



GENERATION ENTERPRISE:

THE HOPE FOR A BRIGHTER
ECONOMIC FUTURE

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Preface

This pamphlet is about value. In particular, it is about how humankind has got much better at generating value for itself in the form of cheaper, better and more diverse products. And it is about how we are on the brink of another leap forward in this.

As the economist Eric Beinhocker has pointed out, the story of economic value starts many millennia in the past when the first hominid exchanged something of worth with another. But it only really got going some 250 years ago when the Industrial Revolution began to achieve real excellence in the generation of value.

There is no better organisation to recount such a story than the RSA, formed by the same forces that were changing the UK landscape in 1754. To use a modern phrase, the RSA was well ahead of the curve.

Sensing the spirit of the times, William Shipley established the Society to encourage and spread the innovative practices he knew could power business and drive up living standards. Over a decade before Richard Arkwright's breakthrough in textile manufacturing methods revolutionised commerce, the RSA was holding industrial exhibitions and awarding financial prizes for innovation.

The RSA always recognised that there was more to the 'publick good' than buying and selling. Commercial innovation had huge upsides but maximising those meant applying just as much innovative effort to addressing the downsides. So as well as encouraging the innovation at the heart of industrial revolution, the Society set about ameliorating its less pleasant aspects. Awards for smoke reduction schemes, inventions that reduced the number of children working as chimney sweeps and tree-planting campaigns followed.

This sophisticated enthusiasm for the power of human enterprise and innovation is never more needed than today. Like the industrial revolution, new technologies and practices (this time associated with the internet) are transforming our economy and society. We are not even close to experiencing the full depth of this transformation but we should be optimistic that the results once again will bring great benefits in terms of cheaper, better and more diverse products. Living standards and quality of life will improve. Of course, there will be costs and we need to be as mindful and as inventive in addressing these as we are in reaping the economic gains.

It is in the Society's traditional spirit of hope and wisdom that the RSA Action and Research Centre is being launched. This centre will continue the Society's tradition of combining practical experimentation with considered research. It will drive the Society's mission of understanding the power of human endeavour and our ability to maximise the gains from today's most exciting innovations and insights. Critically, the centre will apply the same energy to ensuring that these capabilities and the benefits that arise from them, are available widely.

In short, we aim to apply William Shipley's foresight to a period which, could prove to be just as exciting, just as pregnant with possibilities and just as fraught with risk, as the era which Shipley himself lived through and by which he was so deeply inspired.

Commercial innovation had huge upsides but maximising those meant applying just as much innovative effort to addressing the downside

“Pessimistic views about a thing always seem to the public mind to be more profound than optimistic ones”

Joseph Schumpeter

Executive Summary

The last 250 years of economic development have been remarkable. It is estimated that average real income per head has grown ten-fold in the last two and a half centuries. In the most advanced economies, it's closer to a twenty times increase. All the more striking when you consider that throughout the 130,000 years of human existence prior to that incomes probably multiplied by no more than three times. Add in the much greater quality and diversity of the products we buy and the advances since 1750 are mind-bending.

It is innovation and entrepreneurial spirit that has driven this positive change. Great entrepreneurs like Richard Arkwright, Andrew Carnegie, Henry Ford and Eiji Toyoda transformed the world by finding revolutionary ways to produce goods in much greater quantities, to a far higher quality and with a wider diversity. In effect, they helped humanity get much, much better at generating value for itself.

Now a whole new way of doing business is emerging once again. The power to generate value, which was always the preserve of the entrepreneur and their business, is shifting to the consumer. Millions can now download products when, where and how they want them. Consumers now make their own content and share it on-line. Marketing is increasingly led by consumer run networks. A new era is emerging in which value is self-generated.

But far from the entrepreneur becoming obsolete, this self-generated value (SGV) transformation has unleashed a new wave of entrepreneurialism particularly amongst the younger generation who are most engaged with the web and its possibilities.

The reason is simple: if you can use the web to create things of value for yourself, you can also use it to create things of value for others. The very websites and networks that have given the consumer power are also empowering entrepreneurs. As a result, product development, distribution, marketing and even financing have become much easier and cheaper.

This SGV era and the associated entrepreneurial ethos will be highly disruptive. The 'creative destruction' wrought in publishing and the music business, for example, are a taste of what is to come. Ultimately this will generate a new leap forward in living standards and quality of life but there will be casualties along the way in the form of bankruptcies, unemployment and insecurity. There is also the risk that a very strong emphasis on entrepreneurialism could lead to an unreflective and destructive individualism.

The response is not to resist self-generated value or the new entrepreneurial spirit but to embrace it while also keeping a critical eye on its negative implications. Those implications must be addressed with just the same innovative and entrepreneurial spirit as is being applied in the commercial world.

An explosion of value¹

Forget any romantic images of rural idylls and bountiful fields of plenty. Life in the pre-industrial world was, for the great majority, tough.

Imagine yourself taking a trip to stay with your great, great, great, great, great, great, great, great, great, great grandparents. You have about 500 pairs so it should not be difficult to discover the ones that match the global average of the time. This will make sure you get the most representative experience of life in the early years of the 18th century.

Once you get used to the strange accents, the unfamiliar words, the alien manners and, let's face it, the tolerance for very human odours, you will have to get on with living.

Chances are, given this is an average family, you will spend much of your day working hard in the fields nurturing a staple crop. No matter what the weather, you will be out there bent double in the beating sun, driving rain or scarring wind. After a few hours of that, you will have some animals to feed, water and muck out. In the evening, a member of your family may take pity on you and help you learn a simple task or craft to support the household; maybe clothes washing, open fire cooking, spinning, sowing or basic carpentry. And then the sun goes down; after a few songs and maybe a simple game or two, it is bedtime.

No doubt after some weeks of this sinew stiffening and mind-numbing routine, you will be looking forward to the sabbath like the truest of true believers, even if most of that day is taken up with prayer and silent contemplation.

Your life will not be all bad. There will be the odd public holiday when the local villages celebrate with singing, dancing and a fair bit of heavy drinking - assuming the cultural and religious practices observed by your relatives allow for such pleasures. There will be trips to town now and then on bustling market days. But, despite these occasional distractions, you are bound to be focused on what you get in return for those six demanding days of labour a week.²

Most of it will not come in cash but in food, clothing and shelter but for the sake of simplicity, let us convert all of that into dollars at today's prices. This may give you a better idea of your 18th century income. It is hardly a princely sum; around one and a half dollars a day or, to be precise, \$616 a year.³

Think what that might buy you today and you will get a sense of what the average person survived on in the early 1700s. Save it up for two or three days and in today's New York, London or Paris you might be able to afford a decent cheap meal. Spend it every day and you are looking at a couple of packs of crisps and a soft drink, or maybe a child's meal at a fast-food restaurant. Pretty soon you will probably decide on a daily intake of boiled cereals or pulses. Not tasty but filling and, most of all,

cheap. Probably not that dissimilar to what great x eight-grandmother laid on the table day in, day out.

To be fair, that \$616 a year is the global average for 1700. If your ancestors were lucky enough to live in one of the most 'advanced' economies of the time (Belgium, Denmark, Italy or Britain) they will be enjoying an income closer to \$1,000. Think what \$2 to \$3 could buy you today and lick your lips. Find yourself living in the absolute economic powerhouse of the time – Holland – and you will be touching the dizzy heights of \$2,130 a year: double the global average.

If this all sounds slightly incredible, consider that living into your fifties in the 1700s put you amongst the ranks of the long-lived. Average life expectancy in England, for example, was 35 years.⁴ Of course this figure is partly explained by the fact that medical science was worse than useless, public health was a concept yet to be invented and infant mortality was horribly high. But fundamentally life and work was physically hard, while diet was poor. Giving up the ghost after four or so decades was not a surprising outcome.

So bid your relatives a not so fond farewell and rush back to the 21st Century as fast as you can. What will you find when you get back?

You may be a bit more appreciative of the fact that the average global income today is around \$6,500; a 10-fold increase in just eight generations. In the most advanced economies, it is closer to \$20,000. That is a 20 times increase in income. For some countries that were dirt poor in 1700 but are very comfortable now (Finland, Norway and Japan), it is more like a factor of 30.

Imagine shifting from surviving in one of today's richest cities on a daily income of \$3 a day to \$54 a day. Like winning the lottery surely.

As a result, our expectations have shifted. Someone working full-time on the UK's minimum wage earns around £10,000 and the most basic unemployment benefit runs to over £3,000 a year. Poverty, on the official measure, kicks in when anyone falls below an income of around £13,000. So, someone now considered to be living in poverty in Britain is still 18 times better off than your distant relative from the 1700s. This is not to deny the hardship of a life lived in poverty today. But it is undoubtedly a relative form of poverty when viewed through historical eyes.

Such a growth in wealth over such a short period of time is remarkable not just for the improvement in human existence it has wrought but also because it reveals a truly amazing historical fact. This is that average income per head of around \$2.50 dollars a day in the early 1700s does not represent some historical low-point or grim blip. Quite the opposite. For the 130,000 years since homo sapiens first emerged on the plains of Africa, humankind managed to work themselves up to a *peak* of \$2.50 dollars a day. So, if you think 1700 sounds tough, be thankful you were not transported back to 1AD where you would have been struggling along on around \$1.20 a day and would have a life expectancy of around 25 years.

