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Draft (Chapters 6 to 11) – We Think: why mass creativity is the next big thing.

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Many thanks
Charlie Leadbeater

Chapter 6 – The Audience is On the Stage

Where Did the Mountain Bike Come From?
There was a time when there were only two kinds of bikes. There were the clumsy, heavy bikes of the kind men used to ride to go to work in factories and there were racing bikes, as ridden by your elder brother and Eddie Mercks in the Tour de France. Racing bikes were glamorous and sleek, but uncomfortable to ride, with narrow saddles, thin tyres and handlebars that made you bend forward. Like greyhounds, they were too fragile for potholed city roads and for riding along country tracks. Then in the late 1970s, a new kind of bike started to appear, one with a robust frame; thick tyres with a deep tread; straight handle bars with rubber grips; as many gears as a racing bike and ferociously tight brakes. They were mountain bikes. Like most great innovations the mountain bike was adopted so quickly that it soon seemed as if it had been around forever. But where had the mountain bike come from? Standard economic and business theory would tell you the mountain bike came from a clever entrepreneur or innovator working in their garage who emerged one day covered in grease, with his new invention. Having spotted a gap in the market, an unmet need, the entrepreneur's new product would have been hugely successful and attracted mainstream manufacturers in search of their share of the profits. But that is not how it happened. Nor did the mountain bike emerge from the well-funded research and development laboratory of a mainstream bike maker, after months of laborious testing and exhaustive market research to "find" and then "fill" a gap in the market. Standard business theory does not have much useful to say about the emergence of the mountain bike.

There was no lone inventor and no moment of birth. The mountain bike was created by groups of avid users – passionate, Pro Am bikers – not the manufacturers who were quite happy selling products they knew well, through familiar channels, to consumers they also seemed to know well. Bike manufacturers had no incentive to innovate. Mountain bikes were developed when young cyclists in northern California started to take their bikes onto mountain tracks in search of new challenges. Traditional commercial bikes were not designed for this kind of terrain, so the rider-developers put together their machines, mixing strong, old-fashioned bike frames, wider tyres to provide grip and drum brakes from motor cycles. These mutants were called "clunkers." Only the riders really understood what they needed and had the skills to make a product that met their distinctive needs.

For several years Pro Am bikers built clunkers for one another in their garages. Commercial manufacture began in about 1975 but even then only on a tiny scale. A year later there were half a dozen specialist assemblers in a part of northern California that lent its name to Marin, the company that became the best-known mountain bike producer. In 1980 a leading mountain biker, Mike Sinyard, founded a company to bring the first mass produced bike to market. Perhaps two years later, almost a decade after clunkers first hit mountain tracks, the incumbent bike manufacturers finally followed suit. Soon mountain bikes were being used in cities as much as on mountains. As the mountain bike went mainstream so the rider-developers went in search of ever more dangerous environments in which they could test innovations, riding at night and in all climates. These lead users continue to develop their own innovations, which tend to spread into the mainstream industry between four and six years later.

By 2004, mountain bikes were big business. In the US alone mountain bikes and related equipment accounted for 65% of all bike sales. A category that did not exist thirty years earlier and which had been invented by passionate users was worth $58bn dollars. No one in the mainstream bike industry saw it coming. The biggest disruptive innovation in modern biking history came from the users who saw themselves as innovators, not from the boffins in R & D.

With hindsight it is not hard to work out which users were most likely to become innovators. They were the most passionate and the most knowledgeable. They had been riding off road for longer, spent more of their time with their bikes, rode in more challenging terrain, competed in races and acquired more technical know-how. They did not just ride bikes, they understood how they worked and welcomed the technical challenges of improving them. Not only did they have the motivation to innovate, they had the tools as well. Many of the early user-innovators were engineers and so able to deploy skills they used in their day jobs. Riding clunkers week-in-week-out meant they had a way to carry out experiments in real time. The costs of innovation were low and the pay offs high. They enjoyed what they were doing.

The mountain bike story does not fit into the way we usually tell the history of innovation as a string of heroic inventions. In this conventional history every invention has a moment of birth when it comes into being. The inventor can usually say what the invention is for and how it should be used. That traditional focus on invention as the source of innovation leaves us hopelessly ill equipped to understand not just the mountain bike but the rise of barefoot organisations – the likes of Linux, Wikipedia, Craigslist and many others - that succeed by mobilising masses of volunteer contributors and innovators. These organisations do not have research labs and yet they innovate at scale because they turn their users into creators, combining their many small contributions into larger complex products. Once we realise users can be innovators we have a different lens on how technology spreads, productivity improves, society changes and how we could organise ourselves in future.

Users as Innovators

Histories of innovation invariably focus on the race to invent something and end when the invention goes into production, as if the interesting part of the story is complete. Yet what makes an economy more productive is the rate at which a technology spreads and how cleverly it is used. Invention is just the starting point for a much longer process, in which most of the value is created by people applying technology. Obsessed by when and where technologies were first invented, we pay too little attention to how technologies are adapted, extended, remodelled and re-used. Periods of rapid invention, when lots of technology is being created, rarely correspond with periods of rapid productivity growth. That usually comes much later – often thirty or forty years later - and because consumers in their millions have helped one another to work out what a technology is for. They incorporate the technology into their lives, itself a vital part of the innovation process.

Today, more people that ever can be involved in that wider process of innovation in use. Thanks to the falling costs of technology, cheaper communications, rising educational attainments and longer life spans, more people have more time and capacity to be creative, if only in small ways, than ever before. Ideas do not just flow down the pipeline from the back room boys to consumers. Increasingly ideas are flowing the other way: the consumers are increasingly a source of creativity. In the process they stop being mere consumers and become participants and contributors. The idea of the consumer and indeed mass consumption as the basis for economic activity might have to be thought. Instead we should start to think of ourselves as contributors and participants.

Just as we thought we knew what organisations were for, we thought we knew what consumers were for. They were the end of the line, the consummation of the production process, the final link in the value chain. In traditional organisations value is created through a series of transfers and transactions. The consumer looks for the good they want – a fridge in the white goods section of a department store – they choose one, hand over their money and take away the item in question. The act of transferring the good from the producer to the consumer confirms its value in the eyes of the consumer. The more choice consumers have, to find the product that best meets their need, the more likely they are to be satisfied. Consumers choose the good they want, pay for it and then take it away and use it. Of course latterly companies have devised all sorts of ways to get consumers to do more of the labour themselves, through self-service; tracking your own package; assigning your own seat; putting together your own furniture. Some companies have even started to listen to users earlier in the design process. Yet these are just modifications to the basic "value chain" view of the world: consumers are transactions to be managed.

Yet the language of supply and demand, consumer and producer does not make sense for a world in which Wikipedia and Linux are built by the people who use them. These collaboratives are not just the by-product of cheaper technology and easier communications. They have responded to a yearning people have to become contributors, participants and players. They do not want to be well-served but dependent and passive. They want a voice and some tools to allow them to self- provide. The more participants can do this together, peer-to-peer, drawing on one another's expertise and ideas, the more shared ideas and innovation there will be. The transfer and transact model of value creation makes little sense in a world where most of what we consume are services, information and entertainment, cultural goods and brands. These often depend on the consumer investing in the process themselves: their identity, hopes, skills, know-how. More of the time we create value together through our interactions, dialogue and sharing. When organisations start to engage people in this way, people who used to be just the users quickly become contributors and that unlocks a vast new source of innovation. But they key is not to just increase the menu of choice but to deepen opportunities for participation.

This is a tremendous potential competitive advantage. Organisations built on high levels of member participation tend to have very low costs: Wikipedia has just one employee, Craigslist just 16 yet they both support communities with millions of participants. More important community-based companies can become instruments of mass innovation. The consensus amongst academic studies on innovation is that only about 25% of new product introductions are a success. The overwhelming majority of product innovations fail. That is because innovation is beset by uncertainty, mainly over whether consumers will take up a new offering. Innovation is so risky because it is so hard to get inside the heads of the potential consumers, to know how far and how fast they will take up a new product. Companies are constantly seeking ways to close this gap, through better market research. But as long as the gap remains the risks of innovation will be dauntingly high for most companies. Organisations built on a strong member community, eBay for example, often find good ideas coming up from the member base. The link between the company and the community, producer and user is much tighter. That makes innovation a lot less fraught. One of the most powerful examples of this approach to innovation is the rise of the computer games industry.

Game On

Near the height of the dot.com boom in 1999 I was invited to meet a Californian hippy entrepreneur in his London penthouse flat in west London. He was dressed all in black, with the mandatory pony tail, long beard and incense burning at various points about the room with views over the city. Over the following couple of course he outlined a vision of creating an online world in which people would immerse themselves by adopting characters and live out online lives. He wanted to target people with religious beliefs so they could form vast online religious communities, replete with cathedrals and mosques, which would then retail religious items to the players. He figures religion was a vast untapped online market. I left feeling slightly dizzy and bewildered. I told the potential investors who had asked me to talk to him that they should pass on the opportunity because the buy was clearly a nutcase. How wrong I was.

About the time I was dimissing this opportunity a young English couple were creating a site designed to appeal to bored young teenagers where they could adopt an online pet. Within six months of its launch Neopets had acquired almost half a million users. By 2006 about 30m people, about 80% of them below the age of 17, pets had been created. The average players spends almost three hours a week on the site. Once someone has created their pet, they endow it with skills and characteristics and then set off to engage in battle, take part in competitions, furnish a home or simply socialise. The land these pets inhabit, Neopia, has shops, a stock market and currency. There's also a weekly paper, the Neopian Times, in which almost all the content is created by the site's uses. The Neopian Times gets thousands of comic strips a week, poems and stories a week from users who can access it in 11 different languages. The community is not entirely self-organising. The backbone to the site is maintained by a staff of about 130 working in Los Angeles and Singapore. They set a few central rules that help to keep order: pets are not allowed to marry; some posts – about sex or Osama Bin Laden – are ruled out. There is no advertising but instead products are placed around the site. It is an odd mix of community and commerce, fantasy and banality. The computer games industry now outsells Hollywood largely because it encourages massive user participation in

co-creating games. There is no better example of co-creation than the Sims, the most successful computer game ever. The Sims grew out of a game called Sim City, which allows people to design a city and watch it grow, prosper, decline and collapse. The Sims translates that into a home, with a family, for whom the player is responsible. You create your family and watch them sleep, eat, argue, marry, make love, fight and die. The original version of the game, launched in 2000 quickly developed into an online community, with players swapping tools, software and artefacts to put in their online houses. Hundreds of websites now display many thousands of collectible items that are available to the millions of players. One estimate is that 90% of the content of the game is now created not by the game's original authors, working for Electronic Arts, the computer games giant, but by a large and innovative sector of the playing community. One player-created tool that allows a player to draw in an edging to a floor rug has had hundreds of thousands of downloads. The 3D Sims Online launched in 2004 was designed from the outset as a community-based game. Five months before the game was launched, Electronic Arts released tools to allow players to create their own content and characters. By the time the game was launched one estimate was that about 50,000 such items had been created. The Sims online is not just a game but a platform to support a vast, rolling do-it-yourself community of gamers who develop and share their ideas. The point is not just to play the game but to add to it and share ideas.

The Sims is not pure user driven innovation. It did not come about entirely through self- help. The kernel to the online 3D game cost $15m to develop. The information infrastructure to support the community is also costly: it has to deal with more than 30,000 request for information a second. The Sims's is not open source. A player has to pay Electronic Arts an entrance fee to join the game and the community: like eBay it is a managed commons. But knowledge about the Sims is not just held in the heads of its original creators who ship their ideas in the form of packaged software to a waiting audience. The Sims community is a distributed, self-organising body of knowledge in which players are constantly training one another and developing new content. In the Sims community most of the value is co-created among the players, with the help of Electronic Arts' platform and development tools. The original transaction – when the gamer bought the software – was just the entry ticket into that unfolding process. Will Wright, the game's original creator, explained why the players want to contribute to the game not just consume it: "The currency is exposure and recognition for their ideas. People are spending time creating cool objects – a lot of them are not spending so much time playing the game. How do we build the most thriving community online? We have to let the business model flow from that." The Sims business is built on the Sims community, which provides the rolling innovation that extends the game's life and enriches the content. A game's official release is the moment when the innovation initiative passes from the in-house development team to the community of player-developers. If a computer game has 1m players, it just needs 1% of those to be dedicated player-developers for it to have acquired an unpaid development team of 10,000 people whose main incentive seems to be to show off their skills and make the game more enjoyable to play. They are not in it for the money. Computer games are another glimpse of the emerging participative culture.

The Pipeline in Reverse

Consumer contributors are vital to innovation. Disruptive innovations, which upset traditional markets and business models – like the mountain bike – often start in the margins of a sector, with innovative users with distinct needs. User innovators will also be critical to radical innovation. A radical technology is one that has very broad but so very uncertain application. It marks such a big break, no one quite knows what it is for. History tells us the inventors are often very bad at guessing how such technologies will be used. The inventors of the telephone, for example, thought people would use it to listen into live performances on the London stage. They did not think it would be used for conversation. Thomas Edison created the phonograph because he thought people would want to keep a record of those conversations, just as telegraph messages generated a ticker tape. He had no idea it would be used for listening to music. In our own generation no one in the mobile telephone companies predicted that SMS messaging would become one of the main forms of communication among teenagers. They thought it might be used in an emergency. In all these cases and more the technology in question had many possible applications. It was the users who worked out what it was for.

Mainstream companies operating in mainstream markets often have very powerful incentives not to innovate. The way to get promoted in a large company is to go to the board with a proposal for an incremental improvement, to an existing product, aimed at existing consumers that the company knows well, and which it can sell to through familiar channels and which offers sure-fire returns. No one in their right mind would go in saying: "I've got a great idea for an embryonic product, in a marginal market, aimed at consumers we do not know and I am not sure it's going to work, but the pay offs might be great." That way lies a career in ruins. Big companies have inbuilt tendencies to reinforce past success and they tend to overlook smaller, emerging markets. In those markets innovation is often carried forward, as in mountain biking, by people who do have an incentive: the passionate Pro-Am developers. Twenty years ago no one in their right mind in the big record companies would have dared to suggest promoting a form of music in which black men in inner city ghettos revelled in their anger at the world and glorified violence. Rap started as a Pro Am activity, with people recording songs at home, distributing them on tapes, often by word of mouth. Twenty years later Rap was the dominant form of popular music in the world, inflecting many other aspects of popular culture.

Timothy Chan may know a bit about where this is taking us. I met him in a plush, private dinning room, in an exclusive restaurant designed for Shanghai's new rich, half way up a skyscraper, that sits on a plot of land that ten years before grew vegetables. Now Pudong grows skyscrapers. Chan's cherubic face and engaging eyes belie his ambition and drive. He wants to build one of China's most successful companies and what he stumbled on, in 2001, was a way to distribute content to millions of Chinese consumers and get them to pay for it, upfront. Chan used China's rampant culture of illegal file-sharing to his advantage. His company, Shanda, is not so much customer driven as customer created.

