

Megatrends in our portfolios – Zooming in on a key component of structural growth

This issue of our *Insights* series is about the structural megatrends to which our portfolio holdings are exposed. In one of our most recent publications, we presented our *Investment Handbook*, an overview of our bottom-up investment approach. In this follow-up, we want to zoom in on one important component of this approach: the identification and analysis of the megatrends and structural growth trends to which companies are exposed. We believe that correctly identifying structural shifts in underlying end-markets for our companies is an essential ingredient to achieving long-term outperformance. Evolving profit pools provide some firms with an ongoing growth tailwind while others face a continuous uphill battle. As quality growth investors, we seek to invest in businesses that benefit from such growth tailwinds – and avoid those battling a relentless decline.

This is something that we have always done. However, along with the overall rise of thematic investing, funds' exposures to structural megatrends are receiving increasing attention. More than in the past, our investors are approaching us for a better understanding of our portfolios' exposures beyond the simple regional or sectoral splits. As you might be aware, we follow a disciplined bottom-up investment approach, in which top-down thematic considerations play no explicit role. However, given our emphasis on structural growth as part of our analysis, it is maybe unsurprising that we, too, are exposed to many of the long-term megatrends so often discussed. In our case, it is just a natural outcome of our bottom-up process. In this publication, we will discuss the structural megatrends we find attractive and why, as well as showcase our exposure.

A company's end-market exposure is an important investment consideration. So how does it feature as part of our investment process? As we already alluded to, our investment approach rests on bottom-up company analysis that is structured around business models, financial profiles, competitive advantages, access to growth, management, and valuation. As such, structural changes in end-markets are considered as part of our access to growth analysis. However, a good score here cannot make up for weaknesses elsewhere. For any company to make it into our portfolios, it is required to meet our criteria across all these categories (in our *Investment Handbook*, we recently described each category in greater detail).

Further, it is important to mention that how a company scores on access to growth is not just down to the growth of the end-market. While it is a fact that most successful growth companies are in some form or another benefiting from strong growth trends in their target markets, they are rarely just pulled along by these markets. They tend to actively drive and shape markets with their own innovation and differentiated business models. Over the long term, that tends to play a much bigger role and explains why we want to own businesses that have both the power to innovate and a supportive market backdrop.

A good example is **Ambu**, the Danish medical technology company. While the demand for its products is benefiting from the trends of demographic change and

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*Within **Insights** we aim to give you a better understanding of our investment philosophy and thinking.*

ageing, it is really its own innovation that has supercharged its growth. Ambu's single-use endoscopes first made the replacement of old technologies possible. Therefore, we can only emphasise again that company-specific drivers are the key source of future growth potential.

But what are the most relevant long-term trends? We believe they are most helpfully captured by three global megatrends: Techceleration, Demographic and Societal shift, and the Green Revolution. Of course, there are many ways to skin a cat and we claim no monopoly on the categorisation of megatrends. However, we believe ours make sense. In the following, we want to tell you why. There are also several sub-segments – some promising, others less so. We will also explain those, often by giving concrete examples of stocks that you will find in our portfolios.

Fig. 1: Overview of important megatrends in our strategies



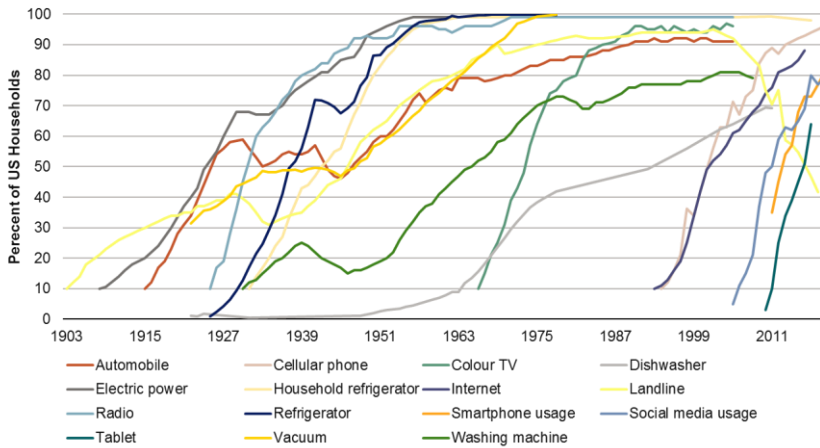
Source: Berenberg

Megatrend 1: Techceleration

Technological change and the rapid “digitalisation of everything” is arguably the most pervasive megatrend with the largest impact on the global investment landscape. This is because it radically alters well-entrenched business models, affects the widest range of sectors and industries, and drives exponential change and economic value creation. It started a couple of decades ago and has gathered steam ever since. Once a breakthrough idea is presented to the market, its rate of adoption is faster than ever before. Just think of the major innovations of the past 100 years – how long it took for cars or even telephones to become ubiquitous. And then contrast that with how quickly we have grown accustomed to mobile phones or the internet. We expect this technological acceleration (“Techceleration”) to continue to be one of the key drivers for the global economy and many companies in our portfolios. In this chapter, we start by examining the key technological breakthroughs enabling this transition and then move to on to describing what we believe are the verticals most affected by this megatrend – and thus, for us, most relevant.



Fig. 2: New technologies are adopted more rapidly



Source: Comin and Hobijn (2004) and others (1903 – 2019)

Fig. 3: Overview of the Techceleration megatrends

Techceleration

Technological changes are accelerating. We examine how disruptive technologies are affecting our lives and are enabling and triggering changes.

This megatrend is also key to creating innovative solutions for the Green Revolution and issues arising from Demographic and Societal Change.

a Technological breakthroughs

Technologies which are enabling digitalisation

- Advanced semiconductors and sensors
- Cloud
- Big data, data analytics and artificial intelligence
- 5G
- Internet of Things (IoT)/Industrial Internet of Things (IIoT)
- Genomics

b Digitalisation

Many verticals are digitised, with a different degree of penetration level achieved

- Digital enterprise
- Digital finance/payments
- Digital government
- Digital consumer
- Digital factory
- Digital education
- Digital health
- Cyber security

Technological breakthroughs

We are in the midst of the digitalisation of seemingly everything. Digitalisation is rapidly permeating all parts of our economy and daily lives. That all of this is possible is the result of several technological breakthroughs that took place in recent decades and that continue to unfold today. It is spurred on by more recent innovations that will drive the next leg of the transition. This section is about those enabling breakthroughs and how we are exposed to them.



Advanced semiconductors and sensors

Semiconductors are the bedrock of Techceleration. Every single digitally-enabled device relies on semiconductor chips. As more and more parts of our daily lives and our economy are digitised, our need for semiconductors is only going to increase. What is more, as digital functionalities become ever more sophisticated, we are also reliant on semiconductor companies and their ability to develop processors with ever more computing power. Without the past improvements in processing power, as well as those that we are yet to witness, the step-ups from the capabilities of a smartphone, an automated factory floor, an autonomous vehicle or artificial intelligence (AI) would simply be impossible. These are the central reasons why we believe that the semiconductor industry has a bright future ahead.

Among all the semiconductor companies exposed to this trend, we consider **ASML** to be the *primus inter pares*. The Dutch semiconductor equipment manufacturer has established itself as the irreplaceable supplier to the semiconductor companies, benefiting from a quasi-monopoly status. We already mentioned the need to continuously upgrade the computing power of semiconductor chips in order to meet the rising demands of more far-reaching digitalisation. This necessitates manufacturing equipment that can essentially transfer that computing power onto an ever-smaller area. This requires incredible skill. As ASML's former competitors have folded in this quest, ASML's latest EUV technology is now the only one available to deliver on this requirement.¹ ASML captures brilliantly what we strive to do: identify a company benefiting from strong market growth, that is also in a prime position to take advantage of it. Our other semiconductor companies, although much smaller, like **BE Semiconductor** and **Comet**, are similarly leading in their strongly growing niches.

Cloud

Another transformative innovation is the introduction of cloud computing, ie the delivery of all kinds of computing services – including data storage, processing and software – over the internet. Until very recently, individuals and businesses alike relied on personal or local servers to access these capabilities. Today, it is possible to outsource this to a network of remote servers hosted on the internet. This brings great convenience to us as individuals, but more importantly, it has significant ramifications to the way businesses operate and leaves enormous potential for the future.

Cloud computing offers significant benefits to us users. First and foremost, it is a lot cheaper and that is down to the very significant economies of scale that a cloud solution provider can achieve. Building, expanding and maintaining a data centre that stores data for literally millions of people all in one place is a lot cheaper than delivering an individual hard drive to each and every one of them. It is also a lot safer. The companies operating these data centres are experts in cyber security and their scale also gives them the funds needed to ensure their firewalls are always high enough and up to the highest standards. And then there is the convenience of such an offering. It allows us to gain access to computing power, more storage, or a new software at the blink of an eye and scale our usage flexibly in line with our needs. Just think of the previous storage limitations that were once so irritating

¹ ASML. (2021, 05). *EUV lithography systems providing highest-resolution lithography in high-volume manufacturing. ASML's EUV machines are pushing Moore's Law forward.* Retrieved from <https://www.asml.com/en/products/euv-lithography-systems>



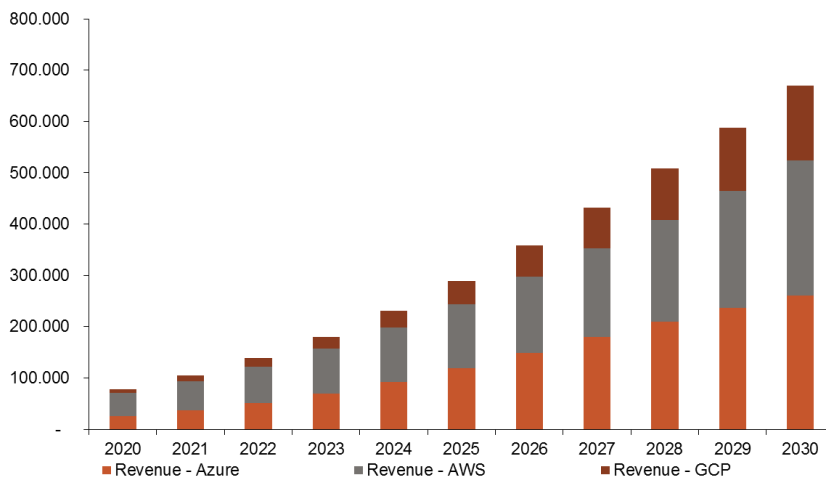
with mobile phones or having to purchase the latest Microsoft Office generation in-store. These are problems that we no longer encounter today.²

We are only at the beginning of the rapid adoption of cloud solutions and it will accelerate as the digital transformation continues. However, cloud computing will also be an enabler to the next leg of the Techceleration megatrend. Its capabilities will fuel the next generation of data analytics (big data) and AI.