Put it this way: humankind managed to grow their incomes by about three times in the space of 130 millennia and then grew it by 10 to 30 times in just two and half centuries. Or as the economist Eric Beinhocker put it: "To summarise... economic history in brief: for a very, very, very long time not much happened; then all of a sudden, all hell broke loose."⁵

There has been a

10 fold

increase in average
global income in just
eight generations

No wonder that wise economic historian, Deirdre McCloskey, decided to call this extraordinary rise in living standards and wealth since around 1750 “The Great Fact”.⁶

Quality and quantity

Economists like measuring things and so they tend to focus on the things they can measure. Real income per head (what I have been writing about above) is one of those things. But as McCloskey herself points out those numbers fail to communicate the revolution that has occurred in the quality of the products and services we now purchase compared to 250 years ago.

If we are really trying to understand how much better off we are as a result of The Great Fact, we must surely incorporate this element of quality as well. Indeed, if we were to take the greater material benefit and ease we now enjoy into account, then the figures for income per head are surely exceptionally conservative.

William Nordhaus is an economist who has taken this problem seriously.⁷ He uses an example that all in the developed world now take for granted: artificial light. Nordhaus calculated that to achieve 1,000 lumen hours of lighting from a burning fire, our hunter-gatherer relatives would have had to put in around 50 hours of labour, nearly all spent collecting fuel. Neolithic oil lamps were only slightly less costly. The invention of the candle was a real leap – reducing the labour needed to five hours – and the best 19th century gas lamps took a quarter of an hour or more. These advances, however, dim into insignificance compared to those that have been made since 1900 – particularly through the use of electricity – with our world now being lit up with a fraction of a second’s labour.

But the real question here is not just how much more light we can buy with our labour but how much brighter, vivid and useable our surroundings are as a result. We have moved from the dim ambience of a wood fire on a dark night, to the flickering glow of a candle, to the reliable glare of electric light that can compete with brightest sunlit day. Light is not only much cheaper, it is also much higher quality and our lives incalculably better as a result. Think of your ancestors with their songs and games before bed not long after the sun went down. For them, darkness really meant something.

Other examples are easy to come by. A well-stocked library is no longer a sign of great wealth but instead simply indicates the fulfilment of a powerful desire to learn. Grandparents can now see real-time moving and speaking images of their growing grandchildren who live many miles away, rather than waiting for the occasional letter or crackly phone call. And any attempt to assess the deepening of human experience brought about by new forms of transport, from the bicycle to the jetliner, could well produce enough words to fill that well-stocked library.

Nordhaus has been more methodical. Taking a long list of different areas of consumption, he reckons they fall into three categories. Those that have undergone ‘run of the mill’ improvements over the last 200 or so years. These include clothing, furniture and personal care. Those that have enjoyed ‘seismic’ change; meaning the goods are still fundamentally recognisable when compared to the early 19th century, but have seen great improvements in quality. Here he puts categories such as cleaning,

watches, housing and education. Finally, there are areas of consumption that have seen ‘tectonic’ change, with products fundamentally transformed compared to 200 years ago. Nordhaus places household appliances, telephones, medical care, transport and electronics here.

He estimates that no less than three-quarters of all the products we surround ourselves with and use have undergone either major qualitative change or are now so improved that they are fundamentally different products from those used by our not-so-distant ancestors.

So the discoveries of the last 250 years have not only radically increased the amount of stuff we can buy, but has also vastly enhanced the quality of that stuff. It is difficult to quantify this in financial terms (that is part of the point) but the brave Nordhaus has had a stab. He reckons that between 1800 and 1992 – if we take into account the actual improvement in the quality of the things we use – real income per head has increased not by around 10 times but by anything between 40 and 190 times.

Diversity, as well ...

Alongside quantity and quality, there is a third aspect to the explosion in value. That is the increase in the diversity of what we are able to purchase. A number of thinkers have tried to give a sense of the vast array of product choices we now have available to us. Writing in the early 1990s, Henry Petroski pointed out that over 5 million patents had been issued in the US and that there were a staggering 10 million artificially produced chemical substances registered with the Chemical Society.⁸

Of course, a simple trip to a large supermarket is all that is needed to convince anyone of the range of products available. The UK’s biggest supermarket chain, Tesco, carries 40,000 products in its largest branches. A figure that is made, perhaps, only more striking when one considers that these 40,000 products are classified under only the handful of headings we can see on every supermarket’s signage.

In other words, the main types of things a supermarket sells such as fresh fruit and vegetables, confectionary, meat, fish, alcoholic drinks and toiletries, are not that different to the goods that have been purchased in the average market square for centuries. It is *within* those categories that there has been an astounding explosion of choice.

Eric Beinhocker has attempted to work out the extent of this explosion. Using a calculation based on the bar code system that assigns a unique number to every commodity, he estimates that our economy is currently flooded with about 12 billion different products. He puts that in perspective by pointing out that such a figure vastly outstrips the number of species on earth which, at upper estimates, are numbered at around a measly 1 billion.⁹

How does this compare to our hunter-gatherer or early farmer selves? Looking at current examples of human societies that still operate under these older economic conditions, Beinhocker reckons somewhere between 300 and 800 items were available for use and exchange. Although, Beinhocker does not discuss the 1700s in this context, given what we know about the very significant rise in purchasing power since then, it is surely safe to assume that while our 18th Century selves probably had a much wider choice than our Stone Age relatives, the bulk of that explosion from around 800 goods to 12 billion goods must have occurred in the last 250 years.

These figures are well-informed guesses but they do give a good sense of the scale of the change we have enjoyed. In fact, they may be quite conservative guesses. Beinhocker has focused on the sorts of tangible products you can slip in a shopping basket. If one were to include the vast range of services now available – everything from plumbers and plasterers, to accountants and aromatherapists – the sheer scope of the marketplace is enough to induce vertigo.

... And a life of opportunity

One does not have to listen hard to hear the collective sniffing of a hundred greybeards shaking their heads at all this. ‘That is all very well’, they say. ‘But really, are we any better off?’

Have we not learnt from such experienced economists as Richards Layard¹⁰ and Easterlin¹¹ that above a surprisingly low level of wealth we cease to get any happier? Maybe the life of an 18th century farmer’s wife was pretty tough but fast forward 100 years or maybe 150 and are we really that much more content than our great, great grandparents?

A definitive ‘yes’, I would say. We live more varied, more entertaining, more comfortable, more fascinating, more thrilling, tastier, sportier, colourful lives than even our grandparents.

Think about all the products and services that give you joy. Not just shallow three minute joy but great days out with friends and families or constant on-line connection with loved ones – joy. Notice how many of them were not around 50 years ago. Of course, not all of us can take advantage of these things to the full, but a heck of a lot of us can. In fact, enough of us to fret about the impoverished existence of the minority living under £13,000 per year.

And if you worry much about the shallow consumerism this implies, Deirdre McCloskey has a response.¹² She points out that an explosion of ‘capabilities’ – the capacity and freedom to live to your full potential – has run alongside this explosion of wealth. As McCloskey says, museums and concert halls are full to bursting in the advanced economies these days. More people go to university in Europe now than the total population of the continent in 1800. She quotes the economist, Tyler Cowen, who estimates that there are more artists alive today than have existed in all previous ages combined.

We can also quibble how much of this opportunity for personal growth is due to the actions of the state and how much to the commercial operations that have driven the rise in wealth over the last two and a bit centuries. Universities, concert halls and museums do a fair bit of leaning on the taxpayer, after all.

But you do not get much tax out of a peasant surviving on \$3 a day. At least, not without some sorry monarch finding his head and his body on the opposite sides of an axe blade. The capacity of the state to raise very large sums of money for the supposedly better things in life, and our willingness to give it up without resorting to arms, must surely, to some rather high degree, be directly related to the much greater material wealth and comfort we now enjoy.

Nevertheless, it is true that the huge upside of the advances in the generation of value does not come unadulterated. There are very real and painful human costs associated with the economic destruction that can

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be wrought by the commercial innovations that have brought about our better lives. There are often negative social, political, cultural and environmental side-effects too. We should acknowledge, analyse and subject these problems to their own innovative and energetic solutions.

The challenge we ultimately face, however, is not to denigrate or belittle the greater wealth and opportunity generated over the last 250 years but to share it and to understand how we can address the downsides, without sucking the life out of the human energy and initiative that generated the upside. This is a challenge I tentatively begin to address in the final chapter of this pamphlet.

The explosion of value

All of these calculations and estimates tell us something very important about The Great Fact. That is that the world has undergone three revolutions in its economic activity since the 1700s: revolutions of quantity, quality and diversity. In other words, we can now buy far more things, far better things and a far wider range of things than could ever have been imagined two and a half centuries ago.

The consequence is that we have seen an explosion of value since the mid-1700s. Humanity has got much, much, much better at making things people value. And increasing numbers of us have lapped it up over the decades and centuries. So not only can billions of us now live lives filled with stuff we want and like but we are far better off materially because our economies are so much more vibrant as a result.

Your great, great, great, great, great, great, great, great grandparents might just be proud.

The worm-holes of value

Any fan of science fiction or popular books on cosmology will have come across the idea of the worm-hole. But for the benefit of the non-trekkies out there: a worm-hole is a type of tunnel that acts like a shortcut across space and time. It is a way for an object (like a spacecraft) to get from one point in the universe to another very distant point much more quickly than normal. Apparently Einstein's theory of relativity makes worm-holes possible although no-one (outside Isaac Asimov's novels and those of his imitators) has ever detected let alone gone down one.

It might not be quite as exciting as the idea of travelling from one galaxy to another in a matter of minutes but worm-holes in the world of value generation have been around for 250 years. In fact, we can say with some precision that we have travelled down five of these wormholes since 1771.

