

Arts, Research, Innovation and Society

Gerald Bast · Elias G. Carayannis
David F.J. Campbell *Editors*

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 Springer

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Foreword

Creativity in general and the arts in particular are increasingly recognized as drivers of cultural, economic, political, social and scientific innovation and development. In art and research (see Bast 2013; Ritterman, Bast and Mittelstraß 2011), some of the principal questions explored by the **ARIS** project (**Arts, Research, Innovation and Society**) are outlined:

1. Could and should artists be researchers?
2. How are the systems of the arts and the sciences connected and/or disconnected?
3. What is the position and status of the arts in defining the terms “progress” and “development”?

Other key questions that the **ARIS** project focuses on are as follows (these are clearly indicative and not all-inclusive or exclusive of additional issues, themes and questions that may arise in the context of the **ARIS** theory, policy and practice discourse):

1. What is the impact of the arts in societal development?
2. How are the arts interrelated with the mechanisms of generating social, scientific and economic innovation?
3. What is, could be and should be the nature, dynamics and role of the arts in shaping the research and innovation theories, policies and practices such as the New Growth Theory?
4. In the same context, what could and should be a new understanding of the support for funding of the arts as a stand-alone pillar with its own merit, value and potential along with research and innovation of smart, sustainable and inclusive growth that is socially embedded and cohesive development and progress?
5. What are the socio-economic, socio-political and socio-technical implications for society from the answers to any and all of these questions?
 - 5.1 For instance, what are the particular implications for sectors such as politics, education, health, manufacturing and others?

- 5.2 How can the New Growth Theory be understood in the context of creative economies, societies and democracies?
- 5.3 Are there limits to growth in the traditional economy, and what is the role of artistic research and arts-based innovations in redefining growth, development and progress?
- 5.4 What are the roles, interdependencies and dynamics of arts versus research versus innovation versus society as catalysts, drivers and accelerators of smart, sustainable and inclusive growth?
- 5.5 What is the relationship of arts to “quality of democracy” in theory and practice?

In particular and based on this context, creativity, invention, innovation and entrepreneurship (CI2E, see also Springer’s *Encyclopedia of CI2E*, edited by Carayannis 2013) are key drivers of smart, sustainable and inclusive growth that are both enhanced and constrained by financial as well as social and environmental considerations and trade-offs. In this context, **Arts, Research, Innovation and Society (ARIS)** are four vantage points from which one could derive and develop insights as to how best to drive cultural, economic, political, social and scientific development and progress.

The Springer **ARIS** series explores (at the macro, meso and micro levels and in terms of qualitative as well as quantitative studies) theories, policies and practices about the contributions of artistic research and innovations towards defining new forms of knowledge, knowledge production (see Mode 3 Knowledge Production Systems by Carayannis and Campbell 2006, 2009, 2012) as well as knowledge diffusion, absorption and use. Artistic research, artistic innovations and arts-based innovations have been major transformers as well as disruptors of the ways in which societies, economies and political systems perform. Ramifications here refer to the epistemic socio-economic, socio-political and socio-technical base and aesthetic considerations on the one hand and to strategies, policies and practices on the other, including sustainable enterprise excellence considerations in the context of knowledge economies, societies and democracies (see also Quadruple and Quintuple Helix Innovation Systems Concepts by Carayannis and Campbell 2009, 2010).

The series features research monographs, edited volumes, proceedings, briefs and textbooks and may also include handbooks and reference works and in-print as well as online rich media encapsulations of ideas and insights, representing cutting-edge research and the synthesis of a body of work in the field.

Please contact *all* three editors at the emails provided for further information and proposals submission guidance.

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Chapter 1

Introduction to: Arts, Research, Innovation, and Society (ARIS)

Gerald Bast, Elias G. Carayannis, and David F.J. Campbell

Abstract Creativity in general and the arts in particular are increasingly recognized as drivers of cultural, economic, political, social, and scientific innovation and development. The title of this first book and the title of the whole book series are identical. This should underline the character and intent of the first book, which is to explore in an open approach the possible, promising, creative, and innovative themes that align with ARIS (Arts, Research, Innovation, and Society). The first volume of the book series consists of fourteen individual chapter contributions, plus the introduction and conclusion. In reference to the structure and form of the chapters, the chapters were not standardized, with the only exception that abstracts and key words were provided to all chapters. Experimenting with content as well as form (structure) will reveal the goal of the ARIS series, namely to explore and to pioneer new grounds at the evolving frontier of knowledge, learning and research across the disciplines. New knowledge should be created and produced in interdisciplinary and in fact trans-disciplinary arrangements and networks (“agglomerations of knowledge”). ARIS aims to provide further input for the international and global discourse on those themes, topics and issues that define the intellectual core of the ARIS project.

Keywords ARIS • Arts • Innovation • Research • Society

In the following, we introduce to the first book volume to the **ARIS** series: **Arts, Research, Innovation, and Society**. The title of the first book and title of the series are identical. This should underline the character and intent of this first book, which is to explore in an open approach the possible, promising, creative, and innovative themes that align with ARIS. *The thematic horizon of ARIS is encompassed by ARISE (Arts, Research, Innovation, Society, and Education; see presentation by Elias Carayannis, invited lecture, Die Angewandte, May 2013).* The first volume of

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the book series consists of fourteen individual chapter contributions, plus the introduction and conclusion. The final conclusion (Chap. 16) to our first book is more tentative by enclosing different propositions for further discussion. With the objective to allow for creativity and diversity in content, the creativity and diversity of the chapter contributions were also encouraged in terms of structure. In reference to the structure and form of the chapters, the chapters were not standardized, with the only exception that abstracts and key words were provided to all chapters. Experimenting with content as well as form (structure) will reveal the goal of the ARIS series, namely to explore and to pioneer new grounds at the evolving frontier of knowledge, learning and research across the disciplines. New knowledge should be created and produced in interdisciplinary and in fact trans-disciplinary arrangements and networks (“agglomerations of knowledge”). ARIS aims to provide further input for the international and global discourse on those themes, topics and issues that define the intellectual core of the ARIS project. The curiosity of thinking “*beyond the box*” (TM trade mark by Elias Carayannis, invited lecture on systems design and systems thinking, Die Angewandte, December 2013) acts as one of the drivers for ARIS.

