Innovation and the Arts

Creative, innovative and artful… (the) work is timely, particularly in relation to the recent Nobel Prize in Economics 2019.

Leif Edvinsson, Professor Emeritus, Lund University,
Co-founder of the New Club of Paris, and
Honorary Chairman, Henley KM

Formica and Edmonson bridge the cultural gap between the arts and sciences in this timely and perspicacious volume.

Professor Henry Etzkowitz, International Triple Helix Institute,
Silicon Valley and President, Triple Helix Association

Innovation and the Arts: The Value of Humanities Studies for Business

EDITED BY

PIERO FORMICA and JOHN EDMONDSON

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INVESTOR IN PEOPLE

‘The great art to make a nation happy, and what we call flourishing, consists in giving everybody an opportunity of being employed; which to compass, let a Government’s first care be to promote as great a variety of Manufactures, Arts and Handicrafts as human wit can invent …’.

(Bernard Mandeville, 1714, quoted by John Maynard Keynes in *The General Theory of Employment, Interest and Money*, 1936, p. 361)

To Gigliola: The Boboli Gardens were our open-air museum where the hours spent together are still hidden.

Piero Formica

To Whistler’s Nocturne ‘Blue and Silver – Chelsea’, with its lights shining through the gloom.

John Edmondson

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Introduction

Humankind is going through a transformative era. We are experiencing a major shift in our technical and socio-technical landscape that will integrate several core information technologies including mobile communications, cloud computing and data analytics. The business environment in which we work is being dramatically transformed by a confluence of emerging forces (Skilton, n.d.) 'Consumerization' is driving down the costs of storage, networks and applications. 'Communitization' is creating networks and devices that are increasingly globally connected. 'Virtualization' is providing information at our fingertips. 'Servization' has resulted in a rise in platforms that offer meeting places and points of connection to search, send and receive information, goods and services.

Successfully navigating our way through this maelstrom of competing and conflicting societal forces will require humankind to marshal its full range of scientific and social competences so that it can develop holistic responses to challenges not easily compartmentalized into traditional, conventional knowledge disciplines. One received view of science sees it as universally valid and located outside the messiness of national, linguistic and popular cultures. One received view of the humanities sees them as co-terminus with creative arts and the associated intellectual and critical disciplines. These mutually reinforcing and restrictive views of science and the humanities underlie a long-standing discussion about 'two cultures' – a phrase most often associated with the lectures and writings of the scientist-novelist C. P. Snow (Trench, 2003). Snow (1959/1993) claimed that in the political culture, in the culture of the universities, in the cultures of science and of the humanities, the production and reproduction of knowledge continued to be represented – and experienced – as taking place in two worlds, two paradigms or two cultures. The institutions, life-worlds and discourses of the professionals involved all contributed to these representations of polarity.

The roots of this polarity run deep. Around 387 BCE Plato founded the Academy. This institution survived for 900 years. The Lyceum was begun in 335 bce by Aristotle. Starting with the Greeks, Western thinkers, unlike their Chinese counterparts, often sought to establish their independence from the masters who had initiated them into intellectual life (Blair & McCormack, 2010). The new masters founded schools which then felt free to subscribe to competing intellectual approaches (Bowen, 1972). In the West, the agonistic tradition of formal education was deeply rooted in Greek antiquity. It persisted not merely through

Medieval dialectic and disputations and Renaissance scholarly polemic, but with remarkable vigour well into the eighteenth century. When the agonistic mode of education was functioning at its maximum – as, for example, in Medieval and Renaissance universities – a student was not formally taught to be 'objective' about knowledge. What was taught in the formal educational operation was to take a stand in favour of a thesis (the leading assertions in a doctoral dissertation) and to attack another thesis that someone else defended. Defence of theses and attacks on theses marked procedures for the teaching not only of such subjects as philosophy, law and theology, but also of physics (then known as natural philosophy) and medicine.

Universities in the sense of an organized body of masters existed by the twelfth century in Bologna and Paris, and the earliest universities initiated a separation of different schools of thought as a fundamental building block of university design that was to last over 700 years and still persists today. By 1231 there were four faculties in Paris, each under a Dean: arts, canon law, medicine and theology (Haskins, 1923). These fundamental entities persisted through the ages. No less a figure than Adam Smith argued that:

> the subdivision of employment in philosophy, as well as in every other business, improves dexterity, and saves time. As each individual becomes more expert in his own particular branch, more work is done upon the whole and the quantity of science is thereby increased. (1776, I, ii, p. 13)

Disciplines, to Smith, were an artefact of scholars seeking a niche in the marketplace of ideas (McNeely & Wolverton, 2006).