What I mean by a value worm-hole is a period of intense innovation and enterprise, which suddenly speeds up the pace at which the quantity, quality and diversity of the things we buy improves. Like bog standard space travel, everyday business activity plods along incrementally improving products all the time. But every now and then, one or more particularly talented entrepreneur stumbles across a worm-hole and suddenly things get much better much more quickly.

Another unorthodox economist, who like Deirdre McCloskey has found history rather than maths a better guide to understanding the economy, is Carlota Perez. It is Perez who argues that there have been five worm-holes (although she opts for the much more serious 'techno-economic paradigm' as a name) since the mid-1700s.¹³

The first is of course, the industrial revolution. At its heart, was the recognition by highly inventive types that mechanisation could bring about a radical change in the production of goods. Machines could produce things much more quickly, more consistently and far more cheaply than humans alone. As a result, prices could fall and more people could buy the things they needed.

As with all the value worm-holes, there was not a single eureka moment in the industrial revolution. Worm-holes are constituted of a series of highly complex and continuing refinements of existing technologies that draw heavily on earlier changes. Having said that, one figure always seems to emerge who draws all the different elements together at the right time, in the right place, to become an iconic figure for a generation of entrepreneurs.

In the case of the industrial revolution it was Richard Arkwright and the opening of his fully mechanised textile mill in 1771 at Cromford.

This event and Arkwright himself came to symbolise the massive leap forward in productive capacity in a whole range of areas over the coming decades.

The Cromford factory set a precedent for all future value worm-holes by revealing how the leap forward was about far more than just the application of new technologies. For a start, the reorganisation of the way humans work on a product was also highly significant. For Arkwright and his contemporaries, mechanisation meant the creation of the factory system where low skilled workers took part in a process that was divided into a range of simple tasks, each with its own dedicated group of employees. Famously, the mechanisation of the industrial revolution began a long process that spelt the end for whole markets based on the skilled craftsman working on raw material through to finished commodity.

New sources of energy and application were also important. Arkwright had little choice but to use rivers and streams to drive his cotton spinning machine (which led to it being called the ‘water frame’). But looking back, we can see how breakthroughs in power generation, such as electricity and oil, helped to transform and improve the generation of value in later periods of intense innovation.

Indeed, Perez argues that the next worm-hole after the Industrial Revolution was the arrival of the age of steam. This began with the test of George Stephenson’s Rocket between Liverpool and Manchester in 1829 although earlier static steam engines had been developed and applied by the likes of Boulton, Watt and others. This took the advances of the industrial revolution to a new level. Not only did the efficient steam engine transform the power that could run factories but a revolution in transportation meant much larger markets at the national and then global scale could be reached faster, more easily and more cheaply.

Scale now became a goal with bigger factories (which no longer had to be located near flowing water for their power source) springing up to create the great industrial cities of the Victorian era.

So worm-holes are, in fact, extraordinarily complex phenomena combining many different technological, organisational and social elements. But they have been very effective for all that complexity.

The combination of the mechanisation of the industrial revolution and efficient steam engines, for example, had a huge impact on productivity and cost. Consumption rates for cotton went stratospheric rising from 5 million pounds in 1800 to 525 million pounds by the middle of the century.¹⁴ Iron, the metal that symbolised everything modern at the time, underwent its own revolution. Between 1788 and 1815, wrought iron production grew by 500 per cent and its price fell from £22 per ton to £14 per ton in the first decade and a half of the 19th century.¹⁵

The third worm-hole identified by Perez, however, saw iron usurped as the king of commercial metals. The great American industrialist, Andrew Carnegie opened his Bessemer process steelworks in Pittsburgh in 1875. Steel, preferable to iron for its greater strength and lighter weight, dropped rapidly in price to a sixth of its original value. An era of vast infrastructure projects and heavy industry was opened as a result. Machinery got bigger and more reliable and factories got even larger serving huge global markets. Simultaneously, electricity began to replace steam as a cheap and reliable form of factory power.

Between 1788 and 1815, wrought iron production grew by

500%

This was the era of standardisation and breakthroughs in accounting techniques that ruthlessly drove efficiency controlling cost and hence prices. A new professional managerial class developed ready to apply scientific technique to the running of factories and distribution systems, alongside the advances science had encouraged in the actual production process itself.

In each of these three cases – the industrial revolution and the ages of first steam and then steel – value worm-holes revealed their enormous power. Alert entrepreneurs, with expertise and experience in different sectors, noticed how a whole new way of doing business could be created by applying new technologies and organisational approaches. These could radically reduce costs of production and drive up quality, allowing them to create new goods that no-one had experienced before. Those entrepreneurs who moved quickly and competently enough could make themselves rich but more importantly they played a critical role in helping humankind to get much better at producing value.

Although these shifts were highly disruptive - forcing less nimble firms into bankruptcy, creating unemployment and not always changing working lives for the better (at least initially) - they ultimately helped create periods of major economic growth, as prices dropped and new markets were developed leading consumers to buy, investment to rise and new jobs to appear. Indeed, surveying this history led the Austrian economist Joseph Schumpeter to describe the modern economy as a constant process of 'creative destruction'.¹⁶

Value worm-holes of the 20th century

Schumpeter's term was never more appropriate than in the first 60 years of the 20th century. For in 1908, the world was thrust down a new worm-hole that brought about the most significant change since Arkwright began tinkering with yarn and thread. In that year, the first Model T rolled out of Henry Ford's factory in Detroit.

At one level, what Ford did in Detroit was bizarrely simple. Instead of bringing workers and parts to a static chassis, he pulled the chassis through a long line of workers each of whom added one or a limited number of parts. With continuous refinement, this innovation reduced the number of man hours needed to produce each chassis from 12 to two and a half hours by 1913.¹⁷ And even though Ford paid his workers almost three times more than they had been paid under the old techniques, the impact on the price and scale of production was astounding. The cost of a Model T fell from \$850 in 1908 to \$360 by 1916.¹⁸ By 1908 Ford had sold under 6,000 cars; eight years later he had sold half a million.¹⁹

But Ford, and the other entrepreneurs who applied his ideas to a wide range of other sectors over the next 50 years, did far more than just introduce the assembly line. They found a way to apply the insights and approaches that had been built up over the last 150 years to allow an explosion of value in the world of the ordinary consumer. The productivity of mechanisation and the division of labour, the toughness of steel, the efficiency of electricity, the scientific application of human capital, the use of standard parts, the improved speed and reliability of transport systems and a whole range of other breakthroughs, were applied in one incredibly fertile period. This allowed millions to enjoy the benefits of

value generation in a way that had not happened before with anything like the same intensity.

Barely a sector was left untouched by this transformation. Goods, once considered the height of luxury, available only to the wealthiest, could be produced in quantities and at a price affordable to the working masses.

The impact on lifestyles and living standards was extraordinary. Particularly after the Second World War, when full-throated mass production spread across the Atlantic. In 1955 just 18 per cent of households in the UK had a washing machine, by 1975 the proportion had risen to 70 per cent.

Television ownership soared from 19 per cent of households to 96 per cent over the same period and the presence of central heating systems rose from 5 per cent of homes to 47 per cent.²⁰

Mass production did not just transform the cost and quantity of goods, it also initiated a period of intense improvement in another feature of value generation: the quality of goods. Steven Payson has studied the ways commodities produced human satisfaction during the 20th century. As you might expect those goods that have undergone scientific revolutions, such as cameras and air conditioning systems, have improved explosively but Payson also found that utterly mundane everyday goods have also got much better. Using an analysis of price as a proxy for how much consumers value goods, he estimates that men's shoes improved in quality by 2.7 per cent every year between 1928 and 1993, sofas by 2.1 per cent and gas cookers by 2.8 per cent.²¹

This explosion of value transformed home life, particularly for women. It has been estimated that the time spent on household chores fell from 58 hours per week in 1900 to 18 in 1975.²² The key driver of this change was, of course, the hugely popular time-saving devices for cooking and cleaning that sold in their millions over this period.

The way households could spend their money also changed. Stanley Lebergott has discovered that the average 1900 American family spent no less than 83 per cent of their expenditure on four things: food, rent or mortgage payments, clothes and running the household.²³ By 1999 this had fallen to 47 per cent with most of the rest now being spent on recreation, transport and healthcare.²⁴

Choice takes off

Mass production showed how improvements in factory processes could be more extraordinarily transformatory than before. More, better and new products would completely rewrite the way we live for the good.

Mass production had a problem though. It was exceptionally efficient at producing lots of cheap, standard goods, many of which were highly innovative and novel. But it was terrible at producing lots of different versions of a commodity and certainly not shifting rapidly and cheaply between one version and another. Such changes required major rethinks and retooling of production processes, all of which took lots of time and money and, even worse, often meant that the actual production process had to come to a halt.

This problem grew during the 1950s and 1960s as consumers became more sophisticated. Customers increasingly wanted products that were distinct and met their specific needs and tastes. This was a double

The flexible production approach recognised that not only did machinery need to be able to adapt to different tasks rapidly but workers also had to be able to rethink their roles at speed.

problem. Not only were consumers frustrated by a lack of choice but the inflexibility of mass production made it risky at a time of rapidly shifting tastes. Producing millions of items, which suddenly fall out of fashion before they are sold, is not a problem any business owner wants.

This led to the next value worm-hole: flexible production. As with mass production, a number of entrepreneurs had experimented with and introduced aspects of the approach. But it was the Toyota car company, led by Eiji Toyoda, that showed the world what could be done.