Arts, Research, Innovation, and Society (ARIS): Several themes (and research questions) are crucial for the governance of the underlying self-understanding of the unfolding ARIS project and ARIS book series. Now without asserting to present or to represent here the complete spectrum of (possible) topics, the following three themes clearly are essential:

1. *Arts, innovation and creativity:* Innovation is important for economic activities. However, innovation is as a concept much broader than the economy and by this innovation clearly transcends the boundaries of the economic system. For our thinking it is important to liberate innovation from narrowly streamlined economic considerations and constraints. Innovation, understood comprehensively, will always acknowledge the context of society. Innovation combines the traits of change, “being new”, “being knowledge-based”, and with a progressive momentum. Innovation provides for the change in human history (and in the human future) with a potential for improvement, betterment and learning. There is economic innovation, but there is also social innovation, political innovation, innovation in democracy, innovation in knowledge production and “innovation in innovation”, and innovation in the arts. *Innovation depends on the input of creativity, and creativity is encouraged by diversity, heterogeneity, and pluralism.* This appears to be necessary, so that innovation can evolve and so that there is a sustainable evolution of innovation.
2. *Arts, arts and the sciences, interdisciplinary and transdisciplinary knowledge production and research:* There exist several, also competing definitions of arts. In a traditional understanding, aesthetics (the beautiful, but also the ugly) plays an important role. A newer understanding of arts also emphasizes the additional aspect to also interpret the arts as a manifestation of knowledge production. Knowledge production (knowledge creation) in the arts represents a form of research, *creating artistic research*, and by this moving the arts closer to

research, also research in the sciences. Artistic research enables various and multifold linkages, inter-linkages and overlaps between research in the arts and research in the sciences. *Therefore, artistic research contributes to the creation, formation, and development of interdisciplinary and transdisciplinary designs, architectures and networks (“clusters of clouds”) of research (knowledge production) and innovation (knowledge application) that integrate the whole spectrum of disciplines in the sciences and arts.* Interdisciplinarity is more than multidisciplinarity. Transdisciplinarity may be defined as interdisciplinarity in application or the context of application. Art represents a strategy that also aids the sciences in efforts of realizing a greater amount of interdisciplinarity and transdisciplinarity in their research activities. The arts support unconventional synapses-building between different fields of knowledge and approaches to knowledge production. By this the arts allow for greater creativity and a wider spectrum of new, unconventional, disruptive and innovative approaches to knowledge production and research, which are also essential for the sciences and research in the sciences. Here, the arts act as a driver for the progress of research in the sciences. *This demonstrates the “epistemic” qualities and potentials of arts for the further and continued evolution of research, also of research in the sciences.* Artistic research transforms the self-understanding of universities and other higher education institutions of the arts. Artistic research connects arts universities to processes of research and re-defines arts universities as being crucial institutions for innovation systems (in the multi-level architecture of national, global and local).

3. *Arts, economic growth, quality of democracy and the context of society:* The comprehension of economic performance often is being guided by conventional models that focus on (short-term) quantitative growth measures. This narrows economic development down to specific paths, routes and trajectories of possible development. However, for the purpose of long-term economic progress it appears necessary to emphasize more clearly the criteria of sustainable development that bring economic growth in balance with social, democratic and ecological considerations. Too much of a focus on short-term economic efficiency may in fact destroy economic development. The interest in a “longer perspective” for economic prosperity requires the realization of a broader basis of sustainable development that re-contextualizes economic progress into the frame of a co-evolution of economy, society and democracy. Economic innovation must be accompanied by innovations in society and democracy. *Here the perspective of ARIS is essential for exploring new routes to new models of economic growth and economic progress. Arts, artistic research and arts-based innovation aid in creating a new vision, for how the economy, society and democracy may be interlinked in moving and for moving toward the frontiers and horizons of today and of tomorrow.* Arts are essential for promoting diversity, heterogeneity, pluralism and creativity, which feed into interdisciplinary and transdisciplinary knowledge production (research) and knowledge application (innovation). Economy and economic development must realize more clearly the qualities of arts and of artistic research and artistic innovation.

There is no sufficient innovation for the economy without an innovation in society (and democracy) that is not being determined by economic considerations. Quality of democracy encourages a “democracy of knowledge” that supports pluralism in knowledge production and innovation. **ARIS (Arts, Research, Innovation, and Society)** reads as the blueprint and vision for a new master-plan for strategy and policy-making for the economy, but also for society and democracy.

Creativity in general and the arts in particular are increasingly recognized as drivers of cultural, economic, political, social, and scientific innovation and development. In the following chapter contributions, the opportunities, potentials and further ramifications of **ARIS (Arts, Research, Innovation, and Society)** are being explored in greater detail. This marks the beginning of an exciting intellectual journey.

Chapter 2

Fighting Creative Illiteracy

Creative Skills Constitute the New Cultural Techniques of Twenty-First Century Innovation Societies

Gerald Bast

Abstract Illiteracy with regard to art and creativity damages a society to the same extent as illiteracy regarding the written word. Today, specialization, productivity and efficiency have become the predominant aspirations, not just with regard to industrial production, but also with growing intensity and speed in the sciences. Universities have been forced to look first at evaluation figures instead of values and content. Quantification and rankings based on quantitative indicators are the main topics in higher education policy. However, history shows clearly how the power of science and the arts can multiply when the two enter into a constructive exchange in awareness of both their own strengths and identity, but also of the synergetic potential for social effects above and beyond citation indices and artistic market rankings. Innovation is increasingly becoming the new no.1 political slogan but is meant mainly as a cure for the economy.

