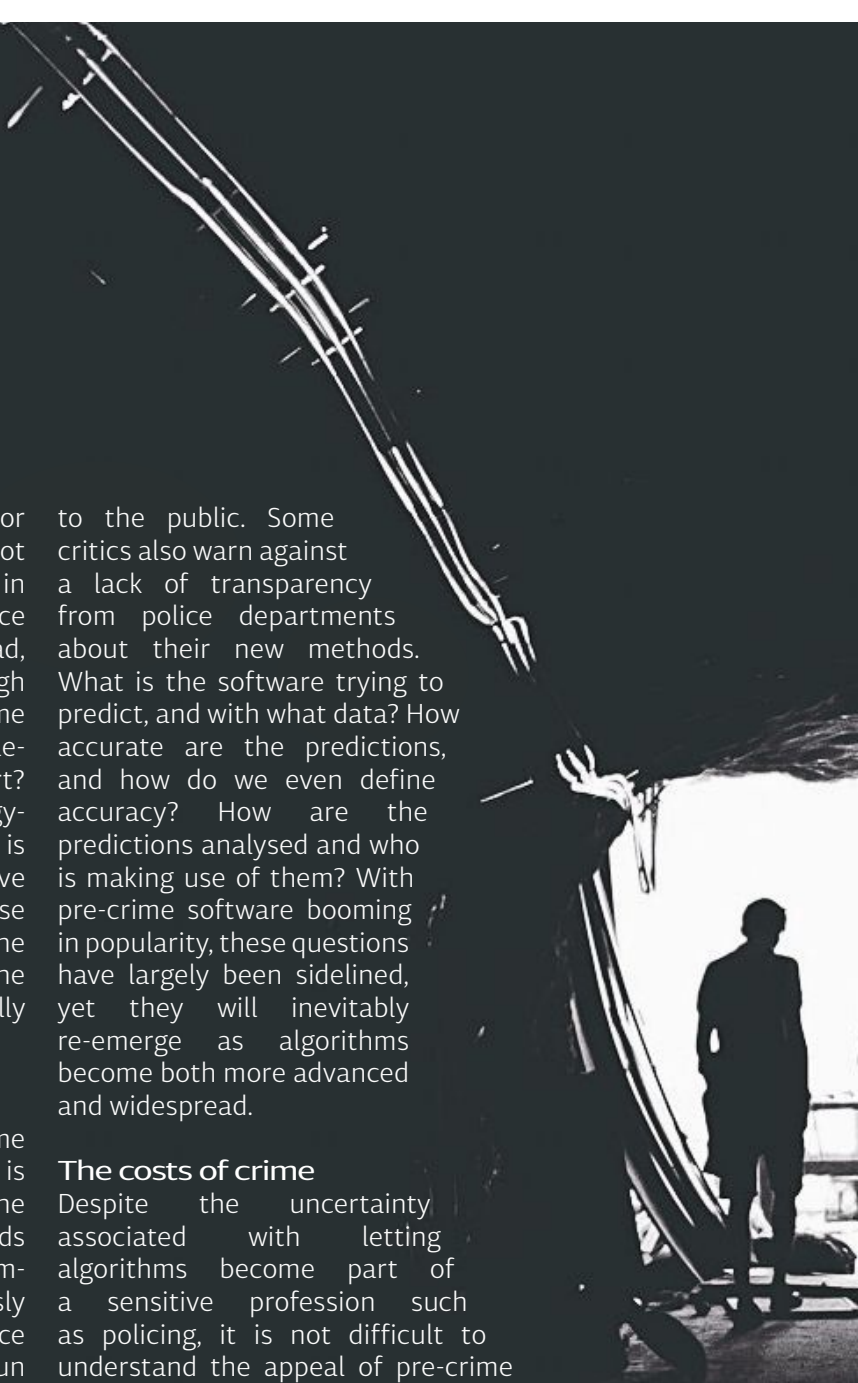
Data-driven predictions

The usage of data analysis to identify crime patterns and prevent future infractions is hardly a novelty in police practice. However, the pre-crime trend signifies a radical shift towards technology, involving advanced algorithm-based software doing the work previously performed by humans. For instance, the police department in the UK county of Kent has begun using PredPol, an internationally recognised prediction software relying on past criminal records. PredPol attempts to predict where and when future crimes will happen, creating 'hotspots' on interactive maps available to the police. And whilst PredPol is an example of a geographically oriented software, other systems feed their algorithms different information and offer different sets of predictions. For instance, The Chicago Police has made a 'heat list' of those judged most likely to be involved in a shooting, based on data on people's locations and social affiliations. Hitachi's Visualization Predictive Crime Analytics includes social media data like tweets, and IBM's systems analyse information on big local events and proximity to payday. HunchLab on the other hand, combines crime statistics with socioeconomic data, weather information and business locations, all in order to predict the locations of crime. While some software companies do offer limited information about their algorithms, much is still unknown

to the public. Some critics also warn against a lack of transparency from police departments about their new methods. What is the software trying to predict, and with what data? How accurate are the predictions, and how do we even define accuracy? How are the predictions analysed and who is making use of them? With pre-crime software booming in popularity, these questions have largely been sidelined, yet they will inevitably re-emerge as algorithms become both more advanced and widespread.

