



# Innovation by Leonardo da Vinci



**Peter Fisk** explores the 7 secrets to finding your *Creative Genius*, and how to ensure that your business delivers more effective innovation.

It is easy to say that a person is “ahead of his time”, but rarely has anyone been so far ahead.

He could see the future – his insights suggested new possibilities, his imagination was uncluttered by today, and his inventions really did emerge from the “future back”.

Leonardo da Vinci anticipated many of the great scientific discoveries ahead of his time, including those by Copernicus, Galileo, Newton and Darwin. He even went further than them, turning their principles into practical applications, from calculators to helicopters, hydrodynamics to solar power.

- 40 years before Nicolaus Copernicus, he proclaimed “il sole no si muove” – the sun does not move, dismissing the belief that the earth sits at the centre of the universe.
- 200 years before Isaac Newton, he proposed the theory of gravity, that “every weight tends to fall towards the centre by the shortest possible

way”, and that the Earth must be spherical.

- 400 years before Charles Darwin, he argued that man and monkey had the same origins, and how evolution has shaped the natural world around us.

How did he do this? The answers lie not in science or technology, but in the way in which he saw the world around him, and how that made him “rethink”. From the *Mona Lisa* to *The Last Supper*, it is the same approaches that made his paintings so remarkable, that enabled him to create, design and invent many of the aspects of life today.

What was it that inspired, shaped and sustained his creative genius? What were his talents and traits which we could seek to recreate in our own quest for creativity and innovation?

Psychologist, and professional juggler, Michael Gelb proposed seven components to da Vinci’s distinctive approach. He labelled them “*Curiosit , sensazione, arte e scienza, connessione, sfumato, dimostrazione and corporalit *”. Whilst there is nothing futuristic in these attributes themselves, they did enable him to see things differently, and as a result, think different things.

So how can we apply these ideas to business today, and specifically to the challenge of more effective innovation, innovation from the “future back”?

1. **Relentless curiosity** ... an insatiable hunger to learn, to question, to search for better answers, and to articulate his ideas in pictures, and propose new possibilities.
2. **Seeing more** ... he observed things differently, using all his senses to appreciate richer detail, to align perspective and perception, and

thereby to understand his subject better.

3. **Thinking bigger** ... appreciating art and science, logic and imagination, he was able to think more broadly, embracing rigorous analysis whilst also trusting his intuition.

4. **Making connections** ... to connect the unconnected, to embrace the fusion and intersection between the natural and physical world, the tiniest seeds to the stars above.

5. **Embracing paradox** ... thriving on ambiguity and uncertainty, creating mystery and depth, be it the contrast in his sketches, or asking questions without obvious answers.

6. **Courageous action** ... always seeking to prove his hypotheses, to experiment and test, to make his ideas tangible, and to do what nobody has done before.

7. **Enlightened mind** ... constantly renewing mental and physical fitness, exploring new worlds to spark new ideas, not being a slave to work but living a full life.

Da Vinci's biographer, Giorgio Vasari, observed that "the gifts that Leonardo possessed seemed unlimited, standing to all areas of human knowledge and skill – artist, scientist, anatomist, sculptor, botanist, architect, musician, engineer, inventor, entertainer and philosopher".

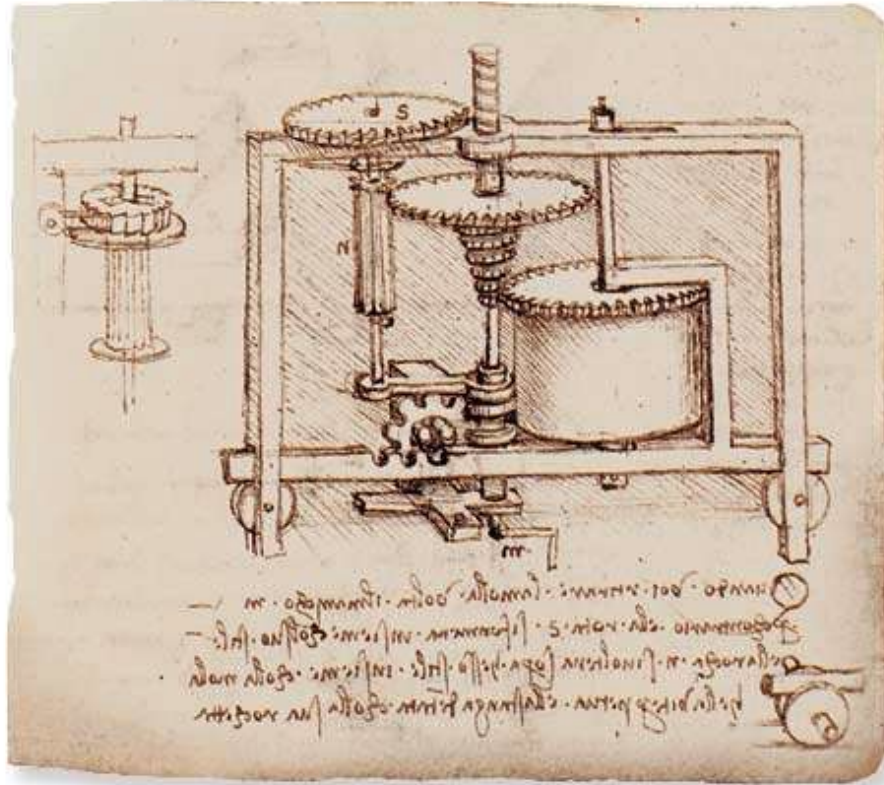
For Leonardo, despite all his talents, languages were not one of them, and so much of this knowledge was Greek to him. Yet, what he missed in

translation he compensated for through his own observation and interpretation. He had an insatiable curiosity and an imagination unconditioned by his surroundings. This combination of catalyst and creativity enabled him to make some of the greatest technological advances of the modern world.