Knowledge is not only growing in volume, but is also playing an ever-greater role in the development of our societies. In the meantime, the expansion of knowledge per se has become somewhat more of a problem rather than a solution. Without a sufficient number of functional knowledge synapses, irrespective of their height, the know-how towers remain isolated and self-referencing. Now the task is to further expand the canon of cultural techniques by the addition of creative skills.

In the post-industrial societies creativity should replace shareholder value as the guiding societal value. Creative literacy has to be spread throughout the entire society. Quantification must be banished as an inappropriate scale for assessing universities. The educational system and social life must be infiltrated and penetrated with the arts. Teaching, learning, research and dissemination of art and science need to be reconnected again. An innovation society has to focus on educating specialists in de-fragmentation.

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Keywords Art • Creativity • Creative literacy • Creative skills • Cultural technique • Education • Knowledge • Innovation • Renaissance • Science • Society • University • Values

In his breath-taking book “The Swerve: How the world became modern”, Steven Greenblatt tells the story of how the recovery of an ancient poem, Titus Lucretius Carus’ manuscript “De rerum natura”, developed into one of the sparks that ignited the Renaissance:

When it occurred, nearly six hundred years ago, the key moment was muffled and almost invisible, tucked away behind walls in a remote place. . . . A short, genial, cannily alert man in his late thirties reached out one day, took a very old manuscript off a library shelf, saw with excitement what he had discovered, and ordered that it be copied. That was all; but it was enough. . . . The finding of a lost book does not ordinarily figure as a thrilling event, but behind that one moment was the arrest and imprisonment of a pope, the burning of heretics, and a great culture-wide explosion of interest in pagan antiquity. When it returned to full circulation after a millennium, much of what the work said about a universe formed out of the clash of atoms in an infinite void seemed absurd. But those very things that first were deemed both impious and nonsensical turned out to be the basis for the contemporary rational understanding of the entire world. What is at stake is not only the startling recognition of key elements of modernity in antiquity¹

Greenblatt stresses that naturally one single event in isolation could not have been responsible for such a massive and revolutionary change to the world like that produced by the Renaissance. Nonetheless, the poem from Lucretius Carus did play a key part in the history of the development of the Renaissance, a history that was to change both humankind’s consciousness and its role in the world. Furthermore, he finds it particularly astonishing that of all people it was a poet, who through his work and specific type of poetic thinking and formulation was able to at least *partly* influence the course of history in such a lasting manner. “*More surprising, perhaps, is the sense, driven home by every page of “On the Nature of Things”, that the scientific vision of the world – a vision of atoms randomly moving in an infinite universe – was in its origins imbued with a poet’s sense of wonder.*” This “sense of wonder” is indeed a central element in the creative skills, which from all sides and especially from the worlds of politics, business and industry, are invoked as being an indispensable qualification for the creative and innovation society of the twenty-first century.

However, when one considers the parameters and the active players in the age of the Renaissance, then the role of the arts in this multi-causal constellation ceases to be such a revelation. The interweaving and interlocking of secular and clerical power politics, trading interests, science and the arts was of major significance, even though it is not always possible to say when and which of these spheres of influence represented the predominant social yardstick at any one time. Whatever the case, they all had a social effect, particularly in concert, and this also applies to the arts. There is such a thing as the power of art and it derives from the capacity of

¹ Steven Greenblatt, *The Swerve: How the world became modern*, p. 8 ff., Norton & Company, New York, 2011.

creative persons to conjure up astonishment and thus facilitate changes of both thought and action.

In the light of art's current position which demonstrates marginalization with regard to broad social relevance and interest, but displays a disproportionate focus on economic effects, it would appear to be especially remarkable that art, or what is recognized as art by the ruling, economics-dominated system, possesses less social influence in democratically organized societies than in their autocratic, secular or clerical counterparts.

In his book "Die Kraft der Kunst", Christoph Menke addresses this apparent contradiction: *"In the modern world, there has never been more art and art has never been more visible, present and socially influential than at the moment. At the same time, art has never before represented such an integral part of the social process as it does today, but only as one of the many forms of communication that define art; as a goods item, an opinion, an insight, a judgement, an action . . . Never before and never to such an extent was the aesthetic simultaneously merely a resource in the economic utilization process, whether directly as a productive force, or indirectly as a means of recuperation from productive endeavours. Therefore, the social omnipresence of art goes hand in hand with the steady loss of what we can call its aesthetic strength."*² However, in reality this contradiction is actually only ostensive. Because it makes a difference if art has the role of a commodity which can be replaced by an alternative commodity, or if art is a carrier of values, identities and meanings. To take part in the production, use and transmission of values within a society by and through the arts it is necessary that the languages of the arts³ can be read. Illiteracy with regard to art and creativity damages a society to the same extent as illiteracy regarding the written word.

When Max Horkheimer and Theodor W. Adorno were writing about the "illiterate principals" in our society they obviously referred to this kind of illiteracy: the inability to creative and therefore innovative thinking and acting. And they also describe the impacts and consequences this illiteracy causes.

In former times, like Kant and Hume, they signed letters with "Your humble servant" while undermining the foundations of throne and altar. Today, they are on first name terms with the heads of government and with regard to every artistic movement are subservient to the judgement of their illiterate superiors!⁴

2.1 What Has Happened to Our Societies?

Why does the idea that a poem or another work of art might be able to change the world, as was the case with Lucretius Carus' "De rerum natura", currently appear to be so scurrilous? In actual fact, it was not the poem as such that produced such a

² Christoph Menke, *Die Kraft der Kunst*, p. 11, Suhrkamp Verlag, Berlin, 2013.