Toyota and, soon after, many others made extensive use of the newly cheap and powerful technology of computers (made possible by Intel's launch of the microchip in 1970) to massively improve the flow of information about customer behaviour into the decision-making centres of the firm. Computer power was also used to improve the efficiency of the design and manufacturing process.

Once again, it was a rethink of human organisation – alongside technological advance – that stimulated the breakthrough. Most notably, the flexible production approach recognised that not only did machinery need to be able to adapt to different tasks rapidly but workers also had to be able to rethink their roles at speed. The traditional image of the mass production worker who does nothing more than pull a lever or screw on a bolt was replaced by more proactive teams of workers, with varied skills and greater autonomy to make decisions for themselves.

The result throughout the 1980s and 1990s was a great expansion in the variety of goods being sold. Again, few sectors were safe.

The number of car models for sale in the US jumped by a third in just eight years between 1982 and 1990 from 151 models to 205.²⁵ Until the late 1980s, the only variant in baby nappy was size. By the end of the 1990s, one brand of nappy – Proctor and Gamble's Pampers – had 13 different versions.²⁶

While the food industry in the UK introduced 1,030 new products in 1970, this had doubled to 2,016 new introductions in 1980 and had multiplied by nine times by 1990 with 9,192 new introductions. The beverage market alone saw 2,000 new products each year at this time. In the US, different brands of cereal rose from 88 to 205 in just 10 years between 1980 and 1990.²⁷ By the early 1990s, over 20,000 new lines were being introduced into UK supermarkets every year.²⁸

Brands that had survived perfectly well with one or two varieties for decades, found they had to produce dozens of products to meet consumer demand and stay profitable. Crest and Colgate between them were producing 35 different types of toothpaste by the early 1990s.²⁹ Even a relatively new industry, such as the personal computer market, already had 2,000 models available before mass ownership had taken off.³⁰ Toshiba alone produced 30 different varieties of laptop between 1986 and 1990.³¹

This was all made possible by the application of new technologies in a new organisational context. Henry Ford would have been gobsmacked, if he could have seen how General Motors was able for the first time in 1988 to adapt one of their factories to produce the prototype of their 1989 models over one weekend and then have the factory recalibrated to continue producing the 1988 model before the first shift of workers arrived on Monday morning.³² His vision of the 'universal car' suitable for every household was well and truly rendered obsolete.

Flexible production and the rise of the east

One other element of the shift to flexible production was to prove extremely important as the 1990s got underway. This was the dis-integration of the factory. The traditional approach of mass production was to bring all processes together in one location, with raw materials coming in one end of the factory and fully-formed commodities emerging out of the other.

However, it became clear that future market advantage rested on the capacity to control a highly flexible system and to design products rapidly to meet changing tastes and demands. The logic of concentrating all of the processes in one place became weaker. Indeed the opposite became true. A firm could be more flexible by picking and choosing on a regular basis between suppliers with varying outputs.

Outsourcing thus became a great trend of the 1990s and 2000s. The biggest beneficiaries of this shift were not just the consumers of the advanced economies but also the companies and employees of South East Asia, Latin America and China who were ready to make substantial profits from this shift.

For these countries, the result has been a stunning improvement in living standards and wealth. For the last 35 years, the average GDP growth rate in China has been around 8 per cent.³³ The number of Chinese people in poverty has dropped by 10 million every year.³⁴ The World Bank estimates that the number of people in East Asia and the Pacific living on 1 dollar a day has fallen from close to half a billion in 1990 to under 100 million today.³⁵

Innovation worm-holes are extraordinarily disruptive but, ultimately, they are the drivers of quantity, quality and diversity and of 'the Great Fact'. Brilliant entrepreneurs take the advances of previous generations, they add in new technologies, rethink production and wider business processes. Beneficial change ultimately results. The historical evidence for that is overwhelming.

How exciting then to be around as we enter a new worm-hole.

Down a new worm-hole: self-generated value

Things are not going well. The daily headlines scream about high unemployment, stubbornly low growth, fiscal and monetary crisis. The human suffering behind these headlines is real and immediate; it is hardly surprising that politicians, their economic advisers and the wider public remain focused on these problems. It would be an inhumane society that did otherwise.

However, there is no reason to give up hope. Recessions, even very deep ones, come and go. But what has not disappeared over the last 250 years is the entrepreneurial drive and innovation, which has improved living standards and quality of life beyond all imagining.

Despair and pessimism afflicted those who lived through the devastating recessions of the 1870s, early 1920s, the 1930s and 1980s. In each case, politics became fraught, even murderous. Society seemed to be cracking in places as whole communities were thrust into poverty. At times, public order and respect for the law broke down. But, amongst all the noise, much deeper transformations were underway in how business was done and the way value was generated. Whether it was the development of heavy industry, mass production or flexible production, entrepreneurs like Carnegie, Ford or Toyoda, and countless unnamed others, were sowing the seeds of a new leap in value generation. This would pull economies out of their slumps, drive up living standards and quality of life well beyond what existed before the crisis.

This is just as true today as it was then. We are now a decade or so into the latest worm-hole in the generation of value. Its driving technology is the interactive web, its preferred business model, is open and highly creative. Its leading entrepreneurs are already business heroes: Mark Zuckerberg, Sergey Brin, Jack Dorsey amongst others.

Just as in the past, behind this innovative leap is a conceptual shift in value generation that has deep implications for the quantity, quality and diversity of the products and services we consume.

This exciting shift is the self-generation of value (SGV). In effect, in a growing number of areas, the consumer no longer has to rely on the insight of the entrepreneur to obtain value. Instead, the consumer can generate that value for him or herself.

Think, for example, how the most potent source of detailed factual knowledge across the world is now an online encyclopaedia written by its readers. Or how one of the fastest growing human networks is made up

of millions of pages with each one created by the users themselves. Or note that one of the most successful toy companies now lets its customers design their own products.

This is a radical shift. But it is also a logical extension of everything that has been happening over the last 250 years. During that time, wealth has accumulated to those entrepreneurs and those firms that have most precisely met the demand for value from customers.

The most effective entrepreneurs found new ways of applying modern technologies and company organisation to create goods and services which more closely matched the needs and desires of their customers. That matching could be quite basic: for example, simply producing items in enough volume and at a low enough price to allow customers to fulfil their wishes to own and use a coat, an electric light bulb or a central heating system.

Or the matching could be much more sophisticated, particularly as flexible production enabled a vast expansion of choice allowing very diverse needs and tastes of customers to be met whether that be in the seat fabric used in a new car, television channels devoted solely to sport or an obscure flavour of a pack of crisps.

But in every case, the driving force is the entrepreneurial goal of creating greater value for the consumer by ever more precisely fulfilling their desire for a particular good by making more things, higher quality things and more diverse things.

It is a small conceptual leap (although a big technological and organisational one) from that to the idea of consumers being provided with the tools by entrepreneurs to control aspects of the process of production itself, to start to generate value that meets their own very specific, individual needs and desires.

The extent to which this transformation varies across sectors and areas of production and consumption is still great. A cursory look at some of the most important processes involved in the running of a business, quickly reveal a highly innovative dynamic taking hold that is shifting the control of value generation from businesses to consumers.

Research and development

The best known and most studied area of this shift is research and development (R&D). Numerous books and articles have been published since Henry Chesbrough first wrote about the trend in 2002 and labelled it *open innovation*.³⁶

For centuries research and development has been the element of the entrepreneurial process that has been the most secretive and most closely guarded by companies. The reason was obvious: great competitive advantage could be secured by a firm that used its R&D to find ways of generating greater value for customers. Giving away ideas to others was universally regarded as a disaster. Even Richard Arkwright spent years in patent battles with his competitors.

But as Chesbrough and others have now documented, something radical has happened in the world of R&D. Diverse companies, from vast corporations to brand new, one person start-ups are discovering that competitive advantage can now be seized by opening up the R&D process to allow customers (and even competitors) to get involved.

Many of the examples of open innovation are now very well-known and the practice is fast becoming a staple feature of business strategy. For a decade, Proctor and Gamble run a programme called *Connect and Develop*, which enables customers to create new products or improve existing ones. As I hinted above, Lego has been an open innovation trailblazer with its Mindstorm range and Design by Me software, which allows customers to modify and design their own toy. Nissan's Project 370Z is designing a car online in partnership with customers and motoring enthusiasts across the world. Many corporations of similar standing – Nike, Converse, Virgin and Starbucks to name just four – are making open innovation a mainstream part of their business process.

There are many new companies that have been built around the very concept of open innovation. Threadless is widely quoted as a success story in the fashion world, where the firm's USP is that it allows customers to design their own T-shirts online. It then manufactures and sells the most popular designs decided by a vote of visitors to the site. Scores of similar start-ups are now emerging: Chocri and Chocomize in the confectionary market; GemKitty, Delusha and Art of Jewels for jewellery; the well-named Blank Label and Shirtsmyway in fashion; and even the world of breakfast cereals is graced by open innovation firms in the shape of MixMyGranola and MeandGoji.

Notably a number of more generic sites now exist to enable companies and entrepreneurs to undertake open innovation. The most famous is probably Innocentive which allows firms to offer cash rewards to those who can solve their knottiest R&D problems, many of which require detailed technical expertise. The site claims to solve one third of all problems posted.

A newer site based in Germany is unserAller, which provides a general space for companies to work with potential customers in the development of a new product. The site's first project involved 11,000 people in the development of a new range of condiments for a Bavarian food company. Going a step further, Quirky is a new company that is built precisely around open innovation by encouraging individuals to submit ideas and designs for products, which it then develops and manufactures for sale, sharing revenues with the initiator of the project.