As our engagement with complex intellectual challenges increased, the crossover between the humanities and science also increased (Edwards, 2008). John Dewey (1934), in his essay *Art as Experience* showed how ideas develop between the arts and the sciences and what happens when they do. Thomas Kuhn (1996) in the *Structure of Scientific Revolutions* and Jacob Bronowski (1956/1975) in *Science and Human Values* describe how artistic aptitude, often more than arduous application of the scientific method, leads to scientific revolutions – as when Johannes Kepler made his breakthrough scientific discoveries in astronomy by optimizing what he viewed as the harmony of celestial bodies with musical notes. Internationally, scientists today show increasing interest in relationships between natural sciences and the humanities, arts and public culture. The evidence is found in papers, essays and correspondence in scientific journals and magazines, dealing with ethical, sociological, political, creative and other aspects of science. Plant scientist Nick Battey (1999) wrote that scientists should 'remember … that what we know and consider valid knowledge is dependent on language, culture, our time in history, and society'. He suggested that scientists have failed to communicate what many of them are clear about, namely that 'science is not able to answer questions about "first and last things" … [and is not] a method for being right'. Battey identified a 'hard science' position that:

> overstates the claims of science and does real harm … The world revealed by science has a fissure in its soul that must be filled by the products of other human activities including literature, music, art and religion. (quoted in Trench, 2003, p. 63)

Throughout history there have been exceptional human beings who transcended conventional modes of thinking and developed insights drawn from a convergence of disparate schools of thought. Leonardo da Vinci was one such person, with his ability to combine the skills of an artist, an artisan and a natural philosopher to wonderful effect across a broad range of fields of endeavour. The ability of some individuals to use different frames of reference and novel 'lenses' through which to examine problems has enabled them to provide new insights into seemingly intractable problems or surface issues in the human condition that might theretofore have gone unnoticed. Primo Levi, a chemist by training, wrote very effectively on the human condition. He summed up his life as follows:

> I have travelled as a loner and have followed a winding path, forming for myself a haphazard culture full of gaps in a smattering of knowledge. In recompense, I have enjoyed looking at the world from unusual angles, inventing, so to speak, the instrumentation; examining matters of technique with the eye of a literary man, and literature with the eye of a technician. (Levi, 1985/1991, p. vii)

The need for greater cohesion across traditional disciplines is perhaps most acute in the case of business. Etzkowitz, in his essay on the rise of entrepreneurial science in universities, described how universities in the USA gradually introduced entrepreneurial thinking to the academy (Etzkowitz, 2001). During the first academic revolution of the late nineteenth and early twentieth centuries, American universities integrated research along with teaching into their academic mission. Etzkowitz characterized the second revolution as being underway at the moment when findings from academic laboratories began to be transformed into marketable products.

Significant focus has been brought to bear on the potential for design to act as a nexus between business and the humanities in the pursuit of novel approaches to addressing cross-disciplinary participatory methods to co-creating solutions to so-called 'wicked' problems:

> It's in Business Education that the attention to design is the most pronounced. For some time now, academics, business leaders, and journalists have celebrated Design as the saviour for failing corporations, the secret of savvy managers, and the resurrection of the MBA. In some circles, the evangelism for 'Design' and 'Design Thinking' is so strong that I've heard the 21st century referred to, a bit prematurely, as the 'Century of Design'. (Burdick, 2009, p. 3)

The lineage of the Design-in-Business movement has been traced back to the Bauhaus school of design in Weimar Germany in the 1920s; the school's design philosophy has come to be captured in the phrase 'form follows function', implying that the optimum design will be the one that solves the problem of how to perform the function most effectively. What the Bauhaus designers actually advocated was that design should grow out of the integration of technology, craftsmanship and art (Lester & Piore, 2004).

