

CONNECTIVITY

Sergio Pietro Lacroix

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Preface

Of all the channels of cultural diffusion, it befits the book the highest rank. There are however, two qualities of reading: one that clarifies and takes the reader to wide-ranging reflections, and another which doesn't add up to anything in the end. In our specific case, this book belongs to the first kind of reading cited, and even adds something really important, some new ideas. We need them to conquer more rights for society, and, consequently, improve the quality of life of all citizens. What's interesting about this work is that Sergio Lacroix conducts us to new horizons, fostering an objective basis which helps us understand, in a convincing and pleasurable manner, the mechanisms behind our evolution, and that are necessary for our self-sustainable development.

I was instantly surprised with the literary vein of the author and partner in the publications of "*Dental Materials*"¹. Later, I learned about his genetic literary roots, inherited from his mother, who is a great savant of our language. The masterpiece that I am prefacing stems from there, but was produced by this friend that has become eclectic, playing in various positions, with incredible and diverse inspirations; the result is a reading both advanced and suave.

¹ Mário João and Sergio Pietro Lacroix are authors of the books: ***Prótese e Materiais Dentários***, of 2002, and ***Materiais e Pesquisa Aplicada a Clínica, Prótese e Dentística***, of 2005. Both published by the Publisher Gama Filho.

The eclecticism of the author, in this work, will enrich the library of everyone who has the privilege of acquiring it. Sergio travels across many realms, from advanced technology of material engineering all the way to the areas of communication, politics and humanities, constantly posing innovative analyses sustained by an illuminism in every proof. I am sure that those who cultivate a good reading will agree that **The Connectivity** is a great book.

My enthusiasm is also due to some aspects that the text contains, in which the author makes some retrospective analyses and paints short, medium, and long term prospective futures. This is especially present in the informational technologies segment, suggesting the social advances that may come about as a result of the increasing connectivity proportioned by the Internet and cellular phones. It is also worthwhile to say that this is a book of courage and counsel, showing a new and possible power to be acquired by society. As such, the book gives us a view of a reasonable scenario where we conquer more human rights.

The political side of the book is characterized by an idea of a high elective power in society, suggesting that we be able to rapidly decide our interests and priorities through connectivity, using plebiscites and multiple referenda. In some way, this idea is congruent with the contemporary haste in which we live so intensely in our technological culture. The suggestion of a faster democracy seen from a technological angle is pleasing to the ears, and is the dynamo powering the text. The book makes it seem logical, politically, that the establishment of a duty for the population should be accompanied by a great social boon.

The factors responsible for the technological advances of humanity throughout the twentieth century were richly analyzed. The author shows this evolution in a Brazilian and global scenario with optimism, and even risks some speculative forecasts about the advances of science that are bound to come. Especially, the possible effects of the technological growth responsible for connectivity, a growth which is just beginning to take form. All of the argumentation suggests that connectivity can lead to a positive influence in

the political, social, and scientific realms, with incredible dimensions for the evolution of society.

The text encompasses sustainable development, an important contemporary project that signals the need to reduce energy losses, save materials, eliminate environmental impacts and supply social satisfaction. This concept is used to confirm that we should think about improving the quality of life, and only with new individual rights will we be able to accomplish this. We know that science is dynamic and mutable, and the author knew how to show that it can still contribute a lot, politically, to our social advances.

Dear friend Sergio, in my life, I was gratified with many realizations and conquests, but I never felt so flattered for prefacing a book, especially one as representative of this post-modern "Era" in which we live. I hope that these modest words can document my gratitude, and reflect all of the admiration that I have for the human being that you are, who has shined in the domain of words with an impeccable Portuguese, always arriving to logical denominators. I wish you success in this "literary pearl" of yours.

My only desire is that this humility of yours remains immutable, and that you always maintain your great generosity. I know that intelligence is also measured by the spirit of synthesis, and for that, I stop here, thanking you for this valuable opportunity to express myself. I will give the reader the chance to fully savor this precious book. Finally, my farewell is with satisfaction, and may God bless you. Thank you.