Production

The internet has, to date, been primarily about the sharing and manipulation of information, so it is maybe unsurprising that it is R&D, as the most knowledge-driven part of a business, which has proved most immediately susceptible to the shift to self-generated value. However, the interactive web is now opening up opportunities for the self-generation of value well beyond the R&D sphere.

For example, customers are increasingly directly involved in the production of the good itself. Indeed, even before the internet, one of personal computing's achievements was the rapid emergence of desktop publishing in the late 1980s, which allowed millions to produce high-quality documents in a form that would have previously required the services of a professional printer, designer or publisher.

The rise of the interactive web has famously allowed millions to produce content directly for themselves and others in far more significant

ways. Indeed, the biggest success stories since the emergence of the interactive web have been those sites which offer blank slates upon which users inscribe their own value and meaning: Facebook, Twitter, YouTube, Wikipedia. But countless blogs and forums sit alongside these behemoths providing a multitude of examples of how consumers are now themselves generating value in a form that was once the preserve of assorted professionals and the businesses that employed them.

However, it would be wrong to believe that the self-generated value transformation is restricted to the direct production of knowledge-based goods like articles, tweets and advice. Before long, the web when linked with other technologies is likely to allow consumers direct engagement with the production of tangible, manufactured goods as well.

At the heart of this trend is the 3D printer, a machine used by product designers to manufacture prototypes for over twenty years. Using liquid plastics and resins, a 3D printer does exactly what its name suggests, it 'prints' out usable objects. Those objects are designed on a computer linked to the machine.

The technology behind 3D printing is developing fast. It is becoming more sophisticated and is being used more widely by engineers and others to produce spare parts, tools and other items in highly customised forms. *The Economist* went as far as describing the rise of 3D printing as a "third industrial revolution" to follow the original industrial revolution and then mass production.³⁷

Most of those working in the field recognise that the really major transformation will occur when 3D printing technology becomes sophisticated and cheap enough for the machine to be located in the consumer's own home. Then the self-generated value transformation will have moved into the whole new world of manufactured goods. Customers will not only be able to print off products they may need using off-the-peg designs, they will also be able to manipulate these to customise products to meet their own specific desires and needs.

For the time being, while the machinery remains expensive and complex, the burden is falling to new companies like Quirky, MakerBot and Cubify to act as intermediaries for customers who want to manufacture their own products; just as early stage desktop publishing was provided by companies before individual users were able to afford the PCs and printers needed to produce quality publications.

Marketing

It may seem strange to think of marketing as something that adds value to a good. But it does. At its most basic, marketing simply draws a product to a customer's attention. This, in itself, imbues the product with value for the consumer; it is impossible to assess whether an item has value for yourself if you do not even know of its existence. But marketing is clearly much, much more than this today. As numerous commentators have noticed since the 1960s our purchasing decisions are deeply affected by the meanings we associate with a product. Marketing is key to shaping those meanings. If I believe a certain car makes me more attractive or that a breakfast cereal gives me a kick-start in the morning, or that a clothing brand makes me a more authentic person, then those products have a greater value for me than they otherwise

would have. That value is fundamentally driven by the sophisticated techniques of marketing.

Marketing is another business process increasingly opening up to direct consumer involvement. In one of its forms, this involvement is little different from the methods of open innovation detailed above. Customers are being provided with the tools to shape marketing strategies and initiatives. Numerous companies now have programmes where customers come up with the ideas for commercials or, increasingly commonly, let customers make the ads themselves for products in ways which were previously the strict preserve of multi-million pound advertising firms. Sony, L'Oreal, Toyota, Nike and Mastercard have all been pioneers in this field. Perhaps the most striking example is the annual event in which Pepsi and Doritos now offer a \$5 million prize to whoever submits the best commercial for their products to be aired during the US's biggest sporting event, the Superbowl.

Social media sites like Facebook and Twitter now play a central role in the promotion of products and services, sometimes in ways that are planned by companies themselves but very often in ways that are outside the control of those firms.

A more profound development in the marketing sphere comes in the shape of the rapidly growing importance of peer-to-peer recommendation made possible by the web. General social media sites like Facebook and Twitter now play a central role in the promotion of products and services, sometimes in ways that are planned by companies themselves but very often in ways that are outside the control of those firms. According to one study, over a third of Twitter's daily users ask their followers for opinions about products and services.³⁸ One survey found that the number of people saying they trust word of mouth over all other forms of advertising had risen by 18 per cent to 92 per cent between 2007 and 2011.³⁹ This is why companies like Tesco and Skechers are incorporating peer-to-peer recommending into their customer loyalty and reward schemes.

Even more marketing power is accruing to independent sites outside the direct influence of any one business. Tripadvisor may be the best known of these but other sites like Mumsnet, Mulu and 50ofriends are influencing marketing approaches in new ways. Meanwhile, the rise of the mobile app adds in a new dimension, allowing shoppers to check peer reviews with ease online, as they wander round real shops: MyShopanion lets customers scan barcodes to view reviews, while ItSpot tells shoppers what other people are buying nearby.

Of course, 'word of mouth' has always played a major role in a company's success but the web has allowed this aspect of marketing to become increasingly significant in its impact and far more detailed and precise in its discussions of specific aspects of a firm's product.

Perhaps the most significant area of change in relation to marketing is in the realm of personal data: the life-blood of marketing. Data allows business to present products in ways which their diverse customers will find appealing.

The web offers a vast wave of data to marketers which, in the past, they could never have hoped to access. All sorts of information about customers or potential customers can be gleaned both from the data we input while online (everything from dates of birth to lengthy comments) and from our online behaviour, including what sites we visit, how we use them and how long we stay.

Gradually, consumers are beginning to realise not only that they have a right to control their own data and how it is used but also that it has

a monetary value for companies that want to sell us things. Hence, the emergence (still in their very early stages) of ‘data locker’ sites such as Personal, Singly and Reputation. These offer users the opportunity to concentrate all their data and then pass it on to other organisations as they see fit and in return for certain benefits, which may include access to special offers or even cash payment.

The author Doc Searls (about whom more below) argues that we will soon move to the next stage where online data is seen entirely as the possession of the user who generated it and whose permission will always be required before a company or any other organisation has the right to use it.⁴⁰ There are, of course, many battles over data protection currently raging and still to be fought before we reach this stage. However, the initial signs are of a grassroots drive to take direct control data, no matter what the courts or policy-makers may say.

The bottom line is that the information that has long underpinned marketing techniques has the potential to become far more tightly controlled by the customer rather than the firm.

Pricing and distribution

Even that most hallowed part of the firm’s operation – the setting of the price of a product – is being stormed by the consumer hordes. Most of us are aware of how the web has made it far easier to compare prices. The sites that allow this are now big business; there are no less than three major sites dedicated to comparison of insurance and other financial services in the UK, locked in a seemingly unending and noisy marketing battle for our affections.

However, this ability to compare prices – something consumers have always done, of course – does not amount to a self-generated value shift. But that is now beginning to occur as consumers start to actually find ways of setting prices. This is happening most dramatically with the mushrooming of sites dedicated to getting consumers to club together to negotiate on price over a product the ‘crowd’ desires. Handsup in China, Galoo in Greece, United Consumers in Holland, Priceline in the US, and a host of others around the world; all operate models that enable customers to name their desired price and negotiate bids with a supplier.

A similar trend is occurring in the sphere of distribution with customers clubbing together online through sites such as DemandIt, Tugg and (again) Handsup, to gain access to products online, to have favourite films shown in their local cinema, or to get particular bands to come and perform in their area.

As online shopping grabs an ever-rising share of the retail market, customers are also exerting greater control over when their purchases are delivered. Particularly in the grocery sector, customers are now able to specify a day and time for delivery down to the nearest hour.

There are whole sectors of the economy where delivery has fallen with even greater rapidity and intensity directly under the control of the customer. Music, film and written publications can now be discovered, purchased and enjoyed literally within a matter of seconds as long as your broadband connection is good enough. We have adjusted so rapidly to these changes that we have already begun to take them for granted, forgetting how much more control we have gained over the distribution

of these goods. It seems almost quaint to recall the trudge to the nearest music, video or book store, sometimes followed by a wait of days or even weeks while a particular product was ordered in.

This shift in control over distribution is, in fact, way ahead of the control we have as consumers over pricing. Crowds of customers creating value for themselves by lowering prices is undoubtedly a growing phenomenon but there is still something clunky about it. Our more common experience in the marketplace is of not having to club together with others to generate value through price-setting. We simply want to be able to pay the best rates for the best goods that most precisely meet our needs (cost, quality and precision, once again) with the minimum of fuss. Given the dynamism of the self-generated value phenomenon, the time when we can demand a certain price as an individual consumer may not be far off.

SGV: more than 'prosumption'

So SGV is a dynamic shift in value generation revolutionising many different elements associated with a business and transforming whole sectors. But it is vital we understand precisely what is going on.

A considerable number of commentators have noted how the interactive web has broken down the traditional barriers between producers and consumers. Famously Alvin Toffler forecast the trend three decades ago and labelled it 'prosumption'.⁴¹ More recently, Don Tapscott and Anthony Williams have proclaimed the dizzying acceleration of the shift and ascribed many different phenomena to its emergence.⁴²

While the notion of prosumption effectively describes the very phenomena I analyse here, there is something off-beam about the concept, which means we fail to fully appreciate what is occurring.