³ Goodman, Nelson. *Languages of Art*. Hackett Publishing Company, 1976.

⁴ Max Horkheimer, Theodor W. Adorno: *Dialektik der Aufklärung*, p. 119, Frankfurt/M. 1989 W.

significant shift in the course of world history, as this effect was only possible due to the interplay between scientific, political and economic forces. Nonetheless, the arts were always present as a type of connective and reinforcing element in this power triangle.

In 2011, the following could be read in the “Stanford Social Innovation Review”: *“Welcome to a nation unable to solve its problems, incapable of civil discourse, bogged down in a morass of multicultural conflict, and lagging behind the global innovation marketplace. Just look forward a generation or two, and this will be America if we do not address the dearth of investment in art and imaginative capacity.”*⁵

Today, and not only in the USA, specialization, productivity and efficiency have become the predominant aspirations, not just with regard to industrial production, but also with growing intensity and speed in the sciences. As “The Economist” recently wrote:

*“The obligation to “publish or perish” has come to rule over academic life.”*⁶ The journal went on to add: *“Too many of the findings that fill the academic ether are the result of shoddy experiments or poor analysis. A rule of thumb among biotechnology venture capitalists is that half of published research cannot be replicated. Even that may be optimistic.” Speed kills quality and thus severely damages both the standards and the image of academic institutions. The pressure for greater productivity and the exclusive personal classification of research results is increasingly leading to professional specialization, the formation of niches and the systematic avoidance of communications and exchanges of information, as these might result in a competitive disadvantage.*

Universities have become used, or have been forced, to look first at evaluation figures instead of values and content. Quantification and rankings based on quantitative indicators are the main topics in higher education policy. Universities advertise their recent standings in national and international university rankings. If they lose ground in these ratings, or if they are unranked, they become subject to major difficulties in terms of institutional identity and economic stability.⁷ As the existing rankings seem to give preferential treatment to universities from the USA and Asia, the European Union is now about to design a similar ranking system⁸ and thus introduce the same concepts and mechanisms for the future development of its universities. These will result in the quantifying of intellectual performance and thus the necessary neglect of those areas that owing to their self-understanding and/or specific subject-related knowledge production processes can only submit partially, if at all, to quantification.

The dominant, global ranking systems for universities (Shanghai and THE rankings) were and are subject to the suspicion of promoting hegemonial interests in an (education-related) political regard, as their influence on educational policy at

⁵ Eric Friedenwald-Fishman, Stanford Social Innovation Review, May 26, 2011.

⁶ How science goes wrong, The Economist, October 19, 2013.

⁷ http://articles.washingtonpost.com/2012-11-14/local/35505709_1_class-rankings-college-rankings-incoming-freshmen

⁸ http://ec.europa.eu/education/higher-education/doc/multirank_en.pdf

governmental and university level has (in combination with other factors) altered the understanding of the nature and task of university education worldwide.⁹

The logic of production processes, the functionality of which demands the measurability of working procedures and results as a prerequisite, is steadily infiltrating educational policy theory and practice. Indeed, the European Union has defined “The role of the Universities in the Europe of Knowledge”¹⁰ entirely in this spirit by linking it clearly with a contribution to Europe’s economic policy success and thus burying Humboldt’s educational ideals as a paradigmatic consequence.

The universities of art and academies have not been spared entirely from this educational trend towards the quantification of performance and hence the orientation of their teaching and learning processes towards efficiency criteria, but they have been affected to a lesser extent than their scientific counterparts. This may have something to do with Eliot Eisner’s pithy, analytical statement that: “*The arts . . . have little room on their agenda for efficiency, at least as a high-level value. Efficiency is largely a virtue for the tasks we don’t like to do; few of us like to eat a great meal efficiently, or to participate in a wonderful conversation efficiently, or indeed to make love efficiently.*”¹¹

In recent decades, we have increasingly tended to believe in the slogan: “If the economy is doing well, we all are doing well.” We have become accustomed to the argument that economic growth is the father of all things such as new and cheaper services and products, social welfare, personal happiness, democracy, world peace, and last, but by no means least, victories in elections. And we all remember the successful slogan, “It’s the economy, stupid!” with which, consciously or not, Bill Clinton’s war room (what a term!) transferred and transformed Heraclitus’ notion that, “*War is the father of all things!*” to the twentieth century.

Buckminster Fuller noted that until 1900 human knowledge doubled approximately every century.¹² However, by the end of World War II knowledge was doubling every 25 years and today human knowledge is doubling roughly every 13 months.

Increasing research specialization represents both the cause and effect of this knowledge explosion. As a result, in the academic world we are facing massive

⁹ Simon Marginson, University Mission and Identity for a Post-Public Era, in: Higher Education Research & Development, Volume 26, Issue 1, 2007, Special Issue: Higher Education Governance, p 117–132, Routledge, 2007.

¹⁰ “Europe needs excellence in its universities, to optimize the processes which underpins the knowledge-society and meet the target, set out by the European Council in Lisbon, of becoming the most competitive and dynamic knowledge-based economy in the world.” Communication from the Commission – The role of the universities in the Europe of knowledge/COM/2003/0058 final, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52003 DC0058:EN:HTML>

¹¹ Eisner, Elliot W., *The Arts and the Creation of Mind*, xiii, Yale University Press, Yale, New Haven, 2002.