Beyond his art, Leonardo is admired for his technological ingenuity. As a scientist, he contributed much to the evolution of knowledge – particularly in the fields of anatomy and optics, mechanical engineering and hydrodynamics. He developed highly original concepts, captured in immaculately detailed designs, for everything from a helicopter, a tank, a calculator, and a double-hulled catamaran, and even a basic theory of plate tectonics.

His symbolic drawing of the *Vitruvian Man* is a cultural icon familiar to us on everything from the Euro to t-shirts. Only fifteen of his paintings survive to this day, most of the others he threw away, thinking them not good enough. However together with his 1300 pages of notebook jottings, drawings and diagrams, we can learn much about the great man, and how he saw his world from the future back.

Da Vinci is still thought of by most people as primarily an artist, but his world-changing approach to realistic painting was only possible due to Leonardo's fascination with science. He took this fascination with understanding and recording the world around him to extreme lengths, dissecting many bodies and drawing them in great detail. He saw the body as a machine, a complex mechanism that could eventually be understood, one of the first, for example, to identify the pumping action of the heart.



Da Vinci's mechanics were inspired by the natural world

He even replaced muscles with strings to experiment and see how they worked with the levers of the bones. His understanding of anatomy and his experimental approach opened the ways for others to follow in later centuries. He also created the first ever designs for a humanoid robot, “The Robot Knight”, based on the anatomical ideas he had developed.

The Renaissance, and particular Florence, is famed for its unusual concentration of great men at the time, although they rarely worked together. Leonardo was twenty-three when Michelangelo was born and thirty-one when Raphael was born. Raphael only lived until the age of 37 and died in 1520, the year after Leonardo, but Michelangelo continued for another 45 years.

Unique to the period was the encouragement by patrons and thinkers of a “cross-over” between the arts and sciences (or social philosophies as they

were regarded at the time). This became known as the “Medici Effect”, enabled by the gathering of diverse talents encouraged by rich benefactors, such as the Medici family. It encouraged a cross-over in ideas and skills, which challenged many of the conventions around, and found newness in their intersection, rather than isolated extremes.

Leonardo was a master of cross-over. He combined ideas from animal and plant studies with psychology and fashion, anatomy and architecture. From this he formed his understanding of mechanics, and everything from hydraulic pumps to new musical instruments emerged. He used analogy, for example he wrote short fables like Aesop, stories that seemed to be to entertain children but were in fact to communicate to adults the danger of greed and so on.

Few of his design concepts were ever constructed, not because they weren't practical, more often because the technologies and resources to create them were just not available at the time. However some of his smaller inventions, such as an automated bobbin winder and a machine for testing the strength of wire became reality.

In 1502, for example, Leonardo produced a drawing of a single span 240m bridge as part of a civil engineering project for Ottoman Sultan Beyazid II of Istanbul. The bridge was intended to span an inlet at the mouth of the Bosphorus. Beyazid did not pursue the project, because he believed that such a construction was impossible. However Leonardo's vision was resurrected in 2006, when the Turkish government decided to construct Leonardo's bridge to span the Golden Horn.

So what can we learn from Leonardo da Vinci? How can his life and work inspire us to be more creative, enlightened, inspired by our surroundings,

and able to innovate from the future back?

Steve Jobs has many great attributes, but he too is not perfect. Maybe surprisingly, much of advanced technology is Greek to him. His skill is to rise above this, to understand people, the simplicity of user-centric design in all its facets, and the power of communication.

Malcolm Gladwell argued that anybody could be a genius as long as they put in the work. In his book “Outliers” he reflected on everyone from Mozart and Madonna, Andy Warhol and Tiger Woods, and resolved that it took around 10000 hours of practice to be a genius.

Maybe we can learn something from this in today’s world – where words and numbers dominate our communication, and restrict our imagination. Maybe P&G have the right idea when they stipulate that any new proposal, innovation or investment, should be communicated in a one-page poster, rather than lengthy reports or slideshows. Certainly the ideas of looking further into the future, and deeper into the consumer’s world, are only beginning to matter in business today. Techniques such as scenario planning on consumer immersion are still rare. Going beyond the assumptions and research statistics to live with consumers, to understand how products and services are used, enable people to do more, enrich their lives – by seeing the challenge and opportunity from their perspective.

We examine Leonardo’s seven talents in a little more detail, what they mean for creativity and innovation today, and how you can embrace them in pursuit of your own creative genius:

## Talent 1: Relentless curiosity

“Curiosità” is translated from Italian as an insatiably curious approach to life and unrelenting quest for continuous learning. It is the ability to constantly ask questions, and to question yourself; the relentless pursuit of knowledge and truth, by learning to ask better questions; the ability to solve the most challenging problems by keeping an open mind.