The costs of crime

Despite the uncertainty associated with letting algorithms become part of a sensitive profession such as policing, it is not difficult to understand the appeal of pre-crime strategies. The economic and social costs of crime are hard to measure, but are potentially colossal. The UK Peace Index estimated that the total cost of violence to the UK economy was £124 billion in 2012, or 7.7% of GDP, and non-violent crime would only add to this number. Intervening before a crime has happened is more cost-efficient for both the police and society as a whole, and even small crime reductions could alleviate massive human costs. Prediction software also promises to help the police use their resources more efficiently, a tempting offer as many departments feel under pressure with budget cuts and performance targets looming. However, such software does not come for free. PredPol cost the Kent Police Force around £100,000 pounds in 2014 alone. The Force itself estimated that they would only need to achieve a 0.35% reduction in crime to financially match these costs, yet as the cost of crime is notoriously hard to measure, it is difficult to know the accuracy of this estimate.



Elisabeth Dietz

winner, fall 2017 writing prize

Nevertheless, it appears that while prediction software may be expensive, the costs of crime are much larger - even small crime reductions would bring economic benefit. From this perspective, predictive software appears to be a rational choice for police departments. Besides, isn't predictive software just a more effective way of making use of the resources the police already possess?

Ambiguous accuracies



However, Economist Peter van Wijk at the University of Leiden argues that pre-crime policing will lead to welfare enhancements only when certain criteria are fulfilled. There needs to be good chances of accurately predicting and influencing future behaviour, substantial harm must be prevalent, and the costs must be low. One might argue that the harm of violent crime is indeed substantial, and that while such software is expensive today, costs will possibly fall in the future as technology advances and more companies enter the market. Yet can the police actually accurately predict crime and prevent it from happening?

Many police forces report back on the efficiency of pre-crime strategies, with a Los Angeles trial having software predict crime accurately at a rate of 6% compared to the human 3%. Similarly, The Trafford precinct of Manchester Police reports having cut burglaries by 26.6% in May 2011, compared to a 9.8% decline in the rest of the city. On the other hand, a report from the American research institute The RAND Corporation indicates that the Chicago 'heat list' has not been effective in preventing crime. At best, critics say, it has been less effective than traditional most wanted lists; at worst it has unnecessarily profiled people for unwarranted police attention. As for Kent, although the continuation of PredPol usage was recommended, the Police's own report is ambiguous about crime reduction results.

Justice ensured?

Critics would explain these results with the limitations of prediction software. As long as software is given data on past crimes, it is bound

to keep detecting the type and location of crime that is already on the police's radar. Similarly, it might also amplify the human biases that have led to the prioritisation of a certain form of policing in the past.

Given recent accusations of racism against police departments in countries like the US, the risk of systemic injustices being magnified by algorithms should not be easily dismissed. Indeed, software might be blind to the fact that some crimes, such as white-collar crime or rape, are consistently under-reported, or to the fact that some groups are overrepresented in arrests due to racial profiling. While some claim that algorithms can in fact reduce human bias, it appears difficult to avoid completely, as long as software is programmed by humans and fed 'human' data. However, the risk of algorithms being biased is not the only concern that has been raised. John Bartlett from the British think-tank DEMOS argues that we need clearer legal guidelines regarding privacy in the age of pre-crime. Indeed, should police be allowed to use data from social media posts in their software? And what will happen if social media companies begin selling private user data like messages to governments or other agencies? The Chinese government, for example, has taken pre-crime software a step further, and is reportedly developing a Social Credit System, rating people's trustworthiness based on Big Data.

So what is the verdict on pre-crime policing? It appears that pre-crime software can bring economic benefits, yet only if it succeeds in accurately predicting crime, which may not always be the case. As van Wijk points out, pre-emptive interventions may in fact reduce welfare if they are inaccurate or expensive to carry out. The social costs to privacy are likely to be immense, especially if the software ends up in the wrong hands. As the content of most pre-crime software is secret, it is difficult to know how the algorithm is programmed, and what judgements it makes. In a justice system riddled with accusations of bias, how can we then make sure that algorithms don't contribute to further inequality? If these concerns are not enough to gather resistance against prediction software, perhaps its all-encompassing and deterministic nature is. What do you do the day the software makes predictions about you? Perhaps we would all be better off if predictive policing tactics stayed in the movies.

healthcare's new frontier

Frederick McElwee

The internet will transform healthcare, with significant economic implications for governments, healthcare payers, and patients. Electronic health records, made possible by computers, have already allowed doctors to more readily have access to patients' medical histories. Now, technology is making another leap forward; internet-facilitated communication is enabling an expansion of telehealth, and small, internet-enabled devices will have a big impact on data collection and monitoring. But we are at the beginning, of the healthcare revolution – one which has the potential to improve health outcomes, lower costs, and strengthen the overall economy.

