



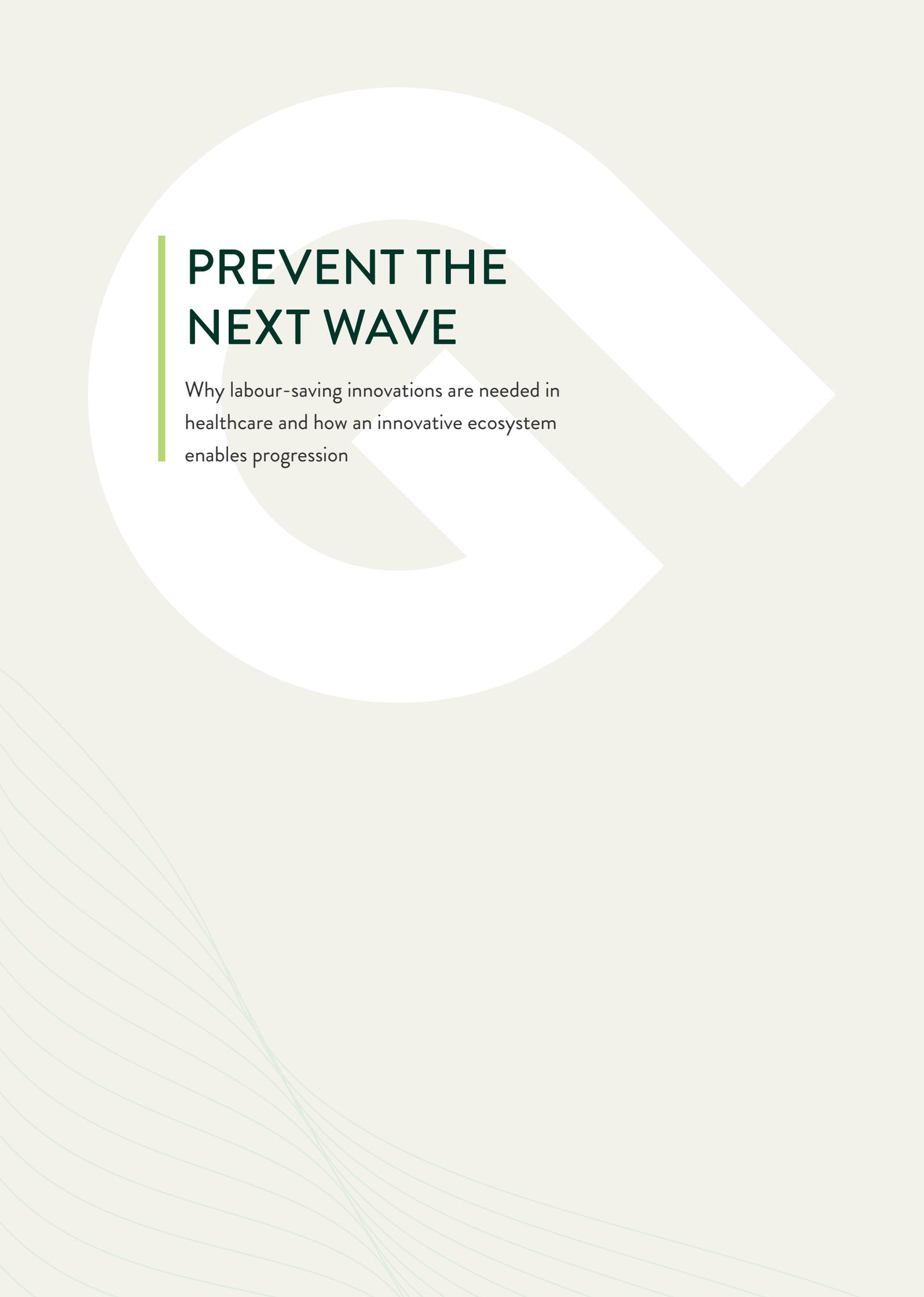
MAY 2021

PREVENT THE NEXT WAVE

Why labour-saving innovations are needed in healthcare and how an innovative ecosystem enables progression

**GUPTA
STRATEGISTS**





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| ABSTRACT

THE CHALLENGE OF OUR TIME STAFFING CRISIS

The past year really put healthcare in the spotlight. Much regular healthcare was delayed or cancelled, while the importance of properly trained medical staff became (painfully) evident. Now that vaccines give hope for a way out of this crisis, the next one already awaits us: the staffing crisis. The demand for care is growing so rapidly that by 2040, 1 in 4 workers will have to be healthcare workers to meet demand. Affordability has long ceased to be the main issue - healthcare in its current form will simply no longer be possible, and the accessibility of care for patients will suffer accordingly.

ABSOLUTE NECESSITY TURNING THE TIDE

Fortunately, policymakers are aware of the impending staffing crisis. However, policies mainly focus on increasing the influx of staff and limiting healthcare demand. Remarkably, there is hardly any policy aimed at stimulating an increase in productivity or efficiency. By this, we obviously do not mean that healthcare workers are to work harder. Quite the contrary: we mean that innovations can increase the efficiency of healthcare processes, enabling employees to actually provide more care with the same effort.

Can smart innovations help enable healthcare workers to deliver more value for the patient? It is definitely not a matter to be taken lightly: in this study we show that in recent years the productivity of healthcare has been in fact decreased, by 1 to 3 percent per year. If this goes on, the shortage of healthcare workers will go up by another million: by 2040, not 1 in 4 workers will have to work in healthcare, but 1 in 3.

Evidently, we cannot allow this to happen. Efficiency-enhancing innovations are essential to ensure that healthcare remains accessible for all patients. Is it realistic to expect that innovations will make healthcare more productive? Examples in healthcare across the board are present. Efficiency-enhancing innovations such as minimally invasive surgery, telemonitoring of chronically ill patients and innovative wound care materials show that many processes can become as much as 30 to 90 percent more efficient. Moreover, these innovations are often appreciated by the patient. Think of faster recovery after surgery, earlier detection of risks by monitoring at home, or a reduction of the wait for home care for wound treatment.

PEEKING OVER THE FENCE IT IS POSSIBLE IN AGRICULTURE AND THE AUTOMOTIVE INDUSTRY

Despite all their advantages, the implementation of innovations in healthcare is no plain sailing. In this respect, healthcare can learn from other sectors. In services industries such as travel and banking, customers have taken over the work, enabled by technology. Also agriculture and the automotive industry are champions in productivity gains: last century they showed that productivity in the entire industry was able to increase by 1 to 2 percent per year. Mass production is not a future that would fit healthcare, and although the agricultural and automotive industries show that mass customization is entirely feasible, the parallel with healthcare only holds to a certain extent. Nevertheless, we recognize several links in which healthcare can learn from the world of agriculture and cars.

1 Objective: Is productivity an end in itself?

- Increasing efficiency has been a dire necessity in agriculture and the automotive industry as well. Governments made this urgency visible and tangible and set productivity growth as an objective. By drawing attention to impending food shortages and mobility issues, labour-saving innovations were implemented faster.
- As opposed to the world of agriculture and cars, productivity in healthcare is not or hardly a theme. Increasing efficiency in order to meet the growing demand for care is not an explicit objective in national healthcare policies. And we hardly see the theme occurring in multi-year strategic plans, policy plans or HR agendas of hospitals or other healthcare providers.

2 Development: Is there enough room to arrive at new labour-saving innovations?

- In agriculture, an intense cross-fertilization between science, the industry and end-users has been going on for decades. The application-oriented development takes place in many different areas: from making American harvesting machines suitable for wet Dutch soil, to the genetic modification of crops. Research is constantly responding to new societal challenges, such as increasing drought or meat substitution. Thus, research and development tie in closely with the needs in the field.
 - In healthcare, there is hardly any focus on research into innovations that save time to treat more patients. After all, in clinical studies, the time HCPs have to dedicate - and as a result, the accessibility of care - is not an outcome measure.
-

3 Regulation: do rules stimulate productivity, or do they inhibit it?

- There are strict standards in both agriculture and the automotive industry, but they are also predictable and unambiguous. In addition, regulation helps in the standardization of processes, which can accelerate innovation. For example, a guideline on sugar beet seed, jointly developed by the Dutch sugar industry and general inspectorates, ensured a uniform size of seeds in the 1960s, which allowed for the performance of sowing machines to be optimized.
 - Naturally, there are strict standards in healthcare too, but these are often more arbitrary. The National Health Care Institute determines for each new form of care, or at the request of the health insurer, whether an innovation is admitted to the basic health insurance package. This is a difficult and time-consuming process. In advance, the outcome measures are not as clear as with emission standards or crash tests. What is clear is that neither efficiency nor labour productivity as compared to quality of care are a measure in the assessment. We also see vast differences between the assessment results across authorities or countries. Based on the same clinical studies, a Health Technology Assessment can lead to market authorization much earlier in one country versus another.
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4 Application: What is the extent of enthusiasm to actually use productivity-enhancing innovations as the standard?

- In both agriculture and the automotive industry, we see that once an innovation has proven itself, implementation and dissemination generally goes smoothly. Efficiency-enhancing innovations are quickly copied, also because everyone acknowledges the (financial) importance of efficiency. The automotive industry is also relatively highly concentrated, with strict government regulations (e.g. the EU's CO2 penalty) and organizations are hierarchical, allowing for rapid adoption of innovations. Customers demand innovation as well. For example, vehicles have to become cleaner, quieter and more practical, and customers are willing to pay for this, sometimes helped along with subsidies.
 - Nobody really is 'the boss' in healthcare. Organizations all set up their own healthcare process. Such differentiation is not unique - there is also a lot of heterogeneity among agricultural businesses - but it does make it more difficult to quickly scale up the use of innovations. There is also no strong innovation requirement from the patient.
-

5 Financing: does the balance between financial risks and the resulting benefits encourage parties to invest in productivity-enhancing innovations?

- Where in these sectors the benefits of investing in efficiency do not (entirely) flow to the party that has to make the investment, there are solutions to share the investment risk. The state has been financially involved in many phases in the development of the automotive industry. In the United States, billions have been spent on 'greening' car manufacturers. In Europe, many governments are co-owners of manufacturers. For example, the German state of Lower Saxony is a shareholder of Volkswagen. As a result, it has 20% of the voting rights, and it shares in the profit as well as the risks.
- In healthcare, the budget that benefits from innovations is often not the same budget from which the costs are paid. For example, minimally invasive techniques have higher out of pocket costs that put pressure on the OR budget, while the savings in number of hospital days benefit the clinic care unit. Or: a more advanced dressing is more expensive for the hospital, but saves a lot of time (and therefore money) in district nursing if it means that a dressing does not have to be changed as often. The siloed budgets make it difficult to make the business case for an innovation.

LOOKING AHEAD EFFICIENCY IS A DIRE NECESSITY

The analyses in this study show that a focus on efficiency is a dire necessity. Within the healthcare system, we must not focus on the goal alone - high-quality, accessible and affordable care - but also on the most efficient way to achieve it.

If we want to be able to make do with the same number of people in the future, all employees must be able to provide 60% more care in twenty years' time than they do now. To achieve this, it is not enough to focus on incremental improvements. An ecosystem that stimulates efficiency improvement at all links is necessary for labour-saving innovations to flourish.

All those involved play their own important role in this. Inspired by the conversations with 14 experts in the healthcare landscape we give five recommendations to convert the brakes into accelerators.