The focus of prosumption and its associated analysis is on process. This is inevitable: the idea starts with the notion that what is happening is a breakdown between two economic processes that are now being synthesised. This focus risks losing sight of what is more important: the ultimate end of production and consumption, the generation and use of value. What is truly revolutionary about the new worm-hole is not the collapse of the distinction between production and consumption *per se* but the new capacity of individuals to start generating value for themselves in ways which continue the capitalist trend towards the creation of ever greater value for millions of consumers.

Prosumption enthusiasts make the same mistake as those who thought what was revolutionary about mass production was the assembly line. Or that the point of flexible production was its use of computer technologies. Of course, these things were of fundamental importance but the real purpose of mass and flexible production was to produce cheaper goods *en masse* and to produce more diverse goods.

This point is absolutely vital. Too many writers are being led down analytical cul-de-sacs asserting that prosumption returns us to an era before the industrial revolution artificially divorced production from consumption.⁴³ Or that some form of Marxist revolution is unfolding with prosumers, rather than workers, seizing control of the means of production.⁴⁴ Or that prosumption will usher in an era of mass collaboration between 'prosumers' unsullied by the individualism or profit-seeking of business.⁴⁵

All of these assertions fail to recognise that presumption, or what I believe is better named 'self-generated value', is one further leap forward in the capacity to generate value originally unleashed by the industrial revolution. As with all previous such leaps forward, the big benefit of self-generated value is that it will ultimately make very large numbers of people much wealthier by creating better and cheaper products and services which more people can afford to buy and want to buy. In effect, we will have got even better at creating value for each other by allowing much larger numbers of people and, in particular, the customers themselves to get directly involved in the processes that create that value.

SGV: an unfinished revolution

Self-generated value is a relatively new development. The World Wide Web is about 20 years old and its full interactive potential was only realised around 10 years ago. If compared to mass production and flexible production, that puts us somewhere equivalent for those technologies around 1930 and 1990 respectively. That means self-generated value (assuming it follows previous patterns) is well developed, is getting increasingly established and causing real disruption in some sectors but still has its greatest period ahead of it. So any assessments about its full impact remain speculative, based on initial trends and nothing more.

This is where visionary thinker Doc Searls returns. He is brave enough to speculate in his book *The Intention Economy*⁴⁶ about where these trends are taking us. For Searls, the irresistible dynamic of the web is the restructuring of the marketplace around the precise intentions of the customer at the expense of whole areas once controlled by the firm.

The real breakthrough, he argues, will come over the next five to 10 years as it becomes more and more common for consumers to simply go to the web and say 'this is what I want' and expect suppliers to meet their demands. In the area of price this effectively means markets could become vast Dutch auctions where companies are constantly struggling to undercut each other as customers' requests flow in.

Doc admits that the technology behind such a shift is still in development (what he calls 'vendor relationship management' software analogous to the 'customer relationship management' software so ubiquitous to businesses now) and that it will require a new strata of firms who are able to manage the flow of offers to customers as they post their demands online. But the technology is in active development and there are already firms able to offer such a service. An interesting example is Flightfox, which allows customers to state the price they want to pay for a flight plus a finder's fee on top and then launches a 'contest' amongst its network of travel specialists to see which one can find the price closest to the customer's request. More general examples of firms whose goal is to act on behalf of individual customers to turn their economic intentions into reality include Mydex, Connect.me and Azigo.

I'm not sure Doc has completely captured the highly active role in the generation of value that consumers seem to increasingly desire but he is certainly right to recognise that it is the individual customer's intentions rather than the entrepreneur's interpretation of those intentions that are the driving force of the new business models.

We know from previous shifts in the generation of value that sectors succumb to the transformation at different rates and times. Both mass production and flexible production had their earliest impacts in the manufacturing sector and, particularly, the automobile industry. However, over time, more and more sectors were transformed as entrepreneurs adapted what Perez calls the ‘common sense’ principles of the new approach to their area. Clothing, the food industry, publishing, healthcare and construction (to name just a few sectors) were all revolutionised by the cost reductions and quality improvements associated with mass production and then by the product diversity, and ultimately the cost reductions, associated with flexible production.

Self-generated value has had its most intensive impact in the publishing and creative industries but already we can see intimations of how it is affecting other sectors such as clothing, food, automobiles, hospitality and even a sector as tangible as manufacturing.

We cannot know precisely how this latest leap in value generation will challenge and change these markets. We can however begin to see the sort of unstoppable dynamic of creative destruction that first appeared with mechanisation in the mid-18th century.

Generation enterprise

Prepare for impact

If previous shifts in value generation are anything to go by then the impact of self-generated value will be significant. Each value worm-hole had enormous and unpredictable consequences not just in the economic sphere but also in the social, political and cultural realms. Whether it was the industrial revolution, flexible production or every shift in between, each became unavoidably bound up with the big issues, divisions and challenges of the day.

The new business paradigm of mass production, for example, became closely intertwined with the culture and the fraught politics of the first half of the 20th century. Much of the fascination apparent in popular and high culture was on the inhuman size, scale and speed of the new factories. Futurism, for example, was an influential art movement originating in Italy in the 1910s that took its inspiration from the technologies and modern ‘feel’ of industrial production. Charlie Chaplin’s 1936 movie ‘Modern Times’ caught the spirit of the little man spiritually (almost literally) crushed by the monstrous factory.

Most fundamentally though, the extreme political movements of both communism and fascism that rapidly emerged in the 1920s and 1930s, had intense and ambivalent relationships to the Carnegie and Fordist transformations. For communists mass production was both an intensification of worker exploitation and a huge potential force for good, if only it could serve the interests of the working man rather than the bourgeoisie. For fascists, industrial production could be a source of glory – witness the way Hitler associated himself with modern technology even before he transformed German industry into a war machine – or an evil destroyer of a simpler, truer time of rural life and close-knit, homogenous communities.

Mass production continued to have a profound impact on post war society, culture and politics. For example, the notion of the ideal post-war family that became so potent in both the US and Europe, was as much the result of mass production as any government initiative to reimpose order after the chaos of war. The nuclear family came to be at the heart of dominant conceptions of the consumer as mass production grew in its influence and impact. The image of the family lodged in their newly built home, filled with the latest convenience goods and a regularly upgraded car on the drive, was the stuff of the American (and European) dream.

It was a dream embraced by millions eager to build better lives for themselves after the trauma of the Depression and war. It was exploited ruthlessly by advertisers and became a staple feature of much popular culture even forming the basis for the baby boomer backlash in the late 1950s and 1960s, which derided the supposed comfort and complacency of their parents’ aspirations.

Mass production became so successful after 1945 and played such a central role in creating the post-war boom because a symbiotic relationship was created between the paradigm of the vast company churning out millions of cheap convenience goods, and the paradigm of the ideal nuclear family stuffing their new homes to the eaves with those same goods. Many of the families spending their money on convenience goods, were also earning that money through the production of those same goods. Or put another way, the men who were buying a new fridge or washing machine in 1956 were working, one way or another, for the very firms making them.

A similar thing happened with the rise of flexible production. The great advance of this particular worm-hole was its capacity to bring a much wider range of products to market. Once cheaper labour became available in the East (enabled to some considerable degree by the disintegration of the old mass production model), this much wider range of products could be brought to market much more cheaply.

Again, the economy felt its way gradually to a symbiotic relationship between this new business paradigm and a new image of the consumer. This consumer was the one who took deep pleasure in the act of consumption itself. Luxuriating in the huge choice on offer and then, if wealthy enough, being able to purchase the very best option became an end in itself.

Gradually, what started in the 1980s as an elite lifestyle (widely derided as ‘yuppie’) became throughout the 1990s and most of the 2000s a much more mainstream set of aspirations. Gradually the things yuppies had placed at the heart of their lives – house prices, mobile phones, bling, luxury cars – became popular concerns. Conspicuous consumption, which the British generally regarded as vulgar, became a national past-time.

Not everyone, by any means, subscribed to this ethos during the long boom (just as not everyone subscribed to the cosy image of the post-war nuclear family). But enough of us did to make the once reviled concerns of the yuppie become the prevailing themes of popular culture, the press, and conversation across the country. Little wonder that some of the most successful TV shows in the period were about the property market, cars and fashion. In many ways, the yuppie conquered all in the 1990s and 2000s and came to shape the spirit of the age.

So self-generated value is already a big noise and is guaranteed to get louder and bigger even if we cannot know for sure exactly how. As it continues to engage in creative destruction in different economic sectors one by one, as it shapes our view of ourselves as consumers and as individuals with certain hopes and aspirations, self-generated value will become one of the driving forces of our age.

Millennials first

Numerous surveys and studies have concluded many different and often contradictory things about the so-called Millennial Generation (that is, people born between the early 1980s and mid-1990s). Apparently their brains are wired differently to everyone else’s because of their use of on-line technology.⁴⁷ Or maybe they are the smartest generation that ever lived with IQs breaking all records.⁴⁸ Alternatively, since the 2008

Self-generated value is already a big noise and is guaranteed to get louder and bigger even if we cannot know for sure exactly how.

crash and recession, they are now none of these things and are in fact a lost generation, scarred for life by their experience of student debt and unemployment.⁴⁹

In reality, of all the studies that have been conducted into the behaviours and views of the Millennial generation, the only one finding that seems consistent is that this generation are significantly more tapped into the internet than their elders.⁵⁰ Given that self-generated value is a transformation that began on and is dependent on the internet and is rapidly becoming a defining feature of the internet, it is safe to assume that it is likely to have a big impact on that Millennial generation.

So what will be the equivalent of the nuclear family or the yuppie to the Millennial generation? What sort of spirit could SGV create?

Youthful business

There are some clues to help us answer this question. One is the increasingly strong data that suggests that the younger generation are a highly entrepreneurial bunch.