¹² Buckminster Fuller, R., *Critical path*. Macmillan, 1981.

subject fragmentation. Universities have become an environment in which highly specialized experts compete to obtain points for their citation index and we are all aware of the strategy of splitting research results in order to increase the number of publications. Separation, demarcation and fragmentation constitute the story that scientific history seeks to tell us. And although the terms transdisciplinarity and interdisciplinarity now occur with greater frequency in a growing number of publications, and even more often during pleasant discussions, effective research collaboration between different disciplines remains an exception. It certainly does not fit comfortably into the current academic system, which is driven to a large extent by competition between institutions, disciplines and individuals.

The consequence of this development is an increasing trend towards self-referencing in the sciences. This has nothing to do with the separation of basic and applied research and is certainly not a per se criticism of the former. Nonetheless, the continuing discussion,^{13, 14, 15} regarding the crisis in the humanities is clearly a symptom of the fact that faced by accelerating knowledge progress and ever more complex theoretical and practical topics, fragmented science is becoming steadily less able to formulate complex questions, complete profound analyses and develop differentiated theses and suggestions that accommodate all objective interconnections.

Instead it can be stated that the relevance of scientific work even for the theoretical discourse within the scientific community is declining in step with increasing specialization and the formation of scientific niches. Visionary concepts based on long-term or even utopian approaches, which generally demand that existing limits be ignored and prohibit the erection of new micro-disciplinary barriers, are therefore becoming rarities.

Lorraine Daston, the respected science historian, has stated that paradigm-breaking innovation arises mostly at the overlapping edges of different disciplines¹⁶ and in fact there are only a few significant examples of systematic, interdisciplinary group formation. The best of these is life sciences, where experts in molecular biology, biotechnology, robotics, biomedicine, biophysics, biomechanics, genetics, neuroscience and other disciplines have decided to work together in various combinations. This strategy has led to an incomparable success story, as at present life sciences probably constitute the world's most powerful field of research from the viewpoint of potential capacity for the shaping of our civilization's future. The

¹³ Levine, Peter, *Nietzsche and the Modern Crisis of the Humanities*, State University of New York Press, Albany, 1995.

¹⁴ Stanley Fish, *The Crisis of the Humanities Officially Arrives*, *The New York Times*, October 11, 2010, [http://www3.qcc.cuny.edu/Wikifiles/file/The Crisis of the Humanities Officially Arrives, NYTimes.com-1.pdf](http://www3.qcc.cuny.edu/Wikifiles/file/The%20Crisis%20of%20the%20Humanities%20Officially%20Arrives,%20NYTimes.com-1.pdf).

¹⁵ Gutting, Garry, *The Real Humanities Crisis*, *The New York Times*, November 30, 2013, http://opinionator.blogs.nytimes.com/2013/11/30/the-real-humanities-crisis/?_php=true&_type=blogs&_r=0

¹⁶ Daston, Lorraine, keynote speech at the European Forum, Alpbach, 2012.

next best example is provided by experimental physics, where theoretical physics, quantum mechanics and quantum optics join forces.

2.2 Art Meets Science Meets Arts

I believe that it is no coincidence when researchers from both these areas state that they need visualization for the enhancement of their theoretical models and that they profit from communications with artists. Anton Zeilinger, a leading expert in experimental physics, even went so far as to demonstrate his teleportation experiment, which is based on quantum mechanics and optics, at the dOKUMENTA (13) in Kassel, the world's most important exhibition of contemporary art.¹⁷ In a response to these signs of the times, in 2011 the University of Applied Arts Vienna established an "Art & Science" master's degree program and graduates from this university presented a widely acclaimed experiment at the international Vienna Art Fair (VIENNAFAIR), using DNA for the storage and recall of visual information.¹⁸

It is also imperative to note that the "invisible hand of the market"¹⁹ is even preparing to seize command in the art system. The art market is booming with parties and selling as the main purpose of the numerous art fairs, from Miami to Basel, from Dubai to Hong Kong and from Beijing to Sao Paulo. Artworks are assuming the role of shares, art collectors are slipping into the role of equity dealers and the artists themselves are occasionally taking the role of traders, as Damien Hirst demonstrated with an auction in New York on September 15, 2008. By bypassing his dealers, Hirst brought more than 200 of his own works to Sotheby's and earned USD198 million through this single auction. Ironically enough, Lehman Brothers collapsed on the very same day.

In fact, reports about art can be reliably expected when auctions bring record results such as USD 58 million for Jeff Koons' Balloon Dog, USD105 million for Andy Warhol's Silver Car Crash and USD142 million for Francis Bacon's Freud Tryprichon. And all this money in 2013 alone.

Naturally, art is also a significant economic factor away from the auction rooms, especially in the tourism area. However, as far as public consciousness is concerned such sensational headlines often serve to conceal the social value of art above and beyond its financial importance. "*The economic importance of the arts is increasingly appreciated, but to consider only the financial impact of cultural activities is to produce a distorted picture of their actual value to society.*"²⁰

¹⁷ dOCUMENTA (13), The Guidebook, Catalogue 3/3, p 134f, Hatje Cantz Verlag, 2012,

¹⁸ <http://pavillon35.polycinease.com/the-phage-λ-simulacrum-viennafair-2013/>

¹⁹ Smith, Adam, An Inquiry into the Nature and Causes of the Wealth of Nations, 1776.

²⁰ Matarasso, François, Use or Ornament? The Social Impact of Participation in the Arts, first published 1997, first published in electronic form 2003, Comedia, The Round, Bournes Green, Stroud, Glos GL6 7NL, ISBN 1 873667 57 4.

Art can also help to swim against the tide, “bear witness, . . . express trauma and catharsis,” and assume the form of collective memory and the sadness born of loss due to conflict.²¹ Niklas Luhman points out that: “It has always been the task of art to deliver descriptions of the world, or offer it forms that do not coincide with those that already exist.”²²

Einstein stated that: “Imagination is more important than knowledge.” And who had the imagination to foresee moon flight? It was neither John F. Kennedy, nor the NASA. It was Jules Verne, in his book “De la Terre à la Lune”, written a century earlier.