- 1 Policymakers and managers: make increased productivity an explicit objective by including it in the hoofdlijnenakkoorden¹, subsidies and strategy documents of institutions. Don't just manage on EUR per QALY², but also on FTEs of healthcare personnel per QALY and make these transparant. A national website, as already exists for quality of care, should provide insight into the state of healthcare efficiency.
.....
- 2 Public and private parties³: collaborate closely in taskforces on innovations that increase efficiency in the primary process. In multi-year projects, work together to develop and scale up new labour-saving innovations throughout the patient journey. Mutual trust and the sharing of data and insights are crucial in this regard.
.....
- 3 Regulators: facilitate innovation more. First of all, by making productivity or efficiency related to quality of outcomes an explicit assessment criterion for the admission of new innovations. In addition, an early access pathway for innovations in the healthcare market including budgets to develop innovations in practice should be devised. Ensure clear criteria, a transparent process and frequent information exchange with the innovating party.
.....
- 4 Associations of medical specialists: advocate for the national implementation of promising (existing) innovations, fuelled by discussions with patients. Patients and caregivers let their voice be heard by collectively speaking out about the benefits of efficiency-enhancing innovations. For example, within the professional association, choose five existing innovations each year that have to become the standard that very year.
.....
- 5 Finally, financiers: devise the right incentives by setting up a national redistribution fund that guarantees the extra costs that are recouped in other places in healthcare. In addition, they reward transparency about productivity and the implementation of labour-saving innovations. Not just during pilots, but also for structural funding.

By mobilizing all stakeholders – governments, payers, medical societies, hospital and territorial healthcare management, private institutions, patients and caregivers - we create a stimulating ecosystem. A system in which labour-saving innovations are noticed, developed, encouraged and fully utilized. Obviously, in addition to the policy aimed at more staff and a lower demand for care. Only if we make smart investments in labour-saving innovations can we guarantee access to healthcare - now and in the future.

¹ Dutch multilateral sector-wide agreements on goals for subsectors within healthcare system

² QALY = quality adjusted life year, a measure of healthy life years gained as a result of care provided

³ Public Private Partnerships (PPPs)

01.

**THE CHALLENGE
OF OUR TIME
STAFFING CRISIS**

Healthcare has not been in the spotlight as much as it was last year, during the corona crisis. Everyone has become a keen observer of number of available ICU beds and admission figures. Hundreds of thousands of patients experienced that care was cancelled or delayed. They no longer had access to care^{4,5}. Everyone has opinions about how healthcare should be organized better, differently, smarter. Above all, it became painfully evident that manpower in healthcare is very valuable and scarce. After all, the number of intensivists and ICU nurses was the limiting factor in the available capacity. And you cannot simply conjure up highly trained healthcare personnel out of nowhere.

IF WE DO NOTHING, HEALTHCARE BECOMES INACCESSIBLE

The corona crisis appears to reveal the threat of an even bigger, structural crisis in healthcare. A wave that is heading towards us slowly but surely and that will crash over us. Because for years we have been speaking about a vision of the future in which healthcare will become unaffordable. In 2040, the projected costs of healthcare will amount to ten thousand euros per Dutch person (see Figure 1)⁶.

The question of how we are going to pay for this is not even the most pressing one, though. How much we want to spend on healthcare is in fact a choice, but even if we would like to spend this much money on healthcare, will we even be able to get it? Who will provide this care? If we continue along the current lines, an average of 30,000 additional healthcare workers will be needed annually. From 1.4 million healthcare workers now to approximately 2 million in 2040. This means that by that time a quarter of all workers must be active in healthcare, while at the moment is it 'just' one in seven workers. This is unattainable as well as untenable. The labour market will largely limit the accessibility of care for patients in the future.

Figure 1 - If we do not change things, healthcare will be unaffordable and unstaffable in 2040^{7,8}

Expected demand for healthcare and healthcare manpower

	2020	2040	yearly
Demand for healthcare			
Total costs	98 B	175 B	+ 3%
Share of GDP	13%	16%	+ 0.4pp
Costs per person	EUR 6,000	EUR 10,000	+ EUR 200
			
Required healthcare manpower			
Total healthcare workers	1.4 M	2.0 M	+ 30,000
Share of total workers	1 in 7	1 in 4	
			

⁴ NZa, Analyse van de gevolgen van de coronacrisis voor verwijzingen naar de medisch-specialistische zorg en inzichten uit Zorgbeeld

⁵ Gupta Strategists, In de slipstream van corona: een secundaire crisis in de zorg

⁶ RIVM, Volksgezondheid Toekomst Verkenning 2018

⁷ SER, Zorg voor de toekomst 2020

⁸ Healthcare costs consist of total costs (cure and care) based on 2019 price level

CURRENT POLICY FOCUSES ON MORE STAFF AND LESS CARE

These numbers are not new, of course. The government, healthcare providers and health insurers have been making efforts for years to try and slow down the rise in costs and solve the staff shortage. However, the question is whether these policies suffice.

To avert the chronic staffing crisis in healthcare, there are roughly three parameters that can be tweaked: (1) less care, (2) more care providers and (3) more productivity (see Figure 2). The purpose of the programmes De Juiste Zorg op de Juiste Plek, Zorgevaluatie en gepast gebruik, Passende zorg and the Nationaal Preventieakkoord is to prevent, replace or relocate care, so that, ultimately, less healthcare is required. The Werken in de zorg action programme, which has been in place since 2018, focuses on training, attracting and retaining care providers. All these programmes make sense, but the option to increase productivity remains completely untapped for the time being. By productivity gains we mean that through the use of labour-saving innovations, more patients can be helped with the same number of healthcare workers. None of the existing programmes aims to increase productivity in order to keep healthcare accessible in the future

Figure 2 - Of the three buttons that can be tweaked to address the staff shortage, that of productivity improvement remains unused

Current policies to tackle increased healthcare demand



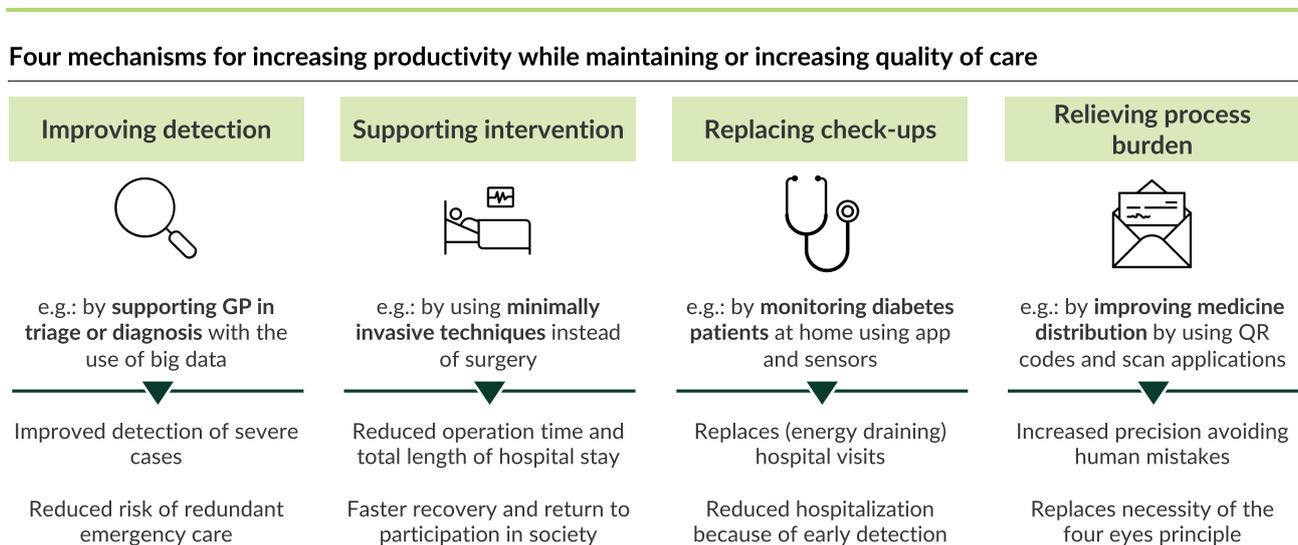
EFFICIENCY APPEARS TO BE A TABOO TOPIC

Why is efficiency in healthcare such an underexposed topic? In healthcare, efficiency or productivity can quickly become a dirty word. It smacks of impersonal assembly line work. Can this go hand in hand with high-quality and accessible care? Moreover, productivity is associated with working even harder, while the corona crisis has actually shown the unbridled commitment of healthcare staff. It is a pity that in healthcare productivity is such a taboo topic. After all, all productivity says is: how can healthcare workers add as much value as possible. Which is exactly what you aim for when you provide care: adding value (namely health and vitality) for patients.

There are numerous ways to enable healthcare workers to add even more value for the patient. This does not refer to marginal process improvements or adding just a little more to the workload.

Increasing efficiency can be done in a much more effective way. Figure 3 shows how innovations can contribute to efficiency within various parts of healthcare: diagnostics, treatment, consultations and registration. The use of (digital) technology and big data not only increases the quality of care for the patient, but also enables the HCP to provide more and better care. Labour-saving innovations can offer HCPs and patients the win-win that everyone is looking for.

Figure 3 - There are many ways to increase productivity and improve patient care



02.

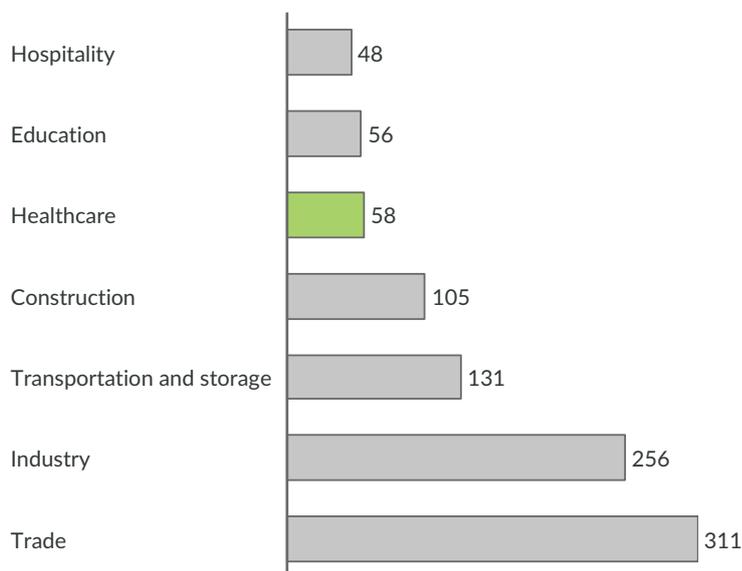
ABSOLUTE NECESSITY TURNING THE TIDE

What about productivity in healthcare as it stands? Compared to many other sectors, healthcare is quite labour-intensive. In a hospital, more than half of the total costs consist of staffing costs. In other sectors (care for the elderly, care for the disabled, mental healthcare) the share of staffing costs is even higher, at around 75%⁹. Industries such as trade, construction or logistics are two to five times less labour-intensive (see Figure 4)^{10,11}. Remarkably, education and catering are roughly equally labour-intensive as healthcare, while the technological possibilities within healthcare are considerably greater in number than in the classroom or the pub. And yet, technology and innovations are currently mainly used to increase quality, but hardly to increase efficiency.

Figure 4 - Healthcare is among the most labour-intensive sectors¹²

Productivity of industries

[EUR revenue per hour of labor, 2016]



ADDED VALUE PER EMPLOYEE IN HEALTHCARE HAS DECLINED IN RECENT YEARS

If we look at the development of productivity in healthcare, we see an alarming picture. Innovations of the past decades have improved the quality of care, but they have not helped to increase the added value per care worker. Quite the contrary, the care provided per full-time employee has declined in recent decades. Of course, this does not mean that HCPs have started to work less hard, nor that the quality of care is declining. It does mean, however, that it takes more and more effort to realize the additional health gains that we want to be achieving.

Although there is no unambiguous measure for expressing productivity, three different approaches point in the same direction: the care provided expressed per FTE annually decreases by 1% to 3% (Figure 5). Incidentally, this is not specifically a Dutch problem. A combination of ten studies shows a slight decline in healthcare productivity in Canada and the US as well¹³.