In 1999 Chan left his job as a government adviser to start his own business at the height of the dot.com boom. Chan, his wife and three friends set up an Internet business in his apartment, raised some venture capital funding and started to fiddle around. They got nowhere and in 2001, virtually broke, they launched themselves into multi-user online games on the back of a game they bought from Korea. It went stratospheric. By 2004 Chan's company Shanda had 170m registered users and 60% of the Chinese online games market with 10m regular players. When Shanda launched its first home grown game it recouped its $1m development costs in a single day of playing.
A key to Shanda's success (Chan's contacts in the government have been pretty important as well) has been providing users with a platform for participation and contribution. Shanda distributed its content quickly and cheaply by giving away the basic game software. The company expects the game to be copied over and over again. The players spread the game through a sibling system of distribution. There is neither a sales force, nor a marketing department. However before someone can start playing a game they have to activate it, which means logging onto one of Shanda's servers, providing a credit card or a pin number from a pre-paid card purchased from a newsagents. The games are mass social events. More than half the participants play from Internet cafes with other people. Shanda specialises in multi-user games, in which a player adopts a character in a fantasy society. The more players, the more action: Shanda provides the playing field, or to be more accurate, usually a battlefield. Chan explained the appeal while crunching through a duck pancake: "The average user plays for three or four hours a day. They concentrate on building up their character and profile in one game. More users means more distribution, which means more action, which attracts more players. It is a virtuous circle."

When a player runs into payment difficulties they lose access to their character. In that situation they have two options. They could buy a new character quite cheaply but that would mean starting all over again, building up a history from scratch. The alternative is to get on a plane to Shanghai, stay overnight in a hotel and queue outside Shanda's offices in Pudong to reclaim your original character, complete with all its history and store of reputation. That costs ten times more than the first option. Nevertheless every morning about 500 people are in line outside the Shanda headquarters. To support this vast undertaking – 9,000 servers, in 60 cities and 30 provinces, used by tens of millions of people a week – Shanda employs just 600 staff. Those are the new economics of barefoot organisations: small bodies of professionals can support vast swarms of participants, so long as the users have the tools they need to support themselves.

Consumers are becoming innovators. The fastest growing consumer markets with the youngest consumers are in Asia. Two thirds of India's 1bn population are below the age of 25. The Philippines has become a centre for innovation in the mobile phone industry because the mobile phone is so ubiquitous and inventive consumers have developed all sorts of ways to trade, share, buy and bank using simple SMS message systems. But most innovation could come from China, assuming consumers have the freedom to experiment. By 2010 China should have more than 200m Internet users and 500m should have mobile phones. A rapidly emerging market on that scale will produce a raft of user-led innovations. The business models that will work in these rapidly growing, but low income economies, will not be the slow moving, top heavy models that developed in Europe and the US in the industrial 20th century. They will operate at low cost by mobilising participants in their millions. The 20th century gave us cinema, still dominated by a few companies based in a narrow strip of Los Angeles, making products for the fast emerging markets in US cities. The fast emerging markets of the 21st century will be found in China and India and that is where the new business models, forms of participative consumption and culture are likely to be created.

Chapter 7 – The Pro-Am Revolution

Star Gazing
On the night of February 23, 1987, light reached Earth from a star that had exploded on the edge of the Tarantula nebula 168,000 years before. The supernova was so large it was the first to be witnessed by the naked eye since 1604. In the Chilean Andes, Ian Shelton an avid amateur astronomer took a photograph with a 10" telescope and went down in history as the man who discovered supernova 1987A. That night two other dedicated amateur astronomers were at work. Albert Jones, a New Zealand veteran with more than half a million observations to his credit had taken a good look at the Tarantula nebula earlier but had seen nothing unusual. Another amateur Robert McNaught, photographed the explosion at 10.30 UT in Australia. (UT is Universal Time, the standard astronomers use, the equivalent of Greenwich Meantime.) Together these amateurs played a vital role in confirming a theory that explains what happens when a star explodes.

Their collaboration is just one example of how dedicated, educated and well-equipped amateurs – Pro-Ams - are changing their fields from astronomy, software programming, to music and politics. Free-form organisations such as Wikipedia and Linux, e Bay and Craisglist, are thriving precisely because they tap into this Pro Am culture. Big organisations, led by professionals, often feel threatened by new amateurs. Doctors do not always like patients who come armed with information about their condition. Big J journalists frown on mere bloggers. Big companies like to see their consumers as targets waiting to be hit. There are few better examples of how Pro Ams can transform a field of activity than modern astronomy. It is a morality tale professionals in other walks of life should take heed of. Astrophysicists had theorised that when a star like the one in the Tarantula nebula exploded most of its energy would be released as neutrinos, low-mass, subatomic particles which fly through planets as if they were not there. The theory suggested neutrinos should exit at high speed and arrive on earth perhaps two hours before the light. The night of February 23rd a large storm of neutrinos from Shelton's supernova was detected by labs in the US and Japan at about 7.35 UT. According to the theory the first light should have arrived at about 9.35UT but the labs did not have photographs. That is where the amateurs came in. Jones checked his meticulous records and confirmed there was no sign of an explosion when he was looking at Tranatula at 9.30UT. That meant the neutrinos had already arrived yet the light had not, just as the theory predicted. McNaught's photograph taken at 10.30UT made the light of the explosion clearly visible, just as the theory predicted, more than two hours after the neutrinos. A key theory explaining how the universe works had been confirmed, thanks to three amateurs working in different countries, combined with professional physicists in the US and Japan. The skilled amateurs were as important as the professionals.

Astronomy is fast becoming a science driven by a vast Pro-Am movement working alongside a much smaller body of professional astronomers and astrophysicists. They are building on deep amateur foundations. Astronomy, like most sciences, was started by amateurs. Copernicus, who moved the sun to the centre of the universe, was only a part-time astronomer. Johannes Kepler, who discovered that planets orbit in ellipses made most of his money from

horoscopes. Yet by the 20th century the pendulum had swung decisively in favour of the professionals, for one simple reason: scale. Professional astronomers had access to huge telescopes, like Jodrell Bank in the UK or the Mt Wilson Observatory near Pasedena where Howard Shipley established that the Sun is located to one edge of our galaxy and Edwin Hubble determined that the galaxies are being carried away from one another into cosmic space. Professionals probed the outer depths of space, home to the most troubling scientific questions. Amateurs, with their puny telescopes, concentrated on closer, well known and brighter objects: astro tourism.

In the last two decades three linked innovations have given the Pro Ams a host of new ways to contribute. A disruptive innovation made powerful telescopes affordable for the average astronomer. John Dobson, a one time monk and lifelong star-gazer designed a crude but powerful telescope using discarded materials. Dobson's philosophy was pure open source: "To me it's not so much how big your telescope is, or how accurately your optics are, or how beautiful the pictures you can take with it; it's how many people in this vast world less privileged than you have had a chance to see through your telescope and understand this universe." Dobson refused to profit from his invention, which he never patented. Soon many companies were making telescopes based on his design. Observers armed with a Dobsonian telescope could invade the deep space that had previously been the preserve of the professionals. Then along came a relatively cheap, highly light sensitive computer chip, which could record very faint starlight much faster than a photograph. Amateurs who attached this chip to a powerful Dobsonian found themselves with light gathering capacity to match the giant telescopes of many professionals. It is a slogan of open source software programming that "many eyes make bugs simple": the more programmers looking at a problem, the easier it should be to solve (so long as they organise themselves in the right way.) The same is true of some aspects of astronomy. Thanks to Dobsonian telescopes and the new light sensors the earth acquired hundreds of thousands of new eyes, recording events in deep space that would have gone unnoticed by the much smaller body of professionals. The Internet vastly amplified this distributed capacity for exploration.

Before the Internet, an amateur who thought they had made a discovery would telegram the Harvard College Observatory. Once the professionals there had checked out the claim, they would mail a post card to observatories around the world. The professionals were the gatekeepers of knowledge. These days if an amateur finds something interesting they can email the image to friends, colleagues and professionals, within minutes. New discoveries are openly debated and assessed. Crude Dobsonian telescopes armed with CCDs had given the Earth thousands of new eyes; the Net provided the optic nerves to knit them together.

In the 1990's, these three innovations started to spawn new forms of endeavour. Astronomy used to be done in "big science" research institutes. Now it is also done in loose Pro-Am collaboratives. Many amateurs continued to work on their own and many professionals were still ensconced in their academic institutions. But global research networks sprang up, linking professionals and amateurs, with shared interests in flare stars, comets and asteroids. Groups of Pro-Am astronomers tracked the weather on Jupiter and craters on Mars as accurately as professionals. They detected echoes from colliding galaxies, and more than 1m contributors, in more than 200 countries, are contributing their computers' idle time to analyse data than might be evidence of extra terrestrial life. Together they have created a super-computer larger than anything IBM could make.

There are limits to what Pro-Ams can do. Amateurs do not produce new theories of astrophysics. Sometimes amateurs do not know how to make sense of the data they have acquired. Yet the future of astronomy, and after it other sciences and professions, will be as a Pro-Am activity, with dedicated amateurs and professionals working in tandem, motivated by the same sense of excitement about exploring the universe. For many professionals this poses a worrying challenge. Some will seek to defend their endangered monopoly. The more enlightened will understand that knowledge is now much more widely distributed and not controlled in a few ivory towers. The most powerful organisations will combine the know-how of professionals and amateurs to solve complex problems. That is true in astronomy, software development and online games. It should be the path our health, education and welfare systems follow as well.

Pro Am Power

Some of the most powerful movements reshaping our world are driven by Pro Ams: people who engage in activity for the love of it, but perform to very high standards. Their motivations are avowedly amateur but the standards they set themselves are comparable to those of professionals. They want to be taken seriously, as players and contributors. Movements that mobilise this Pro Am ethic will be hugely powerful.

The Jubilee 2000 debt campaign, which changed the way we think about debt, development and trade, started life with one campaigner working in a shed in South London in the mid-1990s. By the year 2000 it had a petition with 24 million signatures, spawned a network of 69 national campaigns and mobilised hundreds of thousands of people in protest in the UK. At least $36bn of developing world debt has been written off as a result. Pro-Am activists are reshaping the way democracy works. They are the lifeblood of the local and global single issue movements which now animate politics, while traditional party politics becomes ever more professionalised and media based. Linux and Wikipedia are sustained by Pro-Ams as is much of the computer games industry. Rap music started life as a Pro Am activity which people sharing home made tapes.

The 20th century was shaped by the rise of professionals in most walks of life. From education, science and medicine, to banking, business and sports, formerly amateur activities became more organised, knowledge and procedures were codified and regulated. As professionalism grew, often with hierarchical organisations and formal systems for accrediting knowledge, so the term "such an amateur" came be to a form of derision. Pro-Ams are turning that on its head. Pro-Ams are knowledgeable, educated, committed and networked by new technology. They scramble up the categories that divide and rule our lives. They work at their leisure. They learn by playing. They relax by undertaking challenging tasks. They are unpaid and yet they set themselves very high standards for what they do. Pro Ams are motivated by values that we thought were near exhausted. They do what they do for the love of it: for the pleasure of taking part, to make a contribution, to win a reputation from their peers, for the thrill of the challenge. They are not in it for the money. Pro Ams yearn for more than a Jekkyl and Hyde experience of being mere workers by day and them consumers by night. They want to be contributors. Traditional organisations with their hierarchy, bureaucracy and complicated sets of financial incentives cannot reach these simpler and more powerful motivations. Free-form organisations like Wikipedia and Linux are so threatening and perplexing because they are designed to tap into the Pro Am ethic. What they have done is find a way to transform what might have been individual, leisure activities into organised, mass activity.

For Pro-Ams, leisure involves deploying knowledge and skills, often built up over a long career. Most Pro-Am activities take place outside normal working hours in the evenings, holidays and at weekends, in leisure time. Climbers go climbing at weekends; amateur actors act; software programmers programme. Leisure is usually defined as a form of relaxation that allows people to recuperate from work. Yet Pro-Am leisure is a very serious activity involving: training and rehearsal, competition and grading, and so also frustration, sacrifice, anxiety and tenacity. Pro-Ams report being absorbed in their activities, which yield intense experiences of creativity and self-expression. They provide people with psychic recuperation from – and an alternative to - work that is often seen as drudgery. Leisure is traditionally regarded as the antithesis of work: a zone of pure freedom and spontaneity. Yet much Pro-Am activity is characterised by a sense of compulsion and effort. Pro Ams feel they have to do it, get up early, make sacrifices, put in the hours.

Pro-Ams spend a large share of their disposable income supporting their pastimes, whether through travel, equipment or entering tournaments. They are avid consumers, not least because Pro Ams can now get hold of technology – like Dobsonian telescopes – that was once the preserve of professionals. Amateur composers can now get software tools that only orchestras could afford ten years ago. Amateur photographers can afford cameras that only professionals could use. As technology has got cheaper, smaller and more usable, so it has encouraged more Pro Ams to take up pastimes that once might have been beyond their means. So Pro Ams spend much of their free time as consumers actually being mini-producers. Pro-Am musicians and photographers want to use their instruments and cameras to produce work that other people want to hear and see. They have shadow careers that

they turn to once their formal and public career runs out of steam. They might be a health official by day but an amateur garden designer by night. As one Pro Am mountain climber put it: "When I meet people and say what I do, I say I am a financial analyst. But when I talk about who I am, it is a mountain climber."

Pro Ams do not tend to be loners. They build collaborative organisations – clubs, mutuals and now networks – because it is very difficult to be a Pro Am on your own. To be a Pro Am requires the systematic acquisition of skills. That involves learning from coaches and peers, which in turn requires social organisation so that skills can be passed on and accredited, through clubs, networks, events, competitions and performances. To enjoy going to see a film, one might only need the time and the money to visit a cinema. To join a film club requires more than time and money: it depends on a strong desire to learn more about film and to identify yourself with a community of fellow film buffs. As the investment is significant, so the benefits to the individual have to be durable: a lasting sense of identity, achievement and satisfaction. Pro-Ams seem to get far more intense, pleasurable and satisfying experiences from these activities than they do from work, formal learning or passive consumption. Active leisure, which engages people's minds and bodies, has big pay offs for psychic and physical health as well. As the Pro Am mountain climber put it: "When I am up a mountain it is just me and the mountain, everything else fades away. Everything that was so complex before becomes so simple."

Getting a fix on the scale of Pro-Am activity is tricky not least because it is a hybrid category not recognised by standard research techniques. As a result estimates of Pro-Am activity rely on proxies such as volunteering. British figures suggest that club membership and community participation is holding up well, especially in volunteering, in contrast to the decline charted for the US by Robert Putnam in Bowling Alone. Traditional forms of association have dwindled - membership of Women's Institute for example fell from 442,000 in 1972, to 240,000 thirty years later. Yet new networks have risen: membership of environmental group rose over the same period from 750,000 to close to 6m. According to the British Social Attitudes Survey for 1998, about 21% of people were members of community groups and 26% were members of sports and cultural groups. About 23m adults a year undertake some form of volunteering, contributing close to 90m hours a week. Volunteering has almost doubled in the last decade. Among important volunteer Pro-Am organisations are: the Samaritans with 18,000 Pro-Am volunteer counsellors who devote 2.7m hours a year; the Women's Royal Voluntary Service which 95,000 volunteers who deliver more than 9m meals on wheels a year; Neighbourhood Watch which covers 27% of households and Victim Support which has almost 15,000 volunteer Pro-Am counsellors. About 95% of criminal cases are dealt with the country's 26,000 Pro-Am magistrates. The St John's Ambulance is run by about 43,000 Pro-Ams and trains more than half a million people a year in first aid.

In science there are estimated to be at least 4,500 independent archaeologists, not counting the tens of thousands of men who go out with metal detectors at weekends. The Natural History Museum estimates that 100,000 amateurs are actively involved in nature conservation, through a myriad of specialist societies and clubs. More than 1m people are members of wildlife groups in the UK. The Family Record Centre in London estimates there are 387,000 active members of family history societies in the UK. The Demos Pro Am survey found that perhaps 58% of the British population engage in an amateur activity regularly and rate their skills as reasonably good. The "hard core" Pro-Am population is likely to be a subset of this. Combining our estimates with those of other surveys a reasonable stab is that between 15% and 25% of the population at anyone time are hard core Pro Ams.