Leonardo believed that man is not divorced from nature, or any object from its surroundings. And that observation should be accompanied by reason and application. He saw this as a creative challenge.

As Vasari put it “he taught us that men of genius sometimes accomplish most when they work least, for they are thinking out inventions and forming in their minds the perfect ideas which they subsequently express and reproduce with their hands”.

Leonardo was intensely curious about everything he encountered, never satisfied with existing assumptions, always wanted to discover nature through his own eyes.

His incomplete notebooks, full of spontaneous, random drawings but few words

demonstrated an agile mind – observing, thinking, imagining – capturing new insights, fragments of invention, recognising that future possibilities are unlocked by a better understanding of current phenomena, and then searching for more.

## How does relentless curiosity drive creativity?

Our world is more uncertain than ever. Change is relentless, technologies emerge at break neck speed, markets and behaviours are incredibly complex. Neuro-imaging can give us new insights into the mind, and space travel is unearthing life beyond this planet. Seeking to at least partly



understand this world offers you the best clues to making a bigger difference in it.

Thinking from the future back helps you to challenge the conventions of today. Asking why is always a better starting point than asking how, understanding the context is a more useful place to understand a problem than the symptoms themselves, and developing a better product starts by understanding what people seek to do with it, rather than what it actually is.

Steve Jobs, a little like Leonardo da Vinci has many talents. But like Leonardo's linguistic weaknesses, Jobs readily admits that there are many who understand technology better than him. Yet he also sees this as a virtue, forcing him to focus on his strengths, partly in a way that compensates for this gap, but in a way that also means he is not inhibited like others. Instead he takes a human perspective, challenging every aspect of design, usability and communication.

Meet any other entrepreneur, like Richard Branson for example, and they are intensely curious – about you and your thoughts, about why things are as they are, and how they could be different. In Branson's pocket there is always a small notebook – full of scribbled notes, untidy pictures, questions and new ideas. Every situation, every person, every hour he adds more to his thinking.

## How can you be relentlessly curious?

It is easy to be so focused, that there feels like no time or space in which to think. Yet thinking is perhaps your most valuable use of time. The motivation to think does not come from others, but inside. It comes from

being curious – always asking why, going to new places, throwing yourself into new fields of knowledge or practice.

Take a notebook everywhere you go – small and without lines, so that it is more portable and less restrained. Capture ideas and insights, spend a few minutes every day reflecting on discussions and experiences. And then occasionally sit back and review what you have created. Look for patterns both obvious and not, seek symmetry where there is currently none.

Sometimes it is easier to focus on one theme at a time, or to even force yourself to generate as many ideas as possible around that theme. This is sometimes referred to as “brainwriting”, a personal brainstorm, unlocking your stream of consciousness. A few minutes of thinking time is the best possible starting point to being a creative person.

- Time and Space (Track 2) explores the places where no business has gone before
- Shigeru Miyamoto (Track 3) applies his curiosity to transform Nintendo’s games
- World Changing (Track 4) responds to the shifting power and implications for innovation
- Future Back (Track 6) explains how to stretch your people to be more curious
- James Dyson (Track 9) describes how running up sand dunes led to vacuum cleaners
- Philippe Starck (Track 11) inspires us to stay crazy through creativity and design

## Talent 2: Seeing more

“Sensazione” is the continual refinement of the senses, especially sight, as the means to enliven experience. Of all these, da Vinci was most focused on sight, making “saper vedere” – knowing how to see – the foundation of all his work.

Leonardo was not satisfied with his ability to depict physicality, and sought out the anatomist Marc Antonio della Torre to help him understand people and their motion even more closely. Torre was passionate about using your eyes in new ways.



## Sight and perception

Da Vinci believed that the five senses were connected to a single point, the “senses communis”, located just behind the eye. “Who would believe that so small a space could contain the images of all the universe?” he

pondered in his notebooks, translated and reproduced as “Da Vinci Notebooks” which also include philosophical musings as.

He considered sight to be the superior sense, because it gives more context, it adds perspective, it enables scientific reasoning, and therefore the foundation of creative talents.

Leonardo also believed in the *idolum*, the power that all things possess to give off both their physical shape and inner energy, and that this was only seen actively, if it was stimulated by observation. Or to be more practical, only by looking more closely can you see the real intersection between an objective and its surroundings.

## Light and perspective

Perspective became a defining principle of Leonardo’s work – representing a three dimensional world on a two dimensional surface – showing how objects relate to each other, and to the distance and angle at which they are observed. Geometry and mathematics became increasingly important to his art.

However he did not believe art was a desk job, a slave to geometry. He believed in mingling with the bigger world, thinking big before small, believing that otherwise his detail could be in the wrong place. He recommended that artists walk alone in the countryside to more keenly appreciate the beauty of nature.

He became fascinated with all aspects of nature, producing exquisite botanical drawings, observing the way in which plants grow, their similarities and differences. In particular, trees mattered to him, admiring their structures, changing colours, and the way they interacted with light.

The shadow of trees, he said, is as much about the light patches as the darker patches, and their vibrancy and transparency.