⁹ Annual reports health care providers 2019

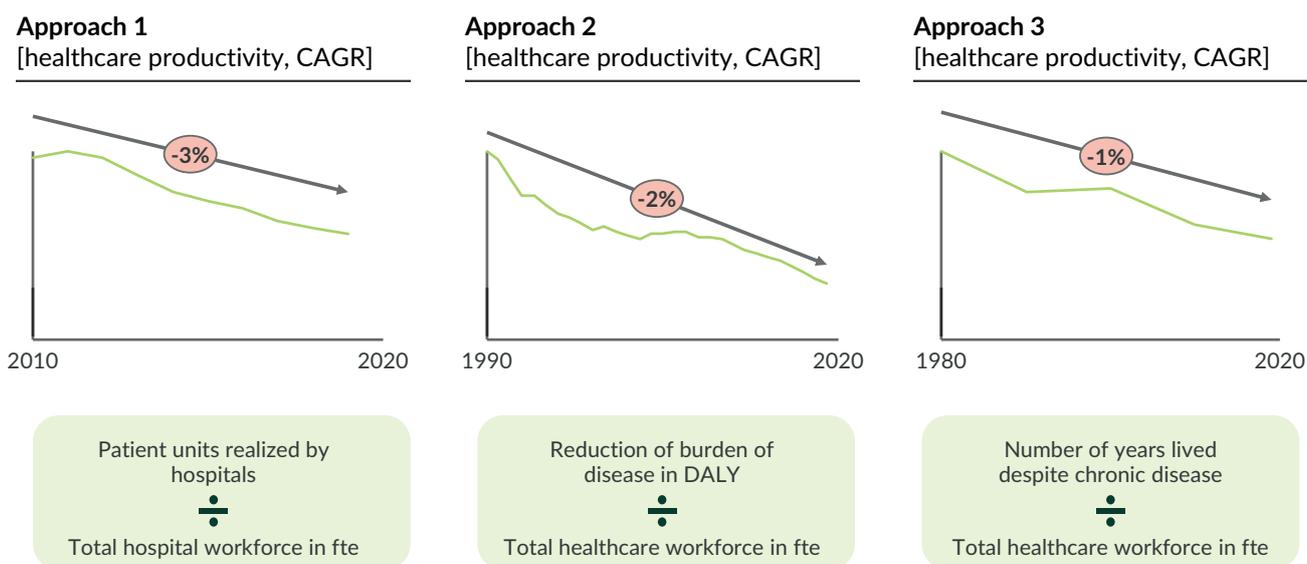
¹⁰ CBS, Arbeidsvolume per bedrijfstak

¹¹ CBS, Omzet per bedrijfstak

¹² Healthcare and education revenues based on total government expenditures

¹³ Sheiner et. al., Measuring productivity in healthcare: an analysis of the literature

Figure 5 - Productivity in healthcare has decreased by 1% to 3% per year



BOX 1. MEASURING PRODUCTIVITY IN HEALTHCARE

Productivity in healthcare is the amount of care provided per employee. Unfortunately, there is no general, unambiguous measure for the output of healthcare. Combining three different approaches - none of which are perfect - gives an impression of the development in productivity¹⁴.

Method 1: The first method looks at hospital production. The production of a hospital can be expressed as a combination of first outpatient visits, outpatient treatments, admissions and hospital days. By adjusting for the costs of these production units, you can determine the annual number of “produced” patient units per hospital. The development of the total number of patient units, compared to the number of (medical and non-medical) employees in hospitals is a measure of the development of productivity¹⁵ (see Figure 1 in appendix)

Method 2: The second method focuses on the total avoided disease burden thanks to healthcare. The WHO annually reports the total disease burden of residents of countries around the world, expressed in DALYs¹⁶. But how do we determine how much disease burden has been avoided through healthcare? This requires a comparison between countries: the difference in disease burden per inhabitant between the Netherlands and countries with very limited healthcare provides an indication of the impact of our healthcare. The development of the number of DALYs¹⁷ avoided, compared to the number of care workers¹⁸, is a second method in which productivity can be measured (see Figure 2 in appendix).

Method 3: The final method expresses care outcomes in the number of years lived with chronic illness¹⁹. The moment when people become ill is largely influenced by genetic factors and lifestyle. How many years a patient then lives after the diagnosis is largely influenced by our healthcare. The latter method expresses care outcomes as the average number of years lived with chronic illness, multiplied by the number of inhabitants of the Netherlands. The development of this outcome, compared to the number of employees in the care sector, is the third measure of productivity (see Figure 3 in appendix).

¹⁴ All approaches concern a 'narrow' definition of the healthcare sector, outcomes of care in a broader sense (elderly care, care for the disabled, youth care) are not factored in

¹⁵ Annual reports healthcare providers, 2019

¹⁶ The DALY quantifies health loss and is made up of two components: the years lived with disease and the years lost due to premature death.

¹⁷ WHO, Global Burden of Disease study

¹⁸ CBS, 'arbeidsvolume per bedrijfstak'

¹⁹ CBS, 'gezonde levensverwachting'

THE FUTURE OF HEALTHCARE DEPENDS ENTIRELY ON A COMMITMENT TO PRODUCTIVITY

The alarming trend in productivity development will have major implications for the accessibility of healthcare in 2040. Just consider the estimated 600,000 additional workers needed (Figure 1). This estimate is based on a constant amount of care provided per HCP. However, with declining productivity - in line with developments in recent decades²⁰ - 1.6 million extra care workers will be needed compared to the current 1.4 million (Figure 6). This means that not 1 in 4, but as many as 1 in 3 workers must have a job in healthcare by 2040. An unfeasible situation that emphasizes the importance of investing in efficiency improvement. Without this commitment, patients will have greatly reduced access to healthcare in 2040, as they did during the corona crisis.

Figure 6 - If productivity continues to decline, 3 million healthcare workers will be needed by 2040

Expected demand for healthcare manpower in 2040, in several scenarios for productivity development

	Baseline: productivity stabilizes	Productivity continues to decrease with 2% per year	Productivity recovers to the level of ten years ago	All future demand is compensated by productivity gain
Productivity in 2040 (compared to 2020)	+0%	-30%	+15%	+60%
Required healthcare manpower in 2040	2.0 M	3.0 M	1.6 M	1.2 M
Share of total workers	1 in 4	1 in 3	1 in 5	1 in 7
				

What can we achieve when the added value per HCP increases? If we want to be able to make do with the same number of people in the future, together with all employees we must be able to provide 60% more care in twenty years' time than they do now. That will not be easy, but even a smaller step in the right direction will help. Suppose we succeed in reducing the care provided per employee to the level of 2010, i.e. about 20% higher than now. Then in 2040 'just' two hundred thousand additional HCP will be needed. The commitment to productivity improvement will make the problem much more manageable in the future. In this way, patients will also have access to care in the future.

²⁰ Assuming an average drop in productivity of 2% (the average of the three methods) between 2010 and 2019

03.

**EXAMPLES GALORE
THERE IS NO SHORTAGE
OF INNOVATIVE IDEAS**

How is it possible that productivity in healthcare has dropped? Fortunately, it is not due to a shortage of innovative ideas. In various places in the healthcare landscape, new techniques and technologies support professionals in providing more and better care.

INNOVATIONS HEALTHCARE ACROSS THE BOARD

In different areas of healthcare we see examples of labour-saving innovations. Not just in surgery, but also in other places inside and outside of the hospital. For example, remote monitoring of COPD patients saves hospitalization time of up to a staggering 45%²¹. And the use of innovative wound materials ensures that a home care worker does not have to change the dressing twice a day, but only once a week. Examples from the entire healthcare landscape show that with innovative applications a healthcare worker will be able to add 30% to 90% more value (Figure 7).

In sum, there is no shortage of innovative ideas. What would happen if we succeeded in implementing this type of innovation in every conceivable aspect of healthcare? In the first chapter, we showed that, without the deployment of additional staff, a productivity increase of 60% is needed to provide all patients with adequate quality care by 2040 (Figure 6). With the examples from Figure 7 this ambitious goal suddenly seems a lot more realistic.

Figure 7 - Labour savings are possible across the entire spectrum of healthcare

Four mechanisms for increasing productivity while maintaining or increasing quality of care

Improving detection	Supporting intervention	Replacing check-ups	Relieving process burden
			
80% Productivity gain on MRI scans using advanced algorithm MR-STAT	45% Reduced length of stay after gall bladder removal when using laparoscopy 90% Less time spent on wound care using innovative dressing materials	45% Reduced time of hospitalization using telemonitoring for COPD patients 30% Less time spent in ICU when monitoring with tele ICU	30% Personnel reduction in GP practice when communication app replaces assistant

²¹ Result of trial telemonitoring COPD patients in Isala Klinieken

BOX 2. INCREASED PRODUCTIVITY: WHAT ARE THE BENEFITS FOR THE PATIENT?

- The use of labour-saving innovations does not have to be at the expense of the patient's perception of quality. Naturally, there are examples with unfortunate side effects. Visiting one one stop shop oncology outpatient clinic in which the patient hears a diagnosis and develops a treatment plan within a single visit can complicate the disease acceptance process. Fortunately, there is usually a win-win situation. Labour-saving innovations actually have advantages for the patient more often:
- **Diagnostics and triage** - The use of algorithms means, as it were, that hundreds of colleagues are watching over the doctor's shoulder - which makes the patient feel safe. In addition, the diagnosis can be made more quickly and treatment can therefore be started in time.
- **Intervention** - Innovative interventions often shorten the treatment time. The patient spends less time in hospital or has to wait at home for home care less long/often. And because of these savings, health insurance premiums can remain low.
- **Monitors** - The use of technology gives a safe feeling. Not only at the monthly check-up, but any time of the day sensors can tell you how things are going with, for example, the blood glucose level or blood pressure. This in turn prevents long-term complications.
- **Process** - direct and rapid contact with the doctor, without the intervention of an assistant, is in line with the way in which services are set up in other sectors and it is also in line with the patient's wishes.

BY WAY OF ILLUSTRATION: SHORTER HOSPITAL STAY THANKS TO NEW HEART VALVE PROCEDURE

Another example of an innovation with high productivity gains can be seen in heart care, for heart valve abnormalities. For twenty years²² open-heart surgery was the only option for patients with aortic valve stenosis. However, in recent years it became possible to replace the heart valve via a catheter in the groin (see Figure 4 in appendix). This procedure, called TAVI²³, is much less invasive for the patient. The heart does not have to be stopped and the chest does not have to be opened. As a result, patients recover much faster and can go home shortly after the procedure.

What are the benefits of this innovation in heart care? The traditional measure by which innovations are assessed is cost-effectiveness, measured as costs per life year gained. An independent review in Ireland²⁴ finds that TAVI results are not inferior to traditional heart valve replacement (Figure 8). Both the health benefit (in QALY) and the costs are comparable. From another perspective, this innovation has advantages compared to traditional surgery. The required deployment of personnel is six times lower, in other words: a productivity gain of more than 80%. Among other things, this is the result of a shorter hospital stay and a reduced risk of ICU admission (see Figure 5 in appendix). In view of the imminent staffing crisis, this innovation is therefore a revolutionary one: not only does the patient benefit from quick recovery and a faster return to participation in society, with the same staff deployment six times more patients can be served.

²² Aortic valve stenosis is a narrowing of the aortic valve. The heart valve does not open properly. This makes the blood flow less easily from the left ventricle to the aorta

²³ TAVI stands for transcatheter aortic valve implantation

²⁴ Health Technology Assessment for TAVI in aortic stenosis in Ireland, focus on patients with low surgical risk

Figure 8 - TAVI provides a huge productivity gain over traditional open heart surgery

High-level comparison of TAVI and traditional open-heart surgery for aortic stenosis

	TAVI	Aortic valve repair (open-heart)
QALY gain compared to situation without any treatment	6.20	6.18
Total costs per patient including hospital stay and rehospitalization	€ 38.3 K	€ 38.6 K
Use of labor for total procedure including rehospitalization	~12 hrs	~75 hrs
<hr/>		
Cost effectiveness in € / QALY	6.2 K	6.3 K
Labor productivity in hours / QALY	~2	~12

04.