Their number is only likely to grow. Pro-Am culture is being driven by a powerful set of social and demographic factors. By 2020, mean UK household income is projected to be more than £44,000, up from about £27,000 in 2002. More income means more spending on experiences and services, proportionately less on basics. Future generations are likely to be better educated. More than 50% of men over the age of 65 have no educational qualifications, compared with less than 10% of those under the age of 30. Those with more education are better equipped for the learning involved in Pro Am activities. The extended life span should give people longer, healthier lives allowing them more time for second and third careers, after their children have grown up. A woman born in 1850 would have had little time for herself. A woman born in 1950, whose eldest child reached 18 in the 1980s, might have 30 years of healthy life without direct child care responsibilities. By 2020 there will be 5m more people

in the UK population over the age of 45, a prime group for many Pro-Am activities. A more open and socially fluid society means people want a sense of individual fulfilment and identity that comes from their hobbies they engage in. Greater insecurity at work means that people are increasingly likely to turn to these shadow careers in their 40's and 50's. Cheaper and high quality technology puts powerful tools, once the preserve of professionals, into the hands of amateurs.

Pro Am Benefits
Pro Ams are more than a new exotic social species of do-it-yourself enthusiasts. They bring wider benefits to society: they help build communities, drive innovation, sustain democracy, empower poorer communities and contribute to culture. Henry Ford's model of organisation was built on the new character of the factory worker. Wikipedia, Linux and their like are substantially built by and for the Pro-Am.

Pro-Ams thrive in communities, where they learn to play with, compete against and perform to others. The volunteer organisations that sustain Pro Ams also help to generate social capital, lasting relationships and friendships that help to provide the social glue and basis for cooperation. As local community has dwindled as a source of shared identity, so Pro Am tribes have become more important. We engage with people who share our view of the world without having to live next door to them. Sharing Pro-Am interests is the new basis for community. This inbuilt impulse to collaboration lies at the heart of the economic power of Pro Ams.

The user innovation we explored in the previous chapter will often start with groups of Pro-Ams. What has already happened in some sporting fields, such as windsurfing, will spread to other sectors. In 1970's Hawaii, top amateur windsurfers were trying to outdo one another by jumping from the top of large waves. Invariably, they fell off in mid-air because they could not keep their feet on the board. Then two of the leading protagonists, Larry Stanley and Mike Horgan, decided to try a different approach. Several years before, Stanley had built an experimental surfboard with footstraps. When he adapted it for jumping it worked immediately. "I could go so much faster than I ever thought," Stanley recalled. "When you hit a wave it was like a motor cycle rider hitting a ramp; you just flew into the air and you could land the thing and change direction. Within a couple of days ten other people had boards with improvised straps." The idea was promiscuous. High performance windsurfing started from that Pro-Am innovation. By 1998 more than a million people were taking part in the sport that Stanley and Horgan created. Disruptive innovation often starts in marginal, experimental markets that are often too small to sustain traditional approaches to R & D. That is where Pro-Ams come in. Dedicated amateurs pursue new ideas even when it appears there is no money to be made. They do it because they love to.

The more Pro-Ams there are in a society the healthier its democracy is likely to be. While participation in formal politics and membership of political parties has declined, there has been a parallel massive growth in single issue and pressure groups campaigns. The fact that people can pursue amateur hobbies without state censorship or interference is a vital measure of freedom. People with passions get drawn into civic life and so are more likely to have a stake in a democratic process that defends this freedom of association. Pro-Ams are also spawning the most powerful new forms of political engagement. These bottom-up, forms of organisation are cheaper, more agile and more fun than formally structured parties. They transforming the way we do politics.

Pro Am creativity will flow through culture in future as well. File sharing sites such as Napster and Kazaa gave people the chance to share music made by established artists. New generations of these services will allow people to share their own creativity. With Sibelius, the software that allows composers to orchestrate their work, someone can play a keyboard connected to a computer and see the notes he is playing transcribed automatically onto a score. With a few more clicks the melody can be orchestrated for a full symphony. Sibelius started in the early 1990s as a heavy-duty software programme for professional composers. The software has been used for the music in countless feature films. It did not take long to infiltrate education: now 60% of UK schools use a simpler and cheaper version for students and teachers. Think of what that means for the average music teacher: the task of staging a school musical just got a lot easier. Writing scores for the school orchestra, often with an odd assembly of

instruments, has became simple. Children doing their GCSE music courses can now use the simple version of Sibelius to compose for themselves. They do not have to learn composition by listening and writing out notes in long hand. They can learn by doing. Thanks to the Sibelius community web site they can publish and share their work online. There some amateur composers are selling their compositions, from online stalls. Many in the community just want to share their work. In 2005, just months after it was created, the site had 45,000 scores contributed by members, with 20 new scores arriving every day. You can listen to Mathew Scowcroft, 16, from Melton Mowbray, playing his first published oboe work : "The train was beautiful on fire, fireflies attracted by the embers, amid the chaos." Jeremy Silver, Sibelius' chief executive, who looks more like an enthusiastically earnest English teacher than a business man explained: "Sibelius is really a tool for the extension of the imagination and we want to take that to as many people as possible. The fact that the professionals use the top of the range version still matters a lot to the product's standing and credibility, but the real impact comes from when it spreads to hundreds and thousands of people, especially children. Then it could transform how they can be creative, together."

Pro-Am power is not confined to the high-tech, developed world. It is at work in some of the poorest communities as well. Many of the social and medical advances achieved in the rich, developed world in the 20th century – especially in health and education – relied on providing people with access to professional expertise: teachers deliver education, doctors cure disease. In the developing world professionals are scarce and these top down, welfare state style approaches are too expensive, which is why the most imaginative social innovations in the developing world employ Pro-Am forms of organisation, such as the Barefoot College.

The outstanding example is Bangladesh's Grameen Bank founded in 1976 by Muhammad Yunnus, a Bangladeshi economics professor, to provide very poor people with access to micro-credit to allow them to improve their houses and invest in businesses. Traditional banks, reliant on professional expertise, regarded poor people seeking small loans as unprofitable. It did not make sense to employ a professional banker to make a small loan to a poor peasant. Grameen has succeed by orchestrating Pro-Am expertise. Grameen employs a small body of professionals who in turn train an army of barefoot bankers. Village committees administer most of Grameen's tiny loans. By 2003, Grameen had lent more than $4bn to about 2.8m Bangladeshi's including 570,000 mortgages to build tin-roofs for huts to keep people dry during the monsoons. Had Grameen relied on traditional, professional models of organisation it would only have reached a tiny proportion of the population. The Pro Am, self-help model is being replicated by social entrepreneurs across the developing world. In India, Jeroo Billimoria, has built up a national emergency telephone service for street children, built almost entirely on training children to advise one another. In Peru, social entrepreneur Martin Burt is creating a self-sustaining school, in which the children operate a farm and so earn enough money to employ teachers. In the Mbuya Parish of Kamapala, the capital of Uganda, Margrethe Junker, is leading an aids support network, for more than 1350 clients, with just 230 volunteers, 77% of whom are also clients of the service themselves. "We had not option," she explained. " We had such huge need and no doctors, we just had to do it by organising people to do it themselves. The more people become involved as contributors, the better they feel." Low-cost, self-organising networks might be the height of organisational fashion on the US west cost but they are a matter of life-and-death in places like Mbuya Parish, Kampala.

Knowledge once held tightly in the hands of professionals and their institutions is flowing into networks of dedicated amateurs. The crude, all or nothing, categories we use to carve up society – leisure vs work, professional vs amateur – will have to be rethought. The Pro-Ams will bring new forms of organisation into life, which are collaborative, networked, light on structure and largely self-organising. Professionals - in science and medicine, war and politics, education and welfare – shaped the 20th century through their knowledge, authority and institutions. They will still be vital in the 21st century. But the new driving force, creating new streams of knowledge, new kinds of organisations, new sources of authority, will be Pro Ams.

Chapter 8 – Open Work

Open Work
Seb Potter is a pasty pale young man who eats too much take-away food and spends far too much time at his computer. He programmed his first computer at the age of eight and has not stopped since. Potter is an unlikely looking organisational revolutionary: baggy jeans, skater T-shirt, trainers. There is no reason why executives in large organisations should take any note of him. Yet the way Seb Potter works says something about how jobs are evolving which even large and conservative organisations will eventually have to take note of. I met Potter in a pokey conference room in a run down and over-crowded building in Brighton where Get Frank, the web development company he works for, is crammed into two tiny rooms, with developers working cheek by jowl, the office cluttered with bikes and workstations. It looks more like a student flat. Perhaps it should be no surprise that radical organisational innovation would start in marginal and overlooked places such as this and not in the work pods of the corporate mainstream.

Potter got involved in open source software development as a student in 1998, when he helped to launch an online community called Evolt to bring together amateur and professional web developers. Evolt started with 24 online collaborators who had never met face-to-face, but started to converse with one another, through a discussion group hosted by a magazine website. Frustrated by the magazine's new owners' plans for the website, they decided to create their own alternative to share ideas. Potter recalled: "It was really very simple. We just exchanged emails and agreed it was a good thing to do. We divided up the tasks among ourselves, depending on who could do what and within a month we had a fully functioning website which people could visit to get tips and advice to make life easier if you were developing a web site. We just wanted to make it easier for people to solve web development problems they faced."

When the community got started contributors would vote on what should go on the site, using email. By 2001 the site had 3,000 signed up members, and Potter and co decided it needed a more formal system of committees, to oversee different aspects of its work. Occasionally members would get together face-to-face in a London pub for a "beer-volt." Once a year there was a big conference. A couple of the original community members got married. By 2004 the Evolt community had 7,000 contributing members worldwide. "Most people hear about Evolt because they've got a problem to solve," Potter explained. "If you go onto Google and type in 'web development problem solving' Evolt comes close to the top of the list. The more people who get involved adds to the number of questions that get asked and the amount of knowledge that gets generated in the shared knowledge base." GetFrank encourages Potter works for, encourages him to spend at least a quarter of his work time involved in these open source projects because the company gets access to software they could never afford to develop on their own. Frank Byford, GetFrank's founder explained: "We are very small so open source software gives a small company like us access to a potentially massive research and development capacity. It makes R & D affordable for small companies who collaborate." For Potter, though, the motivation for his open source work is far more personal: "I love problem solving and if you are into software then pretty much the only way you can do that is to get involved in open source projects because proprietary systems are closed. Open source communities judge you on the ideas you have and the contributions you make not on what you look like. If you have good ideas you get recognised."

Traditional companies find it almost impossible to tap into the passion and imagination of people like Seb Potter. That is why open source communities are going to change the way we work, in all organisations, even those quite unlike these communities. As Potter puts it: "For me work is the oddity. Work is a kind of compromise. I feel most myself when I am doing this open source stuff. When I am doing this and give it my full attention then everything else around me fades away and I become completely focussed." Most managers in large companies can only dream of creating a work environment like the one the Evolt community seems to have created, without design and almost by accident. How can a group of 7,000 people work together, sharing out tasks, building up a knowledge base, set of tools and services, without needing an office, a management hierarchy, a knowledge management

programme or an organisation chart? Seen from within the walls of the traditional organisation it does not make sense. But in time these open approaches to work will become the new common sense. They will expose just how odd, distorted, dysfunctional and unpleasant it is to work for large corporations.

The Soulless Organisation

Organisations exist to get work done. Any successful organisation must do three things well. It must motivate people to work, to make the most effective contribution to the collective endeavour. It must coordinate the work of many people to make sure it all adds up and takes places in the right order, to fit together. It must innovate by learning, adapting and evolving with the demands of the environment around them, exploring opportunities for change. Sounds simple. Yet traditional corporate organisations are in continual crisis over their shape, structure, management, pay systems and ethos because they find it so hard to fashion an approach to work which meets all these challenges – motivate, coordinate, innovate - at the same time.

In closed, industrial era organisations people were allocated to tasks by a division of labour, with work divided into manageable chunks. This allowed workers to become specialists in their particular task, while the central design ensured all their efforts could be brought together. If a worker was not clear what to do next, he could have a look at his job description, which would describe the role. If that did not provide the answer then he could ask someone in authority to provide guidance. The way we work now, in many respects, is nothing like this caricature of factory age work. People no longer have to work at the same time and in the same place to be producing the same item. Work has become dispersed to networks of contractors. Management hierarchies are flatter and working practices more flexible, at least for some. Detailed job descriptions are a thing of the past in many organisations. Workers can be deployed wherever they are needed. The coordination of these networks of far more flexible workers has become an art form in itself, involving logistics and international communications. The psychological contract, what both sides expect from work, has changed as well. In the US and the UK employers seem less committed to providing stable jobs for life. Relationships between workers and companies are less secure and stable, more cynical and short term. In Europe and Asia traditions of stable employment have been more enduring. But even there they are under pressure to change.

Underlying all this change in working life are two competing trends, which many feel makes life impossible for them. Big organisations with big brands, need consistent products, services and processes – often on a global scale – to deliver a consistent customer experience. Wherever you go – Starbucks, Coke, Microsoft – must mean the same thing. That means work has to be highly systematised. The workers have to follow common rules and processes. Product launches have to be planned meticulously, like a military campaign, from the centre. Yet at the same time all organisations – public and private – face a challenge of innovation and adaptation, as new technologies, competitors, consumer trends and kinds of organisation emerge around them. Responding to that changing environment means bending or breaking rules, trying to do new things or at least old things in a different way. Innovation requires variation, experimentation and acceptance of failure, not activities that a high quality, brand-led company can easily tolerate. This balancing act is complicated because these days workers are far less compliant. They have higher expectations of how they should be treated, especially younger, well-educated knowledge workers, who will make up the majority of the workforce in developed economics. Our culture has told them they should be in control of their lives. They want to extend their sense of authorship from how they design their living rooms to how they design their careers. They want to feel autonomous, able to take the initiative and be rewarded with a sense of achievement and ownership. They want their work to belong to them. These younger generations of workers have essentially democratic values: people in authority have to earn their respect, be open to question and justify their decisions.

The kind of angst these tensions create can be seen in corporate offices all over the world, but they seem most troubling in large US corporations. In 2005 I spent a few days advising a division of a very large US multinational software company. On my first day I sat in an airless, windowless room, barely large enough for two people, which had just been redesignated as the "ideas space." The previous "ideas space", which had been decked out with

orange bean-bags, had just been taken over by extra tele-sales staff, to flog more product, because targets had been increased. Everyone seemed to be strapped to their desks, even for lunch. That day my task was to talk to each of the senior managers to find out what their main challenges were. It was not difficult to get them to talk. My pokey little room became a kind of confessional. One after the other they told a story with some common themes. It ran something like this.

The people here are great but the organisation seems soulless. Young, fleet footed competitors are emerging the whole– Google and Linux – and we are embarrassingly slow to respond. We are one of the biggest companies in the world yet in reality we are following the lead of smaller companies. Coming up with new ideas is pointless because all the decisions get made on the West coast of the US. We have no space for innovation: we just deliver products to market, according to a plan set down somewhere else. One of our main tasks is to report back to headquarters with detailed plans but the numbers in those plans are semi-fictional. When we exceed the numbers we get congratulated and when we fail there is an inquest but no one has the courage to point out the plans never made sense in the first place. No one seems to have enough time. Executives are either on a plane to the US to get their marching orders or in conference calls. Most executive time is spent serving the hierarchy, trying to fight it or simply working out what is going on at headquarters. No one seems to be very happy. Most people have their eyes on another job somewhere else, preferably soon. People with families find life pretty intolerable. The Soviet Union's plans had nothing to compare to the detail of those that ruled this corporation.