For the sake of completeness, we want to mention that there is also a contrasting development with so-called “edge computing”. This refers to decentralised data processing at the edge of the network, ie data is stored closer to the location where it is needed. Despite all the benefits of cloud computing, there are some drawbacks, such as latency, bandwidth, and a lack of offline access. Edge computing tries to solve for this, which is why companies like **Siemens** are incorporating edge technology into the factory setting.

Cloud businesses are invariably highly attractive. The economies of scale existent in the cloud, benefit not only the customer but also the few companies that can provide these services, creating seemingly insurmountable barriers to entry and eye-watering profit margins. These so called hyperscalers (ie **Microsoft, Google, Amazon**) have become the one-stop shop for computing power, software development, data storage and analysis. A virtuous circle that has allowed the cloud parts of these businesses to increasingly dominate the overall company. For instance, Microsoft Azure is set to become 50% of Microsoft revenues by 2030, and GCP 20% of Google revenues.

Fig. 4: Strong forecasted growth for the hyperscalers



Source: Exane

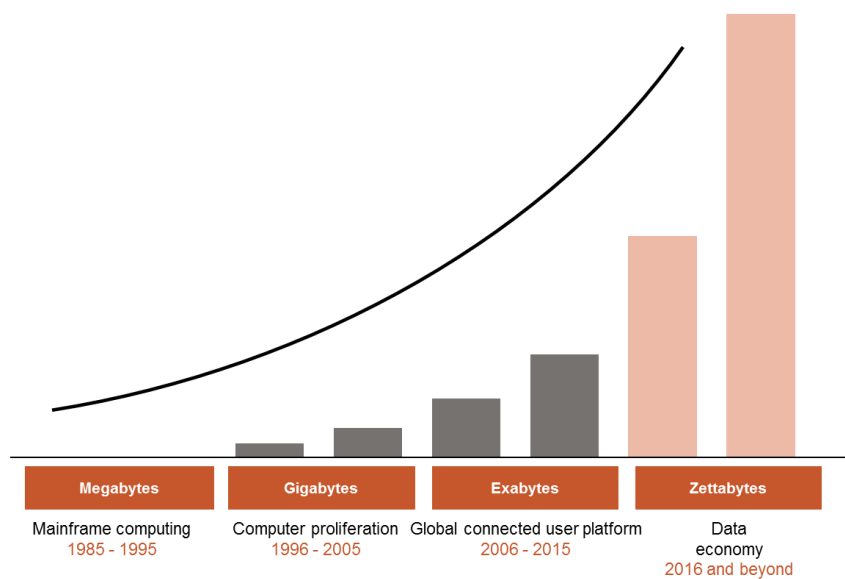
Big data, data analytics and artificial intelligence

As a result of ongoing digitalisation, more and more data are being generated. Just imagine the amount of data being generated by and consumed from search queries, social media behaviour, e-commerce transactions, cloud-based software and video streaming. While it is great for enterprises to collect a lot of data, data alone does not drive any value-add; it is ultimately the analysis of data that provides insights

² Salesforce. (2021, 05). *Benefits of Cloud Computing*. Retrieved from <https://www.salesforce.com/products/platform/best-practices/benefits-of-cloud-of-cloud-computing/>

and informs the decision-making processes. Examples of such analyses are real-time fraud detection, predictive maintenance, call centre optimisation, consumer sentiment analysis and traffic/power grid management. All of these require specialised software to analyse vast data sets on a real-time basis; Microsoft Excel is simply not enough. In addition, data needs to be shared across employees and data scientists to collaboratively analyse it. Also, queries on large datasets are increasingly performed on the cloud as higher computing power is required. This again highlights how big data; data analytics and the cloud go hand in hand and cross-fertilise each other.

Fig. 5: Explosion in data volume



Source: LAM Research

In our view, the big data trend is set to continue to grow in importance due to multiple new megatrends in the next five years such as the emergence of the Internet of Things (millions of connected smart devices), future cars (connected, autonomous, shared, electric), growth of on-demand services (ride-hailing, mobile entertainment, sharing), e-commerce growth, more automation, voice services and virtual/augmented reality.

In the context of data analytics, AI plays a major role. As background, AI refers to intelligent machines able to perform tasks such as visual perception, speech recognition or decision-making. The use of AI has been accelerated by the tremendous increase in data and by the greater adoption of cloud computing platforms. AI is concerned with mapping human cognitive functions such as learning and associations in computers and making them usable for complex, data-intensive questions. Within AI, machine learning is about how computers can generate knowledge autonomously. This is important as humans can no longer cope with the large amounts of data being produced. Algorithms and statistical methods are used by computers to independently identify patterns in sample data in order to be able to make predictions about the development of the data. Deep learning is a variant of machine learning in which the training data used is filtered by self-adjusting neural networks. Such neural networks are particularly suitable for automated image and speech recognition. Image recognition, or machine vision, is the basis of self-driving cars and automation technologies in the industry.



In the healthcare industry, diagnostics also benefit from AI, as image analysis can be used to accurately predict all kinds of diseases. The Finnish company **Optomed**, for instance, has developed a handheld camera that allows non-medical personnel around the world to screen for specific eye diseases. The easy handling, documented superiority in detection and significantly lower costs per screening makes this a viable option in both developed and developing markets and the company is already working on adding screening algorithms for a variety of other disorders to the offering. Besides such examples, AI represents for many companies a new opportunity to improve the efficiency and reliability of their processes, cutting costs along the way.

5G

The new telecommunication technology 5G is 100x faster than its predecessor 4G. 5G networks are rolled out by telecom operators to enable the large-scale expansion of the connected world. This breakthrough will transform homes, enterprises, cities and connected cars. More specifically, 5G will be the support for smarter, more secure enterprise services in the industrial/manufacturing, healthcare, utilities, public services and other professional services areas. The interconnectedness of the world will only increase. By the end of the decade, we will have more than 500bn connected devices versus only 30bn today. By 2030, autonomous vehicles could generate more data than the earth's entire population today and one smart city will generate more data than all autonomous vehicles combined³. 3bn more people will go online. 5G could also provide enough capacity to serve as a last-mile alternative to deploying expensive fibre to the home. Semis will again benefit as being "arms dealers" in that race. **Soitec**, for instance, is a critical supplier of semiconductor wafers into the smartphone. Today, 100% of smartphones rely on Soitec's wafers. The company has successfully set the industry standard for today, and is in pole position to set the standard for tomorrow, given the rising requirement for energy efficient wafers that can compute the increasing amounts of data, and still extend battery lives⁴.

Internet of Things (IoT)/Industrial Internet of Things (IIoT)

The Internet of Things – by that we mean the digitally-enabled interconnectedness of different hardware devices that possess embedded sensors and software – is only just starting to take off. Fuelled by the previously discussed areas of innovation around 5G, big data, the cloud and AI, the Internet of Things is starting to unfold all its potential. The area in which we believe it will have the largest and a truly transformational impact is in the industrial context, i.e. the Industrial Internet of Things. Whether or not your washing machine, toaster and light system speak to each other, and whether the technology allows you to manage these devices remotely, may or may not be convenient, but ultimately it remains a "nice to have". Of course, the impact will vary and there may well be very strong use cases; however, in the industrial context, the Internet of Things is going to be most powerful and it may not be far off the mark to describe this development as the fourth industrial revolution.

³ Cisco. (2021, 05). *Internet of Things*. Retrieved from <https://www.cisco.com/c/en/us/products/collateral/se/internet-of-things/at-a-glance-c45-731471.pdf?dtdid=ossdc000283.#:~:text=According%20to%20Cisco%2C%20500%20billion,network%20of%20these%20connected%20devices>.

⁴ Soitec. (2021, 05) Integrated Report 2019. Retrieved from https://www.soitec.com/media/files/soitec_-_fy19_registration_document_eng.pdf



There are, of course, many companies, that strive to take advantage of this trend. However, only few can compete, given the technological sophistication and deep bench of software engineers required. For those, who can, the financial returns are most appealing. One example is the German software provider **TeamViewer**. In conjunction with the real-time data gathered from the sensors embedded in the industrial machinery, TeamViewer's software can give the customer remote access to a factory operation, enable predictive maintenance and manage the supply chain more efficiently⁵. And this is still just scratching the surface. Industrial product launches are going to rely on digitally created product designs that were tested digitally without ever touching any hardware.

The economic benefits of the Industrial Internet of Things go far beyond the potential savings in labour costs. The capabilities around predictive maintenance, for instance, will significantly reduce factory downtime, thereby achieving very large cost savings.