## How does seeing more drive creativity?

We dive into problems and opportunities with little thought for either their context, or indeed whether we are focused on the right areas. We are all too keen to understand people today, and maybe in the past, but less interested in things that they do not yet say they need, or for which words have not been created. We are comfortable seeking to make sense of our own world, the markets or sectors that are familiar to us, but we lose confidence as soon as we enter a new space.

Opening up, before closing down, is key to innovation – exploring possible markets, existing or emerged; understanding possible future scenarios, rather than assuming one; considering non-customers as well as customers, because there must be reasons why they are not customers; considering more ideas, options and potential solutions before making choices.

By considering different viewpoints, we can see an opportunity from different perspectives – as a customer, competitor, technologist, futurist, artist, and more. By spending more time with customers, we can learn far more about their motivations and aspirations, rather than just their needs and wants. By giving ourselves time to think big, we are more likely to find the best opportunities, rather than just better ones – to do the right thing, rather than just do things right.

Thinking from the future back is perhaps the most useful of all perspectives, because it is without restraint, without prejudice, but with infinite possibility.

## How can you see more?

Learn how to draw. Drawing unlocks your creative spirit like no other – it allows you to express ideas without the necessity of established words and meanings, to develop the ideas as you draw, to connect ideas that are usually addressed individually, to reflect this in a unique and personal manner, to engage people more emotionally.

Above all, learn to draw with a stream of consciousness – with your “right brain” rather than your “left brain”. Whilst the brain is more complex, in simple terms, the right side is more intuitive, more spontaneous and more holistic. This avoids the focus, structure and logic of the left side, which is important yet can often limit creative thinking in the initial stages.

As you draw, use all your senses. Listen to sounds around you, articulate the most important ideas prominently and then connect supporting ideas around them. Think about the touch and smell, as well as sound and vision, describe them and how they make you feel. Remember sometimes that less is more, simplicity as well as detail. And above all, don't feel embarrassed by your drawing skills!

- Seeing things differently (Track 12) encourages us to explore different worldviews
- Deep Diving (Track 15) immerses you the intuitive world of customer aspirations
- Paul Smith (Track 16) reflects on quirkiness and how to embrace parallels and extremes
- Co-Creation (Track 23) adds new ideas to business that you might never have thought of

- John Maeda (Track 27) uses graphic design to find simplicity in our complex world
- Cai Guo-Qiang (Track 45) encourages artistic experimentation to find genuine newness

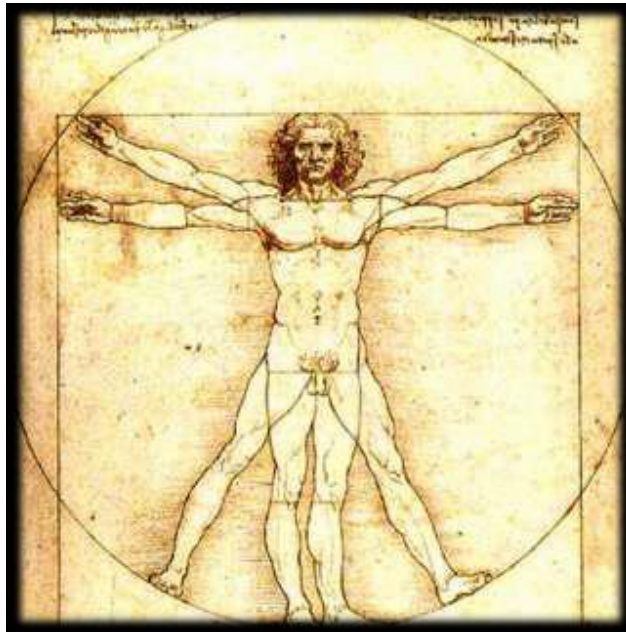
## Talent 3: Thinking Bigger

Da Vinci was able to think beyond his peers because he combined opposites and adjacent fields – art and science, man and machines, logic and imagination. This requires new ways of thinking – the ability to synthesise information in new ways, to work in parallel at different levels, and even to hold two opposing views at the same time.

Left and right brain thinking, analytical and intuitive, focused and holistic ... “creativity” emerges from the connection of both.

Leonardo was fascinated by the proportions of the human body. The Roman architect Vitruvius had previously related these to fundamental geometric principles, but Leonardo went much further, defining his “Vitruvian Man”.

*“... 4 fingers make 1 palm; 4 palms make 1 foot; 6 palms make one cubit; 4 cubits make a man’s height; and also one pace; and 24 palms make a man”*  
...



Thinking bigger ... Vitruvian Man and the Golden Ratio

He was obsessed with finding harmony, symmetry and balance.

*“The span of a man’s outstretched arms is equal to his height” and “Every man at three years is half the full height he will grow to at last”*

In mathematics, and in the arts too, two quantities (a and b) are in a “golden ratio” if the ratio between their combined value (a+b) to the larger value (a), is the same as the ratio between the larger value (a) and the smaller value (b). The ratio is a mathematical constant, approximately 1.6180339887. Behind many of Leonardo’s greatest works, lies this almost spiritual geometry.

His intellectual “border crossing” was also evident in his mechanical breakthroughs. He explored the human body with meticulous dissections, learning from every muscle as if a masterpiece of mechanical engineering, which could applied on much larger scale in the physical world, from levers and pulley systems to visions of automation and flight.

