

HOW A 700 YEAR OLD INVENTION
CAN CHANGE THE WORLD FOREVER

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CLEARLY

JAMES CHEN

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PART I

**THE
SCANDAL
THE
WORLD
FORGOT**

CHAPTER 1

WAKE UP WORLD



More than 700 years ago, spectacles were invented. One of the greatest innovations in our history had arrived.

In those early years, perhaps only aristocrats and the clergy experienced the joy of reading. But the invention of the Gutenberg press in around 1440 meant that very quickly there was a mass audience wanting to read, and requiring glasses if they could not see properly. Over the centuries, as aesthetics improved and our understanding of the eye advanced, we have become so comfortable wearing glasses that we now buy them in all sorts of shapes and sizes. Would Steve Jobs or Bill Gates have been able to code without their glasses? How would Elton John have learned the piano? Would the magical world of Harry Potter ever have been created if J. K. Rowling didn't have a pair of specs?

This book is about the unfulfilled potential of getting this centuries-old innovation on the noses of all the people who need it. Despite the fact that so many of us wear the latest Tom Ford glasses, still, to this day, a staggering 2.5 billion people who need a pair of glasses don't have them.¹ In many instances, they simply cannot get hold of a pair because local markets for affordable glasses do not exist. Or, sadly, they do not understand the simple and proven benefits of spectacles.

Framed negatively, this is an oversight of epic and historical proportions. How did we miss this? How did we skip something so simple and so beneficial to humanity? Although I am tempted to take this path, I am also reluctant, as I am optimistic about the power of public policy, markets and people to change the world. So instead I will try to frame this positively.

Sight is the golden thread of human development. We have a proven, tested, legal and highly desirable product that

can change billions of lives in an instant. The romantic in me wants to make that case in this book. But to make that argument I need to start with the facts, as they are alarming and they make me want to shout out, loudly, ‘Wake up world’.

Today, an estimated 2.5 billion people, just under the combined population of China and India, cannot see clearly and yet have no access to a sight test and a simple pair of glasses.

In a world of huge opportunities for those who can see clearly, we have a third of the planet’s population who are being held back by the biggest oversight in history.

Poor vision is the largest unaddressed disability in the world today, but for decades it has been at best forgotten and at worst ignored. Governments, the United Nations, the World Health Organization (WHO) – none have done enough to acknowledge this problem and act on it.

Helping the world to see is about so much more than health. It’s about the future of our children, because a child who cannot see a blackboard cannot get a decent education; it’s about gender equality, because far more women suffer than men; and it’s about productivity, because if you cannot see clearly, it’s difficult or impossible to work. Not least, it is about the mental health and dignity of the individual to feel stimulated, productive and self-sufficient.

The time for action is now, because the phenomenal technological change taking place in the world looks set to leave behind anyone who cannot participate in progress. By 2020, most people in the world will have access to a smart-phone. In the next five years, another three billion consumers will come online. 3D printers will transform production costs. More and more people will spend their working lives

at computers. We must ensure that no one is left behind because they cannot see clearly.

We have a chance now to correct this. It is critical that governments, global authorities, non-governmental organisations (NGOs), and the public at large understand the scale of this problem and work together to solve it. That is why I set up the Clearly campaign – to draw the world’s attention to this scandal and to start a debate about how we solve it.

It will cost money, but the investment will be repaid so many times over that I believe the economists and finance ministries will not struggle with the ‘business case’.

Poor vision is costing us all trillions of dollars a year in health costs and lost productivity.² Imagine the huge benefits if all those people without proper sight could use computers, read books or carry out mechanical tasks that poor vision prevents them from doing today.

And, unlike many other development challenges facing the world, there is a solution, and it comes from the old world – glasses!

A recent survey in the *Atlantic* magazine to assess the top fifty innovations that had shaped modern life put optical lenses at number five.³ The author, James Fallows, wrote that the adoption of corrective lenses ‘amounted to the largest onetime IQ boost in human history’ – a startling statement that graphically illustrates the inequity and iniquity of the fact that, centuries after the arrival of spectacles, so many in the world don’t have access to them.

And we are hardly touching this problem. As Jordan Kassalow, founder of VisionSpring, a social enterprise that is one of the leaders in this field, tells us later in this book,

his organisation has distributed over 4 million pairs of glasses over the past fifteen years in some developing countries. 'But as we did that it has become more and more apparent that if that figure was 10 million or 100 million we would still only be making a dent in this worldwide problem.'

A step change is needed if we are to make glasses and other treatments available to everyone who needs them. The visionaries of old, the people who gave us spectacles, must have their work completed by the visionaries of today.

But there are four big barriers to achieving this – what I call the four Ds: diagnosis, distribution, dollars and demand.

First, there are simply not enough people carrying out the relatively simple task of diagnosing someone's eyesight. State regulations mean that in many countries screening people to see whether they are short- or far-sighted can only be done by eye doctors with years of training. But only a tiny proportion of these experts live in the developing world. We must train thousands more people – from community nurses to teachers to entrepreneurs – to carry out basic sight tests. This would also free up the eye professionals to focus on more serious eye diseases which only they are qualified to address.