**PEEKING OVER THE
FENCE IT IS POSSIBLE IN
AGRICULTURE AND THE
AUTOMOTIVE INDUSTRY**

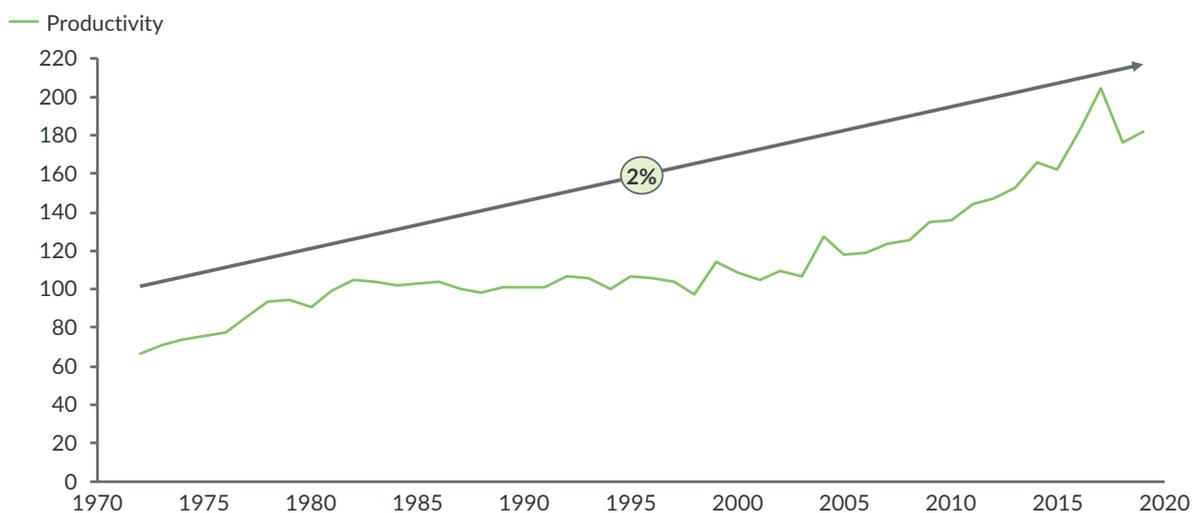
There are plenty of examples of labour-saving innovations, but despite this, in recent decades it has not been possible to make healthcare as a whole more productive. What else is needed for this? Fortunately, we can learn from other industries. In the services sector, customers have increasingly taken over parts of the work from employees, driven by enabling technologies (see appendix). Also agriculture and the automotive industry are champions in optimizing productivity. Of course, the mass production that characterizes large parts of these industries is not necessarily a desirable vision of the future of healthcare. Nevertheless, by studying how labour-saving innovations we implemented there in the past century, we can be inspired to see how healthcare can become more efficient too.

MORE AGRICULTURAL YIELD WITH FEWER PEOPLE

In the past 150 years, agricultural yields in the Netherlands have increased twentyfold (Figure 6 in appendix). Meanwhile, the number of people working in agriculture is steadily decreasing. Since the 1970s, the number of agricultural workers has been roughly halved (Figure 6 in appendix). In the same period, productivity, expressed as the number of kilograms of agricultural product per employee, almost tripled (Figure 9). This equates to an annual productivity improvement of about 2%²⁵.

Figure 9 - Agricultural productivity has nearly tripled in the last 50 years²⁶

Productivity in agriculture [1,000 kg product per fte]



²⁵ CBS, 'arbeidskrachten en productie in de landbouw'

²⁶ Assumption that average contract size in agriculture is constant at 1 FTE

BOX 3. AGRICULTURAL PRODUCTIVITY GAINS

Dutch agriculture has undergone drastic changes over the past century, resulting in major productivity gains. At the start of the twentieth century, the industry still consisted of small businesses. A farmer owned just a few livestock and a few acres of land. Milking the cows and harvesting the crop was done manually, aided only by hand tools. Towards the end of the twentieth century, the picture has changed radically: the small farms of those days have grown into farms and the farmer uses impressive machines in both arable and livestock farming.

An active agricultural policy aimed at labour productivity was an important driving force behind these developments. At the end of the nineteenth century, the first Agriculture Commission was established. Its creed was “OVO”, *Onderzoek, Voorlichting en Onderwijs* or Research, Information and Education. Research not only focused on biological processes, but was also specifically aimed at increasing productivity in practice. Farmers were informed about new developments by the State Agricultural Teacher from their own province. Finally, the opening of the Agricultural College, the predecessor of Wageningen University, in 1918 was the first move towards a broad-based education system in the agricultural sector²⁷.

The emergence of the combine harvester in the 1950s and 1960s is a good example of labour-saving innovation. Whereas previously it took a farmer seven to ten days to mow and cut an acre of grain, the same job with a combine could be done in just one hour. At first, this technique from the US did not seem suitable for the Dutch agricultural climate. Driven by staff shortages, however, machines came onto the market that were optimally equipped for the wet conditions in the Netherlands. Moreover, the high purchase costs due to the emergence of agricultural cooperatives did not fall on the shoulders of individual farmers. The innovation eventually became widely accessible through cooperation between farmers and industry²⁷.

We saw another example of close cooperation in sugar beet cultivation: science and industry both played a major role in the rise of the seed drills. Researchers from Wageningen have frequently published on the use of this new technique. In addition, the joint Dutch sugar industry and general inspection services developed a guideline for seeds. A uniform size ensured that the performance of the seed drills could be optimized, resulting in large productivity gains²⁷.

MORE PEOPLE IN THE AUTOMOTIVE INDUSTRY, BUT ABOVE ALL A LOT MORE CARS

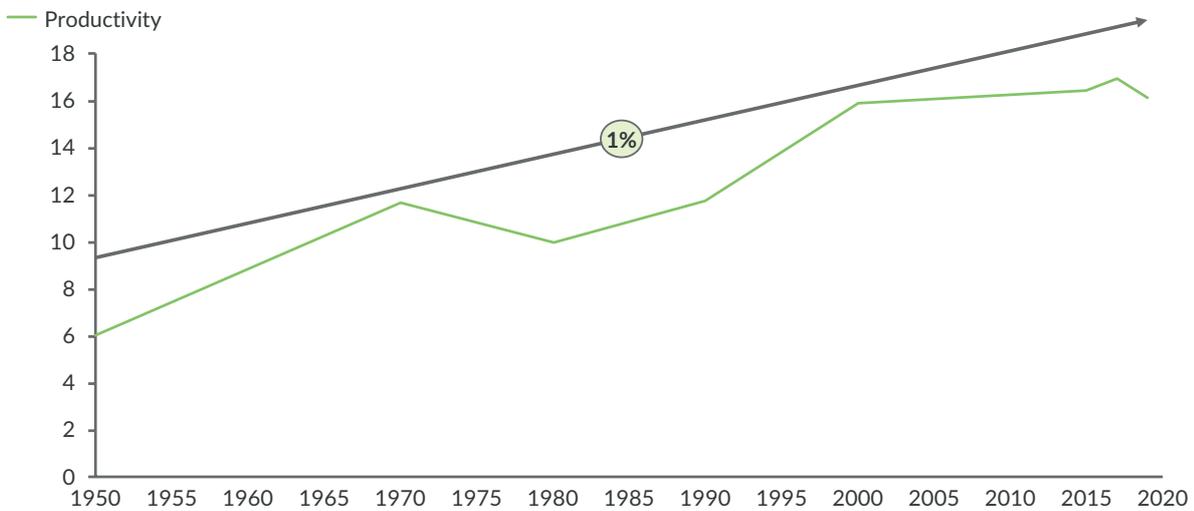
The automotive industry has also seen impressive gains in productivity over the decades. There, the number of cars per employee per year has tripled since 1950: at Volkswagen the number of cars delivered per employee per year was an average of six in 1950, against sixteen now (Figure 10)²⁸. And to think that cars have become many times more complex and advanced in recent years. The absolute production of cars by Volkswagen has increased by a factor of 120 in the past seventy years, while the number of employees ‘only’ increased forty-fold (see Figure 7 in appendix).

²⁷ A.A.A. de la Bruhèze, H.W. Lintsen, A. Rip & J.W. Schot, *Techniek in Nederland in de twintigste eeuw. Deel 3. Landbouw, voeding*

²⁸ Annual reports Volkswagen Group

Figure 10 - Productivity in the automotive industry (Volkswagen as an example) has almost tripled in the last 70 years

Productivity in car manufacturing (Volkswagen)
 [number of cars per employee for Volkswagen Group]



BOX 4. PRODUCTIVITY GAINS IN THE AUTOMOTIVE INDUSTRY

The productivity increase in the automotive industry can be attributed to a series of innovations. The most important ones were the transition from manual work to mass production and, years later, the further development to lean production. The first cars, in the late nineteenth and early twentieth century, were high-end luxury products made entirely by hand. No two cars were the same, simply because they were unable to reproduce parts the exact same way²⁹.

In 1908 Ford introduced the Model T (“Any customer can have a car painted any colour that he wants, as long as it’s black”), one of the first mass-produced cars. In the production process, each employee performed one simple action. By continuously improving that process and have machines perform more and more steps, productivity improved year on year. For example, in 1914 only a quarter of the time was needed per car compared to 1913. As a result, cars could be offered at a lower price and the Model T became affordable for more and more people, which further increased demand. In 1918, half of all cars in the world were Ford Model Ts. In the 1950s, mass production was commonplace in the automotive industry. However, the work was boring and employees increasingly revolted²⁹.

The next breakthrough process innovation, which not only increased productivity but also improved quality and employee satisfaction, was the development of lean production by Toyota. While in mass production the most important thing was for the production chain (‘the conveyor belt’) never to come to a standstill, lean production focused on reducing waste as much as possible. After the World War II, Japan, the home of Toyota, needed to reduce waste because of the scarcity of raw materials. In lean manufacturing, value for the customer is of paramount importance and Toyota soon succeeded in producing much better quality cars than they were able to with the ‘old’ mass production process. Today lean manufacturing is the standard principle of the production process for almost all car manufacturers and to this day they know how to further improve their productivity²⁹.

²⁹ J.P. Womack, D.T. Jones & D. Roos, *The machine that changed the world*

05.

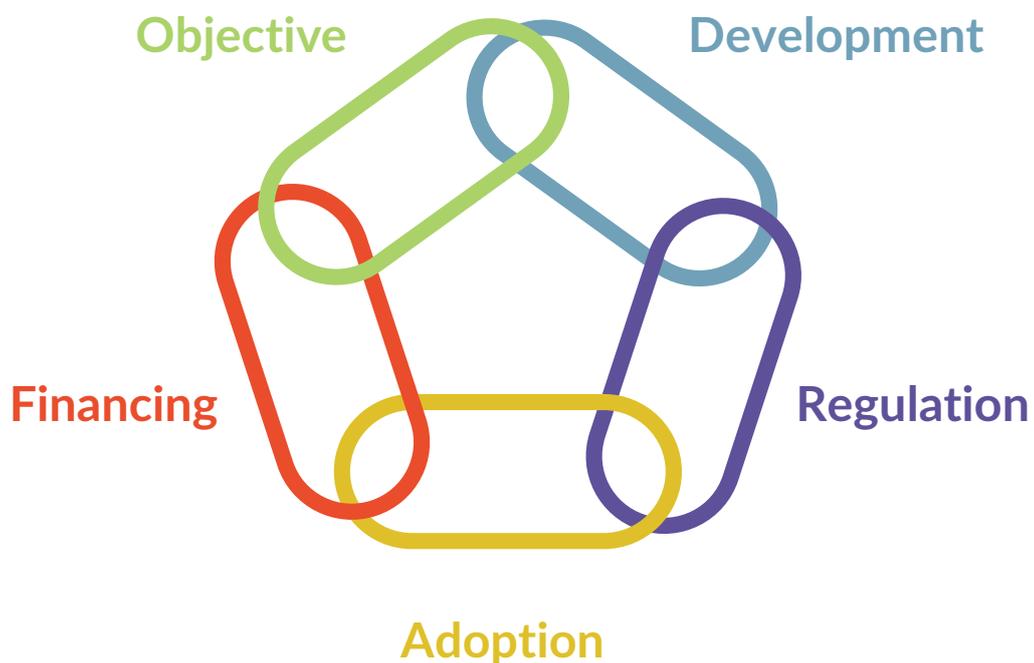
**ACCELERATE OR BRAKE
INNOVATIONS FLOURISH
WHEN THE ECOSYSTEM
IS RIGHT**

The enormous productivity gains in agriculture and the automotive industry appeals to the imagination, but the translation to healthcare is not immediately obvious. After all, the differences between the industries are vast. Moreover, mass production in these industries is neither realistic nor desirable for healthcare. Nevertheless, we recognize several links where healthcare can learn from the world of agriculture and cars (see Figure 11):

- 1 Objective:**
Is productivity an end in itself? Is it a significant factor at all?
.....
- 2 Development:**
Is there enough room to arrive at new labour-saving innovations?
- 3 Regulation:**
Do rules stimulate productivity gains, or do they inhibit it?
.....
- 4 Application:**
What is the extent of enthusiasm to actually use productivity-enhancing innovations as the standard?
.....
- 5 Financing:**
Does the balance between financial risks and the resulting benefits encourage parties to invest in productivity-enhancing innovations?