## How does thinking bigger drive creativity?



Reductionism, incrementalism and efficiency – the enemies of effective innovation in business today. With our heads in our spreadsheets we focus on the minute details. We seek to improve sales, reduce costs, enhance performance by small percentages. We seek to optimise the things we currently do rather than doing things differently, and we stick with the ideas we can quantify rather than those which are more difficult. We are slaves to the left side of our brains, to numbers and logic, process and focus.

Yet we live in a creative world, an ideas economy, a globally connected system where there is infinite space and opportunity to grow as individuals and businesses.

Right-brain thinking is about ideas and intuition, making connections and seeing the bigger picture. Of course we need both, and creativity lies in using our whole brains. Thinking bigger is about understanding people outside their boxes, our home market as the globe not our locality, and opportunities beyond the three-year plan. It is about understanding a person's surroundings, and then the person; applications before products; attitudes before behaviours. And it is about having the imagination to stretch beyond what is known, comfortable or predictable.

Thinking from the future back is a better starting point, because everything is possible.

## How can you think bigger?

The answer lies in this book, to see your world from the future back. To stretch your imagination beyond reality to possibility, and then work backwards to understand how you could do more. To stretch not only in time, or years ahead, but also in space, in terms of adjacent markets. Once

you have stretched, you can then connect it back to today – future back, now forward – to target an emerging market, or leapfrog a convention.

Package your bigger thinking in more acceptable ways for people, for example by saying “let me propose a hypothesis” rather than being dismissed for crazy, impractical ideas. Hypothesis-thinking is far stretching but also credible, scientific if you like, and gives you the opportunity to prove or disprove it, and at least explore it further.

Hold back on the spreadsheets – use your imagination and intuition to reach new domains before seeking to analyse them in detail, rather than diving into the wrong ocean. Equally, once you have settled on a thinking space, then evaluate it for the best opportunity areas – the best potential customers, or products, for example – and then focus your creativity on what matters most.

- Virgin Galactic (Track 2) tells us how a dream of space became reality in a few years
- Tim Berners-Lee (Track 12) thought bigger to reconnect the world through his web
- Future Scenarios (Track 14) develops alternative futures to help make better decisions
- Context Reframing (Track 22) helps us to redefine situations in more powerful ways
- Market Shaping (Track 36) recognises innovations as just the starting point for change
- Zaha Hadid (Track 36) never stopped fighting to make her big ideas come true

## Talent 4: Making connections

Da Vinci had a deep appreciation of the interconnectedness of all things. He was a systems thinker, always looking for patterns, for causes and effects, for parallels in other worlds, and the intersections with them. This helped him to see the bigger picture, find new connections and combinations, and to do open up whole new fields of science and philosophy.

*“Whatever exists in the universe, in essence, in appearance, in the imagination, the painter has first in his mind and then in his hand; and these are of such excellence that they present a proportioned and harmonious view of the whole, that can be seen simultaneously, at one glance ...”*

## The Medici Effect

Leonardo believed that an artist should not just copy nature; he should understand it, saying that a creative expression is only achieved by a total immersion in a task, finding harmony with the natural world in order to see its detail.

Not only did he revolutionise the use of perspective in art, the mathematical application of proportions, he introduced a systematic approach to “immersing” himself in the world of his subject. In this way he was understand the way in which life interacts with what surrounds it, and how it succeeds better when it is in harmony.

Leonardo believed that an artist’s role was to hold a mirror up to nature.

*“He should act as a mirror which transmutes itself into as many colours as are those of the objects that are placed before it ... Above all he should keep his mind as clear as the surface of a mirror”*

However, as a scientist he also believed in questioning what appeared in his mirror, arguing that better understanding enables better judgement, and better art.

Leonardo only believed this was possible by staying in touch with real people – walking the streets, talking to people, observing every their behaviour.

*“You should go about and often as you go for walks observe ... the actions of the men themselves and of the bystanders”*

But he also said that observation was not enough, that understanding why people behave is more significant – how they are influenced by others and their surroundings

*“... consider the circumstances and behaviour of men as they talk and quarrel, or laugh or come to blows with one another”*

## Art and science

Most impressive of all was da Vinci's convergence of art and science. His observations and drawings were ultimately the enablers are phenomenal scientific breakthroughs and innovations. But it was the purity of art, rather than the limitations of academia, which enable him to achieve that.

He demonstrated how to lift and draw great weights by means of levers, hoists and winches, or ways to pump water from great depths. He rejected conventional wisdom and accepted truths, preferring instead to trust his own eyes and interpretation.

The range of his mind was breathtaking, from anatomy to zoology, botany and geology, optics and astronomy, aerodynamics and hydrodynamics. In

each of these areas, his work was decades or even centuries ahead of others.

## How do connections drive creativity?

The best ideas are often a combination of smaller ideas, and indeed the best solutions for customers are usually a combination of various products and services. Therefore, seeking to solve the problem, rather than creating a product, is a far more connected approach to innovation.

Working with a wider range of partners enables you to access ideas, capabilities and customers that you would never have been able to alone – through open innovation, joint ventures, or affinity brands. Rather than being restrained by specific capabilities, retain more flexibility and reduce risk in an ever changing world. These connections extend to your customers too, collaborating – or “co-creating” with them in new ways, to develop ideas, to produce them, evaluate them, and even sell them to others.

