Beauty as a factor of economic and social development

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Abstract:

We discuss here how beauty can be considered a determinant for economic and social growth and what is its importance. We do this by following a line which links beauty with creativity and innovation; commonly reputed the main engines of development, especially in a globalized and highly technological and competitive world, in which many traditional differences in terms of space, time, size, and economic power have dramatically changed.

Keywords:

innovation, creativity, beauty, economic and social growth, work well done

Beauty

There is little doubt that beauty is a concept of great importance for human beings. In all areas, even those that might seem, to those who do not know them fully, *cold* and *rational*. So that, almost surprisingly, we find statements such as the one of the cosmologist Janna Levin (Lethem & Levin, 2007):

> *Something I find particularly interesting is that science, I think, is the last realm in which people talk to each other seriously, with a straight face, about beauty. Visual artists would never say that's a beautiful piece of*

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> *work, not in really contemporary, cutting-edge art. [...] And it's considered kind of provincial to aim for something beautiful. We're not doing pretty pictures here; we're doing something else. But in science, we really hold on to beauty and elegance as the goal because, for reasons that I think nobody fully understands, it's a good criterion for distinguishing what's right from what's wrong. And if something is beautiful and elegant, it's probably right.*

The examples of this view of beauty in science are quite numerous. In 1905 Albert Einstein began a revolution in physics, that was to lead to a view of the world completely different from that which had ruled for more than two centuries (from the publication of Newton's Principia). Its starting point is not the scrutiny of some experimental data, but the realization of the lack of symmetry of Maxwell's equations of electromagnetism. A strong call for simplicity and harmony in a set of mathematical relationships.

A hymn to beauty is also the start of another revolutionary work: *De revolutionibus Orbium Caelestium* by Nicolaus Copernicus. It starts developing his *proposal* just from considerations of simplicity, symmetry and harmony, as stated at the very beginning:

> *Among the many various literary and artistic pursuits which invigorate men's minds, the strongest affection and utmost zeal should, I think, promote the studies concerned with the most beautiful objects, most deserving to be known.*

The relationship between beauty and scientific thought, however, is even richer and deeper, and comes from the observation of nature as a place of aesthetic experience. We realize that, mostly, beauty meets some criteria of symmetry and harmony, and that these can be described and represented in mathematical terms. This idea is so profoundly rooted in many scientists' minds, that one can go as far as to say, as Paul Dirac (1963: 47):

> *... it is more important to have beauty in one's equations that to have them fit experiment. [...] It seems that if one is working from the point of view of getting beauty in one's equations, and if one has really a sound insight, one is on a sure line of progress. If there is not complete agreement between the results of one's work and experiment, one should not allow oneself to be too discouraged, because the discrepancy may well be due to minor features that are not properly taken into account and that will get cleared up with further development of the theory.*

Throughout the history of science, simplicity and elegance, the fundamental attributes of the concept of beauty, have a propelling crucial function. These concepts are closely related to the explanation of a phenomenon and the manner with which this explanation is formulated. The principle of parsimony, known as Ockham's razor, according to

which it is at least useless, if not harmful, to formulate more hypotheses than what is strictly necessary, may be taken as the theoretical basis for much modern scientific development.

On the other hand, in a world often thought (wrongly) as an alternative to scientific knowledge, the world of arts with their many manifestations, the concept of beauty has a central role. In fact, despite the many definitions or attempts to define art, in any of its forms, its essence is in the (emotional) activity of creation and appreciation of beauty. So that, discussing some contemporary refusal of the concept, the critic Roger Kimball strongly makes the point (1997: 59): **"***This much, I think, is clear: without an allegiance to beauty, art degenerates into a caricature of itself; it is beauty that animates aesthetic experience, making it so seductive.***"**

As claimed by Morelli, in his *Mind and Beauty* (Morelli, 2010), the analysis of the different forms of aesthetic experience highlights the close connection, mediated by the principle of imagination, between the human being, and the world around him and its structure. And, as we know, the system of relations, real or virtual, between individuals and between individuals and the environment in which they live, plays a key role in any human action.