In this chapter, we will use these links to examine in greater detail what lessons healthcare can learn from the experiences in other industries.

Figure 11 - The links in an innovative ecosystem



OBJECTIVE

Figure 12 - Objective: accelerators and inhibitors



Objective

Accelerators in other industries

- Focus on productivity helps to overcome shortage in manpower
- Productivity gain gives added economical and societal value at the same time

Hurdles in healthcare

- No explicit ambition to use productivity to increase healthcare access
- Productivity as a goal only observed on a micro level

OTHER INDUSTRIES PRODUCTIVITY IS A NECESSITY AND PROVIDES SOCIAL AND COMPETITIVE ADDED VALUE

Improving productivity has been a dire necessity in agriculture. Over the years, the number of mouths to feed has increased, of course. At the same time, especially from the 1960s, there was a labour shortage. Increasing productivity, both by increasing yields per hectare and by reducing man-hours required, was the only way to meet the growing demand for food.

Productivity improvement has also been central in the automotive industry over the past century. It was and is an explicit target in this industry. It not only provides competitive added value, but also societal value. By increasing productivity, as Ford did with mass production, cars became cheaper and more accessible to more people. This led to more mobility and prosperity for the population. The lower prices led to a greater demand, so that - despite the labour savings - more employees were needed to meet that demand. Labour saving therefore led to more employment here, which was also important for society at large and led to greater prosperity. And this societal added value goes hand in hand with commercial and competitive interests. By increasing productivity, car manufacturers were able to sell more and/or make more profit compared to competitors who were less advanced in this respect.

HEALTHCARE PRODUCTIVITY IS HARDLY IN FOCUS

As opposed to the world of agriculture and cars, productivity in healthcare is hardly a theme, if at all. Increasing efficiency in order to meet the growing demand for healthcare is not an explicit objective in national healthcare policies (see Figure 2). We also hardly see the theme included in the multi-year strategic plans, policy plans or HR agendas of hospitals or other care providers³⁰. If productivity is talked about in healthcare at all, it is often at a micro level, such as the hours invoiced per district nurse. Explicit innovation ambitions to significantly increase productivity appear to be lacking.

What are the objectives that healthcare innovations must meet? In practice, the past decade has been about increasing quality, at the same or lower cost. This is an important goal, of course. But an objective such as increasing accessibility (by helping more patients with the same number of care providers) with the same or higher quality level, would also be entirely justified. This is also necessary for the future-proofness of healthcare. And while more funds can always be made available in extreme cases, at a certain point there really be no additional labour available. As with agriculture, lack of manpower can be a huge accelerator of innovation. Nevertheless, we see that in innovation programmes (such as the Veelbelovende zorg subsidy scheme) and the review framework of the Zorginstituut, labour savings or productivity are not included as criteria.

³⁰The report of the Werk in de zorg Committee "Over sociale en technologische innovatie" calls to focus on innovations that result in labour savings for the first time. And in some IT strategic plans of hospitals or care providers, people explicitly opt for labour-saving technology instead of welfare-promoting technology as well.

DEVELOPMENT

Figure 13 - Development: accelerators and inhibitors



Accelerators in other industries

- Applicability of new technology is central theme in agriculture universities
- Academic researchers often collaborate with companies, government and institutions during research and development

Hurdles in healthcare

- Collaboration with private institutions in research and development phase is rare
- 'Not invented here' syndrome: hospitals prefer to develop process innovations in-house

OTHER SECTORS CLOSE PUBLIC / PRIVATE COLLABORATION

Where innovations interfere with the primary process, cross-fertilization between science, industry and end-user is required to achieve the best possible result. Within the agricultural sector, research and development has long been dominated by practical application, often aimed at optimizing productivity. Wageningen University (WUR, Wageningen University & Research) plays a central role in this. Moreover, WUR researchers actively collaborate with companies, governments and social organizations. The application-oriented development takes place in many different areas: from making American harvesting machines suitable for wet Dutch soil, to the genetic modification of crops. Research is constantly responding to new societal challenges, such as increasing drought or meat substitutes.

In the automotive industry, too, there is close collaboration between car manufacturers and universities in order to innovate and develop with a focus on application. For example, Volkswagen closely collaborates with the Ostfalia University of Applied Sciences in Wolfsburg, including work and training programmes aimed at the future production process of their cars.

HEALTHCARE COLLABORATION WITH PRODUCTIVITY GAIN AS A GOAL IS STILL IN A FLEDGLING STAGE

A lot and a lot of good medical research is performed at Dutch universities, hospitals and other research institutes. Most of that research is aimed at improving quality and outcomes: new treatment techniques, protocols and medicines. Increasingly, attention is paid to the applicability of scientific research³¹, but as a scientist you are primarily assessed based on your publications and obtained grants.

In healthcare, there is hardly any focus on research into innovations that save time. After all, in clinical studies, the time HCPs have to dedicate - and as a result, the accessibility of care - is not an outcome measure. Collaboration between academic institutes and companies in the research and development phase of labour-saving innovations, as is usual in case of agriculture and cars, is still scarce in healthcare.

So where do innovations in the field of processes or technology come from? In general, they come from businesses: from small start-ups to large multinationals. Collaboration between end users (healthcare providers) and developers usually only occurs in the pilot and implementation stages. The initiative for this usually lies with the developers: they look for care providers and HCPs to put their process or product to the test. In some cases, cooperation has even been explicitly hindered, for example because companies are not allowed to be a party to the application or set-up for assessments of medical technology. This in stark contrast to the agriculture and automotive industry, where development often is a joint efforts, from the drawing board onwards.

³¹ Rathenau Instituut, *Totale Investerings in Wetenschap en Innovatie 2017-2023*

In addition, the 'not invented here' syndrome is persistent in healthcare. Whereas in the automotive world people actually copy what works from others and in agriculture people like to elaborate on other people's developments, in healthcare there seems to be a tendency to reinvent the wheel. For example, many hospitals want custom modules in their EPR (which makes it expensive and often less user-friendly) or their own pilot for heart failure home monitoring (while many hospitals are already working on this). The hospitals often aim to achieve a better link with the specific circumstances in the organization or region and broader support among the users. While it is crucial to involve healthcare providers and patients in the further development of any innovation, it can also go too far. A trade-off between the differences in circumstances within the Netherlands and the importance of easy accessibility and applicability of innovations is of great importance.

REGULATION

Figure 14 - Regulation: accelerators and inhibitors



Regulation

Accelerators in other industries

- Standards and regulations developed by collaborations of stakeholders are practical and encourage innovation
- Process standardization can amplify speed of innovation

Hurdles in healthcare

- New applications are tested without clear guidelines
- Interpretation of evidence and assessment outcomes can differ between countries of between parties within the Netherlands

OTHER SECTORS STRICT, BUT PRACTICAL AND PRACTICABLE STANDARDS CREATE PREDICTABILITY

Within the agricultural sector it is common for parties to work together in the development of rules and standards. Thus, the industry arrives at regulations that are practical and practicable. In addition, regulation plays a role in the standardization of processes, which can accelerate innovation. For example, a guideline on sugar beet seed, jointly developed by the Dutch sugar industry and general inspectorates, ensured a uniform size of seeds in the 1960s, which allowed for the performance of seed drills to be optimized. Another example is the Platform Landbouw, in which the Dutch Tax Authorities and Land- en Tuinbouworganisatie (LTO) jointly determine the National Agricultural Standards annually.

We see something similar in the automotive industry. The European Commission sets emission standards that car manufacturers must meet. You are free in how you ensure that you stay within that standard (a more aerodynamic design or addition of an electric engine, for example). Emission standards and the associated measurement methods are also continuously adjusted. This stimulates the development of cleaner cars.

In the field of safety requirements, we also see a well-functioning combination of cooperation in the automotive industry that leads to uniform rules, which car manufacturers can implement as they see fit. The Euro NCAP (European New Car Assessment Program) is an independent testing institute, which is a collaboration between European governments and organizations such as the Dutch road services ANWB. Euro NCAP has developed a standardized crash test in which various collisions are simulated. The result of the test is expressed in a number of stars. Manufacturers are committed to continue innovation in order to improve their test results. And here too, it is better to copy a great idea than to come up with a bad one of your own.

HEALTHCARE STRICT, BUT ALSO MORE ARBITRARY TESTING IN WHICH PRODUCTIVITY DOES NOT PLAY A ROLE

In both agriculture and the automotive industry, independent European or national institutes set requirements for the outcomes, such as emissions or safety. In Dutch healthcare we observe a very different working method. The National Health Care Institute determines for each new form of care, or at the request of the health insurer, whether an innovation is admitted to the basic health insurance package. This is a difficult and time-consuming process. In advance, the outcome measures are not as clear as in the case of emission standards or crash tests. What is clear is that neither time gains nor labour productivity are a measure in the assessment.

In the healthcare sector, we also see that admissions often take place at a national level, instead of at a European or worldwide level. Based on the same clinical studies, a Health Technology Assessment can lead to market authorization much earlier in one country versus another. Not only in case of innovative technologies, but also in case of medicines, patients in the Netherlands often have to wait longer than in other countries before they can benefit from them³². Incidentally, this problem even occurs within our country. It often happens that different parties (such as the National Health Care Institute, RIVM and clinicians) arrive at different recommendations based on the same study results.

³² *Geneesmiddelen in Nederland steeds later beschikbaar*, VIG, 7 juli 2020

ADOPTION

Figure 15 - Adoption: accelerators and inhibitors



Accelerators in other industries

- Individual farmers choose whether to use innovations based on economical and fundamental grounds
- Companies quickly copy each others' innovative applications
- Mass customization results in efficient production process while still meeting customers' customization needs

Hurdles in healthcare

- Implementation of innovations is tough in a fragmented, non-hierarchical landscape
- Patient voice asking for innovation is missing
- Healthcare workers are hesitant to innovate driven by fear of losing their jobs
- Fear that freed capacity is filled up quickly by new types of care stops people from adopting innovations

OTHER SECTORS SMOOTH APPLICATION BASED ON COMMERCIAL AND FUNDAMENTAL CONSIDERATIONS

In agriculture, each farm ultimately decides for itself how it organizes its business process and which innovations do or do not fit in with it. There are, of course, a number of no brainers among them, innovations that improve your productivity so much that almost every company will adopt them. Think of milking machines or mechanical ploughs. In addition, companies make choices that fit their beliefs as a company: from free-range animals to limiting pesticides or leaving flowers in the meadow. As long as those choices are in line with what consumers consider important, such fundamental, principled considerations are ultimately interesting from a commercial point of view.