ER, Phone Home

Telehealth, the provision of healthcare remotely, by means of telecommunications technology such as the internet, offers a way to decrease the burden of healthcare costs on governments, employers, and other payers. The internet presents new opportunities to expand telehealth and integrate it into a wider internet-enabled healthcare ecosystem with automated and robotic care and monitoring. Zion Market Research expects the global telehealth market to grow almost fivefold between 2016 and 2022. This is driven by both better technologies on the supply side and increased demand, due in part to demographic changes. As the aging population increases demand for nursing care, many traditional in-home nursing services may be

automated, so that, in addition to serving as a medium for patient-doctor interaction, internet-connected systems will monitor health conditions, flag causes for concern and alert emergency services when necessary. For instance, a wearable device that measures heart rates using an ECG device can also check for arrhythmias and alert the patient and their doctor if an irregular heartbeat is detected. This is especially relevant in rural areas, where healthcare costs are often high and access sparse for example, aiding a patient with a mental health condition who finds it difficult to access care because they live far from the nearest treatment center. Telehealth makes care easier to access, as patients can self-report their condition online and communicate with medical professionals without needing to travel. The internet also promises to improve the quality of care by facilitating better collaboration and coordination between specialists on clinical care teams. More generally, greater adoption of the internet in healthcare presents both a challenge and an opportunity for governments on the hook for caring for aging – and more expensive – populations. The debate over coverage of and reimbursement for telehealth and monitoring systems will likely intensify over coming years, as payers weigh adding more services to their formularies with the potential for lower costs and higher quality care.

The Arms Race

Health monitoring in the form of wearables –



smartwatches and other devices connected to the internet that can track health metrics – is already making its way into the mainstream. Smartwatches comprise the bulk of the wearables uptake now, but eyewear (e.g. Google Glass), clothing, footwear, accessories and other segments are poised to grow. Products such as these, when connected to the internet, have the potential to analyze biometrics like heart rate, breathing, activity, temperature, oxygen levels, sleep, menstrual cycles and even sweat. The International Data Corporation expects 125.5 million wearable devices will be shipped this year (a 20.4% increase from 2016) and forecasts that the wearables market will double by 2021. This is attracting capital – Billionaire investor Mark Cuban believes that sensors are the future of the internet, and is investing heavily in this space. Biosensors are positioned to be the next wave (and possible investment opportunity) in this trend.

As the “Internet of things” makes wearables that can track user health metrics feasible to use, big tech companies are scrambling to own this data goldmine. In addition to fitness-oriented products from Fitbit and Garmin, large-cap tech firms such as Apple, Samsung and Google, have entered this space. The application of these wearables to facilitate and improve personalized medicine are a promising business prospect; however, the bigger opportunity for these firms is the ownership of patient-generated Real-World Data. But, as with telehealth and monitoring, the immense data generated by wearables presents challenges and opportunities.

Solve for Rx

Who will want this data? Academic researchers, of course – but the greatest demand is that of the pharmaceutical and wearable device industries looking for data to support their products in regulatory, approval, and coverage decisions. This could greatly affect health care stakeholders. Payers will have to determine which, and how, data are used to make coverage and reimbursement decisions; regulators will have to set standards for which data are acceptable for use in regulatory and approval decisions of drugs and devices. Wearables could potentially lead to novel trial designs with biosensor data linked to clinical trials and act as a novel delivery device for treatments – either in the form of medicines (such as insulin for diabetes) or transcutaneous electrical nerve stimulation (for pain management) – with the potential to improve adherence to treatment regimens. Moreover, important to this emerging market of biosensor data are factors influencing the supply side – namely, the quantity and validity of the data. Should

internet-connected monitoring systems or health apps be regulated as medical devices by regulatory agencies as pharmaceuticals and medical devices are? Watch for how regulators answer these questions, as the answers may just impact the role of the wristwatch in your daily life.

Survival of the Fittest

Two additional concerns present themselves regarding the data generated, the first of which is security and privacy. The potential for hacking was evidenced earlier this year by the breach of the National Health Service in March, when patient data was compromised. However, consumer and patient advocates may find that access to this data by law-abiding actors also presents cause for concern. For instance, the ability of insurers to access data when determining their pool and prices, etc. In response, regulatory guardrails may be implemented so that this data falls under similar regulations prohibiting underwriting discrimination based on pre-existing conditions. Private providers may be inclined to mandate or incentivize utilization of wearables to reduce moral hazard in their coverage pool resulting from the ability to socialize losses (in this case, to the rest of the insurance pool), while privatizing benefits. In these cases, where costs are externalized, each individual needs to be held accountable to prevent a real-world manifestation of a “tragedy of the commons.” In the case of government-funded schemes, this may require the government to place devices on its citizens – reminiscent of dystopian microchipping. This premise, even if exercised by more innocuous actors, like employers, could present similar misgivings, if healthcare data could impact hiring decisions.

Improving quality and lower costs in one of the biggest sectors of the economy translates into rising productivity for the economy as a whole. This is especially important considering that productivity growth in developed countries has been sluggish for a decade, and by some estimates, healthcare productivity growth has lagged behind the rest of the economy (although healthcare productivity is notoriously difficult to measure because quality improvements are challenging to quantify). Overall, considering the convergence and integration of “Big Data” analytics, medical records from Electronic Health Records and home monitoring, Real-World Data generated by wearables and improvements in AI, the future of healthcare is promising. The internet has already revolutionized commerce, communication, entertainment, media, etc. In these industries, the internet has changed how we live; in healthcare, it easily could change how long we live.