Thinking from the future back gives us a bigger picture, where we can see patterns and potential connections, which are perhaps invisible day to day. The best ideas might not come from your own field, but from others. Consider parallel sectors which have similar challenges, or different worlds all together. Architects can learn from nature, banking can learn from retailing, car manufacturers can learn from rocket scientists, public sector can learn from private sector, developed nations can learn from developing nations.

## How can you make connections?

Connect the unconnected. Creatively take two different ideas and see how they can produce better ideas. You want to think how social networks can

work for you, then fuse the ideas such as Facebook with something completely random, like a birthday cake. Think about the attributes of each – people, friends, profiles, photos, games, candles, icing, flavours, party, annual. And then connect some of them – real parties for online friends, featured profile if it's your birthday.

Meet with your peers in parallel worlds – go talk to a person with similar challenges to you in a completely different market. If you are a bank trying to attract young people, go and talk to Apple or H&M. If you want to give your shoes more marketing buzz, go see what you can learn from Disney or Bloomsbury (the publisher of Harry Potter books). If you want to understand the likely impacts of deregulation, track what happened in industries where similar events have already taken place.

And if all else fails, try something completely different. Go to the library and choose a book about something of which you know nothing. Watch a different channel on television. Listen to music which you would never have believed you would. Go for a walk in the woods, or browse in a shop which you've never been in before. Look for ideas, look for connections to whatever you are working on.

- Extremes and Parallels (Track 17) drive radical innovation through unusual connections
- Concept Fusions (Track 26) brings the best ideas together to create better solutions
- Going Further (Track 38) uses licensing techniques to replicate ideas in adjacent markets  
Samsung (Track 8) reinvented itself through a design language based on yin and yang

- Lego (Track 42) through open their research labs to the kids who can really play
- IBM (Track 47) uses its “Innovation Jams” to bring people and partners creatively together

## Talent 5. Embracing paradox

“Sfumato” in Italian suggests a willingness to embrace ambiguity, paradox, and uncertainty. This gave da Vinci’s work a great sense of mystery, or even uncertainty, in the mind of others.

Intrigued by light, he saw it as the physical element that stimulated the eye, but also figuratively as the what stimulated the mind.

*“Light is the chaser away of darkness. Look at light and consider its beauty. Blink your eye and look at it again; what you see was not there at first, and what was there is no more”*

As an artist he considered how to interpret where inner and outer light meet, which gave contrast to his paintings, but also depth to their meaning. His paintings demonstrate infinite graduations between dark and light. He understood the power of darkness as well as light, perfecting the techniques of “chiaroscuro.”



Embracing paradox ... light and dark, shadow and sharpness.

Light creates colour, and this became his new obsession – how colours mix and contrast, how colours split and give more meaning – declaring that “where there is most light the true character of a colour in light will be seen”

## The Laughing One

Sitting in the Louvre is perhaps his most famous creation, the *Mona Lisa*.

The painting – also known as “la gioconda”, the laughing one – is most famous for the elusive smile on the woman’s face, has a mysterious quality brought about perhaps by the fact that the artist has subtly shadowed the corners of the mouth and eyes so that the exact nature of the smile cannot be determined.

Faces said everything to Leonardo. Not only anatomically, but in the way they reflected thinking and emotions, relationships and surroundings. He conveyed his beliefs in some of the greatest masterpieces. Of the portrait, Vasari said “The eyes had their natural lustre and moistness. The mouth



joined to the flesh tints of the face by the red of the lips, appeared to be living flesh rather paint. On looking closely at the pit of her throat one could swear that the pulses are beating”.

The shadowy quality for which the work is renowned became known as sfumato, or “Leonardo’s smoke”. Other characteristics found in this work are the unadorned dress, in which the eyes and hands have no competition from other details, the dramatic landscape background in which the world seems to be in a state of flux, the subdued colouring

## How does paradox drive creativity?

Paradox is the “big daddy” of innovation. Finding ways in which to resolve a fundamental contradiction in people’s lives, where they want both but have to choose one, can be the catalyst for significant breakthroughs. The family who needs a big car, but want to reduce their emissions; the executive who craves home comforts, but spends her life in anonymous hotels; the perfect apple but without the GM crops to shape its growth, and pollute our water supplies ... how can you resolve their dilemmas?

Ambiguities lie all around us, and in the detail as well as in the big details. Trying to meet the needs of different audiences, brands are often forced to compromise, to create average solutions or else a whole range of features which many people don’t need or want. The small things – like the shading in Leonardo’s drawings, can make a big difference, particularly to the aesthetic qualities, and the emotional engagement of customers.

Thinking from the future back allows us to address uncertainties by understanding how to reduce risk and concern. It helps us to see how small frustrations or imperfections can have big consequences longer term. It allows us to break free of the constraints which cause many paradoxes and

to create solutions, which we can then set about finding a way to make happen today.

## How can you embrace paradox?

Seek out ambiguity in everything you explore – in the lives of customers, in product composition, in channels to market, in ways of making money, and more. Look to the margins not the mainstream for ways in which people have adapted standard products and services to their own needs – the person who ties a ribbon around the suitcase because they all look the same, or deliberately makes their designer clothes look worn and dishevelled, because it looks cooler than if they were new.