Many large organisations seem to be like this: they are engaged in a low intensity civil war. Much of the paraphernalia of modern management is an effort to square the circle: to make organisations that are top down and financially driven, appear to be more humane, democratic and bottom-up. New forms of open, collaborative organisation are emerging because they resolve these tensions between efficiency and innovation far more effectively than the traditional corporation. These new kinds of organisations answer central questions about work – Why do I do this? Who is in charge? What do I do next? – in a very different way. That is why organisations based on open work are proving so potent.

Why Work for Free?

The perplexing thing about Linux, Evolt and other open source initiatives is that skilled people give their time and effort for free to create a complex product that they give away for free to anyone who wants to use it. Why do they do it? One answer might be that it is just really a way to get a good job: a bit like work experience. Young software programmes use their participation in these communities to show off their skills to their peers. That way they build up a reputation, which at some stage they translate into a well-paid mainstream job. There may be something in that but many of the people who take part in these projects are not after jobs because they have jobs already. Another possibility is that they are motivated by dislike of the opposition – particularly Microsoft – and they buy into the altruistic and egalitarian values of the open source movement. But this only applies to a minority, surveys suggest, and dislike of an opponent is rarely enough to generate creativity. According to surveys of open source programmers, participants contribute to these projects for three main reasons. First, they want to solve a problem. Seb Potter was attracted to Evolt because it provided a better way for him to develop the kind of software he wanted. His employer, GetFrank, regards it as an effective way to share development costs with like-minded smaller companies. Second, individual programmers see it as an investment in their own skills and learning. By taking part in these communities they refresh their own ideas and human capital. Third, they seek a sense of authorship and recognition. Seb Potter likes the sense of achievement he gets, the way he feels in flow, when he is working on open source projects. Open source taps into a richer range of motivations – pragmatic, practical, ethical, personal – than large organisations which many people regard as a necessity: longer hours, more targets, rules and stress.

As these communities have very low costs of entry – it is very easy to take part – they also attract a much larger range of contributions than traditional organisations. Even if your contribution is very limited – spotting a bug, correcting a Wikipedia entry – you can still add to the larger project. Most open source and file sharing

communities depend on perhaps 20% of the contributors – or less – making most of the big contributions. The Linux kernel is supported by a relatively small team. But the other 80% make a long tail of smaller contributions. Innovations in Linux start with users reporting bugs that then get fixed by other programmers and in turn might provoke a significant innovation. Large organisations, by and large, like to employ people who come to work on a regular basis and devote most of their working time to the company. That is what employment contracts achieve. The need to accommodate people who make smaller, less regular contributions, is reflected in the growth of part-time and short-term contract working. But setting up an organisation to cope with lots of people who want to make lots of small contributions is very costly for a traditional organisation with its management hierarchies and brand strategies. One of the distinct advantages of open communities is they allow people to make contributions of just the scale that suits them, large, medium, small, miniscule, episodic, intense. This flexibility allows them to mobilise a much larger range of players from fanatics to occasional dabblers.

The second challenge is how this myriad of contributions is brought together to form a coherent whole. The traditional organisation is based on a division of labour: people are allocated to tasks, divided up from above, according to a strategic plan set out from the centre. That works only on the assumption that the centre – the people who design the work system – know what needs to be done. But these open source communities are designed for innovation and growth. People at the centre cannot say for certain in advance what will need to be done. Open source communities coordinate their work through a distribution of labour: people distribute themselves to tasks they think need doing and they believe they have the skills to undertake. A self-distribution of labour – if it works – is far cheaper and more innovative than a centrally planned division of labour. An organisation does not need a layer of management supervisors to check what people are doing. That decision is left in the hands of the people doing the work, facing the problems, seeking solutions.

Ronald Coase, the organisational economist, famously argued that firms emerge to coordinate work – through management instruction and planning – when it is too costly to achieve the same result through the market. Coordinating complex activities at the right time, in the right place, is a difficult task. Relying on contractors in the open market is a risky business. That is why it makes sense for firms to control the process. But as Yochai Benkler, a law professor at Yale Law School points out, people do not generally get involved in open source projects because their boss tells them to do so, nor because they stand to make money. In open source work gets completed and coordinated, people build complex goods like encyclopaedias, without anyone appearing to be in charge or anyone offering to pay for the service.

Benkler's explanation for how open source communities coordinate themselves runs something like this. The raw material of these collaborations is creative talent. But creative talent is highly variable. People are good at different things and in different ways. It is very difficult to tell from the outside, for example by time and motions studies, who is the more effective creative worker. It is very difficult to write detailed job descriptions and contracts for creativity, specifying what new ideas need to be created when. Creativity cannot be delivered just-in-time. Open source communities resolve the difficulties of assessing creativity and quality by decentralising decision making down to individuals and small groups. They decide what to work on, depending on what needs to be done and what their skills are. There is little sense in working on a project that is already well staffed and where your contribution will add very little. It is very difficult to pull the wool over the eyes of your peers: they will soon spot if the contributions that you make do not really come up to scratch. That allows people to work on just their bit of the puzzle. Good central design rules allow the whole thing to add together. Work in open source communities gets done when creative people self-distribute themselves to different tasks, they submit their work to open peer review to maintain quality and the product has a modular design so that individual contributions can be clicked together easily.

Open source communities are a challenge to the established order because they answer the three critical questions about work – how to motivate, coordinate and innovate at the same time – highly effectively while requiring little in the way of top down bureaucracy or financial incentives. They motivate a mass of contributors by

providing interesting work, posing interesting questions to answer and attracting interesting people to work with. The work is coordinated because the products clip together with modular architectures, performance is judged openly by common yardsticks and the community shares an overarching goal. Open source communities have to be efficient and low cost: they cannot afford overheads so they seek out the lowest cost solutions. Yet these communities also encourage constant exploration, driven by curiosity. Authority is exercised mainly by peer review and with a light touch. It is worth reminding ourselves what open source communities do not need to succeed: restructuring, re-engineering, knowledge management, career reviews, brand strategies, vision statements, corporate bonding sessions in the jungle, embarrassing lunches with the boss.

The See Through Workplace

Open source provides an inspirational new model for how we can work together, collaboratively and creatively. But it will not work in all settings. It depends on people feeling motivated. There are plenty of tasks – collecting the community's rubbish – which most people will not willingly do out of a sense of curiosity. Some products cannot be broken down into modules. Many do not have the equivalent of a source code to be shared. Collaborative and cooperative forms of work have a long, romantic and often disastrous history. Collaborative, peer-based working will not completely supplant market incentives and firms. Yet collaborative working models like Evolt, Wikipedia and Linux cast a long shadow over traditional hierarchical organisations. The biggest impact of these open models may come from how they force established, traditional and top-down organisations to adapt by becoming more open and participative.

Large organisations will have to start learning from open communities of innovation. Employees increasingly need to be flexible, self-motivated problem solvers, not rigid rule followers. More jobs will involve the investment of imagination, creativity and empathy, factors of production that are difficult to measure. The more that people are expected to multi-task – to deliver and execute effectively, but also to innovate and learn – the more difficult it is to set clear incentives and reward them. A performance based pay system that rewards individual efforts and output will do little to encourage new ideas and collaboration. Traditional firms will have to become more democratic, open and egalitarian – if they are to match the innovation capacity of open source. Traditional, top-down companies – with power invested in an unelected executive – are an anachronism in a democratic age. It should be no surprise that young and entrepreneurial companies, founded by people who share these more democratic values, look and feel quite different from traditional organisations.

A fashionable example is the British drinks firm Innocent Drinks where the work culture is defined by informality. The company's three young founders have slightly grating titles such as "Chief Squeezer" and "Top Banana." The Innocent offices abound with the paraphernalia of trendy modern business: table football and photos of staff when they were babies. Everyone is on first name terms. New parents get a £2,000 baby bonus and newly weds an extra week's holiday to have a decent honeymoon. A high proportion of profits are donated to development charities. Over one door of their offices in a non-descript industrial park in Hammersmith, West London a sign hangs: "Burglars' Entrance." The open, entrepreneurial work culture, which encourages people to speak their minds and link their work to their lives, has helped to propel Innocent to become one of the most exciting and widely emulated new entrants into the British food and drinks markets.

Approaches like this are not confined to companies that are small, young and trendy. WL Gore, the maker of Gore Tex and a range of other products has sales of close on $1.4bn – but claims to have no managers, secretaries or even employees. It has a global network of 6,000 associates, who jointly own the company. Salaries are decided collaboratively. Every new associate has three peer mentors who help to navigate their career. Bill Gore, the company's founder, argues that in most companies, the work gets done through informal networks that bear little relation to formal organisation charts. He set out to design an organisation based on those informal networks. As one Gore employee put it: "Why go to someone with a title when you can go to someone with the answer." Large companies are attempting to cherry pick elements of choice and self-management they want to introduce. In

1998 BT, the British telecoms incumbent, created a Freedom to Choose scheme for field engineers, after an experiment with a particularly recalcitrant group of software engineers in Cardiff. Almost in desperation the managers gave them the right to self-schedule their work. The pay system for engineers had encouraged them to work at weekends and to clock overtime. As a result engineers failed to complete jobs so they would be able to earn overtime. The Freedom to Choose programme allowed small teams of engineers to choose which work should be done, in which order and by which team members. Many of these decisions were made in chat rooms on the Internet with the help of scheduling software. Engineers earn points by completing work, mentoring peers and leading groups. The points can be redeemed for pay. In March 2002, the original pilot was extended to 20,000 engineers who self-schedule their work. The BT scheme is a limited form of the self-distribution of labour that is a central feature of open source communities. After three years the average engineer was earning more money and working two hours less per week. Productivity was up by 5% and quality up by 8%. BT's will never become a community. Yet it is adapting elements of the open approach to work because that is how best to motivate and coordinate staff who want to be self-motivated innovators.

In the right conditions these open and participative forms of work can provide better answers to the basic questions that all large organisations face: how to motivate staff to come up with new ideas, and coordinate what they do with as little hierarchy as possible. One can see more elements of this open thinking in the way some large corporations are changing their physical surroundings: their offices.

Organisations revolve around offices. Usually they are designed to help managers coordinate work but as a result they also usually fail to motivate people and can stand in the way of innovation. Offices, in my experience, are good for power politics, flirting and gossip. They are dreadful places for intellectual curiosity. Creativity comes from being immersed in ideas, getting lost in your thoughts. Yet offices provide a constant round of distractions and trivia, the urgent chasing out the interesting. Creativity comes from diversity: exposure to different points of view and experiences. Office cultures tend to make everyone conform to the corporate code, making them seem alike even when they are not. In most offices people rarely move outside their own departments, let alone outside the organisation as a whole. Innovation often comes from creative interaction with customers, yet offices are a good place to hide from the outside world and from consumers in particular. Offices encourage territorialism – different departments on different floors – so it is difficult for people to cross boundaries to borrow and share ideas. Office bureaucracies make people dysfunctional and irrational: most of the conversations I overhear in the lifts of large organisations are either about internal turf wars people are fighting or what they did when they escaped from work. Lateral and sideways thinking is virtually impossible in the standard office environment. People often have their best ideas in idle, marginal moments: after exercise, while walking, on the way from taking the children to school, in the shower. Long work schedules drive out those marginal moments. Innovation thrives on conversation. Days that are scheduled down to the last minute drive out conversation, managers frown on conversation as no more than idle chatter. Yet as we will see conversation is at the root of innovation.

The most open and creative office I have worked in belongs to Ideo, the design and innovation firm. For several months I squatted at a desk in Ideo's London office, joining project meetings and discussions, while my own home office was being built. There was a constant flow of people, especially customers, into the building. They came straight into the workspace. Everyone could see them. Ideas, materials and images were constantly posted on the walls so that people could see work in progress. People felt at home. The décor was unflashy. There was nothing self-conscious about it. It was designed to feel comfortable and efficient. Unlike many advertising companies and large corporations Ideo did not have to display modern art to show everyone it was creative. People moved around the whole time, bumping into one another, colliding and conversing. There were simple spaces where people could congregate: a large table around which people ate lunch. In some areas the atmosphere was as studious as a library. But it was also highly gregarious and at times raucous and playful. People were allowed to be idle: someone taking a nap on a sofa was assumed to be resting, not skiving off. The underlying ethos was of self-organisation and self-discipline. Idea's office encourages people to generate ideas by mixing and melding. Ideo is much vaunted in academic studies of innovation and design but it too has its problems: a culture that can become inward looking;

people who have become tired and conservative; ways of thinking that have turned into routines. But at its core Ideo's places of work allow people to be creative together, in a highly self-disciplined environment.

Of course it is ridiculous to imagine most places of work will be like this in future, even in the developed world. Call centres and retail outlets will be experience and service factories: highly regimented, delivering a commodity service, fast and to high standards of quality. Yet as more organisations come to recognise they need to innovate and motivate staff, as well as coordinate their work, so more of the will have to explore recipes like those of Ideo and Linux. Not all these experiments will be an outstanding success. Big companies tend to think that if they bring in modern art, paint walls bright colours, put out some bean bags and most crucial of all – put in a table football table – they will become buzzy, creative places to work.

But even these clumsy attempts at reform confirm the general drift: offices will have to become spaces for creative conversation. The task of the modern office, as Malcolm Gladwell put it in a New Yorker article, is to invite social interaction that makes it easy for strangers to talk to one another. Offices need a social milieu like that in a bustling city neighbourhood, where much of the life takes place on sidewalks and in cafes. Those spaces need to be at the heart of modern offices not in the margins. Do not design the office around the executive offices but around places where people congregate, mingle and talk: cafes, open workspaces, libraries. Workspaces should be designed to promote collaboration, self-organisation and interaction: think barefoot and beach.

More and more large organisations will feel the gravitational pull of these open and participative ways of working. Many will cherry pick elements of the recipe: self-organisation, self-scheduling, peer review of performance, open plan, café style places of work. Some large organisations, as a result, will be more humane, productive and profitable. But it will prove difficult to take the cherry picking too far: open source styles of work depend on similarly open approaches to leadership and ownership. Open source communities encourage freedom of speech and association; decision making is transparent; ideas are held in shared ownership. Not many large companies are prepared for all that this entails.

This call for more open and participative forms of work may all sound utopian and I might have been inclined to agree until I met Chris Sacca over dinner in late 2005. Sacca is a principal at Google, the information search company and one of the first handful of employees. I asked him how Google managed to come up with its flow of ideas. His reply went something like this. Every Friday everyone in Google gathers for an all company meeting, 7,000 people, face-to-face or connected by video. Anyone can ask the senior management any question about the company's policy, strategy or performance. People who ask more direct and difficult questions tend to get a round of applause. Every Friday, every person working in one of Sacca's teams files him five bullets explaining what he or she has achieved that week and five more on what they plan to achieve in the week to come. That is the only reporting system. He does some work making sure everyone is on track but most of the time it is up to people to sort out what they are doing, adjust to one another without calling in a manager: the beach ethic at work. Anyone in the company can search through the bullets submitted by anyone else, including those from the chief executive. Anyone in Google can launch a development project to create a new service, so long as they post the details on a central site, so everyone else can see what is going on. They can continue with their project until they want to recruit more than two people or start to use some significant server capacity. Once they have reached that stage they have to take the idea to a company council – a bit like a committee in an open source community – which will make a decision about whether it should go ahead. If it does get the go ahead then the project gets given very few resources to begin with. Sacca explained : "You have to keep resources tight. If they can only recruit one extra person to the project, you know they are going to go out and get the best person they can find."