The background consists of several overlapping, torn edges of light gray paper. The layers are arranged in a way that creates a sense of depth and movement, with some pieces appearing to be on top of others. The edges are jagged and uneven, giving the overall composition a textured, layered appearance.

the information reformation

In a famous contribution to the discipline of Information Economics, George Akerlof challenged neo-classical economic theory with his 1970 paper 'The Market for Lemons'. He looked at the market implications of imperfect information and found that it can reduce societal welfare by hindering the ability of markets to allocate resources effectively. Spence and Stiglitz, who both shared the Nobel Prize with Akerlof in 2001, came up with solutions to this problem. They respectively pioneered the ideas of signaling and screening, methods by which information could, and in an efficient market would, be transferred to the mutual benefit of the consumer and seller. Here we explore how the rise of the internet, and the increasing availability of information, will affect the various fields of Information Economics.

The Internet has an unparalleled amount of information due to its vast user base. There are those who wish to benefit from such information through the creation of algorithms to make work easier, or profit from appealing to each consumer at an individual basis. These people will continue to expand the knowledge and abilities of the internet for the benefit of society and themselves.

Jennifer Za Nzambi
runner-up, fall 2017 writing prize

biased algos

Imagine posting 'Good morning' alongside a picture of yourself at work on Facebook and getting arrested for it only a couple hours later. What seems like a silly anecdote, unfortunately happened to a construction worker in Palestine in October this year. His caption, written in Arabic, was automatically translated by Facebook algorithms as 'attack them', which led to his subsequent arrest because many perceived it as incitement. Whilst this particular situation is undoubtedly rare, it is probable that internet algorithms' mistakes have, to various degrees, affected the online lives of us all.

The Workings of an Algo

Algorithms are sets of rules computer programs follow to achieve specific goals. In machine learning they are no longer dependent on people to tell them what to find, as they

can learn without supervision, through pattern recognition in data. For instance, consider an algorithm used to distinguish mammals from birds. It trains on a collection of animal pictures, and develops a pattern recognition mechanism which allows it to tell each of the two types apart. What if, however, we confront the algorithm with an animal outside of its training set, let's say a bat? Chances are that since bats' phenotype at first sight is closer to that of birds, the algorithm will make a mistake. This would be an example of inductive bias that is also prevalent in many different kinds of online advertisement algorithms.

In 2014, an 18-year-old Afro-American woman Brisha Borden stole an unlocked bicycle. A year earlier, Vernon Prater, a middle-aged Caucasian male, stole tools worth approximately the same amount. COMPAS is an algorithm used in the US justice system to predict recidivism probabilities. After being presented with the cases of Brisha and Vernon, along with information about Brisha's previous three counts of juvenile misdemeanour and Vernon's record of three armed robberies, it concluded that Vernon posed a low risk, with a score of 3/10, and that Brisha was a high-risk individual with a score of 8/10. Whilst Brisha has not committed any recorded felony ever

since, Vernon stole thousands of dollars' worth of goods in the following years. ProPublica, an American news organisation, assessed the mechanism used by COMPAS and identified significant racial bias in its decision-making.

Evidence shows that despite committing about as many offences as white people, black people are more likely to be persecuted and arrested, which suggests that algorithm bias stems from that of humans. Does this mean that because of their prejudice, algorithms should not be used in matters as important as court dealings? It's difficult to say. Since evidence suggests that having had lunch makes judges more lenient in their rulings, some form of oversight over human bias in decision-making still seems to be called for.

Albeit very efficient tools, currently being used in areas as diverse as social media and legislation, algorithms also pose multiple risks, of which dissemination of partisan news or biased sentencing are just a few examples. The solution to these problems could be to hold algorithms to the same standards as any other public decision mechanism. German Chancellor Angela Merkel suggested that algorithms with social impact prone to distort people's perception should be made transparent by firms that use them, so that people can have some degree of oversight over algorithms that in turn oversee their decisions. This idea of checks and balances is prevalent in experts' discourse.

Luckily, one does not have to be a software engineer to make up for some of algorithms' heuristics. Online algorithms are working with current internet content as their 'training set'. Everyone online can, however, change this set through posts on social media, publication of documents, or more generally through their online information consumption patterns. Facebook's and YouTube's algorithms learn about our tastes through our likes and choice of videos respectively. They may assume, for example, that if we watch a Donald Trump speech, we may also like to see a radical white supremacist video, thereby possibly creating a radicalising effect. Algorithms derive their outputs from our online behaviour, and it seems that only if 'biased' people try to actively correct for bias caused by misinterpretations, can we move towards well-informed decision-making that people will want to get behind.



Nishith Hegde

overtaken on the superhighway

Scientia potentia est. Knowledge is power. Intuitively, we have valued information for centuries. Yet economists, deeply concerned with 'value', have been slower to accommodate it into theory. Authors like Spence and Stiglitz first developed concepts such as screening and signalling, which try to verify untestable information, in the 1970s. More recently, behavioural economics grapples with informational inconsistency – when individuals do not behave the way they tell us they will – and with biases in perceiving information. As our theories grow more robust, we even model information itself as a commodity – something that can be sold and purchased – and as university students invariably convince themselves, as a form of capital which can eventually be used to demand a wage premium. Uncertainty, or incomplete information, is priced into every modern model of transaction, speculation, and choice.