A number of recent surveys have found that younger people are becoming keener to set up their own businesses and are starting to do so. A recent poll of Americans aged 18 to 34, for example, found that more than half (54 per cent) would like to start their own firm or had already done so.⁵¹ A separate survey found that 35 per cent of people under 30 in employment had started their own business on the side.⁵² While a study of four million Facebook profiles for people aged between 18 and 29 concluded that the pages displayed an “unprecedented entrepreneurial spirit”.⁵³ The profiles indicated that increasing numbers in this age bracket not only want to launch their own start-ups (or had already done so) but that they prefer to work for start-ups than established companies.

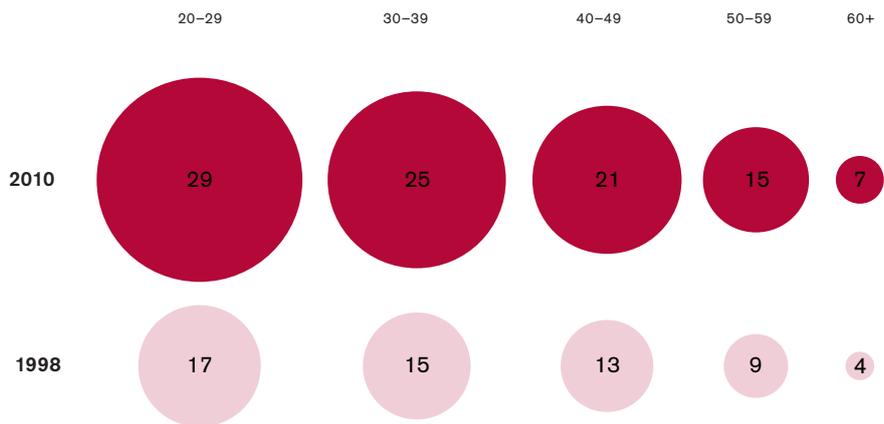
But before we get too excited, it is important to note that none of these studies tell us whether this indicates any greater entrepreneurial spirit than previously.

Working with the National Centre for Social Research, the RSA tried to answer this question by comparing individuals’ propensity to set up a business in 1998 and 2010. We chose these dates for two reasons. Firstly, it allows us to compare responses to the British Household Panel Survey (BHPS) which is now part of the Understanding Society survey. Both of these are among the most extensive longitudinal surveys of attitudes in the world, regularly interviewing 100,000 people in the UK. So we can be confident about the accuracy of the views represented.

Secondly, by choosing these dates we can effectively compare responses of 20 to 29 year olds in the previous generation (the so-called Generation X, born between the late 1960s and late 1970s) and 20 to 29 year olds from today’s generation of Millennials.

What we found is that the desire to start your own business has risen considerably amongst all age groups over the last decade. However, the 20 to 29 age group in both 1998 and 2010 was the keenest to start a business. But it is the Millennial generation who are taking entrepreneurial ambition to new heights, with close to one third now wanting to launch their own business.

Percentage by age group who want to start up their own or a new business



Another major recent analysis was conducted by the Royal Bank of Scotland using data from the extensive Global Entrepreneurship Monitor.⁵⁴ This looked at how many people are actually in the early stages of establishing their own business, rather than who simply express a desire to do so. The analysis found that there has been a sharp increase in early stage entrepreneurship by those in the 18 to 29 age group in the UK.

Total early-stage entrepreneurial activity (TEA) in the UK by age group (2002-2011)



There are many different reasons why we might be seeing this rise in entrepreneurial orientation amongst Millennials and the wider population. It may well be a wider social effect resulting from increased

employment insecurity, which is encouraging more people to think about self-employment. The fact that a rise in entrepreneurial orientation is seen across all age groups might support this view.

However, the recession, lack of credit and lower consumer confidence could also be seen as factors which actively discourage people from setting up their own business. That is precisely what the Global Entrepreneurship Monitor has found revealing a significant reduction in propensity to set up a business occurring after 2008 in America, France and Germany although, interestingly, not in the UK.⁵⁵

The Global Entrepreneurship Monitor also found that while the proportion of people setting up in business out of necessity has risen during the recession, this motivation is still far outstripped by the proportion of people doing so because they want to take advantage of a commercial opportunity.⁵⁶

Self-generated value: not just for me

I believe a stronger candidate to explain the rise in entrepreneurial ambition is the emergence of self-generated value itself. One of its important consequences is that it allows individuals not solely to create value for themselves but also to create value for others.

Those sites which have been at the heart of the self-generated value transformation, particularly in the sphere of content creation, have been predicated as much on the empowerment of an individual to create value for others as for themselves. Every time someone tweets, alters their Facebook page, posts a video on YouTube or uploads any other sort of content to the internet, they are doing it as much for others as for themselves. In fact, these sites have incorporated ways of assessing how much others value the content we upload in the form of 'friends' on Facebook, 'followers' on Twitter, 'views' on YouTube, or visitors to our site. In effect, these are a form of currency which, just like money, reveals how much our 'customers' value our product. So the internet and self-generated value is already drawing us - and particularly the Millennial generation - into the entrepreneurial experience of finding the best way to create value for others.

The impact goes deeper than this because this new world also makes it far easier for entrepreneurs or potential entrepreneurs to undertake the business practices detailed in the last chapter on their own behalf. Marketing no longer requires expensive advertising but can be done through a skilful use of peer-to-peer online networks, which now allow access to global markets.

If you are selling intellectual content then its distribution is now immediate and cheap. If you are selling something that cannot be squeezed down a telephone line then a firm like Amazon or Ebay has established the technological infrastructure to allow you to arrange distribution painlessly and cheaply.⁵⁷ Although keep an eye on the development of 3D printing technology as it does begin to allow tangible commodities to be distributed by broadband.

If you have a great idea for a product or a service but do not have the capital to develop it fully, or need help with some of the technical details, there is a sea of free advice out there available by tapping into the world

of open innovation. Indeed, doing this also helps you start your marketing process early, by getting your potential customers involved in the development of the product even before it even goes on sale.

The world of finance is also opening up. No longer does a young entrepreneur have to face steely-eyed bankers or venture capitalists to get their plans off the ground. The rise of crowdfunding sites reveals a hunger amongst people to get directly involved in the entrepreneurial process but, more importantly, it means small start-ups can now raise money online by enthusing hundreds or thousands of people with their plans.

In terms of the time, energy and money involved, SGV is making it far easier to finance, develop, market and distribute a product.

Whether or not it is this greater opportunity to sell that is driving the increasing entrepreneurialism of the generation most intensively involved with the internet and self-generated value, it is impossible to say for sure without further research. However, understanding what is causing this trend is less immediately important than the fact that the opportunity to be an entrepreneur is expanding very greatly and just at the same time as we have a younger generation that is more inclined to be entrepreneurial than previous generations.

So the initial signs are strong, if yet far from certain, that the spirit promoted by the self-generated value transformation is that of the entrepreneur. Just as the classic mass production customer wallowed in the pleasures and status of convenience goods and the classic flexible production customer luxuriated in the act of consumption and choice, so the classic SGV consumer may well turn out to be one who relishes the act of entrepreneurial creation.

Generation enterprise

No-one surveying the early stages of the industrial revolution, or any of the shifts in value generation that followed, could have known exactly where they would end up two to three decades on. There is no easy determinism at play here just messy processes fitting around one another in ad hoc ways. But we can identify initial trends and speculate about their impact based on past experience. So what might self-generated value and the spirit of enterprise that seems to be infusing and enthusing the generation growing up with SGV mean for our world?

Firstly, we know it will be highly disruptive for existing institutions and practices. This was the case with previous shifts in value generation but we can already see what this latest leap, coupled with an entrepreneurial orientation, has done to sectors such as the creative industries, journalism and publishing.

The music industry is having to completely restructure its business approach to survive in a world where peer-to-peer distribution networks are more important than retail units and where the revenues to be secured through traditional single and album marketing models have fallen dramatically. Businesses have gone bust and jobs have been lost.⁵⁸

It is a similar story in journalism where newspapers are losing readers and advertising revenues as customers turn to the internet for their information. The once-thriving local press is close to extinction and even major international titles have been thrust into an uncertain world of experimentation with paywalls and news 'aggregation'.⁵⁹

Publishing faces the same crisis. The bookstore chains that wiped out the independent booksellers only a few years ago, are themselves going bust or facing deeply uncertain futures as customers turn to downloads onto Kindles and other devices with stunning rapidity. The rest of the publishing industry feels the pain as, much like the music industry, traditional marketing models are thrown into turmoil.⁶⁰

The disruption will not stop there. The retail sector is already facing the chill wind of self-generated value. How will the UK's group of large grocery firms, for example, fare as more and more customers turn to online purchasing, seeking greater control over when they buy, what they buy and when it is delivered? If store location ceases to be one of the main determinants of success in the sector, what other forces might determine who survives and who goes under? What if it is a completely new company that understands and secures those forces first? Well-established firms and jobs could be put rapidly at risk.

And all this before the spread of 3D printing, which will enable more of us to design and make our own goods, and shake up manufacturing and other retail sectors.

The challenge will not be contained within the commercial world. History tells us that the way businesses change their practices, and the way consumers change their behaviours in the wake of a shift in value generation, will affect the public sector and non-profit organisations in time. Witness the way public services mimicked mass production models in the post-war period. Indeed, the National Health Service was set up very much as a factory to process millions of patients each year. Like Henry Ford's vision it was hierarchical, based on large-scale hospitals that concentrated multiple specialisms. It was governed by a faceless bureaucracy, with the Minister for Health at its summit, a sort of public sector industrialist, overseeing the efficient production of healthy citizens.