If the defining quality of the humanities is the expression of the human condition by mood and feeling, calling into play all the senses, evoking both order and disorder, then the need for business to exercise the epigenetic rules of human nature to bias innovation, learning and choice has never been greater. In a recent somewhat controversial call-to-arms, Steven Pinker claimed that the humanities have yet to recover from the disaster of postmodernism, with its 'defiant obscurantism, self-refuting relativism, and suffocating political correctness' (Pinker, 2018, p. 406). He calls for a consilience that would offer the humanities many possibilities for new insight and claims that:

> both sides would win. The humanities would enjoy more of the explanatory depth of the sciences, and a forward-looking agenda that could attract ambitious young talent (not to mention appealing to deans and donors). (Pinker, 2018, p. 406)

It is timely, then, that this collection of essays on the value of humanities to business will shed new light on this important topic. In keeping with the theme of the need for a catholic, eclectic range of perspectives, there are contributions on the potential role of arts *for* business, the arts *with* business and the arts' disruptive business (or *against* business). Creativity is also explored from the perspective of 'wise creativity' and the need to infuse more human-centred learning from the arts and humanities into business fields. The need for such soft skills to tackle the enormously complex ethical and policy issues facing businesses, such as trade disputes, cultural differences, hiring, gender equity, ageing, religious values, income disparities, climate justice, gene engineering and privacy is also highlighted. Case studies from the worlds of orchestra conductors and the performing arts in theatrical settings emphasize the need for new modes of thinking and alternative modes of discourse in the context of humanities–business conversations.

Indeed, the need for us to go beyond current impoverished modes of engagement is identified throughout this collection of papers as a *sine qua non* if we are to transcend our anthropocentric notions of economic performance. A degree of integration between economics, philosophy and biology is required, with the application of Umwelt theory and biosemiotics indicating a potential way forward. Sectors such as the creative industries are perhaps leading the way in exploring how the richness of the human condition can make invaluable contributions to new business models and new modes of entrepreneurial thinking. Techniques such as 'Serious Play' have been used since the mid-1990s as ways to enable managers to describe, create and challenge their views

on their business. The conceptual foundation of Serious Play combines ideas from constructivism, constructionism, complex adaptive system theory and autopoietic corporate epistemology applied to the context of management and organizations.

What seems certain is that breakthroughs in business will not always come from the rarefied atmosphere of laboratories dedicated exclusively to expertise in a single business discipline. One is reminded of the immortal lines of W.B. Yeats, who cautions against embracing ideas that are not grounded in the rich tapestry of the lived human experience:

> God guard me from those thoughts men think
> In the mind alone
> He that sings a lasting song
> Thinks in a marrow-bone[1]

Brian Donnellan

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[1]From 'A Prayer for Old Age' (Yeats, 1934/1962).

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Piero Formica and John Edmondson
August 2019

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Chapter 1

Business, Innovation and the Arts: The Golden Encounter

Piero Formica

Abstract

We live in the Age of Knowledge, which is impelling us towards the Age of Imagination. The technological wave rises and with it rises a wave of change that will affect both the economy and society. When these two waves will reach the coast where knowledge meets ignorance, and how to ride them, are questions that require us to imagine the future. We must, therefore, embark on the vessel of imagination, leaving behind us the baggage of what we know and understand. Imagination is not just the springboard for ideas; it also acts to connect ideas in different ways that may blossom in the garden of an entrepreneurial renaissance. Symbols, metaphors and concepts that belong to our tacit knowledge come to light in our memory. It is from here that the imagination draws its lifeblood, broadening our horizons, inducing us to interact with others who may be the bearers of other cultures. Are we ready to engage in an imaginative learning process to join business with innovation and art? Are we prepared to design a wide-open white space where the actors of entrepreneurship, innovation and art can generate a constructive tension that will sweep away what appears to be mutual antagonism or incompatibility?

Keywords: Ideation; path creator; possibilist; entrepreneurial enterprise; school of imagination; uncertainty

We live in the Age of Knowledge, which is impelling us towards the Age of Imagination. The technological wave rises and with it rises a wave of change that will affect both the economy and society. When these two waves will reach the coast where knowledge meets ignorance, and how to ride them, are questions

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that require us to imagine the future. We must, therefore, embark on the vessel of imagination, leaving behind us the baggage of what we know and understand. Those who give more weight to the imagination and less to knowledge are becoming intolerant of traditional systems of education that tend to stifle imagination with their teaching methods, examinations and specializations.