Genomics

By combining biologics with cutting-edge technology, genomic sciences have made strong progress over the last 20 years. Advances in DNA sequencing techniques, the explanation of which would certainly go beyond the confines of this paper, have brought down the cost of sequencing human or any other DNA tremendously. The first human genome required 15 years to sequence and cost nearly USD3bn. In 2014, genomics pioneer Illumina was able to sequence over 45 human genomes in a single day for approximately USD1,000 each⁶. Technological progress does not stop here; costs are expected to come down even further.

The advance of next-generation sequencing (NGS) techniques has allowed for significant steps forward in healthcare. In this paper, we can only highlight a few applications. NGS is used to better understand and characterise diseases and develop medication that is better suited to the individual patient. While symptoms are often the same, diseases will have different molecular causes and hence one drug might work for a particular patient but not for another. Drug development hence significantly benefited from the progress in genetics. In addition, new NGS-based diagnostic tests from companies like Guardant Health and Exact Sciences have emerged to screen patients for their genetic disposition for certain cancer types or the early detection of cancer. The ultimate goal is to diagnose patients very early, thus increasing the survival rates of the patients but also reducing the cost of treatment significantly.

Digitalisation

Digitalisation is omnipresent and rapidly taking hold in all aspects of life. Having outlined some of the most critical enablers of this transition, we wish to run through the most prominent verticals undergoing the shift.

Digital enterprise

Business processes are still far from being fully digitalised. COVID-19 has brought attention to the endless shortcomings in businesses' digitalisation efforts and is sure to have triggered another round of investment to accelerate the transition. According to a survey by Exane, 71% of IT buyers and 86% of resellers report that

⁵ TeamViewer. (2021, 05). *Digitize Production. Industry 4.0. Manufacturing 4.0*. Retrieved from <https://www.teamviewer.com/en/iot/>

⁶ Illumina. (2021, 05). *An introduction to Next-Generation Sequencing Technology*. Retrieved from https://www.illumina.com/content/dam/illumina-marketing/documents/products/illumina_sequencing_introduction.pdf



COVID-19 has led to an acceleration of digital transformation plans, with Europe and Asia leading the way geographically and financial services, healthcare and technology sectors leading the way by sector.

ServiceNow is a great example for the digitalisation of workflows. In general terms, the company's software products standardise, digitalise and automate workflows, which are even in today's world often reactive, repetitive and manual. ServiceNow's platform and products in this way generate significant productivity gains as employees can focus on the core of their work. In the earlier stages of the company, ServiceNow focused on the digitalisation of the IT service desk. Users report the IT problem they have and the system then categorises the problem and forwards the request to the appropriate IT worker. The current status of requests can be easily monitored on a dashboard and the solution is recorded on the system as well. With the help of AI, recurring or easy problems can be automatically fixed. Following its success in IT departments, ServiceNow expanded into other verticals like customer service, human resources and even security. The company's products forward customer requests to the right salesperson, automatically assist in easy customer problems and automate HR-related requests or new employee onboarding. The opportunities are vast⁷.

Digital finance/digital payments

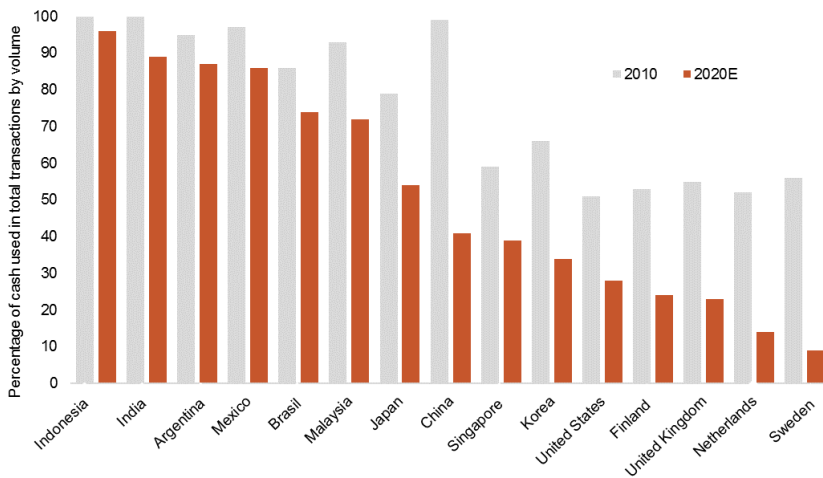
Digitalisation is also rapidly finding its way into financial services. The shift from cash to electronic payments is irreversible at this point, and a wide array of digital banking, credit and insurance solutions are increasingly gaining traction. In payments, we are furthest along. In Sweden, for instance, it is difficult to pay in cash today. However, Sweden is one of a few outliers and the penetration of electronic payments still has far to go. A recent study by McKinsey, the consultancy, illustrates this point: in the US nearly thirty percent of all transactions are still done in cash and in China, another one of the world's largest markets, over forty percent of all transactions were conducted in cash.⁸ With regards to other innovation in the fintech space, we are at an earlier stage still. However, there is a growing range of useful and economically viable solutions. Especially where fintech companies can piggy-back onto an already accepted consumer product, they have the potential to quickly gain share, thus potentially creating attractive structural growth stories.

⁷ ServiceNow. (2021, 05). *Digital Workflows*. Retrieved from <https://workflow.servicenow.com/learn/digital-workflows-and-automation/>

⁸ McKinsey (2021, 05) *The 2020 McKinsey Global Payments Report*. Retrieved from https://www.mckinsey.com/~/_media/mckinsey/industries/financial%20services/our%20insights/accelerating%20winds%20of%20change%20in%20global%20payments/2020-mckinsey-global-payments-report-vf.pdf



Fig. 6: Cash usage by country



Source: McKinsey Global Payments Map

Given the extent of the opportunity, many companies wish to be part of the digitalisation of the financial industry, and payments look to be particularly rewarding. And yet, the differences in the economic prospects of the individual businesses are vast, and it remains critical to sort the wheat from the chaff. One candidate, that ultimately met our criteria, is **StoneCo**, a financial services company, and, in our eyes, one if not the best positioned business to capture this significant opportunity in both payments, as well as digital banking in Brazil. StoneCo started off as a payment provider and rapidly established itself as a formidable player, disrupting what is an oligopolistic industry with egregious pricing and antiquated solutions by offering superior services at more attractive pricing. The company is thus not only enabling the rapid shift from cash to electronic payments, but rapidly eating into the incumbents' share. And yet, StoneCo's strategy is more ambitious still. Utilising its strong merchant relationships, it aspires to move beyond payments and last year started to offer merchants banking and credit solutions. As a result of its payment services, StoneCo has as good an understanding of the financial strength of its merchants as anybody. On top of that, it is already well integrated with its merchants, allowing it to make credit available in a convenient and seamless way.

Hypoport Group is another example of a company that has built the competitive position to take advantage of this trend. With its a network of German technology companies that operate platforms for the credit, real estate and insurance industries, Hypoport is already today the market leader across these industries. The industries all have in common that they are highly fragmented, with many different distribution providers competing intensely. However, in the absence of significant digitalisation, processes remain highly manual and labour-intensive, limiting the potential for scale effects. Hypoport's platforms finally allow for significant efficiency gains and greater price transparency. The company is passing on some of these efficiency gains by offering highly competitive prices, which in turn allow the Hypoport to rapidly expand its market share.

Digital government

Many governments across Europe have announced a digital agenda, which points to higher investments over the next year in digitising the public infrastructure. Some countries are more advanced, like Denmark, which was named the global



leader in the UN e-gov survey for the second year in a row. A company which has helped the Danish government to achieve this is **Netcompany**. With over 250 digital transformation projects, Netcompany has a sizeable and strong track record across northern Europe and the UK, delivering on time and to the agreed budget. The GovTech framework provides a wide selection of solutions and modules specifically designed for digitising public services. It has been delivering critical systems in Denmark like Aula, the new school communication platform, and others like debt collection, housing benefits and child benefits⁹. **Kainos**, a UK IT services firm, has been integral in digitising the UK online passport application service. It achieved a reduced waiting time from several weeks to a number of days, and the previous rate of 25% applications containing errors was reduced to almost zero. Citizens overseas can renew passport online as well. In the public sector, systems are more often highly bespoke and complex; there is no real one-size-fits-all package as there is in the private sector. As a result, highly specialised next-gen IT companies are needed to fill the gap.

Digital consumer

Trends in e-commerce and social media clearly indicate that the average consumer is increasingly becoming a digital consumer. Regardless of their generation, consumers are leveraging new advances in shopping technology (eg online, voice-assistants, same-day delivery) like never before. Millennials and Gen Z are well known for being tech savvy, but seven out of ten US Baby Boomers now own a smartphone and are also increasingly using it to shop¹⁰. Connecting the remaining c4bn people who are still offline is a structural opportunity.

Global e-commerce penetration had reached 13.2% in 2019, before lockdowns during the COVID-19 pandemic made the internet the only place to shop¹¹. E-commerce penetration jumped significantly in the US and other developed countries during lockdowns. According to Goldman Sachs, three to five years' worth of online penetration growth occurred in 2020 across several B2C verticals and up ten years in the most immature segments, like food. The non-food online penetration in the UK – Europe's country with highest adoption – was at 31% before COVID-19 and soared to 70% in the lockdown and is still at elevated levels. In online grocery it went from 8% to 14%. In luxury goods, which was less penetrated, digital as a percentage of luxury sales has moved from 12% in FY19 to 23% in FY20 (or cEUR50bn), according to the Boston Consulting Group. While we expect that some normalisation will occur during 2021 and 2022, the long-term drivers stay very much intact and there is still a case for much higher penetration of online penetration for the next decade. We believe that new customers acquired during the pandemic will remain sticky.