In its infancy, the internet was dubbed the 'information superhighway'. The reason for this isn't just that information travels unimaginably quickly online, it is that the way internet technologies supersede old assumptions makes them look like horse-and-carts in comparison. Even the most sophisticated models have been upended as a result. For example, most models presume some information asymmetry, revealing value instead through prices and behaviour. By contrast, modern internet-empowered agents have unprecedented capabilities in information collection, creation and transmission. Our own phones collect intimate information about our preferences, location, and even health. Each byte of data optimises advertising. Perfect price discrimination, a mere hypothesis in brick-and-mortar stores, is suddenly possible: that is why flight prices can vary so much based on the cookies in your browser.

Consumers benefit too. In Akerlof's famous 'Market for Lemons', a buyer cannot distinguish a healthy car from a dud. Today, anyone can freely research a car's MOT history before signing. Discovering products is effortless: search engines print millions of results, and fine-tuned reviews help optimise consumption choices to preferences. Markets that previously could be locally monopolised are forced into perfect competition. If a firm is exploitative, consumers merely find and order from another. An employer need never hire a worker without Googling them first; yet that same worker is empowered to negotiate their salary when they can look up the rate

offered by competitors. Confident that they are taking a smaller gamble, both agree more readily, and benefit from better employment matches.

Other modelling assumptions suffer nothing less than iconoclasm. There is no concept of scarcity in many internet-enabled marketplaces, when tangible products like education, books, and music can themselves be turned into pure data. Instead of a 'Market for Lemons', today, Beyoncé's *Lemonade* is a multi-platinum album streaming online, exploiting the fact that digital distribution allows near-infinite duplication at near-infinitesimal cost. Illegal file-sharing frustrates every government crackdown, yet this crime is not conventionally 'theft': availability is not reduced for others. The heresy of the internet is that it transforms private products into public goods. However, the effect of these technologies is not wholly positive. When information can be taken without people's consent or knowledge, it disempowers them and strips them of choice. And, with so-called 'fake news', the internet disseminates not just *more* information, but sometimes *false* information.

Studies repeatedly demonstrate that respondents believe around half of the news they consume, even if it is unverified, and estimates of exposure suggest the average American encounters one such story monthly. The effect is skewed decision-making, reducing the agency of individuals to protect their interests. Behavioural economists such as Kahneman and Tversky had already shown that individuals often make worse decisions with partial information than with no information due to the overriding influence of subjective biases – but if you believe you possess *true* information, why would you ever question your choice at all? Claims that Brexit would deliver £350 million weekly for the NHS or that Hillary Clinton ran a paedophile ring, are perfectly sensible from the perspective of voters responding to false information. For now, at least, answers in the fields of economic and political science remain scant regarding this new dilemma: information which is negatively informative; and it remains unclear what unforeseen challenges future technological developments may present.

We're all cruising down the information superhighway, but our final destination remains, for now at least, maddeningly unknowable.



an ocean of data, by Alex Aristidou

Are you interested in going on holiday to Barcelona? You don't need to respond because you have already given an answer. Don't you remember? Even though you just started thinking about it, probably without specific dates or how many friends you want to bring with you, the internet knows everything already. Some may call it magic, but it's nothing like that!

The time has come when our private lives are no longer private. Everyone can see our digital footprints. Do you remember the last time you accepted the use of cookies on a website? Our digital footprints leave traces all over the internet in various forms such as likes, shares and cookies. These digital footprints are collective data sets that can form psychographics. Psychographics is the classification of people into groups according to their personality, values, and attitudes. Dr. Charles Stryker, founder of Venture Development Center, said in a speech, that up to 5 billion gigabytes of data is collected daily. We live in an era where all this collective memory is being transformed into collective intelligence. Dr. Stryker gave the example of cancer institutes: Their systems have all the data required to match the symptoms of the patient and provide the best available cure for every case.

We are now faced with the OCEAN, not one covered by salt water, but full of data, full of us. An OCEAN profile is designed by organizations based on the psychographics of individuals. OCEAN stands for:

Openness to experience

A measurement of innovation or curiosity of an individual

Conscientiousness

The inclination to show self-discipline, ambition and organization

Extraversion

An individual characterized by positive emotions and constantly seeking the company of others

Agreeableness

The tendency to be compassionate and cooperative

Neuroticism

A sensitive individual, demonstrating unpleasant emotions with signs of anger, anxiety or vulnerability

Companies in possession of these data will sell our secrets to the highest bidder who will then go on to utilize this information, optimally allocate their marketing tools and resources to the appropriate OCEAN user. 'Blanket Advertising is now dead', are the words of Alexander Nix, CEO of Cambridge Analytica, a data-analysis company. He argues that the era of mass advertising, when billboards and TV advertisement could target large audiences will slowly vanish. He points out that messages that target people upon their demographics just does not make sense. Personalized marketing and advertising will be the ultimate tool of effective campaigning in the digital and real world. Companies are currently integrating these methods into their marketing strategies. For example, Ford hired 125 new employees who specialize in the research and analysis of data, and Walmart bought a predictive data-analytics company. The latest CBI/PWC survey suggests that two thirds of all British Financial



Services firms are expected to heavily invest in data-analysis such as customer history and risk profiling in the next year.