The neuroscientist Wolf Singer points out that when developing new theories scientists use criteria that go far beyond logical conclusions and that these criteria lead to the language of the arts: “In the case of a scientific theory, one knows that it is correct long before it is proven because it is aesthetically pleasing. Or put another way, not because it is inherently consistent, but simply because it “feels right”. In this connection one employs criteria that go far beyond what one can call logical conclusions.” The neuroscientist is convinced that: “Everything that uses non-rational language such as the fine arts, music and the dance, communicates a form of knowledge that cannot be transported by rational language.” [...] However, the language of art must be learned for this purpose.²³

The breakthrough from the geocentric to the heliocentric model arrived with the invention of the central perspective in Renaissance painting, which was somehow necessary in order to find a way of viewing the world from a fixed central point in space.

The paintings of Seurat (Figs. 2.1 and 2.2) can also be seen as pixelled pictures, a technique or technology that would be used some 60 years later for television.

And isn't it kind of amazing, that Van Gogh's painting of a starry night seems to show patterns of earth magnetism? (Fig. 2.3)

In his paintings, Picasso disassembled the visual and intellectual interrelationship between material, form, time and space with the result that a person or object disintegrates, or we see them from different viewpoints at the same time. Picasso's paintings predate Einstein's theory of relativity by a few years, as well as Heisenberg's discovery that the more precisely a particle's position is measured, the less precisely one is able to determine its momentum.

Uncertainty was thus the paradigm-breaking topic at the end of the nineteenth and the beginning of the twentieth century in both the arts and the sciences.

The twentieth century transformed the planet, or at least large parts of it, from a world of certainty into one of questions and doubt. And as far as influencing this view of the world was concerned, the arts played a role that was least equal to that

²¹ Christoph-Bakargiev, Carolyn, in DOCUMENTA (13), Das Buch der Bücher, Catalogue 1/3, Hatje Cantz Verlag, 2012, p 301 f.

²² Luhmann, Niklas, Interview in: Texte zur Kunst, Vol. I, Herbst 1991, No.4, p. 126.

²³ Singer, Wolf, Ein neues Menschenbild. Gespräche über Hirnforschung, Frankfurt/M., 2003, p. 103 ff.



Figs. 2.1 and 2.2 George-Pierre Seurat, The Channel at Gravelines, 1890 (Imagecredits G. Bast 2014)



Fig. 2.3 Vincent van Gogh, The Starry Night, 1889 (Imagecredit G. Bast 2014)

of the sciences. In fact, when one studies the parallelisms between artistic and scientific history, the fundamental upheavals in music, the visual arts and design, and the paradigmatic shifts in physics, psychology and medicine in the early twentieth century make particularly plain the interactions between what are apparently separate spheres.

Of course this does not at all mean, that Giotto and Brunelleschi were more important than Copernicus. Of course not, that George Braque, Pablo Picasso and Arnold Schoenberg were the pioneers of quantum physics. But it is precisely the quantum physics which has shown us that there is more than just direct and linear connections between time and place, between cause and effect. It is not least about something that you can rewrite with a holistic aesthetic and intellectual climate in a

society, a cultural climate, which artists and their way of looking at the world significantly impacted.

In any case this shows clearly how the power of science and the arts can multiply when the two enter into a constructive exchange in awareness of both their own strengths and identity, but also of the synergetic potential for social effects above and beyond citation indices and artistic market rankings. These random examples prove beyond doubt that the arts can contribute to creating an atmosphere or zeitgeist that is able to fertilize science and technology in a variety of ways.

Indeed, art and science, two sisters of the human spirit that in the course of history have become separated, are now showing an increasing tendency to enter into an active interrelationship, whereby the initiative would appear to emanate primarily from the artistic rather than the scientific side. In the arts, a fascination for the tapping into new possibilities for artistic work predominates, while in the sciences certain reservations remain. These relate to the anxiety that too great a rapprochement with the arts could have a negative effect upon the “seriousness” of the scientific community. This relates closely to the view that science stems from the brain and art from the gut. And that science has something to do with precision and planning, and art with coincidence and intuition.

In fact the history of both the arts and sciences is a saga of errors and accidents, and at the very latest, since Heisenberg we know that the world of the natural sciences does not function according to the conventional concepts of exactitude and precision. Leonardo da Vinci, who in his time influenced the worlds of science, technology and the arts, is alleged to have stated with regard to his painting and not his activities as a scientist and inventor: “*I paint with my brain and not with the brush.*” Furthermore, Edward Wilson, one of the founders of socio-biology writes: “*A good scientist must work like a bookkeeper and think like an artist.*”

Nonetheless, one fundamental difference does exist between art and science. “*Change and renewal in the sciences always bring the contradiction and substitution of existing knowledge, or at least its expansion and supplementation. In other words, they fill knowledge gaps. Thus the difference between science and art is that aesthetic progress does not invalidate what has gone before. The discoveries of Copernicus rendered those of Ptolemy obsolete, but Picasso neither refuted Van Gogh nor reduced his significance.*”²⁴

Therefore, in the arts change automatically implies expansion, while innovation in the sciences means both supplementation and replacement in the sense of the state of the art (still the current term for the respective latest technology!).

²⁴ Bast, Gerald Können Künstler Forscher sein? Can Artists be Researchers? In: Kunst und Forschung. Art and Research. Ritterman, Janet; Bast, Gerald; Mittelstraß, Jürgen, (Eds.) Edition Angewandte, Springer Vienna, New York, 2011.