Another driver of online shopping is monetising social media through shoppable ads. This is enabling a new vector of interaction for retailers with consumers that has less purchasing friction and better conversion rates. According to a survey by Euromonitor, of over 27,000 consumers, all generations found brand and retailer

⁹ Netcompany. (2021, 05). *Netcompany launches govtech framework*. Retrieved from <https://www.netcompany.com/int/News/Netcompany-launches-Govtech-Framework>

¹⁰ Anderson, G. Oscar. *Getting Connected: Older Americans Embrace Technology to Enhance Their Lives*. Washington, DC: AARP Research, December 2017. <https://doi.org/10.26419/res.00210.001>

¹¹ Statista. (2021, 05). *E-commerce share of total global retail sales from 2015 to 2024*. Retrieved from <https://www.statista.com/statistics/534123/e-commerce-share-of-retail-sales-worldwide/>



advertising on social media had become more influential in their product decision-making over the previous four years. YouTube launched direct response tools to make videos more shoppable, with browsable product images below the ad and started “video action campaigns” on the home feed. **Facebook** and Instagram rolled out Shops in 2020. Another great example is **Pinterest**. In the beginning, the social media platform was mainly a venue for users to get inspiration for their wedding planning, home decoration or grocery shopping. Over time, Pinterest was able to attract more advertisers and online sellers to their app. For instance, Pinterest has formed a partnership with **Shopify**, which allows online sellers to easily upload their products onto Pinterest. This evolution has increasingly transformed Pinterest into a platform used by users with a high intent to purchase on the app. By the end of 2021, Pinterest will also feature a check-out feature in its on app. All these strategic moves continue to improve the monetisation of Pinterest’s user base.

Digital factory

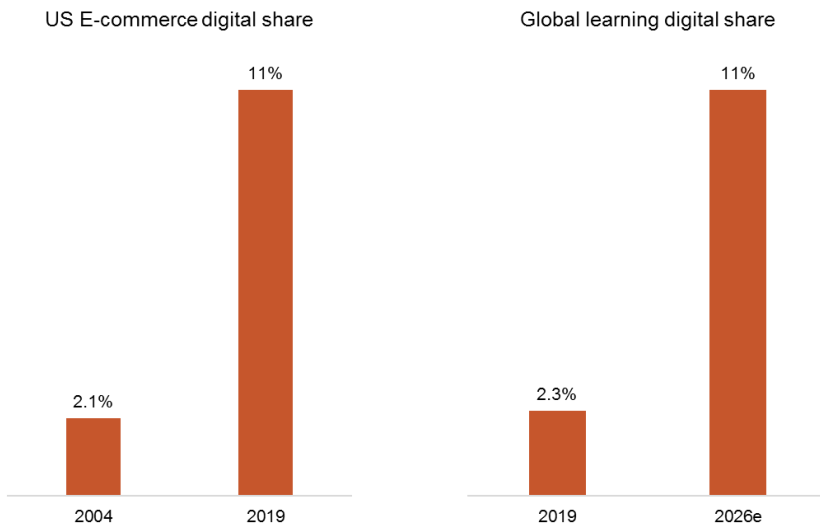
Having already discussed the Industrial Internet of Things, we want to touch briefly on the broader digitalisation of the factory floor. This has been going on for some time and is no longer transformational. By now we have grown accustomed to the sight of orderly lines of robots deployed in the manufacturing process. However, it is still a trend that is significantly outgrowing global GDP and has many years of significant growth ahead. Why that is the case is illustrated by **BMW**’s production site for the model X1 in Holland. This “fully digitalised” factory deploys digitally laser-guided systems at the metal pressing stage in order to roll steel into the press. The factory then deploys c2,000 connected robots, which are used to install parts (eg cylinder valves, welding heads). The paint shop has intelligent testing systems to ensure the paint finish is to the required standard. The manufacturing time is reduced to 40 hours, a c5-10% productivity gain.

Digital education

The rate of educational technology adoption today is where ecommerce was 15 years ago. While it took 15 years for ecommerce to exceed 10% of total commerce, some believe educational technology (EdTech) adoption could pick up even more quickly, from its current share of 2-3% of global USD5trn education spend. The potential was demonstrated during the COVID-19 lockdowns: According to Goldman Sachs, the pandemic has shifted 90% of the global student population across K-12 and higher education to remote/digital learning formats and 20% remain affected until today.



Fig. 7: Digital learning is where E-commerce was 15 years ago



Source: GSV, Exane BNP Paribas Estimates

EdTech industry revenues can be split into two sub-segments: D2C and B2B. D2C accounts for 54% of the cUSD200bn currently spent on EdTech globally. D2C EdTech includes segments such as online courses, tutoring, online test prep and certification, online boot camps and textbook solutions. B2B EdTech includes segments such as virtual schools, online programme management (OPM) and digital learning materials where the payer or the decision-makers are institutions rather than consumers.

The e-learning market before COVID-19 was already an area of structural growth as it made knowledge more inclusive and more scalable. The e-learning space, especially regarding schools and universities, is mainly focused in this area, but the corporate learning space market, with USD350bn in sales, is also quite a huge market and over 50% of trainings are still held in a classroom, which is not very effective. Companies like **Learning Technologies** are creating content and software for these purposes, making digital learning more efficient and effective and learning results more measurable and comparable. Recently, the company leveraged its capabilities in the higher education space to become the largest commercial Moodle provider in the world, helping organisations and institutions deliver great learning experiences without complexities.

Digital health

The digital health vertical is covered in the next chapter, in which we discuss how it helps keep stretched healthcare budgets under control.

Cyber security

Having outlined the endless opportunities around digitalisation, it is necessary to emphasize the inherent risks this creates in terms of cyber security. We already mentioned the advantages of the Cloud in this regard, however the need goes beyond what Cloud providers can offer. However, as so often, what is a risk for many, is also an opportunity for those who can help. The German IT security company **Secunet** is in a highly attractive position to do so. With its focus on government agencies and state institutions, the company has built a tremendous



track record and achieved a virtual monopoly in the provision of the highest level of IT security for the German public sector.

Megatrend 2: Demographic and Societal Change

In our experience, companies operating in the consumer and healthcare industry are often exposed to demographic trends that provide significant growth opportunities. For instance, the ageing of populations results in a structurally growing demand for medical products and services. However, this also represents challenges that we as a society need to overcome. Healthcare budgets all over the world are already enormous, but innovative technologies and business models can help address these challenges. We also stress that demographics are not only about ageing, but also about population growth, urbanisation and societal changes. In this context, the strong rise of the Chinese middle class, for instance, presents tremendous growth opportunities for luxury companies. In this section, we want to briefly elaborate on important demographic trends and identify areas with attractive competitive dynamics for the companies taking advantage of the growth.

Fig. 8: Overview of the Demographic and Societal Change megatrends

Demographic and Societal Change

We discuss how the changing structure of societies and world population impacts our lives. That could be age, gender, race, birth and death rates, education levels, income levels. Social change is the evolution of behaviour or cultural norms over time.

- a Ageing**
 - Growing demand for healthcare products and services
 - Addressing the problem of stretched healthcare budgets
- b Population growth and urbanisation**
 - The nutrition challenges
 - New mobility solutions
- c Societal change**
 - The rise of the Chinese consumer
 - Improving access to healthcare in emerging markets
 - Generational differences in behaviours and attitudes
 - Changing eating habits

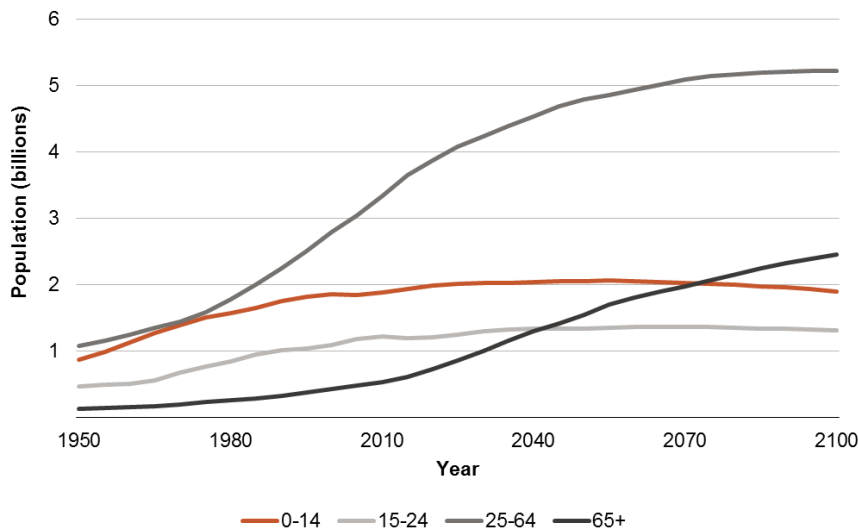
Ageing

As a result of rising life expectancy and decreasing fertility rates, the global population has aged over the last 50 years and is expected to continue to age over the coming decades. According to statistics provided by the United Nations (UN), the median age of the global population has steadily increased since 1970 from 21.5 years to 30.9 years in 2020¹². This trend is expected to continue over the next decades: the UN projects a median age of the world's population of 36.2 years in 2050. Put differently, c9% of the world's population was older than 65 years in 2020. The prevalence of this age group is going to increase steeply over the next decades: 16% in 2050 and 23% of the total population in 2100.