Mario João

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1 - INTRODUCTION

The connectivity is a book of ideas. It contains a narrative of recent history which explores the evolution of technology, linking its effects with improvements in humanity's quality of life. The book's analysis indicates that we have arrived at a new stage of human connectivity. This achievement is a fruit of the age of technological innovation that we have reached in the beginning of this century, and can well be represented by the internet and cellular phones. We don't fully know, yet, how we are going to use it to its fullest potential. However, one thing is certain; the connectivity will conduct us to a new phase of social innovation that is without precedent.

From today onwards, the most important things that we have to look out for will be the ideas that will configure the human connectivity. The good ideas that come up for the development of society will be empowered by this new force, and in time should create a brand new ideology to satisfy our need for reason. It seems clear that the image of connectivity is associated, initially, with a period of search for the correct ideology that will guide us toward our development.

We live in a historic moment that will be remembered in time as a period of consolidation of our technological achievements. We would need many encyclopedias to cite the improvements in our quality of life obtained by the evolution of material science. However, this text will deal primarily with the segment of information technologies. There are many perspectives in this sector that can induce new behaviors in the future, and in consequence, encourage social advances. With this in mind, we should try to create within the connectivity, in the least, a more democratic setting for our societies.

In this book lay before you, reader, a load of contemporary immediacy which we all possess to some degree, to correlate the factors that brought us to our current state of technological development with its clearest present consequences, and with future ones that appear logical within a fictional scenario. In this sense, a small dose of fiction is always good for the health.

Let's accompany a history of our evolution, in which we know the beginning, the middle (our present days), but not the end, since we haven't undergone it yet. In the text, it will be a charming speculative metaphor of ideas, suggesting the use of the connectivity as a tool to help us exert our true power in society in the form of a new right to decide upon our collective interests through multiple and rapid votes.

Rapid votes lead us to imagine lightning fast referenda. This idea, even if appearing absurd at a first glance, contains the first indication of coherence with the high speed of the modern life supported by our technological culture. It is this idea that creates and enables all of the globalization seen so far.

The idea of multiple and rapid votes only begins to show its form when we consider the irreversible expansion of the connectivity by means of the Internet and mobile phones, within the criteria of spontaneity of human behavior. If you still have any doubts, observe a small sample of what the Internet is capable of as we see the profound changes that it has brought to society. We can even say that there exists, today, a small population already resident in the connectivity.

So being, I try to portray the dynamics of the events that a full connectivity can come to impose in everyone's lives. The Internet even fosters a new reality, a virtual reality. But it is so real that even those who don't possess the habit of reading books or newspapers begin to interest themselves in many topics online, and in some way, start receiving a new cultural baggage. Soon, more people will be in the condition of readers, and this will be of deep historical importance considering how we are still fighting the evil of illiteracy. We are even starting to have a new manifestation of this evil; digital illiteracy.

This problem will only be solved when society is engaged in a solution. It is an absurd reality to think of human beings who cannot, to this day, be readers. Reading is the bare minimum necessary to rudimentarily follow the world. Being a reader is reaching a state in the human condition in which we can receive what has been shared. It is the privileged, private, moment during which we operate an evolution within ourselves. We truly are what we read throughout our lives. For there to be any significant change in our reality, it must come through us, readers. It is we who become infused with indignation when confronted with the absurdities of what we read and watch in the newspapers and TV news.

2- SETTING

The Internet is a welcome surprise brought about by humanity's technological development. It is the soul of connectivity. It can acquire various forms and functions, and we have to admit that it is a new culture that complements society's power of information. It marks the beginning of a new revolution in communications by expanding our horizon to much beyond the reach of sight. Being a reader, today, with the internet, is having the power to question the reality of our society, in real time, from direct references of all other societies across the globe.

It seems interesting to review our country through the point of view of a "reader state", considering that, with the connectivity of the Internet, we are not the same people that we were even a few years ago. We have begun to interact quickly with others from all over the world, in something akin to a cultural globalization. In time, all of this can result in a social good sense that can lead us to calmly analyze the facts related to society's needs and interests within the reality of the twenty-first century.