Unlike agriculture, the automotive industry is concentrated in a relatively small number of large companies. New innovations and working methods are constantly emerging, either from the workplace or in collaboration with research institutes as discussed earlier. When an innovation has proven itself, implementation generally goes smoothly. Moreover, it seems to be the case among car manufacturers: it is better to copy a great idea than to come up with a bad one of your own. If possible, manufacturers copy from each other. Not just technologically speaking, things that as a car driver you won't even notice (cruise control, LED lights, parking sensors) but also in the manufacturing methods. Ford's mass production was quickly copied by other manufacturers, as was Toyota's lean manufacturing method. If as a car manufacturer you do not copy the successes of others, you will miss out: because the consumer then opts for someone else's product (in the case of cruise control, for example) or because your car becomes too expensive (compared to competitors with more efficient production methods). And why would you reinvent the wheel, if you can also copy it from someone else?

This does not mean that all cars that are produced are identical. Like in healthcare, personalization is important in the automotive industry. They achieve this thanks to mass customization: by producing parts on a large scale with small variations, production is efficient, but the assembly can be varied in order to meet the wishes of the individual customer.

HEALTHCARE FRAGMENTED LANDSCAPE AND RELUCTANCE TO INNOVATE

Healthcare is the opposite of the automotive industry in terms of hierarchy. There are more than 80 hospitals in the Netherlands and thousands of other healthcare providers (elderly care, mental healthcare, general practitioners, and so on). Each of these organizations is autonomous in how they set up their healthcare process. Nobody really is 'the boss' in healthcare. Moreover, parties are afraid of going beyond their defined role, for fear of trespassing on someone else's territory. Even within a hospital, for example, the hierarchy is very limited. Many decisions are taken

at the level of departments or care units. Such differentiation is not unique - there is also a lot of heterogeneity among agricultural businesses - but it does make it more difficult to quickly scale up the use of innovations. The lack of a strong voice demanding innovation from the patient also hampers innovation. Manufacturers in the automotive industry are constantly forced to further develop their product, driven by the changing demands of their customers. If they fail to meet these demands, they are no longer able to stand out from the competition. This is different in healthcare: despite the increasing possibilities to compare healthcare (online), patients have little insight into the differences between providers compared to other industries. The patient federation is actively committed to improving efficiency, for example in the field of digital care, but in general the voice of the patient is not convincingly aimed at increasing efficiency.

Due to the fragmentation in healthcare and the lack of patient demand for innovation, it is often necessary to convince individual doctors, nurses and other HCPs of the added value of an innovation. All of them will make considerations based on their professional autonomy. And often - from the power of habit or because of a system around them that is already complex - they stick with the method they know. Even if the added value of an innovation is eminently substantiated, as shown in a publication about myIBDcoach from 2017 in the renowned *The Lancet*³³, it takes years for that innovation to actually become the new standard. In fact, this point has not yet been reached in 2021. Due to the decentralized organization of care, in combination with the lack of an explicit productivity objective and the 'not invented here' syndrome, upscaling of innovations is slow and a large part of the applications are never taken beyond the pilot level.

The fear of losing one's livelihood also plays a role in the reluctance in some cases. Healthcare workers fear that technology will make them redundant and that they will lose their jobs as a result³⁴. Moreover, technological innovations are often killed in advance, the idea being that 'a robot can never replace a doctor or nurse'. Both emotions and thoughts are understandable, but the actual practice is more nuanced. Technology is not likely to make people redundant in healthcare. Quite the contrary, our analyses show that we will not be able to cope with the demand for care in 2040 without productivity gains. Innovations can relieve healthcare workers. They allow for the healthcare process to become more efficient and productive and job satisfaction will benefit accordingly.

Finally, part of the reluctance to make healthcare more efficient and productive can be traced back to a risk of 'filler care'. Will enhanced accessibility to healthcare (by being able to do more with the current number of care workers) not lead to the emergence of a new demand for care? In other words: is there a risk of 'filler care', or a supply-driven demand for healthcare? This is of course precisely what happened in the automotive industry: higher productivity made cars cheaper, accessible to more people, so that demand grew and in the end even more employees were needed in the car factories. This risk also plays a role in healthcare, and it is good to monitor whether significant labour savings (fewer hospital days due to minimally-invasive surgeries, less time needed from the radiologist due to the use of artificial intelligence, reduced administrative burden for district nurses, etc.) are actually being realized, or whether it is filled by not-useful care.

Yet you may wonder whether the risk of filler care should be a reason not to realize labour-saving innovations. What is added is by no means always 'a filler' - it may also be healthcare for which there is now less and less time. For example, today there is a tremendous need for extra time for healthcare professionals to have real conversations with patients to establish that for certain problems there are better solutions than medical treatment. Furthermore, the landscape is becoming increasingly complex, and with more parties involved in the care for frail elderly people, there is also an increasing need for coordination. This is only possible if other aspects are handled more efficiently.

Above all, the shortage of healthcare providers in 2040 will be significant, and the risk that the freed-up capacity will be seized by filler care therefore seems only small. Anyone who is still afraid of filler care could focus on targeted measures (specific contract agreements with insurers, care demand management, prevention, etc.) to combat this phenomenon.

³³ De Jong et. al., *Telemedicine for management of inflammatory bowel disease (myIBDcoach): a pragmatic, multicentre, randomised controlled trial*

³⁴ Ictivity, *'Zorgmedewerkers vrezen verlies baan door digitalisering'*

FINANCING

Figure 16 - Financing: accelerators and inhibitors



Accelerators in other industries

- Lease constructions help individual companies to share risk of investments
- Subsidies enable investments when collective interests is not in line with investor's interest
- Governments share in financial risk (and benefits) by owning company shares

Hurdles in healthcare

- Financial benefits of innovations often do not account to the same budget as the investment is made from
- Healthcare providers lack incentives to save costs or free up capacity
- Subsidies target development or pilot phase, but do not support further development to a new standard of care

OTHER SECTORS FINANCIAL CONSTRUCTIONS TO SHARE RISKS AND ENCOURAGE CONSUMERS

The agricultural sector shows good examples of financial solutions to be able to bear investments or risks that are too great for a single farm. Consider, for example, leasing machines, leasing land or using contract workers. This all means that a farmer does not have to incur too much debt. In addition, turnover risks have been partially counteracted with European agricultural subsidies. Almost 40% of the EU budget goes to agricultural policy³⁵. Subsidies benefit from the most targeted use possible to prevent market disruption. There are also examples of this in agriculture, such as the creation of surpluses: the butter mountain and the milk pool.

We also see the principle of risk sharing in the automotive industry. The state has been financially involved at many stages in the development of the automotive industry. In the United States, billions have been spent on 'greening' car manufacturers. In view of the great societal importance of car manufacturers as major employers, (local) governments often play an important role at the manufacturer concerned. For example, the German state of Lower Saxony is a shareholder of Volkswagen. This means they have 20% of the voting rights, they share in the profit but also in the risks. We also clearly see the effect of financial incentives in the automotive world, mainly aimed at the consumer. With bpm (private motor vehicle and motorcycle tax) that depends on the CO₂-emissions from cars, the government stimulates fuel-efficient cars through the wallet of the driver. The addition-for-private-use scheme for drivers of business vehicles shows the superlative of this. Due to the low addition for private use, sales of cars such as the Mitsubishi Outlander PHEV and the Tesla went through the roof, but as soon as those cars are 'off lease', they often disappear to Eastern Europe.

HEALTHCARE IMBALANCE IN INCOME AND EXPENSES

Healthcare is much less financially driven than other sectors. In general, purely financial incentives are therefore not the solution. Financial hurdles or even disincentives do, however, prevent innovations from flourishing. In healthcare, the budget that benefits from innovations is often not the same budget from which the costs are paid. For example, minimally invasive techniques have higher out of pocket costs that put pressure on the OR budget, while the savings in number of hospital days benefit the clinic care unit. Or: a more advanced dressing is more expensive for the hospital, but saves a lot of time (and therefore money) in district nursing if it means that a dressing does not have to be changed as often. The siloed budgets (e.g. between medical care and long-term care) make it difficult to make the business case for an innovation.

³⁵ www.europa.eu, *Europees gemeenschappelijk landbouwbeleid (european agriculture policy)*

Even in cases where the use of innovations does lead to savings in capacity or costs, this does not always yield an advantage in the end. A department or care unit that manages to save on costs is sometimes cut in the budget the following year. And when capacity is released to generate more sales, it is reprimanded because of the restrictions of healthcare budgets. This strict regime does not encourage change and innovation.

There are various subsidy schemes in the healthcare sector to stimulate and finance the development and pilots of innovative applications. There are various examples of funding incentives for digital care, or the development of initiatives that tackle staff retention. Unfortunately, it hardly every goes beyond the funding of this first phase. The possibility of including a successful innovation as a new standard is lacking, because it does not fall within the current payment titles. An innovation perishes early on, while with the right structural financing it could have been further developed to deliver even more value.

06.

**LOOK AHEAD
EFFICIENCY IS A
DIRE NECESSITY**

A stimulating ecosystem is needed for productivity innovations to flourish. All those involved play their own important role in this (see Figure 17). Inspired by the conversations with 14 experts in the healthcare landscape we have five recommendations to convert the brakes into accelerators at all links. By investing smartly in labour-saving innovations, in addition to the policy focus on more staff and slowing down the demand for care, patients will have access to care - now, and in the future.

Governments and decision-makers, set a goal and lead the way

Incorporate a productivity gain target in the hoofdlijnenakkoorden and in healthcare institutions' strategies
 Use a crisp and clear definition of efficiency and publish the healthcare system's efficiency progress on a national website

Financiers, incentivize and reward

Establish a national redistribution fund, guaranteeing payout for healthcare providers who incur costs to achieve labor savings elsewhere



Healthcare professionals and patients, choose to accelerate

Choose 5 innovations and cheerlead them all the way until full adoption as the standard practice

Public and private parties, join forces

Set up 5 working committees around disease areas with public and private companies, assigned to develop and scale up innovations

Regulators, stimulate and facilitate

Include productivity as part of the assessment criteria for new innovations
 Design an early access pathway to enable further development of innovations in practice

1. Governments and decision-makers: Set a goal and lead the way

Include a productivity objective in the hoofdlijnenakkoorden³⁶, for example: 'In order to guarantee accessibility of care for our patients for the next ten years as well, we are actively working to increase the efficient deployment of our scarce healthcare staff. We aim to help 30% more patients by 2030 through the use of innovative ways of providing care with the same number of HCP we have now.'

Make use of a clear and unambiguous definition of efficiency. For example: number of FTEs of healthcare workers per QALY. Create a national website that provides insight into efficiency, as exists for quality care, which stimulates healthcare providers to learn from each other.

Finally, include productivity objectives in the strategy of healthcare institutions, for example: 'We realize that labour-saving innovations are needed to prevent waiting lists from growing longer. We will work on making three projects a success every year for the next five years, each with an efficiency improvement of at least 25%. With this we aim for an average annual efficiency improvement of at least 2% throughout the organization.'

The absolute starting point for real impact with labour-saving innovations is: no longer hesitating to declare this an explicit objective. Formulate a dot on the horizon that inspires and challenges. It should be specific and measurable. Such explicit goals belong at all levels of the healthcare system. For example in the hoofdlijnenakkoorden³⁶, but also in the strategy of a hospital or the HR plans of an elderly care organization. By inspiring and challenging policymakers and management boards we lead the way to new labour-saving innovations.

³⁶ Dutch multilateral sector-wide agreements on goals for subsectors within healthcare system

2. Public and private parties: Join forces

Put together five taskforces³⁷ each focusing on its own disease group. Each taskforce consists of public organizations (National Health Care Institute, NZA, associations of medical specialists, patient organizations, hospitals and long-term care organizations) and private parties. Until 2025, these parties will work together to develop and scale up new labour-saving and quality enhancing innovations throughout the patient journey.

To accelerate the development of innovations in healthcare, it is important to join forces. There is no shortage of good ideas, but by seeking collaboration between private and public parties and users of care from the outset, initiatives can be kickstarted much faster. This is especially important for innovations that help to shorten or simplify processes. It is precisely when innovative parties such as companies or universities collaborate closely with the primary process that an optimal climate for creativity and innovation arises.