Imagination is not just the springboard for ideas; it also acts to connect ideas in different ways that may blossom in the garden of an entrepreneurial renaissance. Symbols, metaphors and concepts that belong to our tacit knowledge come to light in our memory. It is from here that the imagination draws its lifeblood, broadening our horizons, inducing us to interact with others who may be the bearers of other cultures. Exposed to digital technologies, we realize that technology alone is not enough and that alone we can do little. Are we ready to engage in a creative learning process to join business with innovation and art? Are we prepared to design a wide-open white space where the actors of entrepreneurship, innovation and art can train together and so generate a constructive tension that will sweep away what at first glance may appear to be mutual antagonism or incompatibility?

The artistic spirit translates into innovations that are works of art which (excuse the pun) change the state-of-the-art of the time. To understand the world of interaction between business (B), innovation (I) and the arts (A), we must be aware that they do not resemble motionless stars whose relative positions appear fixed on the celestial sphere, but events that occur and change incessantly. Those who interweave humanistic culture and familiarity with quantum physics will be better able to understand the meaning of that complex process which is the encounter between entrepreneurial and artistic activity from which innovations emerge that break with tradition. Those who, from another perspective, focus on art as coexisting with craft will perceive in entrepreneurship a return to Renaissance humanism after the years of mass production which reduced the functions of human beings to those of machines and when, in our present time, artificial intelligence is 'humanizing' machines and challenging our roles and actions.

The tension that causes the bifurcation between art and business, between creativity and innovation, has its source in vertical rather than transversal learning processes. If we look to examples from history, it could be argued that this artificial process of division is contrary to the natural inclination of human beings. Samuel Morse (1791–1872), for instance, was a painter as well as an inventor and innovator. In our own time, we might think of rock musicians working, for example, in Berlin who have found a fertile meeting ground for culture and business in their musical innovations with digital technology specialists.

As an agent of change unrestricted by psychological reservations, art can break with the tradition of incrementalism (an incremental innovation being one that leads to us to do better what we have learned to do well). Through continuous improvement, 'incrementalists' win market share quarter after quarter. For them, the warning bells sound when the 'innovationists' – artists who dream and ideate – introduce radical innovations that will predominate for decades.

A focus on the convergence of business, innovation and art will help to lower the mental barriers that keep them apart. If particular arguments in isolation are not convincing, in combination they are persuasive, especially if approached with the *festina lente* attitude of the ancient Romans – understanding is stronger if we make haste slowly.

Overview

When we remove the veil that renders our vision blurred and therefore approximate, we are able to perceive only a few aspects of the reality that surrounds us. A borderless prairie stretches out before us, on which business, innovation and art run not like strangers and rivals, but criss-crossing and embracing one another. This is more than a (re-)union for dialogic exchange. It is, above all, an endless series of epiphanies and intuitions that lead to a higher level of awareness. The fields of ideas that alter the common sense of things and generate a future become more vibrant and more fertile. Counter-cultural firms design and build ideas factories featuring the play of symbolic analysts, characters in a new *commedia dell'arte* with creativity at centre-stage. This is how innovations blossom, which like all new creatures appear at first to be ill-shaped, as Francis Bacon (1561–1626) might say. Like ugly ducklings, they are doomed to clash with those who have to keep the 'house in order' – like the manager within the boundaries of received knowledge. Entrepreneurial imagination is the way out of old ideas, but the path is littered with obstacles because, as John Maynard Keynes (1883–1946) argued, 'the difficulty lies not so much in developing new ideas, as in escaping from the old ones' (Keynes, 1936, p. viii).

Venturing onto that borderless prairie is a highly personal action of the individual that relates doing with attentive thinking, criticizing and cultivating. There is no map to show the way; there is no predetermined direction of travel. Those who venture carve out their own paths, appreciating the transdisciplinarity and beauty of imperfection – as the German performance artist Joseph Beuys (1921–1986) advocated. These explorers will pose questions for themselves and they will find the answers through imagination and creative ignorance. As highlighted in *The Role of Creative Ignorance* (Formica, 2015), creative ignorance comes after the knowledge accumulated through study and experience, and struggles against mastered knowledge maps and mental structures. Such exploration precedes and heralds the coming together of artists with scientists, researchers, innovators and business creators. At Columbia University, Stuart J. Firestein, Chair of the Department of Biological Sciences, is an explorer. He claims that overcoming the limits of the known requires an ability to remain in the realms of the unknown, which, to adapt a saying of Confucius, can be likened to finding a black cat in a dark room, especially if there is no cat. Hence Firestein's idea:

> for an entire course devoted to, and titled, Ignorance. A science course [...] in which a guest scientist talks to a group of students for a couple of hours about what he or she doesn't know. (Firestein, 2012; see also Formica, 2015)

Freethinkers, non-conformist artists and craftspeople have shown that they are particularly attracted by the fascination of experimentation. As Jenny Uglow (2002) recounts brilliantly, in the second half of the eighteenth century an informal group of experimenters, including gifted amateurs, provincial manufacturers and non-academic practical people, few with a university education, founded the Lunar Society of Birmingham. It was so called because the meetings, which took place between 1765 and 1813, were held on the Monday nearest to the full moon. Driven by curiosity in the workings of the natural world, Lunar Society members were responsible for a wave of innovation set in motion by the discovery of oxygen (Joseph Priestley, 1733–1804), the fine-tuning of the steam engine (James Watt, 1736–1819) and the modern commercialization of pottery (Josiah Wedgwood, 1730–1795). Their achievements included fossil classification, telescope manufacture and the creation of sparks of electricity. Lunar Men lived art in its broadest sense, encompassing the natural world. Uglow (2002) writes:

> In the time of the Lunar Men science and art were not separated: you could be an inventor and designer, an experimenter and a poet, a dreamer and an entrepreneur all at once without anyone raising an eyebrow […] And when people spoke of the 'arts', they did not mean only the fine arts but also the 'mechanic arts', the skills and techniques in agriculture, say, or printing. (pp. xi and xiv)

As Guillet de Monthoux (2004) reminds us, avant-garde painters such as Fernand Léger (1881–1955), Marcel Duchamp (1887–1968), Juan Gris (1887–1927), Pablo Picasso (1881–1973) and Georges Braque (1882–1963) conducted experiments in the field of non-Euclidean geometry. The proximity of art to business was the subject of exploration and experimentation by artists whose apprenticeship took place in the cradle of craftsmanship. Thus, the futurist Fortunato Depero (1892–1960), with his early experiences as an apprentice to a marble worker, came to draw graphic symbols and design typefaces for industrial products. Starting from experimentation in the art of the miniature, the carpenter Ole Kirk Kristiansen (1891–1958) laid the foundations of the Lego Group, the Danish toy manufacturer, transforming artistic creation into enormously successful industrial production. These are just two examples among many of the intertwining of art, crafts, innovation and business.

The opening of minds and arms to effect the mutual embracing of business, innovation and art leads to disturbance, anxiety and discomfort among the champions of the status quo – the kind of agitation we may feel when we contemplate, for example, the metaphysical strangeness of Giorgio de Chirico's (1888–1978) painting *The Disquieting Muses* (1916–1918). Business, innovation and art are three disquieting muses moving in time and space for – as Lucius Annaeus Seneca (*c*4 BCE–65 CE) argued:

> nothing can be made without time [… and] if there be no place where a thing can be made, it will not be made. And motion too;

> nothing is either made or destroyed without motion. (Seneca, *c*65 CE/1979, Vol. 1, p. 451)

Innovators and innovation stakeholders populate the earth. The minds, hearts, passions, imagination and creativity of innovators are the ovens in which ideas are melted and then remodelled into a wide variety of forms. Among the pure forms there is a grey area where they can cross and mix. Thus the ancient art of regular, elegant and ornate writing meets with the automated machine that performs mathematical calculations and processes data. Influenced by the classes of the Trappist monk and calligrapher Robert Palladino (1932–2016), Steve Jobs (1955–2011) combined the art of calligraphy with computing when he incorporated a variety of attractive fonts into his original Mac. This led him to regard Apple as a technology enterprise that went hand in hand with the liberal arts and humanities (Lehrer, 2011).

Occupation, commerce and venture (business); restoration, renewal and change (innovation); skills resulting from learning or practice, methodology for making or effecting something, or a particular type or form of something (art): delving into the meaning of business, innovation and art captures their close connection. This, coincidentally, is conveniently represented in the acronym BIA – from left to right it tells us that 'Business Is Art' and, from right to left, that 'Art Is Business'.

The golden encounter is an innovation. Those who promote it should be aware that at the time we act we are propelled towards new spaces. It is the same innovator who is obliged, metaphorically, to rearrange the clock and move in a different direction because, as the French pioneer of venture capital Georges Doriot (1899–1987) said, 'Nothing works the first time'.