Our common geographical reality is Brazil, and mine in particular is Rio de Janeiro. Being a reader in Rio means having the constant awareness of uncertainty in life, regarding not only your physical safety, but also that of your belongings or freedom of movement. The violence and chaos are taking away, slowly, even our right to come and go. Whether we like it or not, this is the reality in many cities across our country.

Even worse is the fact that there is little hope for improvement in this sad condition, be it in the short or medium term. With the constant economic pressure, the only things that we can see lately are our constantly growing duties as federal, state and local taxpayers. In reality, our rights are increasingly distant.

If we maintain the current rate of dissemination of information, via information technologies, we will soon have the power to decide and demand more fully our rights as an

advanced society. Information, historically, conspires in humanity's favor. We don't have a clear notion of our power yet, but in time, we will realize it more and more as people manage connect themselves to the world-wide web, be it through computers or cell phones.

These two technologies already promise the beginning of a great revolution in the communication between societies from all over the world, and this can be seen as a characteristic of the new century. It is still early to say how and where all of this will stop, but we can't help but notice that the Internet and cell phone constitute brand new tools of connectivity, and when the majority of the population is tuned into it, an idea that unites this mass of individuals will yield a huge power.

Any wish of this new society will represent the will of a country, or who knows, of everyone in the world. This can be in the form of an instant flow of information between millions of people resident in the connectivity. And, if this comes about, we can foresee a scenario in which society will finally have acquired the power of decision, fact never before seen in the history of humanity. The connectivity will, therefore, present itself as being the *boundary condition* of this new power of society, defining its borders with the full force of the technological development characterized by the Internet.⁽¹⁾

Carrying on the spontaneous phenomenon of growth and strengthening of information technologies a new reality will certainly be established, and we will be able to demand more explanations from our governments. It shouldn't be far the day in which the country will be held accountable to the population in a more responsible manner, since today, accountability is reserved for party accords. So we can imagine, only as an exercise in democracy, a reality in which a country has to constantly do its bills together with society until the given day, before the closing of each year, when it has to show what it has done, how much was spent, how much is left in the public coffers, and what else will be accomplished.

Even by inserting the concept of society it is difficult to translate, today, what our reality is as we consider the onslaught of national and international news that crowd our minds every day. We need to unify our reality, effectively identifying the primary needs and wishes of our societies, so that we can redefine our actions if we wish to, one day, have the real right to want and do something.

Today, all of this has to be reviewed in order to be redone, ultimately striving to reconstruct what has been badly done. If we think about it, it's about time that we recreate a new Brazilian ideology so that the citizens are able to be proud of their country and live in a reality more coherent with the intensity of their perceptions.

We have never been offered a moment of calm and priority to idealize Brazil. Everything has always been predetermined, and the only certainty that remains is that society

will have to foot the bill. We can interfere by voting in favor of one person or another who will at some point exert a political function, but notice that, in this act, we don't determine the choice of a common idea, objective or wish of society. We are electing an individual who, after being appointed, will establish his own necessities and party priorities. There lies "the rub" that must be acknowledged. If we don't even remember who we voted for senate or congress a short time after the election, do you reckon we can remember the promises made during elections?

While federal, state and local government priorities are not decided by multiple and rapid popular referenda little will change in Brazil. We can reach this in the future through a grand human connectivity as we complete the expansion of new information technologies, especially of internet ready cell phones. Only when these new types of phones start costing less will they become accessible to the majority of the population, and only then will the masses reside in the connectivity and a new power in society begin to take form.

A new, and never before seen, concept of public administration must emerge as communication technology develops at its vigorous pace. With an instantaneous system of information we can vote, initially, to determine the priorities in all levels of government. Following that, we can vote for the administrators, for the ones we trust to be the best able to do that which has been decided by the society. It is only a matter of time before we stop accepting that national priorities be decided and imposed upon us in party meetings, as is the case today.