Joining forces requires a different mindset. We can learn from agriculture and the automotive industry how valuable it is to see private parties as fully-fledged and reliable partners. But it is not just among public parties where a change in mindset is required. Better access for private parties to the market also requires transparency about the quality and cost effectiveness of care. Companies can stimulate collaborations by focusing more on demonstrating the value of innovations in practice, and making them transparent for the broad stakeholder field that has an interest in this.

3. Supervisory bodies: Stimulate and facilitate

Include productivity or efficiency related to quality of outcomes as part of the assessment criteria for new innovations. Don't just manage on EUR per QALY, but also on FTEs of healthcare personnel per QALY. In addition, an early access pathway for innovations in the healthcare market and budgets for further development of innovations in practice should be devised. Ensure clear criteria, a transparent process and frequent information exchange with the innovating parties³⁸.

To put productivity-enhancing innovations into practice, the productivity target must first be translated into a measurable target. The SROI method offers inspiration: here too efficiency is included as an outcome measure³⁹. Saving time is an indispensable addition to other assessment criteria, including quality and safety, in the process of authorizing new products or processes.

Regulation can do more than just facilitate the introduction of innovations; it can also make an important contribution to accelerating development. Policymakers and regulators can make an important contribution to accelerating innovations. The ability to safely try out new ideas in practice at a relatively early stage ensures a fast learning curve. By creating conditions within which these tests are possible (and funded), innovations can be further developed faster and better.

4. Healthcare providers and patients: Choose to accelerate

For example, within the professional association, choose five existing innovations each year that have to be implemented that very year. Invite patients and jointly formulate a clear statement about the benefits for the patient and the efficiency of the care process. Be an advocate until these innovations are the new gold standard in Dutch healthcare.

If we view the current organization of the Dutch healthcare system with the accompanying fragmentation as a given, the solution for faster large-scale application of innovations is not an obligation but a conscious choice. This requires an tempting perspective for care providers. What will the work look like in five years after the application of labour-saving innovations? How much stress and work pressure can it reduce? How much more time for the patient can it yield? How much more quality and more job satisfaction? Innovation and increasing efficiency is not a burden for the care provider, but a joy.

³⁷ Public Private Partnerships (PPP)

³⁸ EMA, adaptive pathways

³⁹ Zorg+Welzijn, 'Social Return on Investment laat maatschappelijke waarde zien: winst maken met sociaal werk'

Labour-saving innovations can have enormous benefits for patients. For example, while telemonitoring of the chronically ill is seen by some as 'remote care', perhaps to be used as an argument against this form of upscaling, patients may experience it as 'care close by'. The shared perspective can be very enlightening.

Increasing productivity is in the interest of HCP and patient alike. It would be valuable if interest groups would also promote this as a goal. If the representatives of medical specialists or nurses, for example, promote more strongly the value of certain innovations, not every individual has to make that decision every time. Patient associations can also make even louder demands that productivity innovations be on top of the agenda. After all, without these innovations, access to healthcare will be in jeopardy in the long run.

5. Financiers: Incentivise and reward

Establish a national redistribution fund, comparable with a clearing house in the financial sector. Guarantee pay-out for healthcare providers who incur higher costs to achieve labour savings elsewhere. The fund takes responsibility for cashing in on the savings made at other departments or institutions and making further transition agreements. Start with a number of prominent diseases.

Financing is not the only driving force behind innovation in healthcare, but it is the final step to get the ecosystem working. Moreover, the lack of funding for new types of care that is provided to patients is an inhibitor. Access to care is by definition not a matter of an individual party or patient, it is a collective interest. Due to the fragmentation of the healthcare field, this collective interest is by no means always consistent with the interests of the party where the investment must be made. It is important to set up the right incentives for the business case of labour-saving innovation. A good example of this is the bill for cooperation between care domains wlz, zvw and wmo, in which communication between budgets is enabled.

Insurers can play a role by demanding transparency about productivity from providers, supporting projects, transferring savings between care domains and rewarding successful improvement initiatives. At a higher level, the hooflijnenakkoorden⁴⁰ are the standard instrument for this - including a productivity target can help support the discussion at the individual negotiating tables.

When innovation incentives cannot be achieved within the regular market mechanisms, targeted subsidies can help, as was the case with the Juiste Zorg op de Juiste Plek. It is important, however, that not only pilots are financed, but that consideration is given at the outset to how these can be made the standard if proven successful - and paid for as such.

⁴⁰ Dutch multilateral sector-wide agreements on goals for subsectors within healthcare system

07. | ABOUT THIS PUBLICATION

This publication is the result of a co-production of Gupta Strategists and Edwards Lifesciences. We have joined forces and sought convergence of interests. We both want to help accelerate innovations in healthcare, from which patients and society will ultimately reap the benefits.

For this publication, we interviewed 14 healthcare experts (see Appendix). Moreover, additional insights were discussed during conversations Gupta Strategists and Edwards Lifesciences regularly have with stakeholders, including the Ministry of Health, Welfare and Sport. The text in this publication was never intended to display the exact contribution of each of the individual stakeholders. The insights from the interviews and discussions have enriched the text in many areas. We thank everyone for their disinterested contribution.

ABOUT GUPTA STRATEGISTS AND EDWARDS LIFESCIENCES

Gupta Strategists is an independent consulting firm for organizations in the healthcare sector, domestically and abroad: "Everything we do must meet this requirement: it must demonstrably improve healthcare. Characteristic of our working method is that we creatively combine substantive, in-depth knowledge with a practical approach." Nienke Visser, Lisa Vogelpoel and Daan Livestro conducted analyses, held interviews and wrote the text of this publication. Edwards Lifesciences is the global leader of patient-focused innovations for structural heart disease and critical care monitoring. "We are driven by a passion for patients, dedicated to saving and enhancing lives through partnerships with clinicians and stakeholders across the global healthcare landscape. With the growing of the ageing population, we believe that it is our responsibility to help improving people's lives while contributing to creating a more sustainable society. We continuously innovate to tackle life-threatening disease, enable active and healthy ageing and transform the healthcare systems with efficient life-saving therapies." Ward Bijlsma and Pascal Candolfi conducted interviews and collected data on innovations in cardiovascular disease. Edwards Lifesciences funded the production of this publication.

CONTACT EN SAMENWERKING

The aim of this publication is to inspire, hold up a mirror and offer perspective to anyone concerned about the future of our healthcare system. We would love to strike up a conversation and team up with others. For this, please contact:

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I APPENDIX

Appendix I

Figure 1 – Method 1: number of employees and production in Dutch hospitals

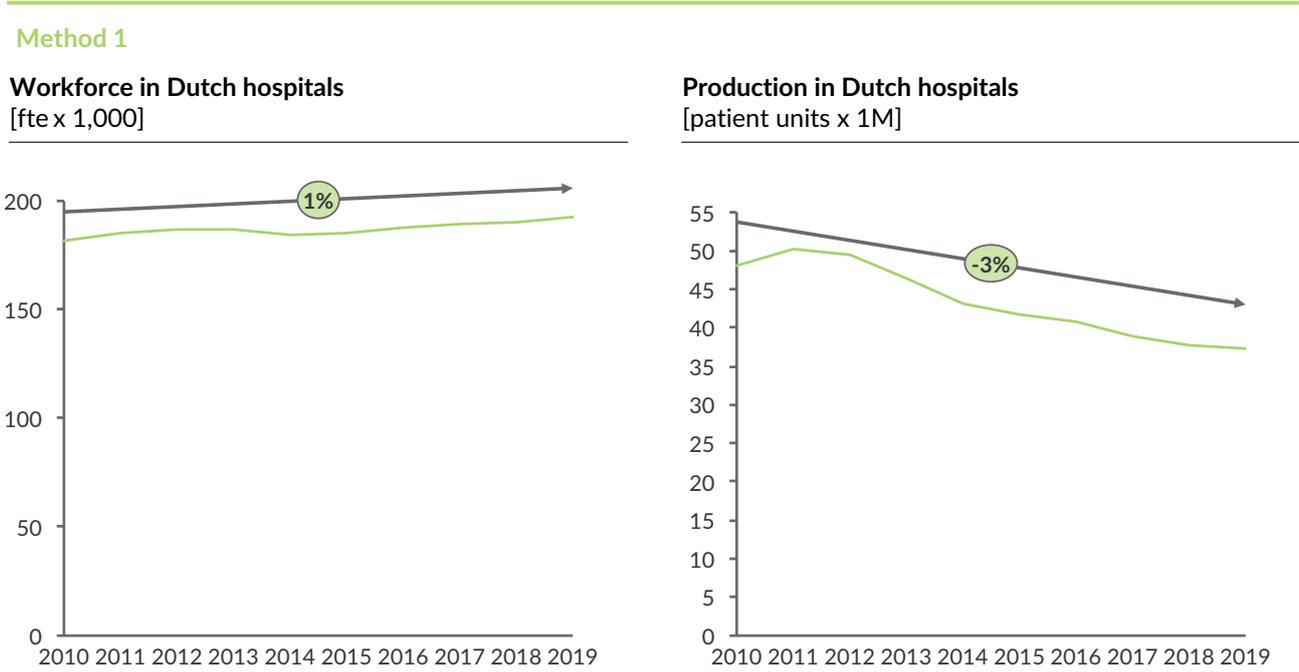
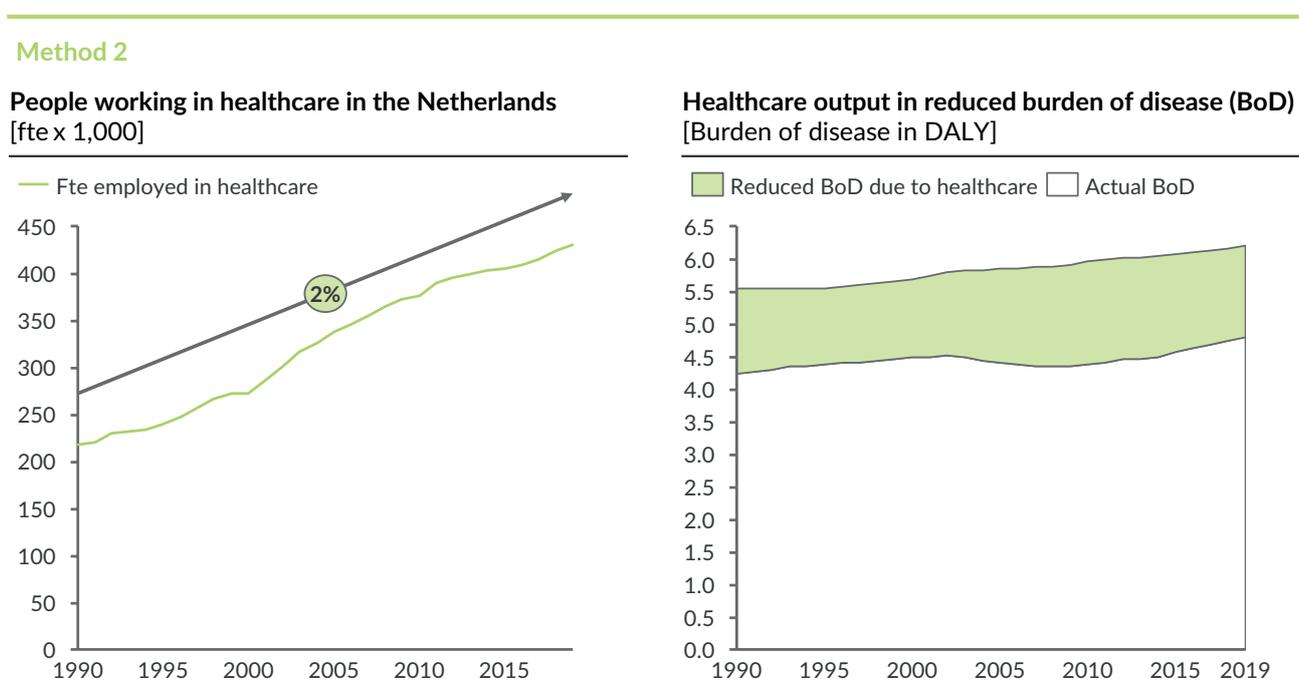