When is the right time to act? Once we are prepared to do so carefully and without haste. If we are obliged to move quickly, we must never fail to act appropriately – that is to say, with in-depth thought. The dispatch of efficient and effective business, coupled with the slowness of careful reflection: this is the recipe for innovation.

Staying comfortably with the old style of doing business does not allow us to look beyond the visible horizon. Innovation that breaks down the status quo requires us to abandon the past in an organized way. 'Organized abandonment', as Peter Drucker (1909–2005) called it (Drucker, 1999), is that same mental exercise the ancient Romans referred to as *festina lente*.

According to Erasmus of Rotterdam (1466–1536), the Roman Emperor Augustus (63 BCE–14 CE), who wanted to change the face of Rome for the better, recommended in his official letters to his ministers the solicitude of action together with the slowness of reflection. The combined need for prompt action and slow reflection is a legacy attributed to great leaders. To be successful, innovation must run at a speed which enables it to achieve effective results efficiently. The famous publisher's device of Aldus Manutius's Aldine Press, a dolphin wrapped around an anchor, fuses together the dolphin's ability to fly over the surface of the water like an arrow and the stability of the anchor – the device thus symbolizes the notion of *festina lente*. Innovation needs to be grounded in such a combination.

The agility of intelligence and the stabilizing effect of constant meditation are cohabitees.

We practise hastening slowly by experimenting, so that the fruits that grow on the BIA tree do not ripen prematurely.

Borderless Arts: A Holistic View

Art has no cultural boundaries. It is a 'temple of all the gods' whose open dome, like that of the Pantheon in Rome, makes it easy to communicate directly with the ideas scattered throughout the world that enter and exit it incessantly. It is the temple that gives us the freedom to learn how to think. Imagining–thinking–acting to build: this is the value loop that was created by Renaissance art. The result was the initiation of innovative entrepreneurial activities, particularly in textile production, with the development of an artisanal class that trained artists and technicians and the appearance of the ideal embodiment of the 'cultural consumer' in the figure of Isabella d'Este (1474–1539), Marquise of Mantua,

> who attends the marketplaces in person. Here, a new class of direct customers, the patricians, who are no longer or not only represented by their intermediaries, joins the commoners. Isabella does more, promoting a new shopping channel, one operating by mail, a forerunner perhaps of e-commerce. (Formica, 2017, p. 33)

More interesting and engaging than the differences are the similarities across arts, science, innovation and business. Attaining the benefit that will derive from making these connections requires the gifts of inspiration and creativity. Quantitative models and demonstrations are no more than subordinate actions. John Maynard Keynes's scepticism about confining economists within the boundary of mathematical method should be extended to the whole field of human sciences, where complexity reigns and the slightest changes can produce effects of major importance.

Creativity, imagination, skill and mastery are words that are associated with, but are not limited to, painting and sculpture, music and dance, theatre and film, literature and interactive media. Then there are the arts of business and innovation, which are part of the art of conversation. Commerce and innovation are achieved by conversing – as the Italian abbot and economist Ferdinando Galiani (1728–1787) noted in the eighteenth century. The *philosophes* of the Enlightenment exalted the art of conversation as a culture of imagination, exploration, experimentation and creation, in a dynamic balance between introspection and open-mindedness that touched the most sensitive chords of human inventiveness projected onto future events. There is too the art of science, which shares, in its essential element of investigation, the four descriptive words that begin this paragraph. Today, the divide that occurred after the eighteenth century between art, on the one hand, and business, innovation and science on the other, is going to be bridged once again. The increasingly intense debate between science and

humanism has already shed light on the compatibility of and virtuous interactions between the infinite facets of the arts.

It is reported that Charles Darwin considered the plant and landscape paintings of the botanical artist Marianne North (1830–1890) excellent examples of his theory of natural selection. Scientists and artists who are unable to communicate their ideas to each other are doomed to failure: success results from the interplay of their skills. Creativity encompasses the scientific process and the artistic method. Artists and scientists share a curiosity for the unknown and are driven to create something new. The intertwining of science and the arts characterized the free thought of Renaissance Man, personified in *Vitruvian Man*, Leonardo's famous drawing that ties art and science in the representation of the human body (Da Vinci, *c*1490). We like to think of the entrepreneurial renaissance as an art form in which the spirit of adventure, imagination and freedom renders the entrepreneurial path accessible to artists and scientists together. Today, digitization is the technological medium that facilitates and expands mutual learning through experiments leading to business opportunities. Thus we shall witness the rebirth of the art of entrepreneurship with the artist and scientist entrepreneurs bringing a new cultural approach, with new technologies helping them in the act of creative production.