All of this has to be taken with a pinch of salt. Work cultures are rarely as open and democratic as people at the top of an organisation claim, even at a company as funky as Google. Yet if only half of what Sacca describes is true then it poses a huge challenge for traditional, top down, slow moving organisations, both public and private. If an organisation wants to match Google's rate of innovation, then technology is only a small part of the story. Google's

most valuable asset is this self-organising work culture which motivates, coordinates and innovates all at the same time and at very low cost. Google is perhaps the most striking example of how a company has taken elements of open source work into the corporate world and in the process created an extremely potent mutant.

Work and consumption are being changed by the emergence of more open ways to organising ourselves at scale. Consumers, especially the Pro-Ams, increasingly want to be participants and contributors not just recipients of services and solutions. Workers aspire to the democratic and participative values that run through open source collaboratives and much of the rest of life. They want to be able to self-organise more. The interaction of new self organising forms of work and new m ore participative forms of consumption will generate new approaches to innovation. New ideas increasingly will emerge from the interaction between users and producers, amateurs and professionals, rather than coming down a pipeline from the boffins and professionals, to the waiting, open mouthed consumers. This more interactive and participative approach to innovation will challenge many deeply held assumptions about what creativity is, where is comes from, how it should be rewarded and organised.

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Chapter 9 – Innovation is Conversation

Ideas have many authors

The worm c elegans is as simple as an organism gets. It has a front end, where the food comes in, a rear where the waste exits, a bottom and a top, a left and right. On the face of it, that is pretty much it. Except even the simplest worm achieves a mind-bogglingly complex task: it generates itself from a tiny set of genetic instructions. The worm is like a self-organising chemical factory, orchestrating millions of miniscule reactions, which seemingly adjust to one another, without any central programmer being in charge. The collaborative effort to understand how the worm achieves this task, which started in the 1960s, created the basis for the subsequent global, public initiative to map the human genome three decades later. Our understanding of both is the outcome of an elaborate work of shared authorship. Scientific research is a vital source for the peer-to-peer methods being deployed by open source projects, file sharing systems and community based companies. In these communities innovation and creativity is also invariably a cumulative, cooperative and shared activity. It is rarely the work of a lone genius who comes up with an idea in a flash of insight, a eureka moment. Most innovations are jointly authored. That is why these emerging collaborative ways of working are so powerful: they promote the kind of collaboration that makes creating new ideas easy.

When Sydney Brenner set out to unravel the worm's genome in 1965 just eight years after Frances Crick and James Watson had uncovered the double-helix structure of DNA, little was known about how genes worked. Brenner set out to find out how the worm's genes directed the growth of the organism as a whole, with a small team of fledgling researchers and crude tools: at the start they lifted worms into Petri dishes with sharpened tooth picks. It was as if someone had seen the Wright brothers' first flight and decided to start work on a rocket to the moon. Had Brenner decided to confine his efforts to his laboratory at Cambridge University, he would be still at work. The worm project succeeded only because from the outset its leaders adopted an open, highly collaborative, model of organisation. Brenner's Laboratory of Molecular Biology at Cambridge University provided the kernel: he

attracted collaborators. Brenner announced he was going to explore a question that intrigued many others. He had just enough resources to get going and just enough momentum to attract other laboratories as collaborators. The way Brenner's lab worked set the tone for what would eventually become a global project involving thousands of researchers. The atmosphere at the Laboratory of Molecular Biology was hard working, meritocratic, egalitarian and conversational. The coffee room quickly became the place where people discussed ideas. They were making it up as they went along, so there were no established territories or reputations to defend. Sharing ideas quickly became the norm. Brenner also insisted people test out their ideas as early as possible: he would call symposia at two-minute's notice so that people would have to talk about ideas without being prepared. That ensured a more open, creative discussion. The atmosphere Brenner created in Cambridge set the tone for the project as a whole, as it expanded to encompass thousands of researchers around the world: collaborative work as the basis for shared innovation. One of the key institutions for this sprawling global community of knowledge was the relentlessly practical Worm Breeder's Gazette, which became the place where researchers shared their discoveries but also their methods, tips and tools (not unlike Graigslist but for worm geneticists.)

Brenner's open approach set in motion a virtuous cycle of knowledge sharing. That was not just because Brenner, and other project leaders such as John Sulston believed in open science. There was no other way to get the work done. Brenner had identified a task too complex for any one lab to complete. If a researcher found out what a particular gene did, that knowledge was virtually worthless unless it could be combined with information about other genes. The puzzle would be completed only through collaboration and that collaboration had to take place on a mass scale: there were too many pieces to find and fit together. The research community could only be sustained on the basis of common ownership of the basic knowledge. Brenner and his colleagues established a commons on which worm breeders could work together. As Bob Waterston, one of the US leaders of the project put it: "The more we put out there the less of a problem it was to get other people to contribute. The more we restricted the flow of knowledge, the more people felt they had to bargain with us before they would release their results. If you just put the data out there then everyone was on the same footing and they were all free to talk about it."

The commons grew with the community that contributed to it. In 1975, ten years after Brenner launched the project, the first international meeting of worm genome researchers attracted 24 participants. A decade later there was enough information to fit into a sizeable textbook. When the complete gene sequence was announced in 1998 the then US vice-president Al Gore greeted it as the equivalent of the moon landings. By 2002 the worm researchers' meeting attracted 1,600 participants. One thesis listed all 5,000 connections between neurons in the worm's brain. The project had traced the history of every cell in the worm's body. It was the most completely understood organism on earth.

Technology was critical to the project's success. Researchers who started out using toothpicks ended up using automated gene sequencing machines. But the worm project – and the human genome project that followed it - were a triumph of open, collaborative, social organisation. Not only did Brenner mobilise a vast community of researchers but he found a way to combine their very different skills and interests with very little hierarchy or bureaucracy. The genetic map was an intricate work of joint-authorship, woven together by an unfolding creative conversation among a global community of researchers.

Eric Raymond, the open software guru, says mass collaborative innovation is like a bazaar – open, cacophonous, with no one in control – rather than a cathedral, where craftsmen implement a master plan. The worm project could never have been a cathedral. There could be no master plan. The researchers were moving into unknown territory. No one knew what they would find next and how it would fit together. Brenner could not look at a plan and allocate people to tasks, because he had no idea what would need to be done next. The researchers had to fan out and find out for themselves. They had to allocate themselves to interesting tasks that they felt able to take on, rather than ask for direction from the centre, and they had to share their ideas with one another, to build upon one another's work. Brenner's leadership also provided a way for this mass of decentralised activity to be brought

together. He set out the cause that animated the community: doing something never attempted before, mapping the genome of an entire organism. He set the style of working by the way he ran his own lab: egalitarian, open and challenging. He set the norms others followed by releasing information early to encourage other to do likewise. It is said that big breakthroughs only come from small teams or even individuals who can focus their energies. The worm project is just one example among many – a more recent one is the way international collaboration among scientists decoded the Sars virus – of how mass collaboration can spur huge strides in scientific knowledge. The ethics of open science are now feeding a much wider range of organisations, working in many different fields. Free form organisations like Wikipedia and Linux have taken practices common in science – open early publication of results, peer-to-peer review – and turned them into a mass, everyday working practices, for people writing software, playing games or creating an encyclopedia. An elite and esoteric way of working, usually confined to men in white coats, has been turned into a mass way of working, ideally suited to large scale innovation and complex tasks. Their success demands we think in an entirely different way about where ideas come from.

We think therefore.
The phrase cogito ergo sum, "I think, therefore I am" was inscribed onto our culture in 1637 by the French soldier cum philosopher Rene Descartes, announcing a dramatic inward turn in the way we think about ourselves. In search of certainty about his own existence, Descartes declared that the act of doubting was itself proof that we exist. To doubt is to think and to think is to be. From Descartes on certainty in our existence was rooted in our ability to think, on our own and for ourselves. Thinking for Descartes was a creative act, an inner construction of order, collecting and bringing together ideas, which was not just proof of our existence but a source of self-esteem and dignity.

The spreading net of vastly cheaper communications and computing, combined with new highly social and collaborative forms of organisations means that we are moving from "I think, therefore I am" into an era in which "we think, therefore we are."

Creativity is invariably not an individualistic activity but a collaborative one that thrives when people share and mix their ideas. Creativity emerges from how we think together. The manner in which we organise ourselves to think together - how we publish, debate, test, refine and reject ideas – is critical. Creative thought is not just the product of Descartes' inner journey, a flash of insight inside the head of a gifted person. It usually comes from creative interaction between people. The mass collaborations profiled in this book are experiments in we-think: finding new ways for people to combine their ideas together. Wikipaedia is the shared creation of thousands of contributors. The mountain bike came into being through shared innovation among hundreds of riders before the big bike manufacturers came on the scene. Linux has grown by orchestrating contributions from thousands of bug reporters and programmers. Computer games thrive on the mass innovation of the players. Most of eBay's best business ideas came from its community of users. Most large scientific projects depend on international collaboration among independent teams. This generation's motto will be: we think, therefore we are.

That is a huge challenge to the way we assume new ideas are created. We are used to thinking that innovation and new ideas come from special people, often working in special places, wearing special clothes: the boffin, in his white coat in the lab; the artist, in his smock, in the studio; the zany inventor, barely clean, in his garage; the loft living bohemian wandering the cultural quarter. The implication of these caricatures of the creative class is clear: if you want more creativity in your city, society or company, you need more people and places like this. Creativity thrives when special people work in special places: bring on the creative class.

Yet innovation and creativity are becoming increasingly distributed, emerging from many, often unexpected, sources thanks to rising educational attainments, spreading communications and cheaper technology. As more people acquire the capacity to express and share their creativity so they will find new ways to be creative together. Creativity will emerge not just from specially gifted individuals, but from creative collaborations bringing together different ideas and points of view. We are schooled to think that new ideas come freshly minted out of the heads of

specially gifted individuals, lone inventors. We are moving into an era when new ideas more often will emerge through collaboration. They will be the products of shared authorship.

Mass Innovation

Innovation is one of the defining features of modern capitalism: the ability to come up with a stream of new products, services, organisational models, experiences. Innovation is critical not just to companies but to regions and countries, if they are to make better use of their resources by combining them more effectively. We-think organisations matter because they have devised a new way to orchestrate innovation, as a rolling, mass process, involving thousands of participants.

Innovation comes from interaction. New ideas invariably emerge through an interaction with the past: the germ for them comes from somewhere. Inventors have to work out which ideas from the past they draw upon, which they discard and which they challenge. Scientists and artists work within and challenge the traditions they come from. Innovators do not just borrow from the past, but from other domains of knowledge around them. They excel at spotting what to borrow and how to blend it with ideas they already have. Cirque du Soleil, the fantastically successful Canadian-Belgian based circus troupe, plays to millions of people each year. It is a unique cultural experience. Yet none of the ingredients in Cirque du Soleil is original. What is original is the way it has blended traditional circus techniques with fable and rock opera.

Innovators build bridges between different ideas. They welcome the clash and collision of ideas that are often uncomfortable with one another. Psychologists call this cognitive dissonance: when ideas do not add up. The natural tendency for most people and most companies is to seek to eliminate this clash, to get everyone singing from the same hymn sheet. The entire knowledge management industry is based on eliminating cognitive dissonance. That is why knowledge management is often the enemy of creativity. If there is too much cognitive dissonance because ideas are too different, it leads to chaos and confusion. If there is too little cognitive dissonance because ideas in an organisation are too similar, it can lead to predictability and boredom. Creativity emerges when different points of view are held in reciprocal tension, so they play off one another, eventually evolving into a different idea. This tends to be an evolutionary and cumulative process, usually punctuated by key moments of insight and invention. Those moments often tend to be architectural: creative people spot how to build a bridge between two ideas to combine them in a new way. The rise of highly collaborative open approaches to innovation should make us rethink how innovation happens in other walks of life. Take architecture as an example.

Nowhere is the connection between individuals and their creations stronger than in architecture. We identify buildings by their architects: Richard Rodgers and the Pompidou Centre; Christopher Wren and St Paul's Cathedral; Norman Foster and the London Gherkin; Frank Ghery and the Guggenheim in Bilbao. The truth is that all buildings are the product of intense collaboration, (after they have been occupied as much as before, as Stewart Brand points out in his brilliant account of How Buildings Learn.)

One of the most striking buildings of the first decade of the 21st century will be the swimming pool for the 2008 Beijing Olympics. Imagine taking a sharp knife to a mountain of foaming bubbles in a bath, cutting out a rectangle and hollowing it out to form walls and a roof. The bubbles would fit together, because by some miracle that is what bubbles do: they curve and fit together, apparently irregularly. Yet the structure would be built around right angles and it would support itself. That is what the Beijing pool will look like: a see-thru structure made entirely of irregular bubbles that nevertheless fit together around right angles. It is a perfect example of how cognitive dissonance – two ideas that should not fit together, rectangular building and irregular bubbles – create an innovation.

No building has ever been made that way before. The idea for the pool's structure seems to have come from a single individual: Tristram Carfrae, a talented engineer working in the Sydney offices of Ove Arup, the engineering firm appointed to the project. Arup has engineered many of the most difficult and ambitious buildings of the last 50

years, including the Sydney Opera House. Arup engineers set out to break rules. This was the third Olympic pool Carfrae had worked on. He wanted to do something different. That meant initially searching for cognitive dissonance: something that seemed impossible to make work, a rectangular pool made of bubbles. Carfrae had already seen a material he wanted to use for this greenhouse-come-swimming pool: the Eden project in Cornwall is made from a Teflon coated film. A member of the design team pointed out that when two sheets of the film were bonded together they could be inflated to form a cushion. The film would let light through but the air would provide insulation and keep heat in. The challenge was to get the cushions to fit together. (As all children know structures built from cushions do not last long.) Carfrae went to work on his computer trying to replicate cells that looked organic but would fit together to make a building with straight edges. Two days later he was ready to admit defeat and almost as a last gasp turned to Google, the Internet search engine which is a distillation of the intelligence and views of millions of web users. After asking a few simple questions about geometry and irregular shapes Carfrae found himself deep in the arcane world of foam theory, which predicts the shapes bubbles take to fit together. With a few more clicks he was reading a paper by two Irish academics in a journal published by a university in Pennsylvania. Their theory depended on software they had got from a US foam theorist, Ken Brakke. Carfrae tracked Brakke down through Google and found the software – Surface Evolver – was available, open source, from Brakke's website.

Within a few of hours of posing his original Google inquiry Carfrae had installed Surface Evolver and was busily generating bubbles. Within a few days he had learned enough to cut the bubbles into shapes. A building with hard edges and right angles could be built from irregular shapes, in this case 7m wide Teflon bubbles. Carfrae does not claim the Beijing pool is his creation. He managed to build a bridged between the dissonant ideas in play: a rectangular building made of irregular building blocks. Like most buildings the Beijing pool is actually the product of a long process of joint authorship, starting with the way Carfrae drew upon the ideas of foam theorists, passing onto the architects, engineers and contractors who would build it and then the people who used it and adapted it to their ends. Creativity and innovation come from promoting this open clash of different ideas. That is why open source communities are so potent. They do that the whole time.