Figure 2 – Method 2: number of healthcare workers and reduced burden of disease⁴¹

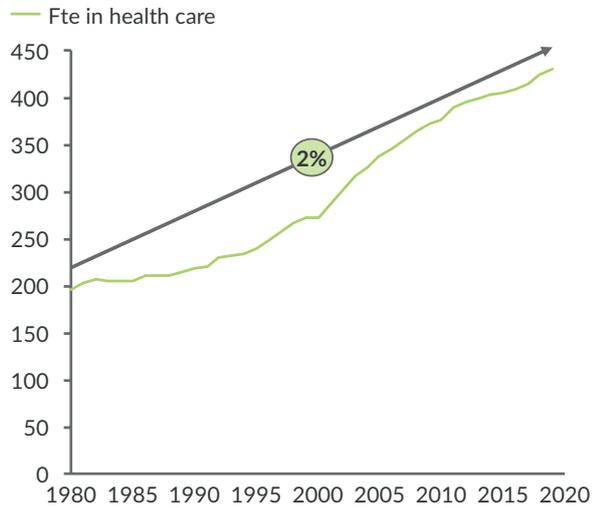


⁴¹Reduction in burden of disease due to healthcare was calculated by comparing DALYs in the Netherlands with DALYs in countries without a well-functioning healthcare system, based on an analysis of countries across the world

Figure 3 – Method 3: number of healthcare workers and years lived with chronic disease

Method 3

People working in healthcare in the Netherlands
[fte x 1,000]



Life expectancy in the Netherlands
[average # years, year of birth]

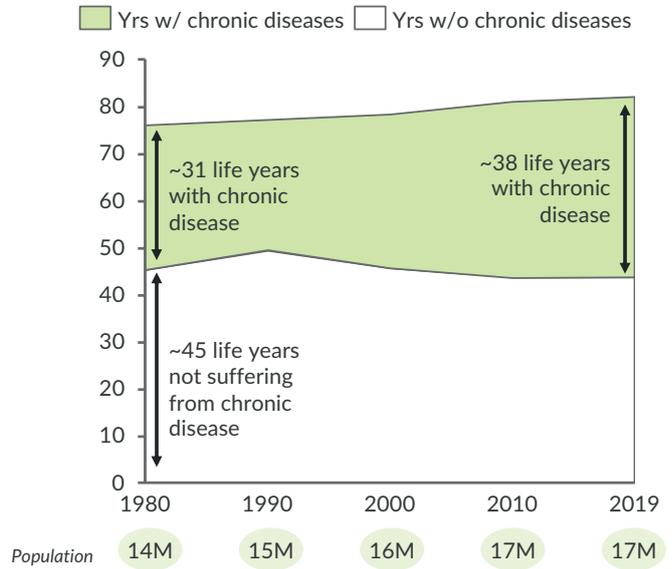
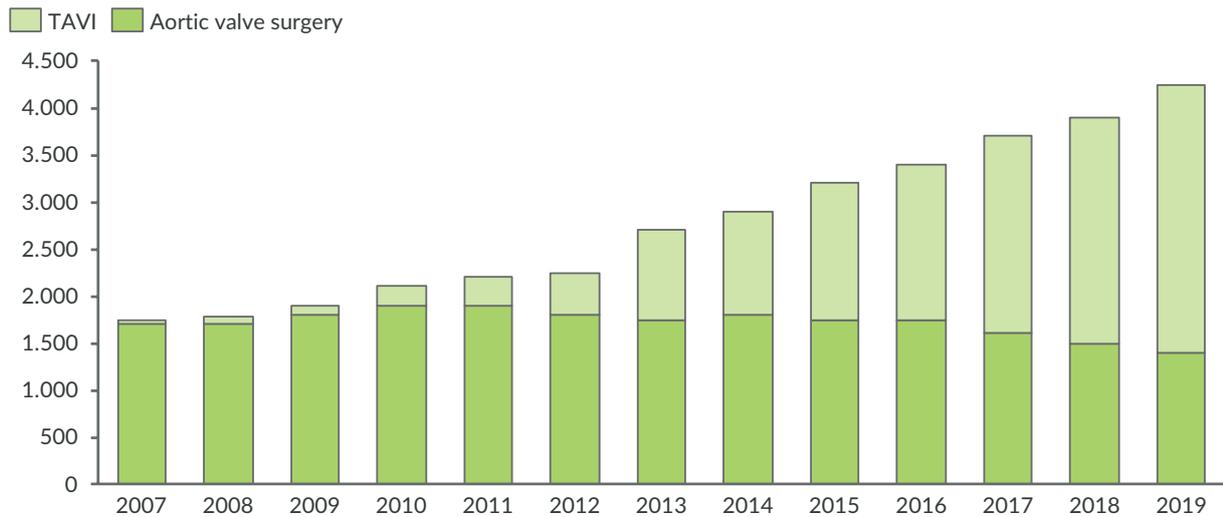


Figure 4 – The number of patients treated with TAVI has gradually increased in recent years⁴²

Treatment of aortic valve disease in the Netherlands
[number of patients treated]



⁴² Nederlandse Hartregistratie (NHR)

Figure 5 – TAVI has, among other things, a shorter hospital stay, length of stay and ICU admission compared to traditional open heart surgery⁴³

Comparison of factors driving labor use

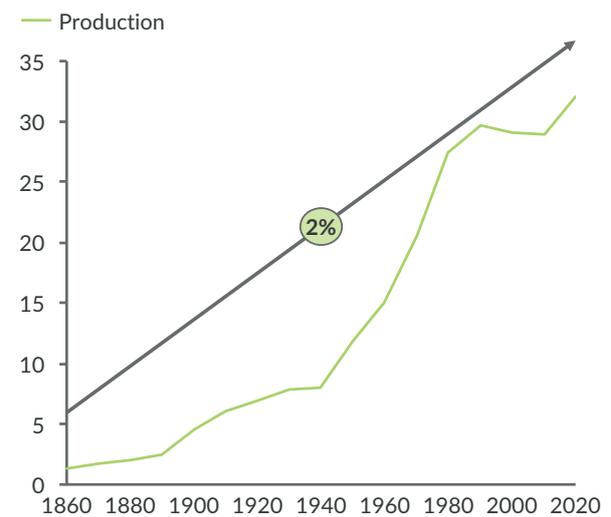
Factors determining labor intensity	TAVI	Aortic valve repair (open-heart)
Procedure length 	58 minutes	210 minutes
Length of stay at ICU 	2 hours	72 hours
Length of total hospital stay 	1 - 3 days	5 - 10 days
Recovery in rehabilitation center 	0.6%	7.5%
Rehospitalization 	7.2%	11%

Figure 6 – Agriculture workforce has decreased, while production has grown

Agriculture workforce in the Netherlands
[# fte x 1,000, year]



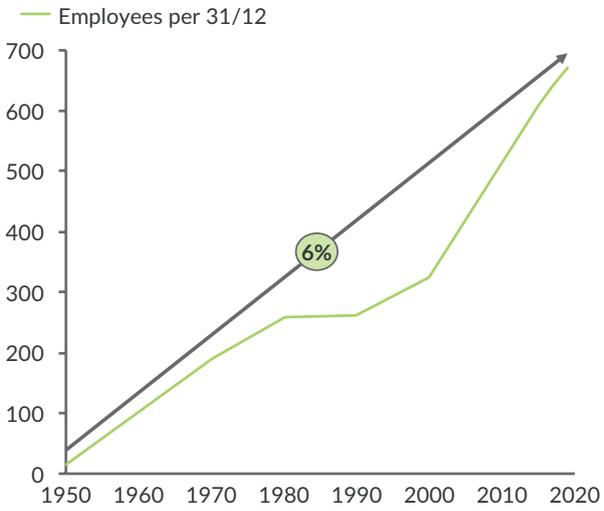
Agriculture production in the Netherlands
[product x 1B kg, year]



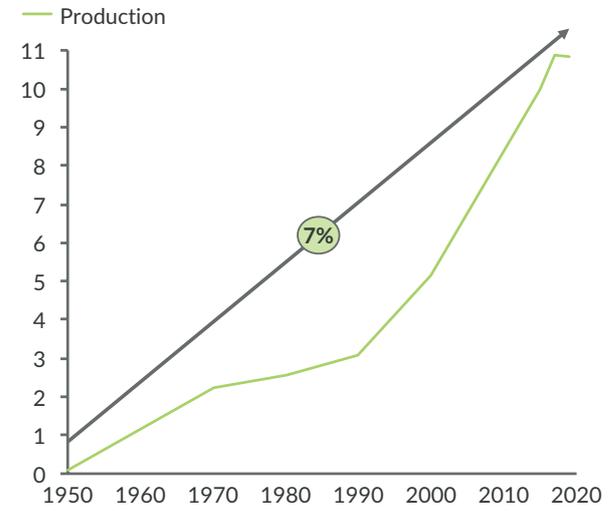
⁴³ Mack et. al., Transcatheter or Surgical Aortic Valve Replacement in Low-Risk Patients; De Nederlandse Hartstichting; A. Wood et. al., The Vancouver 3M study; Analysis based on expert opinion

Figure 7 - Volkswagen workforce increased steeply, but production increased even more

Volkswagen workforce
[employees (x1,000) at Volkswagen Group per 31/12]



Volkswagen production
[vehicles produced x 1 M]



Appendix II

IN THE SERVICES SECTOR, CUSTOMERS HELP THEMSELVES

In agriculture and car manufacturing, over the past century technology took over heavy and/or repetitive duties from employees. This led to substantial productivity gains. The services sector has also seen substantial productivity gains. However, these gains were not driven by technology taking over workload from employees, but instead by technology enabling customers to take over the work.

Take, for example, the travel industry. Until not long ago, it took considerable effort to organize trips. A train ticket was bought physically from a service desk employee, and was checked by a conductor on the train. To book a flight, one had to go to a physical location of a travel agency, or call an airline call center. At the airport, a ground crew helped you check in and drop off your luggage. Today's world of travel is very different: we have a chip card to check us in and out of train rides, we can compare thousands of options online to pick the one flight that suits us best, and we can check ourselves in and drop off our luggage without any substantial assistance.

As another example, let's consider the financial services industry. We used to require assistance by a bank employee for almost any banking service, such as opening an account, closing a mortgage, and even withdrawing or wiring money. Similar to travel, the world today looks very different. The ability to self-serve for these tasks has provided great value-add for customers, and banks have been able increase productivity so much that they have been able to close many of their physical locations without complaints or service degradation.

Can healthcare learn from these examples? The thought is certainly appealing. If a patient could self-serve in greater proportions of his care pathway, it would lead to a more efficient use of the scarce resource of healthcare employees. We see in many examples that the thought is not unrealistic. Prior to an outpatient visit, a patient can submit a digital questionnaire so that the provider can more quickly zoom in on the key problem. In the clinic, patients can find their way through interactive signage, thus eliminating the need for contact with a service desk. Patients can self-monitor glucose, and with remote guidance from a physician or diabetes nurse can eliminate the need for some visits to the clinic. In all of these examples patients take over part of their care pathway. More extreme forms of self-service, however, are certainly feasible. Using e-health programs, patients can sometimes provide for their own mental health care from start to finish without any physical contact with a care provider. These examples are all relatively small-scale. The majority of care is still provided in traditional, physical settings directly by a care provider.

Two developments have contributed to the increasing level of self-service in the service industry. Through technological innovation, clients have firstly gained control over their own information, and secondly gained direct access into transaction systems. To drive similar change in healthcare then, it is crucial that patients gain control over their own medical records, and that they gain the ability to smartly use data generated by other patients (anonymously) to help drive care decisions. This will also enable doctors to manage populations rather than individuals.

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