In the Age of Enlightenment, strongly permeated by a spirit of rationalism, a 'planned' notion of beauty was mooted, according to which the perception of beauty, although subjective, was governed by universal and normative patterns of cognition – and thus was not subject to fragmentations caused by particular and personal states of mind. In the following age, as the Industrial Revolution progressed, planning was the 'perfect' shape that, using the tools of command and control, the art of management gave to manufacturing production – as opposed to the disorderly and, therefore, 'imperfect' shape of the artisan workshops of the proto-industrial age. The new world of the factory, with its machines and what would later be called blue-collar workers, had its bard in the French painter Fernand Léger, a sort of artist-builder who symbolized the culture of modern planned industry.

The English-style Romantic gardens, so called because of their free and irregular forms, as well as the visionary paintings of Romantic artists Caspar David Friedrich (1774–1840) and J. M. W. Turner (1775–1851) – see Zecchi (1999) – are associated with visionary innovators. Such innovators, contemptuous of accepted 'realities', create commercial paths in territories that are unknown to the rulers of the current business regime. In the neo-renaissance entrepreneurship of the twenty-first century, innovative digital craftspeople develop products that are works of art. In Trentino, a small province in the North East of Italy, a technological craftsman has transformed a feather into a piece of innovative design for domestic lighting that is in itself a work of art.[1]

[1]A picture of this feather lamp can be seen at https://www.select-interiorworld.com/uk_en/exnovo-plune-e19-wall-lamp.html

The New 'Steam' of the 21st Century

A gulf between entrepreneurship and art has appeared in the course of past industrial revolutions. The digital revolution now underway is bridging that gap, heralding an entrepreneurial age similar in spirit to the age of the Renaissance.

Digitization is bringing together science and engineering with design and the arts in a golden embrace. When the barriers are broken down, creativity becomes the key player in engineering and human-centred applications of technology. The arts catalyse actions to convert scientific and technological knowledge into new processes, products and services. Maintaining a high propensity for entrepreneurship means encouraging the generation not just of ideas in general but, especially, of the right ideas – ideas that can feed start-ups that will become the creators of new values: this requires continuous learning and adaptability together with the ability to advance into the unknown.

The legacy left to us by Renaissance artists offers a means of increasing the propensity of young people to do business at the intersection of art and manufacture. The European Commission's STARTS programme encourages collaboration between researchers and artists in projects funded by Horizon 2020, the European Framework Programme for Research and Innovation. The STARTS Award recognizes projects that demonstrate successful partnerships between science, technology and the arts, and contribute to economic and social innovation.

To promote this new entrepreneurial culture, it is not enough to 'know how to do' (KHTD), the mantra of companies that focus on continuous improvement, the basis of the ethics of stability. Among these, the family business stands out, whose traditions have such profound and pervasive roots that they give it 'hereditary' characteristics. The status of entrepreneur passes from the founder to his or her immediate successor and so on along the line of descent to the different branches. The two dominant characteristics of KHTD and the successive inheritance of the title of 'entrepreneur' shape that ethic of stability. Innovation is accepted depending on whether and to what extent it contributes to the exploitation of what has already been successfully produced and marketed. Realism is, therefore, the dominant artistic current in the art of family entrepreneurship.

'Stability' in this context does not mean standing still. Enterprises such as those described above are sailing boats that navigate along the KHTD route. The KHTD approach rests on two load-bearing pillars. One pillar is the enterprise founded by workers and technicians, the representative class of 'knowing how to do'. The other is the column of professional and technical schools, the educational cradle of the founders of such businesses. The interaction between businesses and schools centred on technological culture has produced much tacit and implicit knowledge, in which anecdotes, stories, suggestions, intuitions, feelings and individual points of view have mingled with manual skill and the willingness 'to grease the elbows' with the oil of machines. That is how, in Bologna, the worker Bruto Carpigiani, learning with mind and body through direct experience, and trial and error, ushered in the prosperous age of Bolognese packaging