Society is stifled daily by a wave of news of all types and dimensions. Our reality, in turn, starts to seem factual than the news. The world of government decisions is so distant from society, or of the citizen, that the news only provoke a virtual effect on people. Today, the speed in which news are bombarded upon us doesn't allow us to effectively feel the consequences of the facts that surround our everyday lives. The sensation is that they will always affect others, but not us. What we need to do is to think about organizing the information, in such a way as to enable us to sort in our minds what is news, what is an idea, and what is the best course of action for society. Today, all of this is very confused and convoluted in the communication mediums.

We can observe the devastating impact of the news upon us when we are informed of our society's perpetual condition of debtor, with internal and external debts directly responsible for all of this. We have been forced to carry out extreme sacrifices, with successive economic plans that, in the end, only solve momentaneous and minority interests. The single apparent exception to this rule is the Plano Real which has been arduously weathering the storms. Whether we like it or not, this is yet another insight into the reality of us Brazilians.

New ideas have to come up. A new generation must arise to refresh this country politically. I think that it is time to begin establishing the criteria for new ideas to renew Brazil. This generation must possess, at least, a lot more information about preservation, technological advances and sustainable development. These are contemporary movements that will provide the basic conditions needed to spearhead society's evolution. In this manner, we should expect to have ideologies that are characteristically Brazilian, aiming to improve the quality of life of the people in this country.

Currently, models of government from all around the world are being discussed, and the first conclusion is that none of them has managed to be totally effective in preventing significant social inequity. This is troubling. This logically shows that we live in a moment in which we should reevaluate all of our concepts, values, objectives and methods, in both a local and global scale. Somehow, we must rethink our society in favor of not only a faster and more competitive world, but a more egalitarian one as well.

Part of what we have lived in this new century is still a stigma of previous times. In a way, however, we have already started to enter into the new age that can be felt by the new techniques of information, communication and technological innovation of all kinds. They are being introduced in all areas of our daily lives, be it in housing, transportation nutrition, clothing, medicine, odontology, as well as in more advanced areas of technology.

We possess today a lot more experience, information and knowledge than any previous civilization. If humanity's ancestors could see all of the evolution that society has undergone, they would certainly be very envious of our technological parks and their new materials, products, techniques and advanced equipment. Soon, we will be able to say that individuals are a lot more evolved. Therefore, what is missing for us to start rethinking where we want to take the Brazil of our time?

What isn't clear and has gone unnoticed by everyone is that we are about to breakthrough to a new age, in all aspects of our lives, of modern societies constituting today's mankind. The technological frontier started being conquered in the twentieth century via the passage from a macroscopic world to the microscopic domain, and this fact ended up creating the world of technology and comfort in which we live. This world is filled with advanced objects, intelligent homes, sophisticated vehicles, specific equipment, industrialized food, and all the rest of the commodities we cannot imagine living without. All of this is recent however, and a lot more intense than we could imagine if we considered the evolution of human society throughout the last thirty or forty centuries.

In the scientific community, the revolution in material science is experienced most frenetically. There is a constant search for all kinds of possible technological innovations to satisfy people's senses and desires. However, in the same way that technology gives back to

society in the form of physical innovations, it also exerts a heavy social and political influence as we realize the power of instantaneous communication. This can be seen in the cases of reality television programs such as “big brother” or “American idol” which connect votes from millions of people in a matter of hours, by means of cell phones and electronic messages. This is a clear sign of the power of connectivity. Just for curiosity’s sake, there were 32 million votes computed on the final episode of “big brother 5”, in March of 2005, each vote costing around US\$0.15. This number represents more than half of the 53 million votes that elected the last president of Brazil in 2002, where the votes were free.

When we realize that we can rapidly decide Brazil’s issues with some similar system, with complete safety, the will of the citizens will truly prevail. Only when this is done will the Brazilian reality really start changing.

What newspaper headlines would we be seeing in the future when the majority of the population is connected and able to rapidly express its needs and wishes? We could see, for example, “The society’s weekly referendum established the government’s priority plan”, or “The society referendum decided about the Amazon...”

The popular referenda will decide, simply, everything about the public resources. We can no longer tolerate to see headlines such as “The president decided this”, or “The minister determined that we should do that.” It is certainly feasible that we create scenario in which we can really decide about our interests, on all scales, considering that, one day, human connectivity will conspire in the favor of realizing our wishes as an evolved society in a reasonable manner.