Second, we must distribute glasses to those who need them. If we can get a bottle of cola to villages across the world, surely we can deliver a pair of glasses? Yet rules and regulations in many countries stop local shops or kiosks from selling reading glasses, and only a handful of countries have been brave enough to take on the eye health industry and allow prescription glasses to be sold over the counter. As a result, millions of people – including children at the start of their lives – are denied a simple solution to their vision problem.

Third, we must cut the cost of glasses by ensuring they can retail at dollars rather than tens of dollars. A lengthy and complicated supply chain means that by the time glasses reach their users, several people have taken their ‘cut’ and unnecessarily hiked the final cost. There is no true free market in glasses anywhere in the world. Many governments exacerbate this problem by imposing heavy import duties and taxes on glasses, which render them unaffordable for most consumers in the developing world. Whereas imposing these taxes and duties on fashion-branded eyewear is understandable, non-branded eyewear should be exempt and viewed for what it is: an economic tool to boost productivity.

And fourth, the stigma over wearing glasses persists in the developing world, meaning that there is insufficient demand. Glasses are still not seen as a necessity; indeed, to some they imply a sense of weakness. Cultural barriers in some countries mean that women in particular are deterred from wearing them. We need to understand and overcome these obstacles if we are to succeed. Fixing the supply side is simply not enough.

Fortunately, overcoming these barriers is at the forefront of many of the brightest minds in the world.

My entry into the field of eye care was inspired by innovation. I had a chance encounter with Professor Josh Silver, the man who first saw the full potential of the modern fluid-filled adjustable lens, which allows the user to adjust their glasses to see clearly at any distance. I immediately grasped the potential of these lenses in the developing world, where distribution and logistics are fragile and expensive.

I had already begun to wonder whether my family’s philanthropic foundation could do more to make an international

impact, going beyond what was until then more geographically focused work in Asia. Because of my encounter with Josh, my eyewear company Adlens was founded.

We then considered how we could help the developing world with this groundbreaking advance. We considered several African countries, including Ghana, Ethiopia, Kenya and Rwanda, as possible candidates. Rwanda was chosen because of the relatively small size of the population and the relative ease of reaching every part of the country from its capital, Kigali. Rwanda is far from perfect, but its government has developed a burgeoning reputation for competence and good governance after the horrors of the past. As a result, Vision for a Nation, a charity committed to delivering eye care and affordable glasses for all, was born.

Rwanda is a trailblazer, becoming the first developing country in the world to provide access to vision screenings and affordable glasses to anyone who needs them. It has embraced self-adjustable glasses and has eased its rules to allow 2,500 community nurses to be trained in just three days to carry out sight tests and diagnose patients rather than attending a four-year university-level degree course in optometry. Meanwhile, Rwanda has deregulated the sale of eyewear so they are available throughout the country and not just in opticians, removed cost-increasing taxes and import duties on glasses, and developed an outreach programme in 15,000 villages to break down cultural barriers.

We need that kind of deregulation at different levels of the industry, and across Asia, Africa and Latin America, if we are to crack the problem of poor vision once and for all. With the will, this extraordinary achievement could be rolled out across the globe.

A lightbulb moment for me came when I saw a TED Talk from Dr Andrew Bastawrous showing how a smartphone could take a relatively high-resolution picture of the retina using hardware he had developed. I felt immediately that if a mobile could capture a good enough retinal image for diagnosis with minimal training, it could be one of the keys to universal access.

We need that technology and apps like Vula Mobile, the winner of my \$250,000 Clearly Vision Prize, which connects healthcare workers in remote locations who have carried out vision screenings with eye specialists who are primarily based in urban areas.

In this book, I will tell their stories, reflect on their insights and look to the future too. Will we be able to use drones to drop supplies of glasses to distant places? What role could 3D printers play in crashing the cost of glasses? How close are we to developing eyedrops that correct vision through nanotechnology rather than spectacles? How can we encourage local designers and entrepreneurs to create affordable but attractive frames to break down the stigma of wearing glasses? What is the role for artificial intelligence?

As we have seen, spectacles were not popularised until the fifteenth century. We may be on the verge of something similar today as new technologies heighten the demand for vision correction.

But the task of helping the whole world see cannot be left to inventors and entrepreneurs alone. It must now dominate the thinking of global authorities everywhere.

What little money is available from governments and NGOs is primarily channelled to treating avoidable blindness. Around 165 million people have severe problems like

cataracts, glaucoma and trachoma which need specialist treatment and maybe operations. They are and should be the priority.

But the number facing preventable blindness represents less than 10 per cent of those with poor vision. Little money is spent on the 2.5 billion people who may need only a vision screening and a pair of glasses to see clearly.

Access to vision correction is so low on development priorities that it did not feature in the sustainable development goals set by the United Nations in 2015. It is hard to imagine several of these objectives being achieved without people being able to see clearly. Simply put, clear vision is the 'golden thread' that runs through development, helping to achieve global goals on good health, quality education, decent work, gender equality and – of course – poverty elimination.