They bring together people with different ideas around a shared task and a way of working. Innovations succeed only through exposure, as early as possible, to comments and criticism, which allow ideas to be refined, adjusted and reinterpreted. That is best done through dialogue and discussion – Brenner's short notice symposia in Cambridge, for example. Open source communities provide a ready setting for that kind of conversation. The discussions groups around Linux projects, for example, a lively, raucous and sometimes brutal. No one from head office is listening in to check you are toeing the corporate line. There is no boss to kow-tow to. Creativity comes from speaking your mind, with other people, in an attempt to come to a new and shared understanding or idea. Most corporations live in sullen silence or speak the mumbo-jumbo of mission statements. Long after the fall of Communism large corporations are the last place where free association and open debate are not tolerated.

Creative Conversation

To put it another way, creativity thrives on conversation. Open source communities encourage a constant babble. People talk to one another the whole time. They are never silent. Talk about work gets mixed up with gossip and jokes. Organisations that want to be good at innovation have to be good at conversation. Think about some of the most powerful conversations you have had in your life. A good conversation is never fully under control. You learn things you did not expect to and often find yourself saying things you did not plan to: admitting a confidence, revealing a weakness, declaring views you did not realise you held so passionately. Good conversations feel open ended: you cannot say in advance where they will lead. The most important conversations you have in your life will change you and the way you think about the world. Creative conversations are like a shared exploration the results of which cannot be guaranteed in advance. Good conversations are not lectures, diatribes, sermons, cross examinations or proclamations. They depend on people listening as intently as they talk.

Two of the biggest advances in 20th century science came from conversation. Werner Heisenberg, the German nuclear physicist and author of the uncertainty principle said in his autobiography that all science is rooted in conversation. His conversations with Neils Bohr and other physicists in Copenhagen in the 1920s paved the way for quantum mechanics and other theories that in time led not just to the nuclear bomb but many advances in modern electronics. Bohr liked to work out theories through constant, often meandering, intense conversations, which spilled out from his laboratory to his villa or summer house. Conversation was also central to Watson and Crick's unravelling of DNA. They spurred each other on, offering new ideas and insights. One a chemist, the other a biologist, they would often clash but combined to create a new shared insight. It was their ability to hold creative conversations that allowed them to succeed where others failed.

Even the most famous inventor of all, Thomas Edison, was a great collaborator. March 25th, 1876, is one of the most important dates in the history of modern capitalism: Edison opened his legendary laboratory in Menlo Park, to create a factory for invention. It was in Menlo Park that Edison produced the phonograph and the light bulb. Edison seemed to have found a way to systematically organise invention. At the time Menlo Park, in New Jersey, was little more than a hamlet with a dozen houses where an inventor could cut himself off, concentrate, without distraction, rapidly building, testing and refining prototypes, often working an 80 hour week. The truth is that most of Edison's achievements came about through collaboration. Far from being a tortured lone inventor Edison was highly social. He was constantly seeking new partnerships with people with money and ideas. He was restless and rarely stayed in one place. Edison had started his working life as an itinerant telegraph operator. Moving from place to place he struck up conversations with strangers, picking up an idea in one place and taking it to another. That was the method he employed throughout his life. Edison worked at Menlo Park for only four years. The Menlo Park lab was closed just six years after it opened and Edison had move back to New York City.

As Edison took on more complex tasks so his methods became more collaborative. Those collaborators are not household names – Charles Batchelor, James Adam, John Kuresi, Charles Wurth – but as Edison admitted, without them, he would not have come up with many of the inventions which made him famous. We think of Edison as a lone inventor in part thanks to the patent system which routinely named employers as the owners and originators of any invention made by an employee. The patent system disguises the collaborative nature of innovation. Edison had a genius for rapidly developing his ideas by drawing on the talents and skills of others. His laboratories were small communities of creativity. As Edison's career progressed it became harder and harder to see him as "the" inventor. He was the focal point for a mass of intense creative collaboration and joint authorship.

Creative conversations of the kind that Watson and Crick, Bohr and Heisenberg engaged in are not usually helped by strict time limits on when they can end because the parties for the next meeting are banging at the door. Powerpoint is not good for conversation. Nor is sitting quivering on the sofa in the boss's office. Big corporations are designed to be conversation killers. That is why they often find innovation so hard.

A creative conversation is not just a good chat though. The word dialogue comes from the Greek dia-logos: a flow of shared meanings. Each participant must give something of themselves in a way that encourages the other to reciprocate. A good conversation requires people to listen intently not just to speak their mind. Listening attentively and thoughtfully to other people, trying to help them make sense of what they are saying is more tiring than speaking. You have to be prepared to adjust, not simply to defend the views you came into the conversation with. When you are in a good conversation you loose a sense of time, the conversation takes on a flow. What to say next seems obvious without being planned. But a good conversation also needs pauses, spaces for thought and reflection. How many managers in large companies have the time to really listen to people or show a willingness to adjust their views? Being a manager is about being in charge, showing no doubt. That is why managers don't often have good conversations with the people they work with. Good conversations are self-moderating. People do not hog the limelight. How often in large companies do senior managers ever get involved in conversations moderated by other people? The manager is always the moderator. Good conversations start and keep going when they are about questions that interest people but to which there is no set answer. Linus Torvalds got Linux going by leaving

his programme open ended: it started an interesting conversation. Most managers do not ask interesting, open ended questions because they already know the answers: this is the direction we should go in, this is how we get there, I am in charge. Being a manager is not about asking open ended, often apparently stupid questions that will excite the right kind of conversation. Most of the time management is about doing things to people; dialogue is about doing things with people.

Good conversations often take place in shared, neutral spaces. That does not mean a barren meeting room. Most of the best conversations about work do not take place at work. They happen over food or drink. I suspect one reason the Finnish mobile phone company Nokia has been so innovative over such a long period is that everyone stops for lunch and everyone eats in the same canteen. They do not go out to get a sandwich that they wolf down in their work pod while sending a few emails. There is no separate dining room for executives. Everyone eats together and so talks together. These days most work it seems involves talking, which is why so much work now gets done in coffee shops and so many offices seek to model themselves on cafes. Creative conversations have to encourage people to let go of fixed positions that make people want to reject ideas that strike them as unfamiliar and threatening. Innovation only happens if people are prepared to suspend judgements, entertain wild ideas and build upon them. If you want to lead a creative organisation, city or region, you have to lead a creative conversation. That means promoting interesting questions, creating spaces where people can talk, bringing in different view points, ensuring the discussion is moderated but not by you, making sure it does not split, meander or lose its way and knowing when to bring it to a close, to stop talking and start acting. Open source communities are just these kinds of conversations. That is why they excel at highly social, collaborative forms of innovation.

Consensus and conformity, can inhibit the very free-thinking and debate on which innovation thrives. To be innovative you have to be gregarious, promiscuous even, in search of promising ideas. As well as peering into the future you have to be prepared to look for ideas in marginal and non-mainstream places. And you have to be good at attracting people with these deviant ideas to take part in the conversation you are hosting. Above all, do not eat lunch at your desk or in an executive dining room: stop, sit down, do it properly and talk to other people, across a neutral space. The best ideas come about through conversations and the best conversations do not happen in the office, they take place over food. The challenge of open source communities will mean large organisations will have to remodel themselves as open innovators. Leading innovation and creativity is often like leading a creative conversation. That is why open and collaborative ways of working demand new open and collaborative approaches to leadership.

Chapter 10 – Open Leadership

Leading a flock

Imagine you are organising your ten-year old son's birthday party, the kind of boy for whom parents have started to become an embarrassment. How would you manage that task? Well if you brought in the people from McKinsey you would probably first do an exhaustive trawl to benchmark global best-practices in tenth birthday parties. You would get together all of the parents of the children attending the party for an away-day at which with a facilitator you would agree a vision statement and some learning goals for the party, which would be set out on a small card, given to every child on their arrival. It would be made clear that their performance against these goals would determine what kind of party bag they would leave with and how much food they get. The top performers would get bonus presents. Half way through the party everything would grind to a halt so that all the children and adults could engage in 360 degree discussions to recalibrate their goals for the remainder of the party. The party would not conclude without a knowledge management team coming in to debrief everyone and make sure lessons learned were downloaded.

There is a reason McKinsey restructures corporations and does not throw children's parties. As Dave Snowden, the knowledge management advising puts it: children's parties are complex, self-organising affairs. They are at their best when they are boisterous, slightly unruly and on the edge of being out of control. A child's party that is under

control is dull. One that spins out of control will end in tears. Parties work best when they take on a life of their own, without ever becoming chaotic. The rules for throwing a good child's party are quite simple. To start with you have to set the tone, by establishing a clear and simple purpose: we are here to celebrate a birthday. That says everything people need to know about how they should behave and what is about to happen: bring a present, dress up, be prepared to have a good time. Setting the tone gives people a huge amount of information not just about what they should be ready to do, but how: it motivates as well as informs. Then you have to provide some attractors, to attract the flock of children towards activities that will engage them: an entertainer or a game, something they can all get involved with. You also have to set some boundaries so people also know where not to go and what not to do: do not go into the parent's bedroom, do not push your sister in the pond. Those boundaries need to set with care. If they are drawn too close then the children will cross them too often and so call on your authority too much, eventually overstretching it. As all parents know, the more you intervene the more demand for intervention you create. Once you have sorted out one argument, another hand shoots up asking for assistance. Intervene rarely; encourage people to sort out their disputes among themselves and make up; withdraw fast. The more parents there are trying to keep order the more chaos there will be. Timing is also critical. A party that goes on too long is exhausting. Too short and it is frustrating. Being realistic about how long it will take is vital. If you can keep to those simple rules then you have a chance to enjoy the final one: stand back an enjoy. Children's parties are at their best when the children self-organise and play among themselves. What children enjoy most about parties is playing with one another: there are no consumers in a good party and no value chain delivering pleasure to them. The children are participants. They are what make the party enjoyable.

Parties examples of our everyday capacity for self-organisation, where the parents provide the platform, some rules and some tools, to encourage mass participation. No two parties are ever the same. They run best with a few simple rules. The same is true for all efforts at mass innovation that combine a large number of participants in a complex project. In future we should try to run organisations more in the way that we throw parties. But that will require some very significant changes to the way organisations are lead. Good managers are often the enemies of innovation. They stifle it, control it or seek to dominate it. They are often bad at providing a simple, compelling sense of purpose that people need to engage their imaginations. Traditional organisations are often poor at creating attractors: they hope to encourage people to innovate by putting too much emphasis on money at the expense of recognition and quality of working life. Many large organisations, especially in the public sector, are bad at confining themselves to setting only a few simple rules, preferring instead complex and detailed rules that ensnare potential innovators. Often impatient leaders overestimate what can be done in the short-run when they seek to drive change but underestimate how much can be changed in the long run, once the momentum for change builds up. As we move from closed to more open and interactive models of innovation, so we will need a parallel shift in management and leadership. It will not happen without an enormous, often uncomfortable struggle. The people with the most to lose from new, looser forms of self-organising are the people at the top of traditional organisations: professionals, leaders and managers. They will not change without a fight.

Attraction not Propulsion

Innovators are pulled towards interesting challenges, they gather around intriguing questions and opportunities. That is what leaders of open source communities – the likes of Linus Torvalds, Sydney Brenner, and Jimmy Wales – do so well. They attract collaborators to interesting questions, orchestrate creative conversations around those questions, help set the framework in which people make decisions themselves about which ideas are best. Open leaders tend to come from the communities they lead. Their position is established through merit. They embody the values of the organisation in what they have done and how they behave. They do not make too many decisions, nor set the direction in detail but they do propagate the values that guide the community forward.

It is like the difference between propulsion and attraction. Most traditional senior managers think they are in the propulsion business: it is their job to propel their organisation on, drive it forward. Senior managers arrive at their offices early in the morning, ready to pick up the organisation as if it were a rock and throw it forward, to get it from A to B. But instead imagine your task is to get a bird from point A to point B. If you have spent too much time

with McKinsey & Co you will know the solution is to strap up the bird's wings, attach a rock to the bottom and throw it. The bird is likely to die in the process and has been robbed of all birdlike properties but at least it gets to its destination. Now imagine your task is to get a flock of birds from point A to point B. That flock includes you staff, customers, suppliers, shareholders, partners, even some of your competitors. You do not have enough hands and rocks to propel them all. The only way to get them to point B is to attract them by putting out bird-seed and water at point B. Standard approaches to management rely on shock and propulsion. Innovation thrives when flocks of creative people – inside and outside and organisations – are attracted to an exciting goal or opportunity. That is how Linux, eBay, Wikipedia and Brenner's worm project got going: a swarm of innovators was attracted to an interesting question posed by people who in time became leaders of a community. Closed leaders mainly propel. Open leaders mainly attract: they create the conditions for creative self-organisation by articulating compelling goals and unlock the capacity of others to reach those goals. As Jimmy Wales explains leadership of Wikipedia is not just invested in him, although he plays a role as quasi-monarch. Leadership, accountability and power are distributed throughout the community through a mixture of different ways for people to take decisions and justify them: anarchy, democracy, meritocracy and aristocracy. We-think organisations would not succeed without leadership, but it is leadership of a completely different style from the stereotypical, charismatic ceo. Or put it another way if it's a choice between Jack Welch and Jimmy Wales, give me Jimmy Wales everytime.

Traditional closed organisations bred generations of closed leaders. Leadership was a job for special people, who worked in special places: the executive offices, with their attached dining rooms, restrooms and lounges. Leadership was something people did at the top of an organisation, because they had special qualities, skills and information. Leaders made the decisions that counted: they gave permission and approval. They made sure resources were "aligned" behind corporate priorities, by creating the right incentives or issuing instructions. If you did not know what to do next in a traditional organisation the best idea was to ask someone in authority for guidance. That is what leaders did: decisions went up for approval, instructions and permissions filtered down.

The organisational upheavals of the last twenty years have put enormous pressure on this closed model of leadership. Organisations and leaders need to be more alert, agile and nimble. Networked organisations cannot be self-contained. They can be affected by events in far-flung financial markets and economies. Developed societies are becoming more democratic, with a growing stress on individual rights and choice. People increasingly see their careers as an expression of their identity, something they want to control rather than something the company defines. Traditional sources of authority are more likely to be questioned, less-likely to be followed meekly. Leaders in all walks of life operate in a far more open environment, with constant scrutiny from the media, regulators and their own employees. Leaders cannot control the conversations that take place about their organisations and their own performance. Followers are not voiceless. Their support cannot be taken for granted, it needs to be renewed, time and again.

Closed leadership is too slow because too many decisions have to be passed upwards for approval to an often homogenous elite. Command and control may impart drive to an organisation for a while, perhaps during a crisis, but over the long run it undermines motivation and initiative. It is increasingly difficult for organisations to maintain a sense of order and stability through a hierarchy drawn on an organisational chart. The closed model of leadership, like the closed model of pipeline innovation, is increasingly outmoded in a era of mass creativity and participation. Traditional managerial leadership is often at odds with innovation. Good managers often say they want innovation but actually they hate it.

Innovation invariably starts with ignorance, someone asking a stupid question. Michael Dell asked as stupid question about the computer industry: "Why do we have to sell computers through shops? Why not sell them over the phone, or online, make them just-in-time and ship them direct." Yet asking stupid questions makes you look naïve and being a manager means being in control, having the answers. Admitting ignorance looks like weakness. But unless you are prepared to admit to ignorance – you do not know the answer to an interesting question - it is very difficult to get innovation going. Innovation often requires unlearning: a critical reassessment of the past. It is very

difficult to create the space to do new things, unless you can clear away the undergrowth of old habits, and ways of thinking. That means looking hard at the past and working out what needs to be retained and what can be consigned to the dustbin. Senior managers have more invested in the past than anyone else in an organisation: the past is what got them promoted to where they are today. Asking senior managers to unlearn old habits is like asking them to recant what made them successful.