When listening or researching customers, don't ask them what's good or what they want, instead focus on what's not so good, or frustrating, and understand why. Probe their answers more deeply until you find some fundamental contradiction in their needs, or in the solutions available to them. Understand how you could make it better.

Explore possibilities by asking questions to which there is no obvious answer (sometimes known as the “Socratic method”). Of course, this could just seem like you are being difficult, so it is worth perhaps also worth adding that you understand that there is no obvious answer, but that it is still worth asking the question.

- Aravind Eye Care (Track 4) transforms sight in India with a non-profit healthcare model
- Creativity (Track 7) uses the Jester to challenge your thinking and open your mind

- Pattern Recognition (Track 13) explores the world of paradoxes and possibilities
- Rule Breakers (Track 18) challenges you to disrupt normality and embrace discontinuity
- Alessi (Track 29) reveals his secret formula for connecting function and form
- Tesla (Track 34) demonstrates that fast sports cars can also be environmentally friendly

## Talent 6: Courageous action.

Da Vinci was not just a smart thinker, he had a bias to action, to making things happen. Having an idea, creating a hypothesis, proposing a theory is one thing, but proving it is another. Scientific method is all about experimentation and continually testing to prove that the proposal is valid, or through mistakes to learn how to create a better solution.

Mathematics was central to Leonardo's thinking. Whilst much of his interpretation was intuitive, he saw analysis as supporting hypothesis, needing to make a leap of faith before proving it. He supported his proofs with repeated experimentation, and only after such rigour did he trust his conclusions. He also found that new ideas often arose through deeper analysis and testing, and often took him closer to the origins of phenomena.

He brought all this together in his scientific method of four steps

1. **Observing** – trusting your eye and other senses to understand the subject, its contextual surroundings and the influence they have.

2. **Interpreting** – making sense of these observations and from them hypothesising reason, which can be postulated as scientific laws
3. **Demonstrating** – showing how factors such as mathematical proportion can be found in many different situations, and its implications.
4. **Articulating** – testing the logic through repeated experimentation, and visualising the logic in pictures or diagrams, words and numbers.

## Creative Engineers

Leonardo designed incredibly sophisticated machines – beyond anything that had been articulated before. However his focus was not on the invention, but on the mechanical engineering which solved the problems. He was less interested in devices, more in the processes behind them, and their applications which made people's lives better.

His creative engineering created a new world of weights and forces, levers and pulleys, cogs and wheels. From this he created everything thing from a loom to spin wool to clocks that kept time. His understanding of propulsion led to the first designs for a bicycle, his insight into water displacement allowed him to imagine what a submarine could do. Of course, such words did not exist at the time, they were more about solving problems, or enabling new possibilities.

## Fly like a bird

His visions of flight were his most ambitious, fundamentally challenging what people at the time dreamed was possible. Examining motion through air, Leonardo studied the flight of birds to understand how their delicate

structures were able to resist the force of gravity, and to soar high in the sky. He marvelled at the natural technology of wings and considered how he could replicate it.

*“The wing of a bird is always concave in its lower part extending from the elbow to the shoulder, and the rest is convex. In the concave part of the wing the air is whirled round, and the convex is pressed and condensed”*

He stretched his study of aerodynamics to understand not only the movement of objects in flight, but the movement of air as it passed by the object. By addressing the problem in reverse he was able to explore ways in which air could be channelled in order to keep much heavier objects in flight, and ultimately to create flying machines.



Courageous action ... turning insights and ideas into practical designs

## How does courage drive creativity?

Thinking from the future back requires courage. A more conventional approach would be to adopt a customer-centric. The customer, or more often the customer research, says it is wanted, and therefore it must be the right solution. Too much innovation is still based on the current articulated needs and paradigms of customers. But breakthrough requires more, it requires stretch and challenge, perhaps collaboratively with customers,

but it takes you beyond the known, beyond the safety zone of quantitative research, fusing insight and imagination, and inspired implementation.

It is one thing to sit around having good ideas, another to make them happen. Test new ideas with experiments and prototypes, either physical builds or computer-generated graphics. Use this testing approach to learn and improve the designs, to build commitment from stakeholders, and to engage customers and partners.

Few of us are confident in our drawing capabilities, less still in our model-making skills. But we can all be tremendously inventive when we try. Draw pictures, cartoons, diagrams of your ideas. Rip out pictures and slogans from magazines, build collages of ideas to give a sense of the look and feel of a new idea. And just like at school, get you glue and scissors, and start building the concepts too. They might look ridiculous, but they help you to then describe your new possibility far better than words.

## How can you act courageously?

Test and challenge all of your assumptions. Apply it to real situations and consider how it would work, if it's a product, when and where would people buy it from, who the competition would be, and what price it could demand. Ask other people. Customers, colleagues and partners, friends and relatives, they don't need to be an expert to have a view, better still they all bring different perspectives.

Make things happen – draw your pictures, stick them on wall. If you are walking as a team, consider recruiting an artist or cartoonist who can capture all the best ideas as spoken or developed, and create a visual record of the evolving ideas (cartoonists are great, because they can poke fun too!). Make models, even the most amateur combination of cereal

boxes and toilet rolls are good. Engage people with it “imagine this is a 60 cm LCD screen, and this is a body sensor” or whatever.