Consider the 2016 United States presidential campaign, while the presidential polls indicated Hillary Clinton as the definite winner, Donald Trump argued otherwise. Specifically, a day before the elections, CNN predicted that Hillary Clinton, with 332 electoral votes against 206 for Donald Trump and with 91% of public confidence, would become the next President of the United States. However, 24 hours later, results were announced showing a victory for Trump with 306 electoral votes against 232 of Hillary's. Where did all the experts and polls go wrong? Some say that people were desperate for change, while others say that voters were badly influenced. Both statements are normative, but we can only be sure about one thing: Trump's campaign closely worked with Cambridge Analytica. They profiled every single voter in the United States, they knew exactly what people demanded, and they offered exactly that. Statistics show that Trump lost the public vote, but as he said, he couldn't care less. Due to statistical analysis, Trump's Campaign knew exactly where and on whom they should focus their campaigning efforts. Take for example the state of Wisconsin, which is considered highly democratic. The last time the state voted for a Republican candidate was in 1984. What happened? Hillary Clinton didn't even run a single rally in Wisconsin. Due to data-analysis, Cambridge Analytica found many suggestible voters. As a result, Trump's campaign ran 5 rallies and won over around 70,000 voters. It is no surprise that Trump won Wisconsin with a margin of 27,257 votes. While a variety of reasons can influence the results, it is undeniable that analyzing data and acting on the results massively boosted Trump's chances of winning.

OCEAN profiles provide organizations information

on what we want to hear. No wonder Google 'magically' advertises Barcelona hotels and restaurants on your computer screen. Through personalized and targeted marketing, resources are being utilized more efficiently and achieving a closer point to the optimal allocation of resources on our Production Possibility Frontier. This has a greater positive impact on our society, tackling the fundamental economic problem of scarcity. Furthermore, we can clearly see the macroeconomic effects. As we can now profile users, we learn more about them, and predictions about what is going to happen in the future can be evaluated more accurately. 'In order to do good economics, you have to keep in mind that people are human', were the words of the recent Nobel Laureate in Economics, Richard Thaler.

As Eduardo Porter suggested in his book *The Price of Everything*, behind every decision there lies a cost. The time when you felt safe and comfortable enjoying music on YouTube or reading an online magazine is a matter of past. Your footprints are there for everyone to see and exploit, easily purchased and given without your consent. Every time we use the internet, we are faced with a cost-benefit analysis. Costs, as we now know, are not limited to the explicit costs of paying our provider but the implicit costs of our personal data exist as well. What is left unclear is, how much do you value the benefits of internet use?

The internet is part of our life and soon, it might be our whole life. It is crazy to think that we can totally exclude it from our daily routine and avoid totally giving out our footprints. Going back to the roots of humanity, we should all follow the advice of the Ancient Greek philosophers, who famously used to say 'Πάν μέτρον Ἀρίστον'. Its meaning is simple: everything in moderation.





S C A N
D I N A
V I A J
A P A N





The Go Abroad Economics scheme started in February 2015, with a trip to Dubai. Since then, students have gone on trips to various destinations on four continents, including Cuba, Argentina and India, learning about real-life economics issues. On these trips, students are largely responsible for organizing the program, which includes in-depth studies of the destinations with visits to various businesses and government offices. These trips have enabled Economics students to witness first hand the world that economic models try to describe, and have given students opportunities to put their skills into practice.

In the coming months, trips are planned to Hong Kong, Morocco, Mexico and Peru. Students are currently conducting research into their selected destinations, in collaboration with both students and members of staff. Most recently, students have been on Go Abroad trips to Japan and Scandinavia, exploring the complexities of different economies, and learning about the social, cultural and political context of their destinations. In this section, we will hear about their experiences. For more information about the Go Abroad scheme, please contact GoAbroad@ed.ac.uk.



worlds ahead, decades behind

May was filled with exams and excitement for the twelve lucky economics students bound for Japan following the completion of exams. Armed with passports, rail passes, and economic background knowledge, we flew to Osaka and began a 12-day journey across Japan going as far south as Hiroshima, and as far north as Tokyo. We not only saw the sights and enjoyed Japanese culture and cuisine, but also met with Japanese companies and organisations to discuss the current economic environment in Japan as well as their organisations' and the country's prospects.

In preparation for this trip, students and staff met on a weekly basis starting in January, presenting and discussing economic concepts in the context of Japan, as well as the culture and potential experiences we should prepare for. We learned about the economic and political history, and discussed the potential issues Japan is facing now or in the future.

Scottish Whisky & Japanese Sake

In Tokyo we met with Scottish Development International, to learn about the Scottish-Japanese investment and trade relationship. Here we learned that Japan is one of the UK's largest export markets, and that there are 85 Scottish businesses with parent companies registered in Japan, employing 6,250 local people with a nearly £1.5 billion turnover. These companies range from finance firms including RBS and Aberdeen Asset Management to retail ranging from Hunters to Johnstons of Elgin and Hawick Cashmere. The growth rates are large, with 4.6% average annual growth in exports, nearly 9% employee growth, and 12% turnover growth. Unsurprisingly, whisky made up a large proportion of Scottish food and drink exports, representing 77% of the £98.7m in food and drink sales in 2015. With regards to Japanese companies in Scotland there is likewise a lot of activity. For example, Nikon expanded its presence in Scotland by acquiring Fife-based eye specialist Optos valued at £259m, signalling a long-term move into the medical sector for Nikon.