Facing an acceleration of the world promoted by the Internet, we find ourselves confronting a new public paradigm of communication. If we stop to think, we can conclude that the three constitutional powers (the executive, legislative and judiciary) are already not enough to deal with society’s current speed. It is possible to imagine a fourth constitutional power, created by the instantaneous information derived from the connectivity, responsible for identifying society’s wish in liaison with the legislative, forwarding priorities to the executive and monitoring it all together with the judiciary branch.

We can see in the structure of the three powers that it lacks an input from the society that should be benefiting from them in the first place. Everything is very distant from the population. The fourth constitutional power, or the power of society, should be guided by the voice of the populace, by means of rapid referenda acting as liaison between society and the three other powers. This is especially important since the three branches should be working for society, and in this way, there would be an improvement in the relationship between “bosses” and “workers”

It's a complex reality, but it seems that all of this would eventually lead to a remodeling of the house, necessary for it to become compatible with the high velocity of modern society. The term "fourth constitutional power" is already used to define the power of the media in the interface between government and society. Note that I have used the expression "fourth constitutional power", only to illustrate a possible direct consequence of connectivity upon politics. I will later reference this phenomenon using the expression "power of society", which sounds reasonable to me considering that this would be the true power emanating from the people.

This idea of a power of society, coming about by an instant flow of information, in a great human connectivity, might seem a utopia at a first glance; however, it's nothing but a possible projection of a sequential future not too far ahead, considering the new communication tools that are already within reach of mankind. When we take into consideration the capacity of those computers found within our internet-ready cellular phones, it should be very hard to imagine how a new power of society can physically manifest itself.

We live in an age of technological innovations, fruit of a revolution in material science, and historically the materials have determined the degree of society's evolution. We will notice in time that advances in communication will determine an incredible revolution in the structure of power as well, and in the future, this fact will only be narrated in history books.

The internet has already escaped control by governments and presents itself as an accomplishment by the citizens of the world. We can only imagine how we will describe, in the future, these times of profound transformations in interpersonal relations by means of cell phones, instant electronic messages and online chats, in real time, between people from remote areas of the world.

One day, we will tell the story of how mankind conquered the microscopic domain in the twentieth century. He so triggered a technological revolution with new materials. In the turn of the twenty-first century this fact led to many other revolutions in various technological segments, including the connection between societies and new information and communication technologies. This new human connectivity resulted in a political revolution without historical precedents, which permitted us to distribute the resources all the while reducing humankind's inequities.

Well, all of this can appear to be nothing but optimist fiction, but when we are read this text in the future, and if the end hasn't happened in the way I narrated, that will be a sign that we took a wrong turn somewhere near the end of the path. I can claim this because we already possess a connectivity which is very much a reality, and this will certainly be recorded in history. Therefore, it is in a moment following ours, the "now", that a great expansion will occur, the content of connectivity will be organized, and the exact scenario I hope to paint in

this book will unfold. What I am forecasting is nothing but our short, medium and long-term future. So being, I believe that I am describing both the close-by and the distant days which will compose our lives and that of our future generations.

3- IN SEARCH OF AN IDEOLOGY

We live in a world of materials and these are incorporated in our culture even more than we can imagine. All segments of our day to day lives are influenced, in some way or another, by the materials developed by human necessity and creativity.

Historically, the development and advancement of societies are intimately related to the ability of its members in producing and manipulating materials. In the same way, we classify ancient peoples by the level of development in their materials, such as those from the Stone, Bronze or Iron Age. It is important that we realize the historic period in human evolution in which we are living, for it is a way to attain an identity in time and be able to think about what we want, taking into consideration the vigorous technological potential that we already possess. Today, we are in the Technological Innovations Age.

In the last 70 years alone, approximately, scientists began to understand the relationship which exists between the microstructural elements of materials and the properties desired. This is the basis for the new Material Engineering, which projects and constructs the microstructure of a material in order to produce a set of desired predetermined properties, highlighting the concept of the relationship between microstructure and properties. This advance was reached by means of a microscopic dominion over materials, and in a way, was the key player that sparked all of this technological environment in which we live.