2.3 Innovation and Arts

Innovation is increasingly becoming the new no.1 political slogan. Innovation as a panacea for saving the world's ills, but perhaps first and foremost, as a cure for its economy. Whatever the truth, political slogans must always be subjected to careful analysis. And in this case, the task is to uncover the actual meaning of the word innovation within the aforementioned context.

From Schumpeter to current definitions, innovation is seen as meaning the introduction and dissemination of new and improved products, processes, systems and devices for commercial use. Only a small few classify achievements relating to our social existence such as law, music, literature, painting, dancing, democracy, human rights, schools, universities, hospitals, museums and theatres as belonging to the innovation system.

Government documents show clearly the current direction: *“With an ageing population and strong competitive pressures from globalization, Europe’s future economic growth and jobs will increasingly have to come from innovation in products, services and business models. This is why innovation has been placed at the heart of the Europe 2020 Strategy for growth and jobs.”* (EU Commission)²⁵ And on the White House website one can read: *“President Obama’s Strategy for American Innovation seeks to harness the ingenuity of the American people to ensure economic growth that is rapid, broad-based, and sustained. This economic growth will bring greater income, higher quality jobs, and improved quality of life to all Americans.”*²⁶ Innovation is therefore seen primarily in terms of a direct economic interdependency.

Prior to the Industrial Revolution in the mid-eighteenth century, no one could have imagined that within a few decades, first Europe and subsequently the USA and parts of Asia would go through a profound and lasting economic and social transformation affecting both working and living conditions. Inventions based on the use of mechanical processes altered radically both the means of production and travel, and large sections of the population lost both their occupations and income. Traditional trades and skills, like those of the weavers disappeared, while new professions arose along with increasing social inequality.

Similarly, the digital revolution of the twentieth century has not only reshaped production processes and communications, but also changed fundamentally our perception of the world. For those members of the global population with access to digital information technology conventional, fact-based knowledge is no longer the master key to power, but instead the processing and linkage of information. At the same time, the global differences relating to the availability of digital information have resulted in a previously unknown imbalance in the distribution of power. In addition, owing to the exponential acceleration in the speed of quantitative

²⁵ <http://ec.europa.eu/research/horizon2020/pdf/press/horizon2020-societal-challenges-infokit.pdf>

²⁶ <http://www.whitehouse.gov/issues/economy/innovation>

knowledge production (see above) not only is the gap between those with and those without knowledge, and between those with or without access to the linkage of data becoming ever larger, but also this inequality is gaining in permanence. Social differences are solidifying and are being “inherited”. It is becoming increasingly difficult for anyone that once falls behind to ever make up the resultant leeway.

In addition to “innovation society”, the terms “knowledge society” and “knowledge economy” are in increasing use. Knowledge is not only growing in volume, but is also playing, or rather could play, an ever-greater role in the development of our societies but additional knowledge alone is insufficient. In the meantime, the expansion of knowledge per se has become somewhat more of a problem rather than a solution. Our brains have myriads of nerve cells, but their simple multiplication does not enhance our memory capacity. Instead, of decisive importance are the synapses, the links between the nerve cells. It is these that enable the potential of raw information to be employed productively. For example, when the brain of a pedestrian crossing a road receives optical information from the eyes that a car is approaching, this alone is insufficient to establish the existence of a potential danger and initiate measures that would appear to be worthwhile and in the pedestrian’s interest. Moreover, although as a result of the structure of its nerve cells the eye is capable of transmitting the image of the car, this remains useless irrespective of the degree of resolution. It is also of no help when such information remains isolated in the visual centre of the brain. In fact, what is vital for the survival of the pedestrian is the ability to assess the speed of the vehicle, estimate the extent to which it poses a fundamental danger (a capacity that small children do not yet possess) and allow this potential danger to find expression in other regions of the brain. The pedestrian then decides as to whether an accelerated stride is required, or if a leisurely pace will suffice owing to the fact that a marked crossing is being used in a country that in this situation allocates pedestrians rather than drivers the statutory right of way. This is a simple example, but nevertheless the possibilities are immensely complex. Of decisive importance are the quality and reaction speed of the links, the synapses, between the individual cell regions.

2.4 The Limits of a Knowledge Society

The knowledge society presents a similar behavioural pattern. The links formed by the lines of communication between the various branches of knowledge determine the degree of effectiveness of know-how within society. Without a sufficient number of functional knowledge synapses, irrespective of their height, the know-how towers remain isolated and self-referencing (Fig. 2.4).

In the 1950s Marino Auriti wanted to build a huge tower of knowledge, the Encyclopaedic Palace of the World, where all the world’s knowledge should be stored. It never was built not only it became clear that even at that time the tower already would have been too small. Today for a lot of disciplines such a tower would

Fig. 2.4 Marino Auriti,
The Encyclopaedic Palace
of the World, ca 1950s
(Imagecredit G. Bast 2013)



be too small even for a single scientific discipline. Auriti's model, shown at the Biennale di Venezia in 2013, reminds of Breughel's Tower of Babylon (Fig. 2.5).

The Tower of Babel did not fail owing to structural presumption or even more to being an expression of human hubris, but rather an underestimation of the complexity of the task in hand and the resultant communications requirement. It was the "Babylonian linguistic confusion", or in other words the babble caused by the inability of a large number of experts to communicate, that caused the Tower-of-Babylon-project to collapse.