There seems to be a physiological reason for this appreciation of beauty. Recent studies on human brain performed with functional magnetic resonance imaging (fMRI), which allows to highlight areas of the brain activated in the presence of stimuli or during specific activities, show how important is the function played by mirror neurons, those elements that many researchers deem able to allow us to grasp on the fly what is happening around us, to empathize with the emotions of others, and, above all, to learn by imitation (Cook et al., 2014). For some scholars, mirror neurons may even be the building blocks upon which the culture of a human being is founded, because the dissemination of knowledge would occur principally by imitation (Ramachandran, 2000). In any case, these studies show a substantial equivalence, when aesthetic appreciation or creative impulse are concerned, in both the scientific and the artistic world (Andreasen, 2012; Zeki et al., 2014).

In essence a human being (his brain) participates in the experience of beauty as if embedded in an open system that co-evolves with the dynamic environment in which it is immersed, and visual and auditory stimuli are the makers of aesthetic experience (Welsh & Di Dio, 2012). Recent research in *neuroaesthetics* (Gallese & Di Dio, 2012), posits that this would happen by activating several groups of neurons that produce pleasing sensations, and, more importantly, create new connections between different areas of the brain, the reticular connections that form the basis of many creative processes (Vartanian et al., 2013).

One further consideration is in order before going on. Beauty is often seen as a subjective feature ("*it is in the eyes of the beholder*") and the debate on whether instead it is an objective feature is as long as the history of human thought. Here we adopt the

view that, even if matter of personal interpretation, beauty has an irreducibly social dimension. It is a view we share, or we want to share, and shared experiences of beauty are exceptionally intense forms of communication. In this interpretation, the beauty experience is not only confined to the mind of an individual, but connects people and objects in communities of appreciation, even small, but strongly cohesive in their views (Sartwell, 2014).

Creativity and innovation

Creativity and innovation are, today, a widespread mantra when it comes to economic and social development. These features are identified as essential to ensure success, growth, improvement of material and spiritual life, happiness and well-being of individuals, companies, organizations and social systems (Anderson et al., 2014; Leckey, 2011; Piergiovanni et al., 2012). They are increasingly seen as critical to the design of the elements that can make the difference between a successful product and the serial reproduction of overcrowded offers (Richards, 2011).

Although not very well defined, creativity seems to have, as essential foundation, the ability to combine and recombine ideas or visions of reality. **"***Good artists copy, great artists steal***"**, Picasso is known to have stated, and in many academic fields is popular the adage: **"***copying one is plagiarism, copying many is research***"**. All statements of the fact that having a good amount of creativity means being able to seize, consciously or unconsciously, a set of different stimuli and to frame them into a solution for a problem or the design of a new object. This idea leads on to consider another phenomenon often closely related to creativity, and more or less based on the same elements: *serendipity* (Moretti, 2015b).

Genius, chance and context

There is a strong connection between the drive for innovation that characterizes the current phase of development, and the concept of serendipity, defined by Robert K. Merton (Merton & Barber, 2006: 196) as **"***the fairly common experience of observing an unanticipated, anomalous and strategic datum which becomes the occasion for developing a new theory or for extending an existing theory.***"** According to Merton (2006: 234), there is a **"***sociological importance of the unintended consequences of intended actions in social life generally and of unanticipated phases in the growth of knowledge* **"** and, as pointed out on several occasions, chance particularly favors the prepared mind operating in microenvironments that facilitate socio-cognitive interactions, and that can be described as a socio-cognitive serendipitous environments.

Given this background, our question now becomes: is it possible to imagine a different perspective, organizational rather than individual, that links the possibility of making discoveries by genius and chance with the capacity of organizations to establish rich

interactive socio-cognitive environments, beyond the ability of a prepared mind to grasp unexpected anomalous data? And again, to what extent this perspective, with the consequent priority inversion, can promote further unprecedented developments in defining the concept of serendipity and its uses within the boundaries of scientific advancement?

In our view, seriously considering this perspective means taking seriously, before all, the sociological character of serendipity and its relationship with the contexts, the organizational structures and the processes that encourage and determine development.