Learn from failures, yours and of others. Failure is good, even great. But learn what went wrong, and find ways to make it better. Persevere, keep trying, try a thousand times, and for 10 years or more (like James Dyson), each time getting a little closer to your dream, and to a practical solution. Enjoy the journey, not just the result. If the idea is good enough, the reality will be worth the effort.

- Mohammad Yunus (Track 6) is transforming third world business with micro- credits
- Honda Asimo (Track 13) is the cute little robot that makes the future more possible
- Launch Pads (Track 31) focuses on getting ideas to market fast and effectively
- Innovation Process (Track 44) defines the disciplines of new product development
- Game Changing (Track 49) keeps us thinking bigger, about creating a better world
- Reid Hoffman (Track 46) is the networking and investment star of the digital world

## Talent 7: Enlightened mind

The ability to think requires health and fitness, stimulus and diversity, a healthy body creates a healthy mind. More than artist or scientist, da Vinci was a thinker, a philosopher. He reflected on life and its meaning,

problems and possibilities. “*Feathers will raise men, as they do birds towards heaven*”

And he was more still. As a court entertainer, he designed sets and costumes, often loaded with symbols and significance. Sometimes this symbolism reflected his patronage, but it was also just another aspect of his curiosity.

Whilst Dan Brown’s *The Da Vinci Code* makes much of such hidden messages, from Mary Magdelene’s appearance in his picture of *The Last Supper*, to conjecture about the real meaning of the Holy Grail – it is more likely that he was playing with ideas, provoking and entertaining.



Enlightened mind ... from art to robotics, imagination without limits

Leonardo became a great storyteller, partly in his role as entertainer, but more importantly as a way to communicate and spread his ideas. His stories were thoughtful and amusing, and his company was sought by royalty and nobility across Europe. One of his most famous, or lasting, is “the Ant and the Grain of Millet”, simple yet provocative. It made people think.



*“The ant found a grain of millet. The seed, feeling itself caught, cried out ‘If you do me the kindness to allow me to accomplish my function of reproduction, I will give you a hundred such as I am.’ And so it was”.*

Leonardo pushed the boundary of knowledge, exploring things that did not become accepted and physical until hundreds of years later. His notebooks were not published until four centuries after his death, and in them people were amazed to find what they thought was the latest discovery had been imagined many years before.

Yet his contemporaries also realised that they lived alongside a supremely gifted man – a genius – a man who could see things differently, and think different things.

A man who redefined his world from the future back

## How does enlightenment drive creativity?

It sounds almost spiritual, but certainly requires spirit ... the personal energy to stretch yourself, to look wider and deeper, to listen harder and interpret better, to think what has never been thought and to connect the unconnected, and to turn ideas into practical solutions for implementation.

Thinking from the future back is exhausting but exhilarating. Like a racing driver or tennis player, it doesn't look too physically demanding, but it requires immense mental presence.

There is no magic formula, no definitive process, just a number of talents which you can embrace. The rest is up to you, to embrace curiosity and perspective, and all the other factors. Yet if there is one essential

ingredient, then it is an enlightened mind – one which has the fitness and agility to think beyond the norm.

The agility comes from mental fitness, and like physical fitness this requires training. It demands regular stimulus in many different ways – art and scientific, business and personal, analytical and creative, big picture and in with the detail.

## How can you enlighten your mind?

Develop your aerobic conditioning. Build body awareness, spiritually and physically – yoga and dance, juggling and fitness. Morning runs, lunchtime swims, evening at the gym. Do it regularly, not as a lung-bursting, muscle-burning workout, but a sustained effort, that can be repeated often, and from which you feel better afterwards than when you started.

Physical fitness heightens your mental agility, ready for your mind to be fuelled with new and interesting stimuli. You can achieve much of this in the way you live, the interests you have, the magazines you read, the people you meet – and also in the workplace, diversity of tasks, the configuration of offices, the structure of meetings, even the food you eat.

Break your conventions. Encourage your ambidexterity, use your non-dominant hand at least once every day. Be more spontaneous, and encourage more randomness. With colleagues and teams, shake things up a little – throwing in some random ideas, changing the subject regularly, working on multiple projects at the same time, and making unusual but interesting connections.

It can be a little disorientating at first, but it breaks you and them out of your conventions, and eventually becomes fun and inspiring.

- Creative Genius (Track 10) defines the nature of “genius” in today’s business world
- Steve Jobs (Track 10) is the “reality distortion field” that we all want to learn him
- Dave Stewart (Track 35) transforms himself from rock star to ideas man at Nokia
- Creative People (Track 45) explores the attributes that drive your own creativity
- Niklas Zennström (Track 49) stays on the edge, always looking for the next big thing
- Now Forward (Track 50) inspires you to stay crazy in practical and profitable ways

## Future back

We can judge of Leonardo’s impact on the world around him – his thoughts and ideas, paintings and drawings – he created a future way beyond most people’s imagination, a future in which so much innovation, and so many people have been inspired.

He imagined and shaped the future like nobody else. His peers were not just his contemporaries, and his context was not just the world as it is. He looked beyond the science and conventions of the time, to understand people and nature like never before. He rewrote the rules of science and technology, many of which we still use today.

His ideas were centuries ahead of his time, his insights had a depth not before encountered, and his results were extraordinary.