¹² United Nations. (2021, 05). *World Population Prospects 2019*. Retrieved from United Nations: <https://population.un.org/wpp/>



Fig. 9: Global population growth is driven by the age group 65+



Source: United Nations

Growing demand for healthcare products and services

Without a doubt, the ageing of societies drives a structurally growing demand for healthcare services and products. As we age, we end up in the hospital more often, require more medication and need more assistance. The US National Council on Aging (NCOA) captured this in a nutshell with a very useful statistic: 80% of adults above 65 have at least one chronic condition such as diabetes, heart disease or arthritis and nearly 70% of the Medicare population have two or more¹³. In this context, it is no surprise that, while the age group 65+ represents only c16% of the total population, it accounts for c36% of healthcare spending, ie more than 2x its “fair share”¹⁴.

We believe that the ageing of societies presents particularly healthcare companies with an end market that can structurally outgrow GDP growth over time. The trend is slowly but steadily developing; hence ageing alone does not drive abnormal growth for exposed companies by itself. In our view, companies in the sector need to have strong and innovative products to generate strong and sustainable growth. Just imagine a pharma company that has had a blockbuster success and then fails to bring further innovation to the market. Such a company will see revenues erode after a certain time when competing or better products enter the market. Although lifestyle is a more important driver than ageing for the diabetes market, let us consider our holding **Novo Nordisk** as an example. If, for instance, Novo Nordisk, the leading pharmaceutical company for the treatment of diabetes and obesity, 10 years would have stopped innovating and started resting on the success of its insulin franchise, the company would not have brought forward the new GLP-1 class of diabetes products, which is today driving the entire growth of the company.

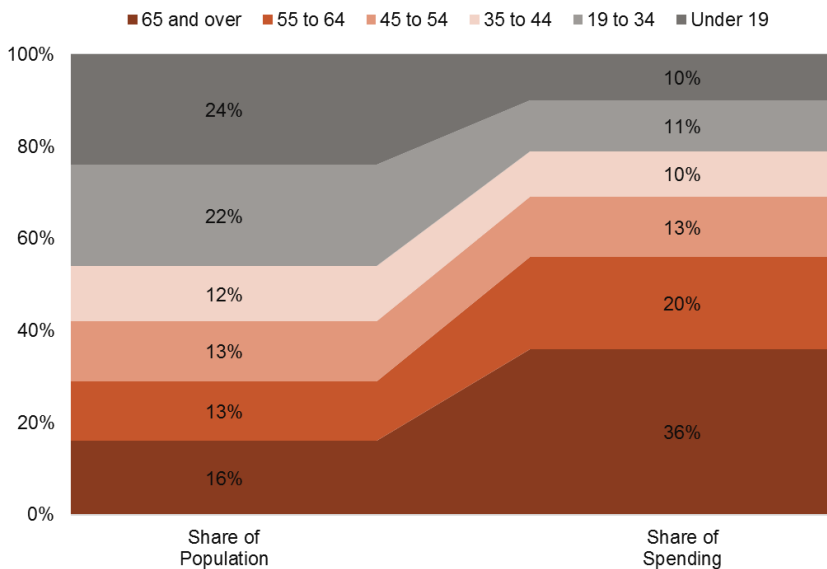
¹³ National Council on Ageing. (2021, 05). *Get the Facts on Healthy Ageing*. Retrieved from <https://www.ncoa.org/article/get-the-facts-on-healthy-aging>

¹⁴ Kaiser Family Foundation. (2021, 05). *Analysis of Medical Expenditure Panel Survey*. Retrieved from https://www.healthsystemtracker.org/chart-collection/health-expenditures-vary-across-population/#item-people-age-55-and-over-account-for-over-half-of-total-health-spending_2016



Without GLP-1s, Novo Nordisk would not be a growth company any more even though overall supporting megatrends remain unchanged.

Fig. 10: People age 55+ account for more than 50% of healthcare spending in the US



Source: Kaiser Family Foundation

Ryman Healthcare serves as a great example for the growing demand for care services. Ryman is a leading developer and operator of senior living villages in New Zealand and Victoria, Australia. According to the UN's population data, the population aged 80+ in New Zealand alone is expected to grow by about 11,000 people pa from 2020-50. Ryman is the largest developer of senior villages in New Zealand and is planning to add about 1,000-1,600 units pa over the next years, which includes units developed in Victoria, Australia. These numbers illustrate the imbalance between demand growth driven by demographics and supply growth and explain why demand should not be a limitation to growth any time soon. In fact, growth is rather determined by the pace at which Ryman can develop and build new villages. Ryman's unique integrated business model as a developer and operator is a clear competitive advantage as the company can reinvest its operating cash flow into the expansion of its portfolio of residences. In addition, Ryman has a very strong brand in the market and is seen as the quality leader, which is another important driver of demand. Based on the strong market dynamics and the company's very strong market position, Ryman aims to double its underlying earnings every five years.

In this context of ageing, **Siemens Healthineers** serves as a good example in the medical technology sector, particularly after the acquisition of Varian Medical Systems, the leading radiotherapy device manufacturer. Besides surgery and chemotherapy, radiotherapy is a common treatment modality for many cancer types. According to data from the American Cancer Society (2021), one in three males and one in four females over 70 are likely to develop invasive cancer¹⁵. This compares to one in 16 males or females between 50 and 59. This data is confirmed by Cancer Research UK, according to which 36% of new cancer cases in 2015-17

¹⁵ American Cancer Society. (2021, 05). *Cancer Facts & Figures 2021*. Retrieved from <https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2021/cancer-facts-and-figures-2021.pdf>

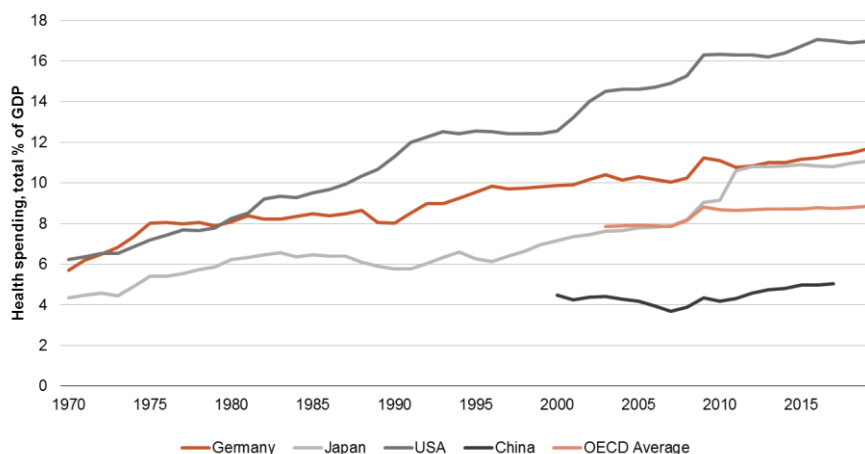


were in people aged 75 and above¹⁶. Varian hence concludes that the cancer burden is growing from 13.6m cases in 2010 to 24.6m cases by 2030, which should support the demand for the company's products over the long term¹⁷. But why is the company strongly positioned to benefit from this trend? Firstly, the market for radiotherapy devices is a oligopoly between Varian and the Swedish company Elekta. Varian is the market leader by a significant margin and has been the innovation driver over the last decades. Secondly, the combination of Varian and Siemens Healthineers should allow for strong innovation going forward as radiotherapy and diagnostic imaging are synergistic areas. As a result, we believe that Siemens Healthineers will not only be the beneficiary of a trend, but the company will have a significant impact on the fight against cancer.

Addressing the problem of stretched healthcare budgets

Countries around the world are already running considerable healthcare budgets. The US, for instance, spent c17% of GDP on healthcare in 2019¹⁸. Historically, the share of healthcare spending of GDP has consistently grown. Demographic change will continue to put pressure on healthcare budgets; however, this trend cannot go on forever. Healthcare systems need to become more efficient. We hence view companies that take costs out of the system positively.

Fig. 11: Healthcare spending is on the rise



Source: OECD, 1970 - 2019

As discussed previously, digitisation is an important topic in nearly every industry. The healthcare sector is no different: technological innovations are important cornerstones to improving productivity and reducing costs. Also, investors can benefit. The COVID-19 pandemic has, for instance, accelerated the digitalisation of patient-doctor relationships. Companies like **Teladoc Health** are benefiting from this shift. While we order food online or purchase our clothes online, one important area of life has remained predominantly offline: healthcare services. For centuries, people have walked into their doctor's office when they feel sick. Everybody can talk about their experiences with long lead times for an appointment or

¹⁶ Cancer Research UK. (2021, 05). *Cancer Incidence Statistics*. Retrieved from <https://www.cancerresearchuk.org/health-professional/cancer-statistics/incidence/age#heading-Zero>

¹⁷ Varian Medical Systems. (2021, 05). *Investor Day 2019*. Retrieved from <http://investors.varian.com/presentations?item=225>

¹⁸ Organisation for Economic Co-operation and Development. (2021, 05). *Health Spending*. Retrieved from <https://data.oecd.org/healthres/health-spending.htm>



hours spent in waiting rooms. As a pioneer in digital health, it is Teladoc's mission to change this centuries-old paradigm. The company has created a digital platform that facilitates virtual health visits, may it be acute care, mental health, behavioural health or annual check-up visits. Prior to the COVID-19 crisis, less than 1% of health visits in the US were performed digitally¹⁹. Lockdowns during the pandemic accelerated the demand for digital visits and many patients had their first experiences with the technology. Many of them will have realised the benefits of digitisation: shorter waiting times (immediate appointments and shorter waiting times), lower cost (in particular for patients with insurance policies carrying significant co-payments) and other time savings (no drive to the doctor). But the more important opportunity in our view is the management of chronic disease like diabetes and hypertension, which drive a significant amount of healthcare spending. With Teladoc's remote monitoring platform, acquired in 2020 with the Livongo merger, patients' chronic conditions can be better monitored and treated. Severe conditions can be pre-empted and patients kept healthy. In the medium to long term, Teladoc's platform will increasingly utilise technology to change the paradigm of the healthcare system from treating people when they are sick to assisting people in staying healthy. Followers of the digital health industry know that this field is still in the very early days of its evolution and that there are many companies trying to enter the field. So why are we confident, that Teladoc can be successful in the long run in this dynamically growing but also competitive space? We strongly believe that the breadth of Teladoc's platform and services combined with its market leading relationships with all the stakeholders in the healthcare industry, may it be insurance companies, care providers, employers or patients, differentiates the company from other emerging telehealth platforms. Clients are increasingly looking for holistic solutions rather than point solutions and Teladoc is one of a few companies able to provide these. The video conferencing tool that Teladoc provides will in our view become a commodity in due course; however, the platform that Teladoc provides is the company's edge versus competition.