Cultural techniques are basic structures where a society is built on. Like organisms need the cell structure to take form and grow, any society needs members with mastery of cultural techniques. Social life, politics, economy, they all need this basic structure. To date, reading, writing and calculating continue to be regarded as the most important "cultural techniques" for the functioning of society in general and the economy in particular. They occupy a central position in education. Indeed, the empowering of as many sections of the population as possible with an ability to employ these tools without difficulty was a major prerequisite for the industrial society. And not least, the introduction of general compulsory education in various

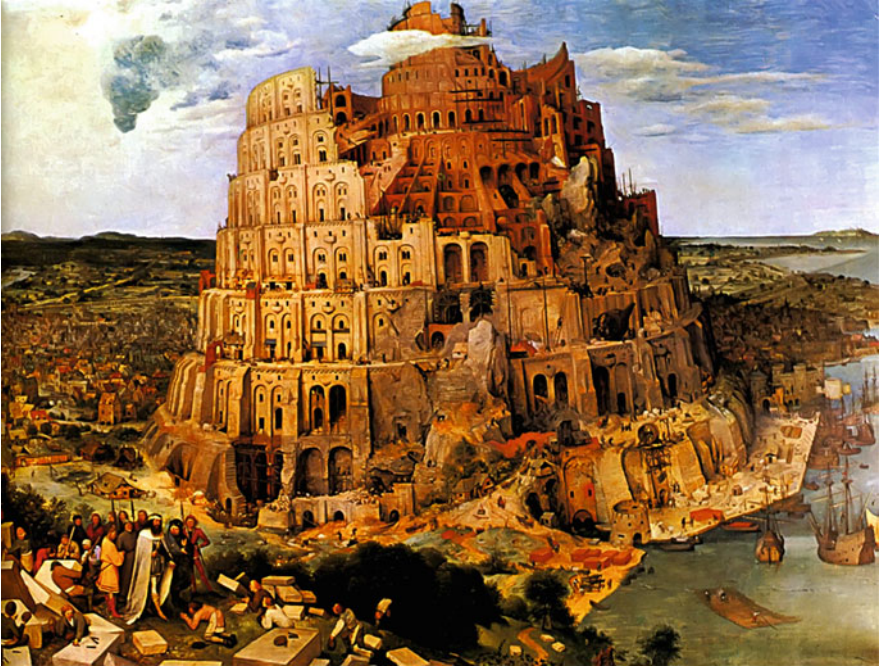


Fig. 2.5 Pieter Bruegel the Elder, *The Tower of Babel*, 1563 (Imagecredit: Creative Commons, via Free Christ Images, http://www.flickr.com/photos/tico_bassie/4120114329/lightbox)

countries, which coincided roughly with the development of industrial societies from the second half of the eighteenth century onwards, had the objective of making a basic version of these “cultural tools” available on a broad basis.

At the close of the twentieth century and the onset of the digital revolution, the canon of the cultural techniques originating from the industrial age was supplemented by the ability to communicate digitally. Those lacking skills in this respect were and are regarded as digital illiterates with social exclusion and a shortage of employment opportunities in the labour market as a consequence.

Today, on the eve of a “creative revolution”²⁷ that is essential for the society and economy of the twenty-first century, the task is to further expand the canon of cultural techniques by the addition of creative skills:

- Imaginative and associative abilities
- The recognition of coherences that are not immediately apparent
- Problem-solving and critical thinking

²⁷ Compare Bast, Gerald, *Preparing a “Creative Revolution” – Arts and Universities of the Arts in the Creative Knowledge Economy*, in: Carayannis, Elias G (Ed.), *Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship*, p 1471–1476, Springer Reference New York, Heidelberg, Dordrecht, London, 2013.

- Thinking in terms of alternatives
- The questioning of the status quo
- Communications and teamwork
- Recognition of the fact that there are various perspectives
- Recognition of the fact that there are forms of communication other than the verbal and the promotion of an ability to employ them

It is here that art comes into play for as early as 1995, the UNESCO pointed out that: *“If ever there was a need to stimulate creative imagination and initiative on the part of individuals, communities and whole societies the time is now. The notion of creativity can no longer be restricted to the arts. It must be applied across the full spectrum of human problem-solving.”*²⁸

The US Secretary of Education, Arne Duncan, justified the demand for an increase in art teaching as follows: *“Education in the arts is more important than ever. In the global economy, creativity is essential. Today’s workers need more than just skills and knowledge to be productive and innovative participants in the workforce. Through the combination of knowledge and creativity, they have transformed the way we communicate, specialize and do business.”*²⁹

Owing to the underlying principles of art, persons with an artistic affinity, or in other words, people who in whatever form engage with the arts, possess far greater chances of underpinning the acquisition and consolidation of the characteristics and abilities that are collated under the term “creative skills”, than those sections of the population that remain oblivious to the arts.

The reason is obvious for while science attempts to explain the present world, art attempts to create new ones. *“Works of art do not represent “reality”, “the real world” or “everyday life”, even if these terms are assumed to bear a specific or meaningful reference. Rather, art creates new realities and worlds. People receive and conceive in the light of narratives, pictures and images. This is why art is central to politics, just as it is central to social relationships and beliefs about nature. . . . Because they create something different from conventional perceptions, works of art are the medium through which fresh meanings emerge.”*³⁰

The issue is therefore the power of imagination, which the production and analysis of art demand from both artists and recipients. The ability to transform imagination and information in both an intellectual and an emotional sense is also involved because: *“Successful works of art enhance, destroy or transform assump-*

²⁸ World Commission on Culture and Development, 1 From web summary of WCCD Our Creative Diversity. UNESCO 1995. See: http://portal.unesco.org/culture/en/ev.php-URL_ID=15019&URL_DO=DO_TOPIC&URL_SECTION=201.html

²⁹ Re-Investing in Arts Education, p. viii, President’s Committee on the Arts and the Humanities 2011, http://www.pcah.gov/sites/default/files/PCAH_Reinvesting_4web_0.pdf

³⁰ Edelman, Murray, From Art to Politics: How Artistic Creations Shape Political Conceptions, The University of Chicago Press, Chicago and London, 1995, p. 7.