Innovation comes from diversity and dissonance: interacting with people who not only think differently from you but may well contest your view of the world. How many managers appoint people who are going to disagree with them and make life uncomfortable by constantly questioning assumptions? It is much more likely that senior managers will appoint people who share their vision, think like them, reinforce the way they see the world. Criticism and failure has to become routine, not something that people feel blamed for or afraid of. Yet few senior managers talk openly about their failures. If it is impossible to talk about failure then it's impossible to learn and so impossible to innovate, and if senior managers are not prepared to set the tone, by talking about their failures, then how can other people in the rest of the organisation summon up the courage to do so? Closed leadership encouraged conformity; innovation requires diversity. It is very difficult to have ideas unless you see the world from different vantage points. Yet most managers spend their days at their desk, in their office, at the seat of power. Innovation is impossible without spare capacity. If all parts of a corporate machine are finely honed to do their job, to fit perfectly with the other parts of the organisation and no more, then there will be no room for innovation. Innovation requires some spare time, in which people can fiddle, imagine, try out new things. Good managers abhor spare capacity. Driven by performance targets they like organisations to be lean and focussed.

Many innovations start in the margins of a business, yet most managers are not interested in embryonic markets because they are too small and too risky. They want sure-fire investments in large, mainstream markets, where incremental innovations targeted at consumers the company already knows, have a high probability of paying off. Senior managers sitting atop large companies think big. But that is a real problem if innovation starts small. Most of all creativity needs inspiration: leaders who set the tone. Yet senior managers are mainly concerned with market share, margins, costs and profits. They talk the language of numbers when people want values and goals embedded in simple stories which sum up what they are trying to achieve.

Open Leadership

Effective leaders, these days, have to be open in several respects. Organisations have to be more open to the world beyond them, their suppliers and partners, but also to ideas that comes from beyond their walls. They will have to be more open in the way they work, providing greater transparency for shareholders, regulators, stakeholders and the public. Routes to leadership will have to become open to a wider range of people. In the past leadership positions have largely been closed to women and ethnic minorities. Most important for innovation, leaders will have to be open to challenge and question: they will have to be curious and inquisitive. They cannot afford to be intellectually closed. They will have to be accessible to the people they lead, visible and part of the conversation at work, rather than cut off in the executive suite. Leadership will not longer be the preserve of the people at the top of the organisation: it needs to be exercised in large and small way by many people at all levels. If innovation is going to come from all over the organisation, then so too will leadership.

This desire for more open styles leadership is not confined to a handful of trendy, Californian companies, employing creative types. In 2003 I was asked by a leading consulting firm to write a report on the views of emerging young corporate leaders in Korean, Brazil, Germany, the UK and the US. Their message was remarkably consistent. Heroic top down leadership did not work anymore: it was too clumsy and too slow; people were no longer willing to be told what to do and potential leaders were no longer willing to sacrifice everything else in their life, including their families, for their jobs. As one young Brazilian executive in her early thirties put it: "There used to be big delays in decision making in big companies, with the hierarchy. Nowadays you have to follow the market, so you have to change much faster." Her German counterpart described the shift in these terms: "Once upon a time those above were nodded to and up there someone sat all alone and decided and left their mark. Now the competencies are

distributed on all level, not equally, but at least so that one can more quickly decide. The trend is away from the authoritative style of management in which one person decided and others carried out. The emphasis now is more on team work."

The shift from more closed to more open and democratic forms of leadership will not happen without a struggle, however. That struggle is going on from politics to business as new generations of leaders, with new values and styles, attempt to fashion more open approaches to leadership in fields used to older, closed models.

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Jorma Ollila is quietly confident without being the slightest overbearing. A well cut blue suit hangs off his lean, steely frame, as he slips into his seat, his eyes studious and alert. Ollila, the long time chairman and chief executive of Nokia, is probably as close as you get to an open leader within a multinational company. Nokia made itself a leading force in mobile communications only thanks to the vision and entrepreneurship of a small group in its senior leadership who charted it away from Wellington boots and cycle tyres into high technology when the market for mobile phones was still unproven. Yet Nokia is also a highly egalitarian bottom-up company, which earned its position only by learning rapidly as the market developed around it. One reason Nokia adapted so fast was that its staff all feel it is their job to learn and innovate. Creating a culture in which innovation thrives is one of Ollila's main tasks: "Innovation and creativity are not individualistic. It's really about interaction. Getting people to interact with one another in the right way. That is about creating an atmosphere in which people get a kick from working with one another."

Ollila explained the kind of culture he is trying to create in a company in which almost half the 55,000 employees work in some for of R & D: "You have to forget the pipeline model of innovation. It does not work anymore. In the past when phones were simpler analogue devices research and development had an engineering culture. You set out of solve difficult but manageable problems. You could draw a timeline for that. But now products are much more complex. It's about hardware and software, infrastructure and services. People are trying to solve complex problems that are always shifting, as the market, competition and the consumer shift. The atmosphere in R & D is much closer to working with artists. We have to create an atmosphere in which people can express themselves." In these conditions the costs of bad leadership go up, according to Ollila. "In the past if you managed people in the wrong way you might lose a bit of output but you could make that up later. Now bad management could mean you lose a great idea with lots of potential. In the past you could quantify the costs of bad management. Now it is much more difficult to do that."

Increasingly Ollila is leading not just his staff but a flocks of suppliers and partners, developing games, software, components, base station, as well as regulators and consumers. Nokia is trying to lead this flock not just to innovate a new physical product – a handset – not just new software or systems but the way they all come together. Erkki Ormala, head of technology policy at Nokia calls it new value domain innovation: "The mobile phone is not just a handset or a product. That is what we might have thought of it when it first started. Now we are creating a whole range of mobile services that come to people via this handset, which they can use to do a whole range of things in their lives, not just make telephone calls. That is why we talk about life going mobile not just about people making telephone calls on mobile phones. Mobile services are a new domain of value, a new kind of economic space. We have created a new way of doing things but that has meant bringing together telephone companies, regulators, infrastructure, software, all these players have been involved in creating this new platform. We might have started as a mobile telephone maker but increasingly our job is to try to orchestrate all these people to continue to develop the space in which we all operate."

Innovation does not come down a pipeline but from the interaction of all these players together. That kind of orchestration requires open leadership. As products and services become more complex, created by networks of suppliers and partners, so open leadership of the kind practised by Ollila and other Nokians will be vital.
The more that organisations depend on complex networks of suppliers and partners, employ people who see themselves as the authors of their own careers and interact with demanding consumers who want to be contributors and participants, at least some of the time, the more these open styles of leadership will be required. An unlikely example of where this kind of leadership has been applied is Heathrow airport. Heathrow is many people's least favourite airport, a rag bag of different buildings, long walks, confusing signage. Some people call it Theifrow because of its reputation for bags going missing. And it has been the repeated scene of chaos brought on either by industrial disputes at catering companies or threats of terrorist action. In the summer of 2006 the company that runs the airport – BAA – came under fierce attack for failing to employ enough new security staff to deal with tightened security regulations following a threatened terrorist attack.

But for a moment imagine what it is like trying to run Heathrow airport. Each day about 80,000 passengers arrive, the same number leave and 40,000 transfer from one flight to another, often moving between terminals. The population of a reasonable sized town moves through 224 gates, served by about 100 airlines, spread over four terminals, built in different eras, to quite different designs. A fifth terminal, which has to fit into the way the whole airport works is under construction. A plane takes off and lands every 45 seconds. Heathrow can be a nightmare, a byword for delays and lost baggage, but in a way it is a triumph of innovation. When the airport opened in the 1950s, it was expected to handle 180,000 passengers a year. Now it handles almost that many in a day. Not quite Moore's law perhaps – which predicts a doubling of semi-conductor processing power every year – but something close to it. More and more output has been generated from a tiny strip of land to the West of London. Heathrow serves about 60m passengers a year and they bring with them about 90m bags. About 15,000 bags a day travel through a tunnel connecting Terminal 4 to its three sister terminals. Those bags are usually time critical for passengers transferring from long haul flights onto European services. If something goes wrong with the automatic

trains that carry bags through the tunnel staff have five minutes to decide what should be done. If they wait any longer then chaos spreads like a plague through the terminals. Bags get stacked up and so they miss connecting flights. People get very upset.

Heathrow is a highly complex system: there are many players, everything it intimately connected and constantly in motion. Just to add to the complexity, the company that runs the airport – the British Airports Authority - does not control key aspects of Heathrow's operations: air traffic control, the airlines, aspects of security, transport to and from the airport.

I spent a day with Nick Temple the man charged with running Heathrow and I asked him how he managed to stay in control. Temple explained: "Every day there must be ten million, little interconnected decisions taken by the people working at Heathrow and the people using it. I cannot take those decisions or even know about more than a tiny handful of them. The only way I can do my job is to set the context so that people – my staff, airline staff, transport staff – are more likely to make decisions in a way that adds up and helps people." In complex and very open systems like an airport the job of leadership is mainly to help other people to take decisions in the right way, not to take decisions yourself.

Temple shapes the context for those decisions by setting a few simple goals: "We have a slogan – clean, safe, friendly – those are our priorities for serving people. They apply to someone cleaning the toilets, checking bags or running the security system. People need a sense of how their jobs fit into the bigger picture of how the place works without that being vague." The more complex the system the simpler the rules of thumb needed to run it. Temple reckons that those goals – clean, safe, friendly – help guide people to work out how to handle 85% of decisions they make. If a complex system like Heathrow was ruled by complex and bureaucratic rules then an already complex system would just be made more complex, and unmanageable, by the rules designed to control it.
As well as some simple goals the system also needs boundaries: "We want people to take responsibility for decisions within their roles but also to recognise their responsibilities to others in the system. There have to be parameters. When something starts to get out of hand, something that might affect safety and the rest of the system, for example, then it is critical that people do not try to solve it themselves but they ask for help." Once an issue like that emerges – something like a breakdown on that railway between the terminals – then executives at the centre need to get involved to sort it out. Central leadership has to focus on challenges and opportunities that affect the system as a whole.

Temple has to lead more than his own staff. He has his flock to think of, all the other people who use the airport – airlines, passengers, retailers – as well as people whose cooperation he needs to make it all work – air traffic control. So he works assiduously trying to get people to collaborate even when they are fierce competitors. "They have to recognise they share the same stadium and play by the same rules even if they are competing like hell," he says.

Temple's approach has more in common with Wales, Torvalds and Trippi and other open innovators than might first be apparent: set a few simple goals; establish some critical boundaries; know when the centre has to intervene and lead; provide good information and clear yardsticks so decisions can be distributed; create a sense of shared purpose among all the people collaborating so they are motivated by a shared goal. The job of leadership is not to take decisions but to create the context in which thousands of others can make the right decisions.

Seen from Temple's office Heathrow is not a value chain but a platform on which tens of thousands of people a day come together, collaborate and combine, making millions of interconnected decisions. The value of the platform goes up the more that people can use it easily, connect to it, exchange with others and then leave. The Sims is a platform for computer game playing and content creation. Wikipedia is a platform for knowledge sharing created by a community. EBay is a platform for people wanting to buy and sell with one another, often within communities of interest. The Linux community has created a platform for software development. All these platforms and communities have leaders. They are not rudderless. But the kind of leadership they exercise is quite different from

the closed leaders of traditional and closed organisations. The more networked companies become the more they will need open styles of leadership practised by the likes of Ollila and Temple. Open leadership does not mean distributing all decisions to the community. It requires a mix: a strong, entrepreneurial and inspirational centre, to set big challenges and goals, combined with high levels of devolution to allow people much greater scope over most day-to-day decisions. Open and distributed leadership allows most decisions to be taken away from the centre, thus creating more scope for the centre to do what it should do best: the strategic and system-wide issues that only it can deal with. Often strategic challenges are not evident at the periphery where people can only see that part of the picture closest to them. Yet open, devolved and distributed are not bywords for vague, relaxed or creative. Open organisations require common yardsticks of performance and contribution. A highly devolved organisation needs a confident, strong leadership at its core. Truly open organisations measure performance rigorously and openly: no code gets adopted in Linux without being checked out by several people; a Wikipedia contribution has to pass the test of peer-review. The task of modern leaders is to create the conditions for effective self-organisation. Nowhere is that more evident than in the way we organise ourselves in cities.

Chapter 11 – Open City

Curitiba

Curitiba in central Brazil faces a challenge common to all fast growing cities in the developing world: to encourage order to emerge from the ever present threat of chaos. Between 1970 and 2004, Curitiba's population grew from 300k to more than 2m. Each year between 20,000 and 30,000 people come to the city from the countryside looking for a better life. Often they have no education, trade, skills, place to live and no sense of what it means to be a citizen of a city. All over Curitiba but particularly along riverbanks and under power lines, migrants throw up shanty-towns which spread like a forest fire as word spreads that a new area of land has been invaded. It takes just a few weeks for a field to become a shanty town housing thousands of people. These shanties are pure self-organising solutions, but they are also breeding grounds for poor education and bad health, protection rackets and exploitation.

Curitiba's solution is structured self-organisation. The most striking example of this philosophy in action is Cujaru, a former squatter encampment, on the city's edge which houses 120,000 people on land that was pasture in 1990. When the Cujaru settlement started growing the city got a loan from the Inter American Development Bank to replace the shacks with permanent houses. The bank stipulated that the council had get a registered builder to build the new homes. Pretty soon the builders were throwing up standardised, low-rise housing units that looked like army barracks. The council called a halt and went back to the bank with a different solution.

The contractor's houses cost $10,000 per unit. The council argued that if people were allowed to build their own houses, employing their own labour – often family and friends – the cost would be about $3,000. Instead of the area being blanketed by barracks, Cujaru would have a variety of architectural styles. People who build their own homes would look after them and their neighbourhood, the council pointed out. If something went wrong with the plumbing the householder would fix it themselves rather than calling the council to provide a solution. The council would have had to employ a large and no doubt bureaucratic housing maintenance department to carry out the work. Eventually the council persuaded the bank that its mass self-build approach, turning people into participants rather than recipients, would be more cost effective. In the first four months of the revised scheme 10,000 homes were self-built. Cujaru is a thriving, stable community of more than 120,000 homeowners, perhaps the largest self-build community in the world. Structured self-organisation - a well-designed, mass, self-organised solution trumped both our bottom up and top down solutions.

Curitiba is one of the most creative cities in the world. But it has not followed in the footsteps of Richard Florida's disciples and created a cultural quarter, for specially creative people, members of the creative class, to do special work. Instead Curitiba has applied creativity to the most important aspects of city life: how people live together, housing themselves, moving to and from work, educating themselves, looking after the sick and poor, and most tellingly in collective rubbish. Which is where Rodrigo Muscolevy comes in.

Rodrigo is tired. For eight hours he has been tramping the streets pulling Interprise II his makeshift, light green, hand made, cart, collecting rubbish to be recycled. A recent arrival in the city, Rodrigo is jobless. Collecting rubbish is his way to make a living. On a good day, after two or three outings Rodrigo collects enough to earn £5 when he delivers his load to the recycling centre. Today his cart is full with 80kg of plastic, glass and metal: he should earn about £2.50. Rodrigo is a one of a small army of recycling entrepreneurs created by a remarkable example of mass social innovation orchestrated by the council.