The idea is that recognizing the limits of a psychological perspective or agreeing on the need to integrate it with the sociological one is not enough. We must reverse the approach and place the emphasis first on the resources made available to the network and on the active relationships between the different institutions (universities, research groups, innovators, etc.) and then on the preparation and the creativity of the individuals. Of course, even a sociological perspective, as well as the psychological one, cannot be self-sufficient. It does not suffice, by itself, to account for the nature and processes of serendipity, but the thesis proposed here on the borders (and limitations) of the psychological perspective is inside the borders (and limits) of sociology and the two boundaries **'***do not match*.**'**

Geography, even before the history of scientific discoveries, can help to clarify the matter. Two examples: the first one is the Cavendish Laboratory in Cambridge, who has been home, for a considerable period of time, to 29 Nobel Prize winners; the second one is the California Institute of Technology (more commonly known as Caltech) in Pasadena, California, in which as many as 32 Nobel Prize winners have worked (the single laboratory of Renato Dulbecco hosted four: Dulbecco and Howard M. Temin in 1975, Susumu Tonegawa in 1987, Leland H. Hartwell in 2001).

Creative processes as a social processes

A consistent line of thought has begun to recognize the fact that a creative process is, at least partially, a social process. There is the idea that a group is more creative than isolated individuals, because their members bring different contributions, and their interactions favor creations more and better (John-Steiner, 2000; Paulus & Nijstad, 2003). For this reason, some argue that, especially in a working milieu, environmental factors such as the support of a supervisor or influences resulting from an interaction are crucial for creativity (Amabile, 1988). This is emphasized several times in a decisive manner by Isacsoon in *The Innovators* (Isaacson, 2014) that traces the history of the development of information and communication technologies which, notoriously, were, and still are, examples of high creativity and innovation.

Innovation and creativity are based on what sociologists have called human capital, that set of knowledge, skills, abilities, emotions, acquired by an individual aimed to the

attainment of social and economic objectives, individual or collective (Coleman, 1988; Subramaniam & Youndt, 2005). But if these phenomena are social processes, they can be fully understood only by adding to the individual characteristics the consideration of the environmental conditions and the effects of the connections existing between the different individuals. This role is now well recognized, and Bourdieu (Bourdieu, 1986) extends the concept by defining social capital as (p. 249): "*the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words, to membership in a group.*"

Speaking of connections and social ties means adopting a systemic vision and considering the network that connects the different elements (people, groups, circles). This raises a discussion on which is the ideal network configuration for encouraging the emergence of creative ideas. Many contrasting proposals have been made, but a convergence seems to come forward on the idea that the best solution is that of a network consisting of a series of cohesive communities, which then facilitate intense exchanges, that have connections, even very weak, between them, which would help the dissemination new ways of thinking, thus avoiding the risk of excessive closure of a connected , but isolated, community which would remain stuck on what flows inside (Baggio, 2014a; Fleming & Marx, 2006). In such a configuration, then, the availability of highly standardized infrastructures and technologies increases the possibility of recombining different elements and simplifies the exchange of information and knowledge (Baggio, 2014b).

Beauty, creativity and innovation

If creativity, necessary basis for innovation, is largely linked to the individual's ability to connect different elements, then we have to think that the elements that most affect the human mind are privileged in this process. Among these factors, the aesthetic experience certainly has a significant influence. This happens not only when individual elements (objects, ideas etc.) are at play, but also, quite obviously, when beauty and aesthetic pleasantness characterize the environment surrounding an individual.

A beautiful setting, being it natural or artificial (meaning 'man-made'), seems to encourage creative development and innovation, as many state, especially in the field of architecture and city planning. This is the argument put forward for example by Kaisa Holloway Cripps (2013) on the environment, but it also appears valid within individual workplaces (Van Marrewijk, 2009).

Empirical evidence that aesthetically pleasing visual stimuli increase the capacity of creative problem solving is quite solid. Two factors are involved in this process: the structure of the brain that controls memory processes, and the individual knowledge and skills (Goldschmidt, 2015). As Richard Florida argues in his book *The Rise of the Creative Class* (Florida, 2002), the basis of a favorable environment for creativity, and

for fostering innovation, can be traced back to three elements: individual talent (education, skills, experience), a tolerant and multicultural environment, and the necessary technological infrastructures.