Despite the myopia of some international organisations, progress is being made in some of the most unlikely parts of the world. This book documents the amazing work of organisations like sightsavers and the Fred Hollows Foundation which work tirelessly to tackle vision in the developing world.

Now global authorities need to take notice. The next Commonwealth summit will be in London in the spring of 2018. Of the 2.35 billion Commonwealth citizens, 1.2 billion – just over half – need glasses, but 900 million of those cannot get them.

The last summit in 2015 committed to tackling preventable blindness, so the Commonwealth has promising form on this issue. Extending the agenda to cover the goal of clear vision for all would seem logical. We hope the communiqué emerging from the summit will commit to unlocking the full

potential of sight as quickly as possible by increasing access to affordable glasses throughout the Commonwealth.

If humans are to be on Mars by the 2030s, or even earlier, as many predict, it will be to the world's shame if everyone cannot see it happen.

The World Health Organization has estimated it could cost \$28 billion over five years to tackle poor vision caused by refractive error.⁴ Over ten years, the additional investment required to eliminate avoidable blindness in the developing world is estimated to be \$128.2 billion.⁵

But just \$850 million is spent by the top ten eye-care NGOs each year – primarily on tackling avoidable blindness.⁶

Entrepreneurs are doing their bit to bring down the cost. But we also need governments to step up. We must convince world governments that universal eye care is ultimately self-financing. If donors are looking for results, the answer is in eye care.



If you are reading this, there's a one in two chance that you're doing so with a pair of glasses or contact lenses. Just imagine what your life would be like without them.

I failed an eye test when I was just fifteen after applying for a driving permit. We were living in upstate New York at the time. It was a blow to my self-esteem, but not a lasting one. I got my first pair of glasses and, wow, the world I had lived in for fifteen years suddenly became clearer.

Now I knew what I had been missing. There would never, ever, be any chance of going back to a world without glasses. Life was better and I was more assured of the world around me. I was fortunate. So many are not.

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I spent much of my early life in Nigeria. I remember how few Africans were wearing glasses, whereas many expatriates from richer countries were.

That memory is what inspires me. It cannot be right that clear vision is a lottery when the technology is so old and the costs are increasingly affordable. That's why I'm devoting my life to helping the whole world see, and I want to inspire you to sign up to my mission.

In this book, I will write about the eye, how it works and the invention of corrective lenses. I describe the work of the giants in this field and the inventions that will help us on our way. I write about the huge cost of this problem and tell the stories of people whose lives have been changed in Rwanda and elsewhere by the provision of glasses.

As you'll find, I'm not fatalistic. I believe that with the right political will, we can tackle the world's most intractable problems. But the issue of poor vision has been forgotten. So we are going to have to make a lot of noise. We also need to be practical, which is why I will use this book to set out my blueprint for how we tackle this issue.

Blueprint

Diagnosis:

- 1) Empowering practitioners: Restrictions preventing health workers, nurses or teachers from carrying out straightforward tasks like vision screening should be swept away.
- 2) Simpler diagnosis: The use of smartphones to screen vision must spread across the developing world rather than being confined to certain countries and age groups.

Distribution:

- 3) Market creation: Governments and NGOs must pump-prime or subsidise the provision of glasses to the poorest people in developing countries to help the eventual development of an open market. Global authorities like the United Nations and Commonwealth must wake up to this problem and recognise explicitly that global prosperity cannot be achieved without clear vision for all.
- 4) Removing inappropriate regulations: Restrictions on selling glasses over the counter should be removed so that shops around the world can stock glasses alongside other items such as biscuits and soft drinks.
- 5) Simpler supply chains: Entrepreneurs must be allowed to import glasses, transport them, screen people's eyesight and provide them with glasses, drastically simplifying the expensive supply chain.

Dollars:

- 6) Cutting costs: Governments must eliminate import duties and taxes on non-fashion glasses.
- 7) Unlocking technology: All exciting technological developments – for example the 3D printing of glasses, the use of drones for delivery, and artificial intelligence to detect eye disease – must be studied to see how they can help us achieve our aims.

Demand:

- 8) Eliminating cultural barriers: We must sensitively use role models and cultural figures to break down taboos over wearing glasses.
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We cannot escape the fact that 700 years after glasses were invented the world has been prepared to tolerate a situation where billions of people still cannot see clearly.

New inventions mean that vision screenings and glasses have never been more affordable. But the pace of technological change means that if we don't act quickly we will condemn a third of the world's population to miss out on this progress.

On the flip side, if we get this right – ensuring that states and markets work together so that everyone has access to a sight test and an affordable pair of glasses – we will achieve a radical leap in productivity, prosperity and opportunity. This will be of benefit, yes, to those 2.5 billion people and the many more yet to be born who have poor vision. But it will also be to the good of everyone who can already see clearly, by creating more human ingenuity, more human creativity and more human happiness.

No longer can we let down the forgotten billions. It's time to wake up and help the whole world see.