Another great example of the digitisation of the healthcare system is the more effective use of patient data to improve clinical decisions and patient outcomes. Some of us may remember the times when clinical diagnoses were handwritten by doctors and when patient files were not digitised. While digitalisation has made life easier for everyone, it has not immediately improved clinical decisions. However, digitised data and diagnoses allow for the development of software supported by AI tools to assist clinical decisions. The clinical imaging industry, with leader **Siemens Healthineers**, is a great example here. In collaboration with hospitals, the company has used a vast amount of curated and anonymised images to develop software that reduces the manual labour involved in the analysis of images (eg the manual counting of vertebrae) and supports decision-making or double-checks the radiologist's diagnosis. Such tools make workflows more efficient, which might in turn lead to greater access to this technology for patients and improve patient outcomes. As Siemens Healthineers is the largest player in the imaging industry, it has the greatest scale to invest into its technologies and the best access to renowned hospital system to collaborate on product development.

Innovative technologies also need to be combined with new and innovative business models to improve the efficiency of the healthcare industry and maintain affordability. **Evotec**, a provider of outsourced pharmaceutical research services, is

¹⁹ The Commonwealth Fund. (2021, 05). *Number Person Visits Dropped Telehealth Visits Increased.* Retrieved from <https://www.commonwealthfund.org/chart/2020/number-person-visits-dropped-telehealth-visits-increased-increase-telehealth-visits-only>



one such innovator in our view. Over recent years, due to higher regulatory standards and treatment targets becoming more complex, development costs for drugs have risen considerably. At the same time, the potential payoff has shrunk as drugs become narrower in their application and more targeted in their patient population. To become more efficient, pharma and biotech companies are increasingly partnering with companies like Evotec to identify drug targets, develop molecules and manufacture the final product. Evotec's strong technology platforms ultimately aim to improve the success rates in pharmaceutical development. According to Deloitte (2018), pharma companies on average spend USD2.2bn for the development of a drug²⁰ while only c14% of clinical trials lead to a regulatory approved product in the end²¹. In other words, nearly nine out of 10 clinical projects fail. If technology can increase these probabilities even slightly, the cost savings in the system would be massive. The partnerships with leading pharmaceutical companies like Bristol-Myers Squibb, Sanofi or Bayer and renowned academic institutions exemplify the quality of Evotec's work.

Population growth and urbanisation

The world's population has more than tripled after the Second World War, from 2.5bn in 1950 to 7.7bn in 2019²². While growth has decelerated since 1968, the global population is still expected to grow to about 9.7bn in 2050. Besides population growth, density is also important. In 1800, over 90% of the global population lived in rural areas. Over the last 200 years, the share of the population living in urban areas has steadily increased. The UN estimates that today, just over 55% of the world lives in urban areas. Projections by the UN imply a continuation of this trend; by 2050, more than two-thirds of the world could live in urban areas. Overall population growth as well as urbanisation require solutions to tackle population growth and higher population density.

The nutrition challenge

Without a doubt, population growth and growing wealth in emerging markets will drive an increasing demand for agricultural products. This is a challenge as there is limited land left to be cultivated – 50% of habitable land is used by agriculture – and water usage is significant (agriculture accounts for 70% of water consumption). Companies able to improve agricultural yields, for instance, should therefore benefit from structurally growing demand for their solutions.

New mobility solutions

Rising levels of urbanization along with changing consumer tastes in relation to owning a car will together drive the need for new mobility solutions. We believe, this will be a boon for mobility providers such as the German car rental company **Sixt**. The company has a well-entrenched car rental business, but has also been an early mover on providing ride hailing and car subscription services. With SIXT+ the company entered the market for car subscriptions, that are cancellable on a monthly basis, catering to novel mobility needs. Within the first year alone, the Sixt could report more than 10,000 subscribers. Just to put this into perspective, Sixt

²⁰ Deloitte. (2021, 05). *Measuring the return from pharmaceutical innovation 2019*. Retrieved from <https://www2.deloitte.com/us/en/pages/life-sciences-and-health-care/articles/measuring-return-from-pharmaceutical-innovation.html>

²¹ Wong, C. H., Siah, K. W., & Lo, A. W. (2019). Estimation of clinical trial success rates and related parameters. *Biostatistics*, 273-286.

²² Roser, M., Ritchie, H., & Ortiz-Ospina, E. (05 2021). *World Population Growth*. Retrieved from <https://ourworldindata.org/world-population-growth>



Leasing – the leasing business the company divested – had roughly 85,000 contracts at the time of the sale.

Societal shifts

Shifts in the global middle class are another important demographic change. According to the European Commission, the global middle class is expected to grow, reaching 5.3bn in 2030 versus c3.5bn in 2017²³. Interestingly, 87% of the additional middle class population will be Asian as the middle class in advanced economies is only growing at about 0.5-1.0% pa. By 2030, over 70% of China's population could be considered middle class, consuming nearly USD10trn in goods and services.

The rise of the Chinese consumer

Chinese households have become an increasingly important driver of consumption over the last 20 years. China's share of global consumption has expanded from 9% between 2000-05 to 23% in 2013-18. As a result, the Chinese consumer is an increasingly important target for many companies in our investment universe.

Prominent examples of beneficiaries from strong Chinese demand for consumption are our luxury goods holdings **Kering**, **LVMH** and **Moncler**. According to McKinsey (2019), Chinese consumers accounted for 32% of global luxury goods consumption in 2018 and are expected to account for 40% by 2025²⁴. But it is not only these numbers that explain how demographics drive revenues for these companies. In a McKinsey consumer survey from 2019, 40-50% of Chinese people between 20-30 years old stated that they never worry about income as their parents can easily cover expenses. Many of these consumers have never experienced a recession, only a period of strong economic growth, and hence this generation has a propensity to consume rather than save. An important point to highlight is that, while the rise of the Chinese consumer serves as a great tailwind to the luxury industry, more is needed to be and remain successful: strong brands, effective marketing and good strategic execution. While Salvatore Ferragamo's revenues have remained broadly flat over the period 2015-2019, Moncler's revenues have nearly doubled. The underlying trend is the same for both companies.

Improving access to healthcare in emerging markets

With a rapidly growing middle class and rising wealth, the demand for healthcare products and services in China is also increasing, while the underlying infrastructure is still underdeveloped compared to Western countries.

Revenio, one of our portfolio holdings operating in the ophthalmology (ie eye care) market, for instance, stated that there are about three ophthalmologists/eye specialists per 100,000 inhabitants in China, while there are 30 per 100,000 in Germany. With rising wealth, more value is placed on healthcare and aesthetics as affordability improves. We know from our frequent conversations with **Carl Zeiss Meditec** that there is very strong demand for refractive eye surgery in China, also due to cultural reasons. Similarly, our holding in dental leader **Straumann** has benefited from strong growth in China over the last years. The penetration of dental implants is still very low in China compared to Germany, which presents

²³ European Commission. (2021, 05). *Growing consumption*. Retrieved from https://knowledge4policy.ec.europa.eu/growing-consumerism_en

²⁴ McKinsey & Company. (2021, 05). *China consumer report 2021*. Retrieved from <https://www.mckinsey.com/~media/mckinsey/featured%20insights/china/china%20still%20the%20worlds%20growth%20engine%20after%20covid%2019/mckinsey%20china%20consumer%20report%202021.pdf>



strong growth opportunities for the company in this region. Revenio, Carl Zeiss Meditec and Straumann are all highly regarded innovators in their field bringing new and better products to the market and thus improving the standard of care.

Generational differences in behaviours and attitudes

As discussed earlier, younger generations like Gen Z and Millennials are typically earlier adopters of technology and hence show different consumer behaviours, eg spend more time on Netflix rather than traditional TV or shop more online versus offline. But it is not only the adoption of technology that is different for various generations. It is also values that differ between Millennials and Baby Boomers. Good examples of this phenomenon can be found in the animal health sector. According to **IDEXX Laboratories**, the largest provider of veterinary diagnostics, Gen Z and Millennials account for c45% of current dog ownership in the US, while they will account for nearly 60% of dog ownership in 2025²⁵. Interestingly, the company's survey data shows that the willingness to spend on pets is significantly higher for younger generations compared to Baby Boomers. Newer generations regard pets as family members and as these generations represent a growing share of pet owners, pet spending grows structurally. This tailwind is one of the reasons why companies like IDEXX Laboratories and **Dechra Pharmaceuticals**, the UK animal pharmaceutical company, are attractive investments. In addition, both companies have built strong market positions that allows them to outgrow their respective end markets. IDEXX Laboratories for instance enjoys considerable scale advantages over its competitors. The company invests more than 80% of the veterinary diagnostics industry's research and development expenditure, resulting in strong technological advantages. In addition, the company is benefiting for increasing use of diagnostics for pets. As a result, the company is outgrowing its end market by a significant margin. The investment case of Dechra is very different in fact. The company is a small niche player that focuses on product categories which are below the radar of significantly larger companies, which results in a lower level of competition. Nevertheless, this niche strategy still allows for further product development, which adds to Dechra's growth.