The rise of flexible production also had its effect on public services. By the late 1990s, reform in the public sector was centred on choice as politicians and public sector professionals struggled to keep up with the changing expectations of service users who no longer accepted just one option in the commercial world and did not much like the idea of just one option in the public world. Ironically, it is a battle still being fought with great intensity just at the time when the commercial world is moving into a whole new phase in the form of self-generated value.

The result is a world in which historical hierarchies and connections are being further undermined, even after their considerable erosion by three or more decades of flexible production and the associated global out-sourcing. Those who think or hope that the turmoil unleashed by a shift to a post-industrial economy from the 1970s onwards can be slowed, or even halted, in the wake of the crash will be sadly disappointed.

As we have seen, all this disruption and turmoil ultimately has its benefits and it will be the Millennial generation who will take on the responsibility for ensuring the upside. As they secure positions of influence in existing organisations and use the tools of self-generated value to transform markets, they will drive the changes that will reap the benefits of this latest value worm-hole.

It will be their insight and entrepreneurial spirit that will finally lift us out of the dire, seemingly unending economic crisis we find ourselves

in. It will be today's twenty-somethings who will create in their thirties, forties and fifties the new products and services that will generate that three-fold leap in value we have seen five times before: more and cheaper products, better products and more diverse, specialised products. We can already see how this is happening in the disrupted sectors mentioned above; expect it to intensify and happen in a wider range of other sectors as well.

It may take time to develop fully but the chances are high that, as in the past, living standards and quality of life will improve for many millions across the world as a result.

Addressing the downside

So that is the bright side. In the longer term, living standards and quality of life take a gargantuan leap forward. But innovation worm-holes have their dark side and there can be many casualties along the way.

There will always be those who romanticise older ways of life before the latest innovative leap. It may be that they do not understand or benefit or understand how they can benefit, from the new tools at their disposal. They are usually pining for the previous paradigm, just as those who experienced that one pined for the one before. Expect a wave of complaint in the next five years or so from those who long for the days when you got to choose what you bought rather than having to create it for yourself. Others may look with distaste on an 'arrogant' generation, too confident in its own ability to launch enterprises with little respect for established convention or constraints.

Much more serious than such recurrent complaints is the genuine human cost that comes with an intense period of innovation: the bankruptcy, unemployment, insecurity of those companies and employees unable to adapt and compete in a new world dominated by self-generated value and an intense entrepreneurial ethos.

The solution is not to try and resist the wave of self-generated value or to dampen the emerging spirit of enterprise. Quite the opposite. It must be to think about how this transformation can be shaped and directed to bring maximum benefit. It must be encouraged, enabled and embraced in every part of the economy and society whether that be private, public or not-for-profit sector.

Resisting this wave of innovation will not only deny us and future generations its full benefit but will only leave the resisters open, at some point in the future, to more advanced, efficient and appealing competition from overseas or elsewhere. Witness, for example, the long period of turmoil suffered by UK business that refused to adopt mass production models in the 1940s and 1950s and paid a heavy price in the 1960s and 1970s.⁶¹

Creating a really vibrant wave of innovation in an economy at this time also makes it more likely that those who do lose out will find new work or opportunities more quickly. But this means that government, business and civil society must work together to help those who face redundancy with retraining, proper financial support through tough times and, where necessary, help to move to where appropriate jobs may be.

We need to be alert to the fact that the social and cultural implications of this shift are not unerringly beneficial nor immune to thoughtful challenge. The mass production and nuclear family symbiosis of the

Creating a really vibrant wave of innovation in an economy at this time also makes it more likely that those who do lose out will find new work or opportunities more quickly.

post-war period brought vast economic benefits but they also created a stifling culture of conformity that was illiberal in its treatment of those who did not fit easily into the heterosexual, able-bodied, paternalistic and predominantly white image of the family.

Flexible production brought great economic benefits and helped inject a joyful sense of individual freedom into some aspects of life in the advanced economies. But there was also an undoubted shallowness in the yuppie ethos, which turned consumption into an end in itself.

So we must be highly supportive but not entirely uncritical of the spirit of enterprise, which may be emerging as SGV gathers pace.

One particular risk is that a rather unreflective individualism could result. There is clearly something about the entrepreneurial mind-set that encourages the belief that each of us is the sole author of our fortunes even though most of us, on reflection, know life is much more complicated than this.

RSA Chief Executive Matthew Taylor has argued recently that the dominance of an unreflective individualism can stand in the way of major social advances such as addressing the problems of an ageing population⁶². He calls instead for solutions combining the three major sources of social power; hierarchical authority, social solidarity *and* individual aspiration. Only by deploying all of these sources can we truly address our most pressing problems.

From this perspective if self-generated value has the transformative potential described in this essay, two pressing challenges emerge. First, we need to explore how in this new world of value, political hierarchies can be rethought to restore some of their lost legitimacy, while also identifying new foundations and processes to strengthen collaboration.

Taylor is surely right to say, for example, that leaders of all organisations need to shift from the belief that they can deliver solutions, to creating the clear goals and values within which others are given the opportunity to discover and deliver solutions themselves. It would be hard to find a better guiding principle for leaders in the era of self-generated value and enterprise.

Second, we need to encourage a more progressive and holistic way of thinking about the value individuals can generate so that our scope and desire for comfort, enjoyment and entertainment as individuals is balanced by an equally strong scope and desire to live rounded, fulfilled and responsible lives as citizens. To return to McClosky, we want to be sure that universities, museums and concert halls are as much a part of this story as iPads, 3D printing and a growing interest from the younger generation in cash flow projections.

The truth is that when humans are gripped by entrepreneurial innovation, they soon find that the world is diverse and complex enough to apply that spirit in all sorts of ways. Some will apply self-generated value entrepreneurially in highly competitive commercial settings. Others will find ways of doing it to advance the core values of public service. Still others will develop philanthropic and altruistic purposes. All must be encouraged, enabled and embraced.

Ultimately this plethora of different initiatives with different goals will live in both tension and harmony to create the complex world we will come to know over the next few decades. To use Taylor's phrase: the

solutions generated by this new wave of innovation will undoubtedly be 'clumsy' but they will be effective. At least, until the point at which the next worm-hole opens up ahead of us.

Endnotes

- 1 Much of the inspiration for this chapter comes from Deirdre McCloskey's marvellous book, *Bourgeois Dignity*.
- 2 See, for example, Porter 1991 for a detailed account of daily life in the 18th Century.
- 3 All figures for historical and current per capita income are taken from Maddison 2006 and Maddison 2007.
- 4 Maddison 2006
- 5 Beinhocker 2007
- 6 McCloskey 2010
- 7 Nordhaus 1997
- 8 Petroski 1992
- 9 Beinhocker 2007
- 10 Layard 2011
- 11 Easterlin 2010
- 12 McCloskey 2010
- 13 Perez 2002
- 14 Broadberry and Bishnupriya 2005
- 15 Greenwood 1999
- 16 Schumpeter 2010
- 17 Pine 1993
- 18 Pine 1993
- 19 Pine 1993
- 20 Obelkevich 1994
- 21 Payson 1994
- 22 Cardia 2008
- 23 Lebergott 1996
- 24 Joint Economic Committee 1999
- 25 Pine 1993
- 26 Pine 1993
- 27 Pine 1992
- 28 Kantor 1991
- 29 Bayus & Putsis 1998

- 30 Bayus & Putsis 1998
- 31 Pine 1993
- 32 Milgrom and Roberts 1990
- 33 www.chinability.com/GDP.htm
- 34 www.chinability.com/GDP.htm
- 35 <http://data.worldbank.org/country/china?display=graph>
- 36 Chesborough 2002
- 37 The Economist, 21st April 2012 www.economist.com/node/21553017
- 38 Edison Research and Arbitron Internet 2010 via Trendwatching <http://trendwatching.com/trends/ffactor/>
- 39 Nielsen Global Trust in Advertising survey, 2011 www.nielsen.com/us/en/insights/reports-downloads/2012/global-trust-in-advertising-and-brand-messages.html
- 40 Searls 2012
- 41 Toffler 1980
- 42 Tapscott and Williams 2010
- 43 Toffler 2007
- 44 Kelly 2009
- 45 Tapscott and Williams 2010
- 46 Searls 2012
- 47 Prensky 2001
- 48 Abram 2009 and Tapscott and Williams 2010
- 49 See, for example, www.theatlanticwire.com/national/2011/09/american-youth-lost-generation/42814/
- 50 See, for example, Pew Social Trends 2010; PWC 2011; BCG Perspectives 2012
- 51 www.kauffman.org/newsroom/millennials-want-to-start-companies-when-economy-rebounds-poll-says.aspx
- 52 www.iconoculture.com/media/PDF/pd_GenerationsatWorkPDF_287508_2.pdf
- 53 http://bx.businessweek.com/diversity-in-the-millennial-age/view?url=http%3A%2F%2Fwww.networkworld.com%2Fnews%2F2012%2F010912-gen-y-traits-in-the-254695.html%3Fsource%3Dnww_rss
- 54 Hart, Levie and Shamsul 2012
- 55 Hart, Levie and Shamsul 2012
- 56 Levie and Hart 2012
- 57 Jopson 2012

- 58 Hunter-Tilney 2010
- 59 Edgecliffe-Johnson 2009
- 60 Gelles and Edgecliffe-Johnson 2010
- 61 Owen 1999
- 62 See Matthew Taylor's RSA Annual Lecture 2012

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