This strong Scottish connection put our trip into context as we discussed the avenues open to Scottish companies in Japan and vice versa. Here we were able to gain the macro-economic perspective that was reemphasized

when we met with Bjorn Kongstad, the policy director of the European Business Council (EBC) in Japan. The EBC is a lobby organisation focused on trade policy and improving business opportunities for Europeans in Japan. Bjorn discussed the trade history of Japan including trade agreements and negotiations, emphasising that incentives are mostly aligned, and both sides of the table are seeking to increase trade. However, the Japanese system is unique in its approach to trade and this has caused issues in trade negotiations and dealings.

One Step Behind

Japan is incredibly ahead in many ways, but it is also incredibly complicated in ways that the rest of the world has managed to simplify. In trade, for instance, Bjorn gave the example of customs and trade regulations. In Japan there are nine customs administrations while many countries only have one.

Furthermore, we met with Cogent Labs, a high-tech artificial intelligence company, whose main source of profit is a digitisation technology for computerising Japanese characters, employed on widespread bureaucratic paperwork. While they were seeking to advance technology in one of the most advanced countries in the world, they were profiting off of the paperwork-heavy society that remains decades behind in computerising daily nuisances such as paperwork.

Many Steps Ahead

While Japan is behind in their use of paperwork, they are ahead in many other ways. From vending machines that sensed what soft drink you wanted, to chemical and manufacturing technology, Japan lived up to its technologically advanced stereotype. One visit that emphasized this was with Nicca Chemical in Fukui where we learned about a history of textile chemical production, felt fabrics not yet on the market, and discovered interesting overlap in chemicals that lead to a firm producing aviation grade materials and shampoo on the next production line over.

Another example of the innovation and technological prowess could be seen in our visit to the space centre where we saw years of

innovation and heard about the collaboration between space programmes and witnessed it first hand. Additionally, witnessing the production line at Mazda highlighted the automobile industry and the innovation Japan is known for with regards to this.

Advancing Poverty

One of the most distinctive ways we saw Japan leading the world was in a visit with a charity in the Kamagasaki area of Osaka. Kamagasaki is Japan's largest slum with approximately 25,000 people, significantly larger than the Tokyo equivalent, Sanya. Ever since the 1960s, this area has been the safety net of Japan with shelters and day labourer opportunities centred out of the Arin Labour and Welfare Centre. Here we spoke with homeless residents about their day-to-day lives and the opportunities available for them.

Following our discussion with the area's residents we spoke with Arimura Sen, the director of the Kamagasaki Regeneration Forum, who reminded us that although today we celebrate Kamagasaki's success as a 'modern slum', it was not always like this and there was a lot of work to get to this point.

Once plagued with crime and disorder, one of the most interesting changes implemented in the regeneration of the area's safety was the inclusion of homeless people's rights in the school curriculum. As much of the crime was done to the homeless rather than by them, this went a long way in informing potential future criminals that what they were doing was against human rights, decreasing the crime rate in the area over time.

Overall it was argued that the success of Kamagaski was rooted in well-aligned incentives for all stakeholders. For example, government benefits increased with the number of days worked in a month and the area's shelters closed at 4:30am to motivate residents to get to the Arin Labour Centre for the 5am start to get a day labourer job.

Furthermore, we were reminded of the consequences of success. Luxury hotels are now buying up land and building mile-high resorts far out of reach from the average resident. This is pushing up land prices and limiting the opportunities of residents. This will be a challenge for the area to overcome in the coming years.

Stuck in the Past, Far in the Future

While Japan continues to push the boundaries in technology, they hold on to the past in various ways. Through handwriting almost all legal and bureaucratic documents, to hand-making brushes to do this with, Japan holds on to its cultural history as well as methods of the past while advancing the capabilities and possibilities of technology on a global scale. Through meeting with companies and organisations across Japan we were able to see not only the economic history at play, but also catch a glimpse of the future issues Japan will need to overcome to reach its potential in the coming years.



memories from scandinavia

The 2017 Go Abroad Economics trip to Scandinavia took a group of 13 students to study economics 'hands-on', through a two-week journey through Copenhagen, Stockholm, and Bergen. We prepared for our visits to economically interesting destinations with a collection of readings on Scandinavia from academic journals and news sources. Still there were unexpected shocks. Unlike on previous Go Abroad Economics trips, where students have faced extremities of heat or altitude, our rudest adjustment upon arrival in Scandinavia was to the extreme price level. It took several days after stepping off the plane in Copenhagen to acclimate ourselves to the unspeakable prices of restaurant food, and to the idea that a bottle of lemonade could cost £6. The hardest moment for Sean, our trip organizer, was when he bought what proved to be a £3 Snickers bar in the Copenhagen airport. We later learned that parts of this high price came from the 13 distinct taxes that Denmark levies on nuts. We had hoped to ask about this during our visit to the Danish Finance Ministry, but our meeting was cut short by caterers who needed prepare the venue for a scheduled tax negotiation by laying out bowls of almonds. Nuts.