Changing eating habits

Along with the changing societal composition, eating habits are also in flux. Increasingly larger parts of the global population are health conscious with regards to their daily food intake. They are looking for alternatives to meat-based proteins, prefer natural ingredients over processed foods, drink less or lower-alcohol beverages and generally look for food and beverages that have a lower sugar content. While this is putting increasing pressure on food producers to deliver on these demands, it is providing ingredients companies – basically the outsourced R&D departments of the food and beverage industries – with strong demand tailwinds for their solutions to work on the flavour, colour, texture and content of food.

The ingredients company **Treatt** is very well positioned to benefit from this growing health consciousness. For instance, the company is a key supplier for hard seltzers, ie flavoured carbonated water with alcohol. Why are these in increasing demand? These drinks tend to have a significantly lower carbohydrate content than beer, lower calories than beer or wine, and a lower alcohol content than most beers and certainly wine. Last but not least, seltzers are suitable for vegans and are gluten free. On sugar reduction Treatt is particularly well exposed. Sugar content is generally not only important for taste; it also enhances flavour and generates an aroma

²⁵ IDEXX Laboratories. (2021, 05). *Investor day 2020*. Retrieved from <https://www.idexx.com/files/2020-08-13-investor-day.pdf>

and a mouth sensation. Treatt offers molecules that make beverages taste sweet without having to add sugar.

Megatrend 3: Green Revolution

With the environmental side effects of economic progress ever more apparent, the mutually reinforcing shifts in regulation, technological innovation and consumer behaviour will drive a “Green Revolution” for decades to come. We expect an increasing share of economic output to be driven by industrial activities and consumer behaviour that is far less damaging and, in some instances, even beneficial to the environment. We are hopeful to see more work being done to mitigate climate change, reduce our dependency on scarce resources, and protect our planet and its biodiversity from the effects of economic growth, in particular from the effects of increasing mountains of waste. Altogether this is a structural megatrend that will fundamentally transform our economy and provide those companies enabling this transformation with a lasting growth tailwind. This part of the global equity universe thus presents us with an important hunting ground for our portfolios.

Fig. 12: Overview of the Green Revolution megatrends

Green Revolution

We discuss how shifts in regulation, technological innovation and changing consumer behaviour are to drive an increasing share of economic activity that is less damaging to the environment.

a Climate Change

- Higher demand for renewables and energy storage technology
- Electric mobility
- Less carbon intensive production processes

b Scarce Resources

- Water treatment and water saving solutions
- Less resource intensive production processes
- Food alternatives

c Waste Problem

- Waste management
- Biodegradable plastics
- Circular economy

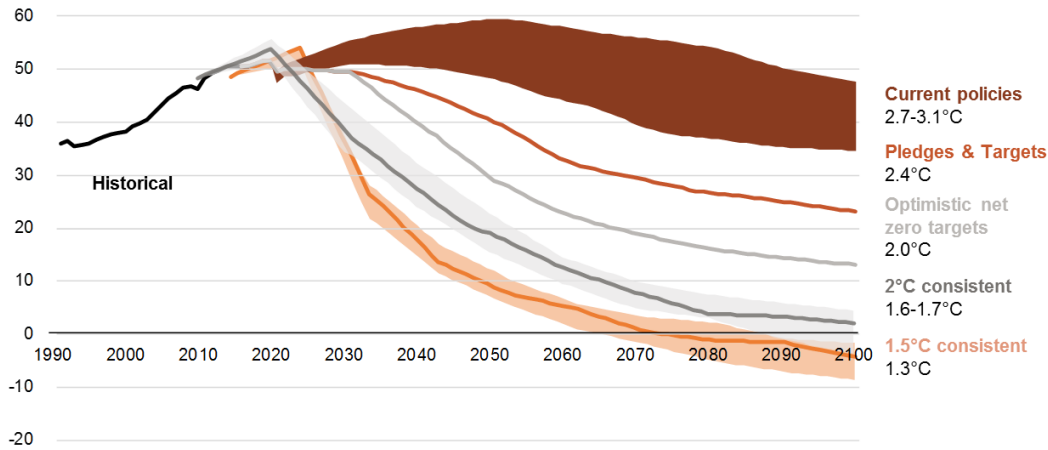
Climate change

The accelerating effects of climate change are ever more apparent. 2020 just tied as the warmest year on record (together with 2016) and the last seven years were the hottest ever recorded. This translates into a temperature increase of more than 1.2°C since the late 19th century and most of that change occurred over recent decades²⁶. The fight against climate change is thus rapidly ascending the list of political priorities of governments all around the globe. To succeed in this endeavour and limit warming to 1.5°C above pre-industrial levels by 2100, we must drastically reduce our dependency on fossil fuels and achieve net zero emissions by mid-century. To date, nothing of the sort has been achieved. With the policies currently in place, the Climate Action Tracker projects that we are likely to see a 2.9°C warming above pre-industrial levels by 2100²⁷.

²⁶ NASA. (2021, 01). *2020 Tied for Warmest Year on Record, NASA Analysis Shows*. Retrieved from <https://www.nasa.gov/press-release/2020-tied-for-warmest-year-on-record-nasa-analysis-shows>

²⁷ Climate Action Tracker. (2021, 05). *Addressing global warming*. 2.9°C is the median of the low and high ends of current policy projections (2.1 to 3.9°C). Retrieved from <https://climateactiontracker.org/global/temperatures/>

Fig. 13: 2100 warming projections



Source: Climate Action Tracker, 11.05.2021

The good news is that several low-carbon technologies can finally make a serious dent in global emissions. They are at a point where it is about scaling these technologies to meaningfully reduce our dependency on fossil fuels. Renewable energy, especially from wind and solar, in conjunction with much enhanced energy management systems and storage technologies, are already significantly reducing our reliance on fossil fuels. Furthermore, the electrification of transport, still in the early stages, is likely to gain significant momentum over the coming years. Several other technologies and solutions, such as smart homes and buildings, better insulations, and LED lights, are helping to reduce emissions further.

However, for several highly significant and emission-intensive parts of the economy – think cement and fertiliser – economically viable technological alternatives are much further afield. Potential solutions do exist, but they will require significant incremental innovation and bold investment to drive them forward and into widespread adoption. The businesses solving these problems – for instance by making inroads into vertical farming and alternative foods – have the potential to reap ample rewards.

Scaling renewable energy

The ascent of renewable energy has been in the making for a very long time. For decades, the costs of wind and solar were too high for them to be an economically viable alternative to fossil fuels. However, this has radically changed. Depending on geographic location, wind and solar is already cost competitive. The International Renewable Energy Agency found in a report last year that more than half of the renewable capacity added in 2019 achieved lower power costs than the cheapest fossil fuel alternative, namely coal plants. Over the past decade, for instance, utility-scale solar PV has seen cost declines of c. 82% and onshore wind of c. 38%. What's more, the agency, along with many other experts, see this trend continuing.²⁸ This is also why we believe renewables will, with the help of regulatory sup-

²⁸ IRENA (June 2020) *Renewable Power Generation Costs in 2019*. Retrieved from https://www.irena.org/media/Files/IRENA/Agency/Publication/2020/Jun/IRENA_Power_Generation_Costs_2019.pdf



port and further investment, significantly outgrow global power demand over the next decade and beyond and expand its share of the overall power market.

Despite the strong structural growth current, we struggle to identify attractive investment opportunities in this market segment. This is because the industry continues to lack significant barriers to entry. As a result of low interest rates and capital from pension funds, Big Oil and other investors are flooding the market. This has resulted in the commoditisation of most parts of the value chain, putting significant pressure on the returns on capital for these businesses. This is also why we believe investors need to be very selective and look for companies that possess pricing power and competitive advantages.

The electrification of the global car fleet

The virtuous circle of regulation, technological advancement and consumer adoption are rapidly propelling the electrification of the global vehicle fleet. This is to a large extent the result of improving battery technology and especially rapid price declines. According to the research company BloombergNEF, lithium-ion battery pack prices have declined by 89% over the past ten years²⁹. This is expected to continue and the car companies are responding by preparing to produce a wide range of EV models at scale. And yet, despite the growth, battery makers, as a result of the ongoing commoditisation, do not possess a particularly attractive financial profile, and it remains to be seen which car maker will ultimately win the race. In other words, this remains a competitive environment that is unlikely to yield many opportunities that spark our interest.

To still benefit from the strong structural growth tailwind, we have decided to focus on the key enablers of electrification: the semiconductor companies. They are strong beneficiaries of the growth acceleration in electric vehicle (EV) adoption, as EVs require 4-5x the semiconductor content of a combustion engine. What is more, among the different suppliers of the semiconductors, it is a lot easier identify the winner. **Infineon** is the number one auto semi vendor and, more importantly, the number one in power semis, with its market share twice as large as that of the number two. This scale gives the company a cost advantage that makes it unbelievably difficult to compete against³⁰.

Reducing the energy intensity of food production

The entire value chain of food production is responsible for a very significant proportion of global greenhouse gases. A recent study found that more than one-third of global emissions can be attributed to the way we produce, process and package food³¹. With projections for c10bn people living on the planet by 2050, it is difficult to see how food-related emissions are to be reduced, illustrating the

²⁹ BloombergNEF. (May, 05). *Battery Pack Prices Cited Below \$100/kWh for the First Time in 2020, While Market Average Sits at \$137/kWh*. Retrieved from <https://about.bnef.com/blog/battery-pack-prices-cited-below-100-kwh-for-the-first-time-in-2020-while-market-average-sits-at-137-kwh/>

³⁰ Infineon. (04.02.2021). *Q1 Results Presentation*. Retrieved from <https://www.infineon.com/dgdl/2021-02-04+Q1+FY21+Investor+Presentation.pdf?fileId=5546d461774fe9d30177691529b20005>

³¹ Crippa, M., Solazzo, E., Guizzardi, D. et al. Food systems are responsible for a third of global anthropogenic GHG emissions. *Nat Food* 2, 198–209 (2021). <https://doi.org/10.1038/s43016-021-00225-9>



daunting task ahead of us³². To mitigate climate change and protect the environment while also meeting the global food demand, food production needs to become a lot more efficient and environmentally friendly.