Rodrigo does not collect litter from the side of the street but from plastic shopping bags placed on platforms that stand outside most houses in the city. People started to leave out items for recycling – plastic, paper, metal, rubbish that is not rubbish as it's known in the city - twice a week when the city's big green recycling trucks were due to come by. But the council organised for its large trucks to collect recycling late in the afternoon, giving entrepreneurs like Rodrigo eight hours to collect the rubbish first. As a result Curitiba is crawling with thousands of men and boys pulling hand made carts collecting rubbish that is not rubbish. The city gets its rubbish collected at much lower cost to the taxpayer because the council needs far fewer big green trucks. The city population gets a cleaner environment: Curitiba recycles more than thirty per cent of its rubbish far more than comparable cities in Europe and the US. Young men recently arrived from the countryside can find a way to make a living as recyclers with little more than a bike. As the city grows and generates more rubbish, so the population of rubbish collectors grows as well. Demand produces its own supply far more flexibly than if the council was in charge of planning a centrally organised service. The micro-entrepreneurs who collect most of the rubbish and the householders have created a self-organising solution within a framework provided by the council.

One of the chief architects of this structured self organisation is Cassio Taniguchi, who was the council's chief engineer and then mayor: "No matter how well run we are we still would not have all the resources we need as a council. We can only get those resources by mobilising more people to participate and take co-responsibility for devising solutions. We cannot organise ourselves in linear ways because people do not live their lives in straight lines." The results of this participative approach have been impressive. In 1995 Curitiba's income per head was already 40% above the Brazilian average; by 2004 it was twice as high. Thanks to the creation of more than 30 large parks there is 51.5 sq metres of green space per resident, compared with 0.5 sq metres in 1970. The unemployment and infant mortality rates are among the lowest in Brazil and literacy rates are higher than in many cities in the US and the UK.

Curitiba has had a stable leadership formed around Jaime Lerner, several times Curitiba's mayor and original architect of the city plan. Many of the specific strategies have been devised by Curitiba's Institute of Public Policy where 300 people work in multi disciplinary teams of architects, engineers, planners, designers and economists. They are the city's systems designers, responsible for the framework of rules, incentives, interfaces and tools that make it fit together. They are the equivalents of lead programmers in the Linux community or the original 200 contributors who got Wikipedia going. Since the 1970s Curitiba's political leaders have mainly been non-politicians. Jaime Lerner trained as an architect; Cassio Taniguchi was one of Brazil's top engineers. Both brought to their office a pragmatic, technocratic, problem solving style. Their charisma comes from being quiet and thoughtful. As Taniguchi put it: "Everytime the public sector tries to do something on its own it tends to be a failure. The public sector works best when it encourages contributions from many other people – the private sector and citizens – to solve problems."

Self-organisation in Curitiba works because it is not a free-for-all. It is structured by simple rules. No one can cut down a tree without council permission and if permission is granted two trees have to be planted somewhere else in the city. Since 1970, about 1.7m trees have been planted. No buildings are allowed within 200m of public parks. The historic core of the city, founded by European immigrants in the 18th century, has been preserved by strict planning guidelines. Curitiba has grown six fold in less than three decades and yet it feels ordered, calm and at ease with itself, in contrast to other fast developing cities which seem chaotic, frenetic and on the verge of break down.

Curitiba has also invested in its own "commons", chiefly public transport. The city literally flows: Curitiba has the highest rate of car ownership of any city in Brazil - but even in rush hour there are no traffic jams. That is because 2,530 buses make 21,000 journeys a day to carry 2m passengers, along 71km of bus lanes within the city and more than 270km of feeder routes. More people travel by bus in Curitiba than in New York City which is several times larger. The busiest interchanges at the edge of the city handle 35,000 passengers an hour, more than Heathrow airport, with a revolutionary roll-on-roll-off system for boarding buses designed by IPPUC engineers. Most of the population live within a short walk of an express bus stop. Curitiba does not have sprawling suburbs in which people have to use cars to get to work. Poor people can use the buses for free as can pensioners and people making a payment to the council. People living on the fringes of the city, where the poorer communities lie, can make it to the jobs in the centre.

As resources are scarce in Curitiba many innovations have to serve more than one purpose. Curitiba is built on a flood plain, criss-crossed by five rivers. Flooding was a major problem when the city began to grow rapidly in the 1970s. The solution has been to create a string of lakes within the 30 parks the city has created. The parks give the city its green feel and act as flood defences. Squatters tend not to invade public parks. The 48 Lighthouses of Knowledge: local libraries and Internet centres, located next to schools or health centres, which tend to be close to bus interchanges, are all built with a lighthouse tower that makes them easy to find but which also serves as a look out post for the local policeman.

Across Curitiba there are small pockets of resources rather than large, central departments and institutions. In addition to the 48 libraries, there are 106 municipal day care centres, four of which are open 24-hours and hundreds of vocational training centres, which cater for more than 33,000 people a year doing short courses to prepare them for work or to start their own courses. There are 165 health centres, and 1m Curitibans have an electronic health card that allows them to book an appointment at any centre, regardless of where they live. Most of the 163 schools have Internet connections and many are open beyond school hours for use by the community. Over the past few years all education budgets, for capital, maintenance and teaching, have been devolved directly to schools. Elisangel Cabral, the coordinator of the council's business incubator programme explained how they planned to take their service door-to-door in future: "Far more people will create jobs and businesses at home in the garage or kitchen than will come to a council incubator. We have to take our service to them rather than expecting them to come to us." It is almost as if public services have to be organised like a guerrilla campaign, operating in the community not on it.

City planners have drawn up a detailed social map of the city, highlighting communities blighted by multiple social problems: crime, unemployment and family breakdown. Council staff compiled the map by going door-to-door collecting detailed information on educational attainments, household income, employment and health. They now have a detailed picture of the lifestyles of 10,000 of the poorest families in the city who live in 50 of its poorest neighbourhoods where they have launched collaborative community planning initiatives. The city's aim is to provoke a creative conversation within these communities to generate momentum for change from within. Ana Jayme, the project's leader explained: "Getting people engaged in this collaborative model has been really hard and we've had a lot of false starts. We have had to equip people to do it, to give them the support and tools they need. We have to find the real leaders in a community. If we can get them involved, the first twenty people then the initiative spreads by word of mouth and we get many more people involved. We have to find something positive in the community, whatever it might be that they can start building upon. Self-esteem is very low in these neighbourhoods. We want to get people to feel involved because unless they do they will not feel like real citizens, people who feel a sense of belonging in the city."

Self-organisation without leadership all too easily leads to a dead end: the shanty. Top down leadership that stifles self-organisation fails to mobilise a wide range of people and resources. The trick is to provide leadership for a process through which people, together, find structured collaborative solutions. Cities like Curitiba are among the best examples we have of innovation as a mass, self-organising collaborative activity. That is why cities have been

such vital sources of innovation in all fields – government, art, science, business. The lessons of cities like Curitiba should be applied to innovation in other walks of life. Yet all too often in the 20th century, at least, cities themselves turned their backs on these ideas in favour of their own version of closed innovation.

Creating platforms for public innovation

Cities will be vital to the future of creativity. In 1800 only 3% of the world's population lived in cities, even though cities had been around since about 6,000 BC. By 1900 it was 14%. But now half the world's population lives in cities and by 2050 it will be 75%. Cities will be our future. Cities are cradles for innovation because they are cradles for knowledge, culture and self-governance. It is in cities that we learn how to live together creatively. Cities encourage mass innovation as people learn new habits from one another just by walking down the street or observing what their fellow citizens are doing. Everything propagates faster in cities, diseases, fashions, ideas. Cities are neither pipelines nor value chains: they are the original communities of co-creation, the first places where we got all mixed up. Cities provide the social mix that propels creativity But getting mixed up in creative ways depends on how cities are governed. Cities can be diverse and dense without propelling creativity. Everything depends on the mix. What are the design principles for open, creative cities?

Cities nurture a particular kind of freedom, one which comes with its own constraints. Consumers cities give us many more options and choices, to be the person we want to be, to enjoy a wider range of goods, services, food and entertainment, opportunities for work. As centres for cultural creativity cities provide more opportunities for self-expression. But the presence of many other people, in close proximity, also limits what we can do. We cannot roam about regardless. We depend upon other people to provide us with the diverse experiences that makes city life so valuable. Yet the presence of all those people also constraints our freedom for action. That is why cities have always been centres of innovation for new kinds of government and shared infrastructure: to manage the tensions generated by the highly social form of freedom they create. Cities are exercises in continual collaborative innovation.

The postal system is a prime example. Before the invention of the Penny Post in 1837 letter delivery was mainly carried out by messengers finding their way around by word of mouth. Letter delivery was a risky trade: a letter was paid for by the recipient, there were no fixed charges. The creation of a cheap and reliable postal system required overlapping social innovations: a system to link names to addresses, which required streets to be named and houses to be numbered. These names, and addresses were gathered into large directories, which for the first time provided an index of who lived where. The stamp was a cheap and ingenious way for senders to pay up front for the delivery, allowing many more people to send letters. The postal system depended on public innovation, the creation of a new public system with its own rules. But it also enabled a massive growth in private communication – peer-to-peer. Private letter writing had been confined to those who could write and afford to send letters. It was an elite activity. The postal system encouraged writing to become a mass form of self-expression. One beneficiary, for example, was Florence Nightingale, who wrote 12,000 letters in her campaign for nursing to be recognised as a professional calling. Public and private grew together: the shared, public infrastructure of the postal system, with its numbered houses and street names, posting boxes and sorting centres, allowed an even larger flowering of private creativity and self-expression.

Much the same was true of city maps, which for the first time allowed the city to be seen from above. Before the city map was developed people navigated their way by tacit knowledge and local landmarks. Maps created a universal, standardised and artificial language for describing the shared spaces we live in. Yet maps are also a tool people use in their everyday life, navigating the city for their own purposes. Private purposes – finding your way to a restaurant, theatre or club – become easier thanks to a public innovation – a city map – which created a shared platform. In cities private and public do not operate in separate domains, they interact, intensely: that is fundamental to what makes a city creative. Shared public platforms – like maps, postal systems and public spaces – should allow private purposes to multiply and grow.

Spaces only become truly public when they are colonised by their users, who adapt them to their own, often unexpected ends, which they discover for themselves rather than being prescribed to them. Cities are too large, open and unruly to be regulated in detail, top down by an all seeing state or a feudal lord. So they have to encourage collective, voluntary, self control. People have to learn how to adjust to one another and collaborate. Cities become creative when people start learning from one another about how to use their shared resources more effectively. Successful cities allow a lot of room for adaptive mutation, encouraging their citizens to invest their ideas in the spaces they inhabit. Top down city planning, in the authoritarian tradition inspired by the Swiss French architect Le Corbusier, was such a disaster because it sought to extinguish this kind of incremental, vernacular innovation. People were meant to live inside the creation of the designer. In Curitiba the role of the designers at IPPUC is to draw out the intelligence of citizens as participants in the city, the way it moves, works and clears itself up.

It is commonplace to argue that creative cities must tolerate, even encourage diversity, of cultures, outlooks and ideas. Diversity generated by mutation and immigration is not enough on its own to generate creativity. Diversity must be matched by integration and exchange, to draw together people with different ideas. Creativity comes from mixing and mingling people and ideas. London, for example, is a marvellously open and diverse city. Yet its neighbourhoods and tribes, no more than five minutes on a bus apart, exist in separate worlds. Diverse communities that never connect will never produce creativity. We need to invest in what connects communities, their edges and interfaces. The sociologist Richard Sennett tells a story about the debate in New York over the placement of a new market for an Hispanic district. The planners, quite sensibly and listening to the community, decided to put the market in the heart of the community where most Hispanic people would use it. But the only people to use the market were Hispanic, living close by. Had the market been placed at the edge of the community, it would have also drawn to it people from outside the Hispanic neighbourhood. It would have bridged several communities, become points of interaction and integration. Diversity can just lead to hopeless fragmentation if all the pieces of the mosaic do not join up. Cities – like the Internet – are made up of lots of small pieces, loosely joined together. Unless cities integrate their citizens into a shared cultural and social life they run the risk of not just fragmentation but rising social tension.

Dutch dilemma

Sitting in Amsterdam's Debalie art's centre Jeroen de Lange has a headache. The strategy adviser to the chief of staff of Amsterdam's city government is devising a "vision" for the city's future. What is creating de Lange's headache is the very openness to diversity that should make Amsterdam so creative. About 43% of the Amsterdam population is of ethnic minority descent – from Indonesia and Morocco, Ghana and Nigeria. More than 60% of people under the age of 21 are from ethnic minority backgrounds. Within ten years they will make up a majority of Amsterdam's population of about 700,000. Many of these young people from migrant backgrounds feel disconnected from the place where they live, its institutions and traditions. De Lange estimates that within five years about 10,000 late adolescents, mainly boys, will have dropped out of school and will be supported by welfare. Mostly they live in large housing estates on the periphery of the city centre, where life obeys different rules and rituals. On "African" estates, in one of Europe's most mature democracies', leadership is exercised by tribal chieftains. In one block De Lange found forty illegal nurseries, run from apartments, catering for the children of parents who had risen at 4am to travel in buses to chicken processing plants 60 miles away.

The sense of dispossession on estates like these in cities across Europe feeds tension, especially among young men. Tales of violence, sexual harassment, robbery and rape swirl around feeding the possibility of a white backlash to reclaim Dutch society for the white Dutch. De Lange spent eight years as a diplomat in Rwanda. He returned to Holland to put something back into his country, only to find he was dealing with many of the issues he confronted in Africa: "I've thought about the sources of mass violence a lot. The Hutu and Tutsi in Rwanda lived with one another for 800 years before 1.5m were slaughtered in a few days. I am not saying there will be racial violence in Amsterdam but all the elements which promote violence – lack of a sense of justice, dehumanising images of minority groups, lack of emotional connections between social groups – all these are present in this city."

Most cities, like Amsterdam, thrive on their openness, their ability to attract people from diverse backgrounds. Yet how do they hold together, retain a sense of coherence, if many of the new people don't believe in the institutions and symbols of the old? If order was imposed in a heavy-handed way it would provoke a backlash. If the city were closed off to incomers – even assuming this could be done – it would lose its vitality. De Lange scratches his curly locks: "We have to find some common symbols, visions, goals, around which such a diverse population can come together, to see their common interests." Open, complex, mass system of innovation – in this case a city – will only cohere around simple shared goals and values. That requires inspiring, authentic local leadership, which connects with people. It also means investing to give new entrants hope: social mobility is essential to social stability and creativity.

Creative cities have to flow, not just physically and but socially as well. Curitiba is so successful largely because its cheap public transport system keeps the city moving. It also means that recently arrived migrants, living in new settlements on the city's edge, can easily get to jobs in the city's centre. That helps social mobility, which is critical to creativity. As Peter Hall's sweeping history Cities and Civilisation makes clear creativity is often driven by recently arrived immigrants who have to find new routes of advancement by challenging the status quo. The social mix of cities propels creativity only when emerging social groups – traders, artists, politicians, entrepreneurs, students, yuppies – can try out different lifestyles and ways of working. Cities dominated by an establishment will not be creative for long if they lock other people out of power and opportunity. A city that has a lot of people in it from different backgrounds and cultures will not be creative unless it is socially open in the more fundamental sense of offering opportunities for mobility.

Cities are centres for mass, participatory innovation. They provide a potent mixture of density and diversity: lots of people with different backgrounds and cultures in close proximity, their ideas jostling, mingling and competing with one another. Cities provide markets for the adoption of new products. They tend to attract experimenters. Creative cities work with the grain of mass innovation.