Godoe (2012) broadens the perspective redefining the utility (economic) which is the basis of many models on the dynamics of innovation, highlighting as key elements: aesthetic factors, serendipity and imagination, and, of course, creativity. In the author's view the role of aesthetic factors defined as "*the appeal and attraction associated with beauty*" (p. 378), is predominant. According to Godoe (2012: 387): "*The innovation problem is to find an admissible set of values (e.g., aesthetic factors and codes) of the command variable, compatible with constraints, which maximize the beauty [instead of Simon's 'utility function'] for the given variables of the environmental variables.*"

Innovation and socio-economic development

The relationship between innovation and economic and social development is well known and studied, it is only worth to mention here just a few essentials. An OECD report (OECD, 2012) describes carefully the fact that the last decades have shown that innovation plays a central role in the economic development of many countries, even considering different forms and different approaches in the various stages of evolution. Research on the subject is rich and many studies have good empirical evidence. The conclusions seem unanimous in holding the important contribution of innovation, and its quality and quantity, to economic growth. Moreover, this close relationship is confirmed not only globally (at country or sectors level), but also at the level of individual organizations or companies, and is usually geographically bound (Hasan & Tucci, 2010).

Innovation is crucial not only for an economic development, but also plays an important role for the social system involved. This aspect is not always clearly shown, especially by economists, but is of enormous significance (MacCallum et al., 2009). The central idea is that social innovation is about meeting not only material needs but also social relationships and a good management system must adjust the allocation of goods and services so as to satisfy both. This passes through a review of the forms and the structures of governance that should pay careful attention also to factors other than those usually considered. For example they should consider issues such as the creative and artistic milieu, the creation of social capital, the link with the territory. The opportunities offered by this approach seem very interesting especially because they look better development options, as an alternative to the current neoliberal economic vision, and emphasize socially important factors such as cooperation, cultural activities, solidarity and diversity.

Beauty and *work well done*

A further consideration is in order here. It concerns a matter which, unfortunately, has been disregarded by too many parties for too a long time: the importance of *doing things well because that's how they should be done*. The idea in this case is that without a profound cultural change in the approach to work, at every level, it is not possible to capture, and then multiply, the opportunities for development offered by the modern digital society. We definitely need to give more value to work, respecting the work and those who work. Connecting own work to dignity, identity, sense of people, structures and organizational systems is more essential than ever, if we want to prevent the shadow of a flat future (Martinelli et al., 2009).

Libero, one of the protagonists of *Head, Heart and Hands* (Moretti, 2013), would say that perhaps we "*forget the effort it takes to make bread, to pull up a bridge, to pick tomatoes, to build a car. By keeping watching television some people think that we live in the world of Copperfield the magician, voila! and things appear as if from nowhere. But behind everything there are the ability, the commitment, the hard work of those who make it.*" In the era of Internet and the knowledge society, the key for a change is more than ever right here, in the realization that any work makes sense and has a meaning if it is done properly (Weick, 1995); in other words: "*what's 'almost' good doesn't fit.*"

There is also an etymological connection between the idea of beauty and that of doing things well, given by the Latin *bellus*, beautiful, which is short for an ancient form of *bonus*: good, well. Beauty may be an opportunity (in the sense of the right time, *kairos*) to lengthen the shadow of the future on the present, to seize opportunities and multiply them. It can provide a different supporting structure, and put in place a new system of mutual relations, words, ideas, concepts, decisions, and actions aimed at the development.

Work should be associated with the concept of 'respect'. A job well done should be seen as self-realization, both at individual and at systems, organization and country levels. Under the same conditions, whatever they are, those who have chosen to do properly what they have to do are more relaxed, more satisfied, more able to design successful strategies and to adopt virtuous behaviors (individually and collectively). They progress their working conditions, and thus contribute positively to the social and economic environment in which they live. We like to think about the connections between 'doing things well' and 'doing good things' as the symptoms of a possibility to pay back culture, innovation, and future to the world. In essence, our argument is betting on the connections between doing things well and doing good things so that smart cities, resilient cities, digital cities, can have smart features and unmatched capabilities.