Economic surprises

The rapid growth of our total expenses during the trip was softened by the fact that Scandinavian economies are largely cashless. We found that everyone from train conductors to hotdog vendors accepted card payments, and everyone from the Bankers at "Danske Bank" to the crusty anarchists of Copenhagen's "Free State of Christiania" had cards to pay with. The ubiquity of the cashless economy was such that GAE students relying on cash consistently struggled to find ATMs, while many of us

using cards made it through Denmark, Sweden, and Norway without ever touching a single Krone or Krona. I myself touched exactly 1 Krona during the trip, which I found lying on a basketball court in Rinkeby, the Stockholm neighbourhood infamous for its riots and large immigrant population. More surprising than finding money lying in the streets of one of Stockholm's poorest neighbourhoods, was how remarkably well maintained even the poorest parts of Sweden are. Despite the low average income and high unemployment rate, Rinkeby enjoys exceptionally well-built and well-maintained sports pitches, parks, toilets, and other public utilities. In fact, the amount of public capital we observed was enough to make us question whether the government is overfunded. We found anecdotal evidence for this in a poor neighbourhood just outside Rinkeby, where the city had spent an excess of 10 million pounds to build a competition sized baseball diamond, complete with stadium lighting and a full-sized electronic scoreboard. Despite these incredibly expensive fixtures, the bleachers were designed to hold only a light smattering of spectators. Even without calculating marginal utility, it seemed abundantly clear to our group that the resources to build such a thing were inefficiently allocated.

Wages and labour

In addition to allocative inefficiency, we also saw indications of productive inefficiency during our trip. Many of the government offices we visited seemed to be thinking quietly about the productive consequences of Scandinavia's famously generous welfare model, and the infamously high taxes that support it. We learned from a journal article by Henrik Kleven that this has resulted in an 80% labour force participation tax rate in some Scandinavian coun-



tries, meaning that a nominal person entering the labour force earns only 20% more than they did when unemployed. Apparently this has affected labour force participation rates, especially among recent immigrants and immigrants. For example, we learned in our preparatory readings from the Economist that Sweden requires an 80% labour force participation rate to fund its welfare programs, but only 51% of its non-European immigrant residents work. During our visit to the Danish integration ministry we learned of more extreme examples of this trend; 91% of female Somali immigrants in Denmark are unemployed. Hans Jørgen Whitta-Jacobsen, former chairman of the Danish Economic Council, mentioned to us that the poor labour participation rate amongst immigrants is partly driven by the exceptionally high minimum wages across Scandinavia. His assessment was that these wages are well above the marginal productivity of many immigrants, who are kept out of a labour force they could otherwise contribute to.

The future of automation?

We also observed some of the positive consequences of high Scandinavian wages, in the form of large capital investment into automation. The most striking automation motif during our trip was the 'two person rule', which states that for any largely automatable activity, all of the work will be done by exactly two workers. We found two unexpected features of this rule in practice: firstly, the two workers often don't appear to work very hard, and secondly, there is no limit to the possible number of auxiliary workers who appear to not contribute much. The prominence of this second feature appeared to correlate with the degree of government involvement in production. For example, we visited a private fish farm in Norway where two workers, and an apprentice, oversaw the automated feeding and maintenance of three massive fish enclosures, each of which contained roughly 100,000 fish. The feeding and pumping cycles were completely automated; the only remaining task was to perform a daily check on the fish "to see how they are feeling", and tweak the feeding rates accordingly. It was apparently no inconvenience to the workers to drive us around on their speedboat and give us a lecture on the history and science of fish farming.

Similarly, at the Kollsnes Gas Processing Plant in Norway, we found that only two people operated the entire control room. Despite the fact that Kollsnes supplies over 10% of the total European gas demand, the control room operators glanced only periodically at their screens; their workload seemed to easily accommodate long conversations with tourists. The 'two person rule' also held true at the Norwegian Statoil dispatch station, which monitors boat traffic around oil rigs. Their warning system has been automated to the point that the two remaining dispatch operators are no longer required monitor the screens. Of the two dispatch operators, one was happy to tell us about his job, while the other answered emails and only occasionally glanced at the screens. Neither seemed to be in a hurry about either. The most striking feature of the 'two person rule' we observed was not the indolence of the workers, but the fact that they were the vestigial remnants of entire teams by software. This seems to indicate that modern capital combined with a small and possibly superfluous labour input is a substitute for scores of unassisted workers in some industries. We found the most extreme example of this at the Danish Central Bank. Hidden amongst over 300 human resource managers and other employees were four economists who executed the entirety of Danish monetary policy from a computer terminal by maintaining the Krone/Euro currency peg. Of these four economists, only two were required to come in on any given day, one of whom had time to give us a protracted presentation on Danish monetary policy.

Automation of the kind we saw is currently profitable in Scandinavia because of the extremely high cost of labour, but the falling cost of automation may soon render it profitable in other parts of Europe. The 2017 GoAbroad trip to Scandinavia was not only an exceptional opportunity to learn first-hand about an economy outside the United Kingdom, but also to develop a deeper understanding of our potential economic future. This is the essential value of the GoAbroad program; that it bridges the gap between an economics education and the larger world in which that education is ultimately employed.

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