Ingredients companies are playing an essential role in reducing the environmental footprint of food and agriculture. Their feed additives and customised products enriched with ingredients such as vitamins, minerals, enzymes and antioxidants are all expected to help reduce emissions. In fact, the Food and Agriculture Organization estimates simply by migrating to the global best practices in terms of feeding practices and breeding techniques, significant greenhouse gas savings can be achieved³³.

With its range of ingredients, the Dutch company **DSM** is well exposed and actively contributing to the endeavour of reducing our ecological footprint. Among the many different solutions, one is receiving particular attention for it may get us closer to decarbonising our food. With Bovaer the company hopes to introduce a food additive that cuts the methane emitted by cattle by roughly 30%. DSM has filed this new feed ingredient for commercial registration and is awaiting regulatory approval in Europe. The company is confident that this small additive can soon significantly reduce the emissions footprint of dairy³⁴. Of course, there is a long list of ingredients companies that play a part in this transformation, and indeed a fair number of them benefit from significant competitive advantages that translate into a superior financial profile. However, there are also many suppliers of the more commoditized parts of the value chain. These are the businesses we would try to avoid despite the exposure to this trend.

Scarce resources

It is not only the amount of fossil fuel we can burn without devastating consequences that is finite; many other vital resources are also finite. Ensuring their supply or finding viable alternatives is one of the major challenges of the 21st century. Water, for instance, is already a desperately scarce resource in many geographies and the situation is rapidly deteriorating. An estimated 2.2bn people do not have access to safely managed drinking water services³⁵. It will be many more unless we deploy the solutions we have on a large scale – because there are solutions. As a couple of countries have demonstrated, the situation can be remedied. Israel, for instance, reuses 80% of total wastewater and relies on five desalination plants on the Mediterranean coast. In many geographies the situation is much bleaker, and it is not just water that is becoming scarcer by the day. We believe companies that can help in confronting shortages in key resources are likely to experience structural growth for many years to come.

³² United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019: Highlights. ST/ESA/SER.A/423.

³³ Food and Agriculture Organization. (May, 05). *GLEAM 2.0 - Assessment of greenhouse gas emissions and mitigation potential* Retrieved from <http://www.fao.org/gleam/results/en/>

³⁴ DSM. (28.01.2021). *Major reduction of greenhouse gas emissions from dairy cows proven in Dutch trial of DSM's novel feed additive.* Retrieved from https://www.dsm.com/anh/en_US/news-events/press-releases/2021/2021-01-28-major-reduction-of-greenhouse-gas-emissions-from-dairy-cows-proven-in-dutch-trial-of-dsm-novel-feed-additive.html

³⁵ *Progress on household drinking water, sanitation and hygiene 2000-2017. Special focus on inequalities.* New York: United Nations Children's Fund (UNICEF) and World Health Organization, 2019.



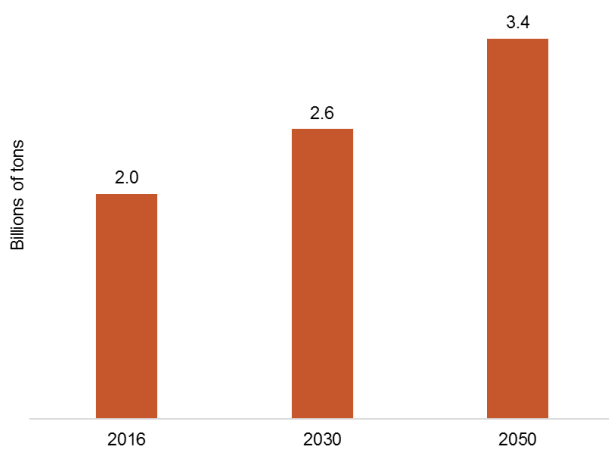
Water infrastructure

The intensifying scarcity of water in many geographies is increasing the global need for technologies that improve water availability and quality. **Xylem** is the world's leading provider of efficient water technologies, with solutions along the entire water cycle. Its solutions help customers reduce water consumption and conserve resources. Xylem is developing technologies that can detect and remedy undiscovered water loss in the water infrastructure, which is approximately 20-30% of the total water consumed. With its strong commitment to emerging markets such as China and India, Xylem is deeply involved in trying to ease the ongoing water crisis.

Waste problem

Besides climate change and resource scarcity, mounting waste is yet another unintended but nonetheless devastating side effect of economic growth. The World Bank estimates that waste generation will reach 2.6bn tonnes by 2030 and 3.4bn tonnes by 2050, nearly 70% more than in 2016³⁶. The production of these mountains of waste exacerbates the climate crisis and resource scarcity; we are increasingly struggling to deal with the waste we create, and this is having a dire impact on the environment. This rising pressure is likely to be a boon for the “circular economy” – in other words, the companies that develop the technologies and provide the services to confront this challenge.

Fig. 14: Projected waste generation



Source: World Bank Group

Waste management

A particular challenge remains concrete. According to the European Commission, 25-30% of all the waste that is being generated across the European Union is the result of construction demolition waste materials. A lot of this could be recycled but is not. **Sika**, the Swiss speciality chemicals company, may have a solution for this. The company recently reported on a new recycling process for old concrete. In this process, old concrete is broken down into its original ingredients of gravel, sand and limestone. This process makes it possible to completely recycle concrete and save it from landfill. Even more excitingly, the process also manages to bind

³⁶ World Bank Group. (20.08.2018). *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*. Retrieved from <https://openknowledge.worldbank.org/handle/10986/30317>

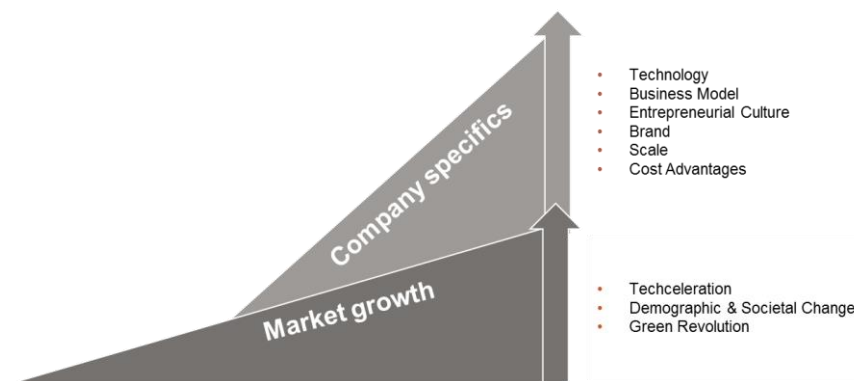
c60kg of CO₂ per ton of crushed concrete³⁷. Besides its many other sustainable solutions, this is yet another one that should see a durable demand tailwind from the Green Revolution.

The challenge of waste applies more generally to the construction industry. During the construction phase 10% of materials are wasted and all too often (30% of time, to be precise) construction work is actually rework. **Nemetschek** – the German software developer for the AEC (Architecture, Engineering, Construction) industry – is working hard to help its customers with this inefficient and unnecessary waste. The company is offering solutions along the value chain, including the design phase, the construction, as well as the operation of the build, to reduce the need for rework and also the amount of waste created. We believe, this puts Nemetschek in prime position to benefit from the growing pressures in the industry.

Conclusion

We strongly believe that our portfolios capture a lot of megatrends through our holdings in unique businesses and we have shown with the track record of our global funds that we can easily compete with popular theme funds. As described extensively, the megatrend is just one side of the coin as it can only fuel the underlying growth rates of a company, which could serve as a tailwind, but is not a guarantee for companies to be successful in the long run. As shown in Figure 16 below, the most decisive drivers of growth are company specifics driven by innovation, unique business model and entrepreneurial culture.

Fig. 15: Company specifics as drivers of growth



Source: Berenberg

Because of that, top-down thematic investing plays no role in our investment approach (ie the investment in stocks merely for their exposure to one or more megatrends, irrespective of their other characteristics). Rather, it is a result of our work digging through the universe selecting the best growth opportunities. On the other side, turning one or more megatrends into investment themes could be a helpful tool to describe a sub-segment of the overall market. Where that sub-segment or investment theme comes with different characteristics than the overall market, eg more or less defensive, it may well prove to be an attractive solution for investors looking for these characteristics, just as investors have historically looked for specific exposure to the healthcare sector.

³⁷ Sika. (02.03.2021). *Sika achieves breakthrough in concrete recycling by developing a groundbreaking new process*. Retrieved from <https://www.sika.com/en/media/media-releases/2021/sika-achieves-breakthrough-in-concrete-recycling.html>



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PUBLISHING INFORMATION

PUBLISHER

Matthias Born | Head of Investments & CIO Equities at Berenberg Wealth & Asset Management

CO-AUTHOR



Matthias Born

Head of Investments & CIO Equities, Wealth & Asset Management

CO-AUTHOR



Justus Schirmacher

Portfolio Manager, Wealth & Asset Management

CO-AUTHOR



Kay Eichhorn-Schott

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Joh. Berenberg, Gossler & Co. KG
Neuer Jungfernstieg 20
20354 Hamburg
Telephone +49 40 350 60-0
Telefax +49 40 350 60-900
www.berenberg.de/en
funds@berenberg.com