Materials play a fundamental role in the development of a nation. In any economic forecast, the new materials will represent structural priority and function. All of this can be observed, most importantly, in the form of technological innovations, new technological capacitation of the industry, specific characteristics of the demand and new paths for research and development (R&D).

Consequently, a new economic system emerges supported in the variety of new products, which are typical signs of a period of technological transformations in a society.

Together with the technological advances, we have also acquired new behavioral patterns. The big changes are noticed slowly, for they are being constructed by subsequent facts of a natural pre-requisite of technology, and of time, necessary to understand well its consequences.

At times, things change as a result of impersonal and unconscious forces. This is what history shows when relating the facts about human behavior across time. We have the emblematic case of the French revolution, which started as a peasant revolt, and soon became an ideological crusade towards republicanism, human rights and anticlericalism. In the beginning, the revolutionaries had no clear idea of what they really wanted, but the whole movement came to create a new order of power. This often happens, across the centuries; it is part of human nature for us to wish for something and not give up until we get it, no matter what the cost, producing unpredicted effects. In a way, consequences are almost always larger than we can imagine.

There isn't an explosive revolution in sight, but in a way, there is a similarity in the lack of consciousness, today, as to what can happen in the power structure due to the increasingly tighter correlation between technological innovations in communication and society's increasing capacity of informing and mobilizing itself by means of an instantaneous connection.

In time, all of this can create a new power of society, as we use rapid and multiple electronic referenda and plebiscites, within connectivity, to decide collective issues. The power of society, as the essence of democracy, would create a new right for the citizens in the form of direct interference by popular vote to decide society's issues.

The more the technological innovations enhance the connectivity towards instant and multiple votes, the more we will be heading towards an evolved ideology capable of interfering more intensely in governmental decisions that embrace our lives within the nation.

This way, besides the three powers that already exist, the legislative, the judiciary and the executive, we would have a democracy empowered by a fourth dimension as we introduce the power of the society, characterized by the instant vote of people resident in connectivity. **This** would be the real power of society, where power would effectively emanate from the people. This is why I thought of "**the connectivity**" as the main character in this book, for it is she who will determine people's lives more and more. A first sign of this, today, is that those who are digitally illiterate tend to distance themselves much more from basic opportunities to reach a desirable lifestyle.

We possess a structure of communication technology that is still recent, but maybe it is still the basis for a new type of inter-personal relations, much more evolved, in which we will

be living as a result of connectivity in the future. Soon, in the moment in which the connection is widely consolidated and better channeled, we will acquire the power to exert our democratic rights more fully, both those rights we have already attained and those that are yet to come.

If all of this generates more reasonability, in time, the great human inequities will tend to be reduced. This can be supported historically, since whenever significant technological advances have improved the quality of our lives, humankind's inequity has tended to diminish, enabling new and unthought conquests for society.

We can't clearly imagine where we will arrive with the innovations and advances. We are immersed in a technological culture which supplies us a lifestyle of great comfort and able to inspire considerable jealousy in any previous civilization. An optimist perspective of the future can be supported by the current technological evolution, as in the kind indicated in the graph of figure 1. This graph shows the amount of information contained in each class of materials across time. The technological jump in the time axis signals the materials revolution that we have lived so intensely, and which has been redefining our lifestyles in the last decades.