The message is: let us rethink cities, regions, districts, be they industrial, social or cultural - as many Italian centers - and let us reorganize, rebuild, re-evaluate them in the light of the opportunities offered by the modern advanced technologies: the Internet of Things, the Internet of People, the Internet of Knowledge. We should start working

concretely, enhancing and enriching the historical, cultural, environmental, natural, and productive environment. And we can do this by doing things well, making beautiful things, as has been done for centuries, in every corner of the world. In a world increasingly 'condemned' to find a distinctive, competitive advantage, the quid that a country, an institution, a company have as exclusive trait (or in excess with respect to all others), together with the improvement of territories and the emphasis on their beauty, can be the key to return to grow in a balanced way (sustainable some would say), both from an economic and a social point of view (Moretti, 2015a).

Hinged around the territory, the industrial revolution started with the advent of the Internet of Things (industrial internet, industry 4.0), and the Internet of Energy (reorganization of efficient buildings, reorganization of the public transport system, priority use of public goods, environmental protection, production and waste disposal), knits increasingly close relationships between the two ecosystems, digital and physical. This ensemble can have, in our and in many other countries, an enormous potential for development, starting from the ability to attract capitals (monetary and human).

The territory (city, district, region) becomes the socio-economic context (scope, background) open and interconnected, able to give uniqueness, value, and competitive advantage to the Italian way to work, fostering innovation, business creation, development (agriculture, industry, tourism, etc.), and liberating our enterprise culture from the constraints of family transmission. It can enhance and multiply its resources, with the objective to increase employment in both the 'traditional' and the more 'innovative' sectors in which new businesses are created (commonly said to be the main source of new jobs). The idea of triggering a new phase from companies and innovative start-ups can help make more explicit the link between job creation and business creation and can help to release the innovative traits of the same companies or start-ups from the (restricted) business sector in which they operate, and connect them with more significant elements such as skilled workforce, certified incubators, universities and research institutions. This would certainly improve the quality and quantity of transactions with medium and large enterprises and with industrial and financial investors.

We have a dream

Bay of Naples, the year of grace 2065.

Fifty years after the establishment of the metropolitan area, the old Naples appears literally transformed by the advent of the Internet of things and the smart reconfiguration of the relationship between humans and generated by the dramatic development of digital technologies. The dream of experiencing a model centered on beauty as a multiplier of opportunities, as creator of sense, wealth and development (cultural, social and economic), as development of the immense human, cultural and

social capitals available, and as promotion of good and active citizenship, has been superseded by reality.

The city of Bacoli, used by Baggio and Moretti in 2015 as an example of a waste of beauty (Cuma the Acropolis and the archaeological park; Baia Aragonese Castle, the underwater remains of the Roman Baths and Villa; Sacellum in Miseno; Agrippina's Tomb, Centum Cellae and Mirabile pool in Bacoli, all in the same town and within a few kilometers), , is today, unequaled in the world, at the first place in the international ranking of high quality cultural tourism.

In a few months the entire Bay of Naples - from Sorrento to Monte di Procida, passing through the many agricultural areas, the three active volcanoes and the islands of Capri, Ischia and Procida - will be proposed to the Plenum of the Interplanetary Council of the Galaxy as good practice to be studied and used in order to activate the necessary isomorphism processes. A few years more and the objective of ensuring beauty and prosperity to all the people of our beloved Earth will have been realized.

Concluding remarks

This is for now only a dream, but the beauty equation: *job well done - creativity - innovation - development* seems to hold, at least according to the qualitative reasoning and logical-deductive line followed so far. Actually, more than of an equation we should speak of a system of equations and, what is more, of a system with an unspecified number of equations. In fact, there are numerous factors that should be considered and that can contribute to the solution. As noted, whatever the territory we consider, we should add to the equation the basic parameters involving the efficiency of physical infrastructure (communications, economic and financial), the structure of social relations, and, as well highlighted by some research (Baggio, 2014a, 2014b), we should also add a system of effective governance.

Assessing these impacts is not easy, primarily because the metrics to evaluate these factors and the relationships between them are virtually nonexistent. Help will come probably only by the use of simulation techniques that allow, as already happens in many fields, to build scenarios and analyze their consequences (Axelrod, 2006; Henrickson & McKelvey, 2002).

On this we can and will work in the future. In the meantime we feel satisfied from having shown that the fundamental equation at the base of our research program holds well.

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