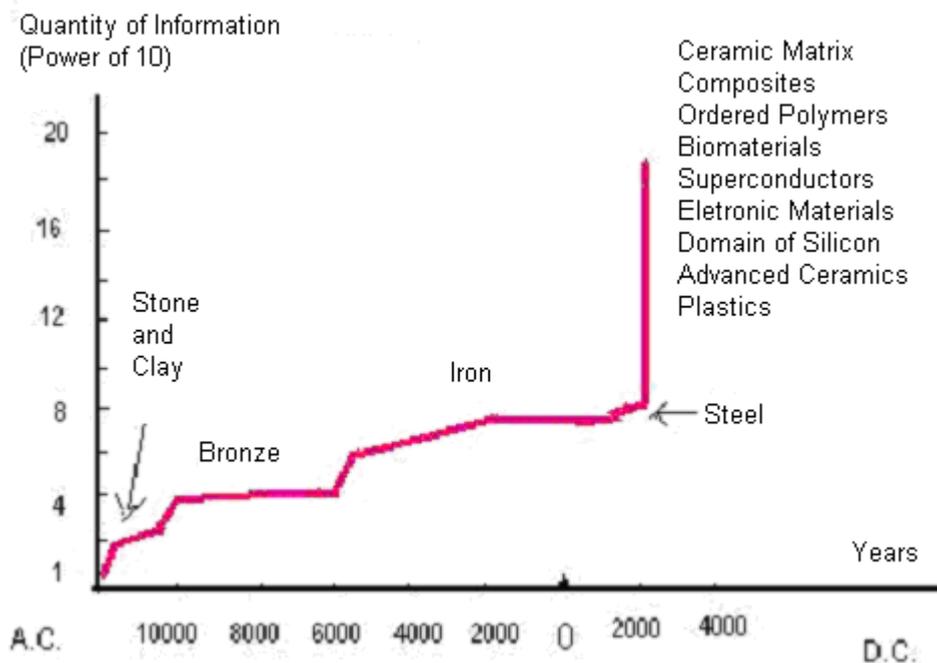


FIGURE 1 – The technological jump in the time axis indicates the revolution of new materials in which we live in the turn of this new century. It can be seen as an estimate of the amount of information contained in each class of materials, to the power of 10. Currently, it is estimated that we are close to the order of 10^{20} .

From primordial times until today, the amount of information incorporated in each new class of materials has increased exponentially. Information is being incorporated as technological innovations appear, and through the advances in materials we achieve a significant increase in social satisfaction for humankind. So, what is most important to notice is how a great evolution in human behavior seems to be the very least that we can expect when confronted with the sheer magnitude of the material revolution.

This whole phenomenon has also been producing a cataclysm in the information and communication technologies, which present themselves as the determining factors for new social conquests. These new technologies will be focused on in the text due to their critical relevance as fundamental physical components that will configure the great human connectivity.

Even with all the turbulence in the world, the outlook must be optimistic, for it is obvious that for every action of technological absorption by society, there will be a consecutive reaction of uncontrollable dimensions in human behavior and evolution. We are already absorbing the internet, the soul and icon of information technologies. Therefore, from this point of view, the connectivity will be a reactive symbol of a new power of society. As all of this continues to grow, a new ideology about a fourth constitutional power of society can be created which will impart a future quaternary structure of government.

4- SUSTAINABLE DEVELOPMENT

The vision of sustainable development seems to be the most sensible solution that we have at the moment as a model of evolution for modern societies. Everything indicates that many future generations will still hear about it, for it is a conscious movement which binds the boundary conditions of technology with society's wishes. Note that from this point onwards history already considers us members of an evolved society, and shows that a technological culture goes on generating its own reasonability.

The goals for sustainable development are:

- 1 – Minimization of energy loss.
- 2 – Minimization of material use.
- 3 – Minimization of social impact.
- 4 – Provide adequate social satisfaction.

These goals clearly indicate the start of man's worry with natural resources, associating them with the instinct of self-preservation of the human species for people's well-being. The analysis of its objectives reveals a concern in preserving the planet's natural cycle, necessary to maintain all of our technological development underway. For example, we already know that energy means finite resources and environmental impact, therefore it must be conserved. Materials are equally valuable due to their scarce origin, for they are physical resources and present a great problem in the exponential increase of waste they generate. Current understanding is unanimous in regards to the importance of preventing environmental impact. Ultimately, the search for social satisfaction suggests the return of technology to the people. This is the aspect that most interests us within the proposal contained in this book.

The passage a macroscopic world to the microscopic domain, which occurred in the twentieth century, marked a historic evolution in the relationship between man and his natural resources. This enabled him to start to understand the existing correlation between microstructures and material properties. From this point on was begun a material revolution, characterized by the frenetic search of processes able of transforming any raw material into new synthetic materials with specific properties desired for specific functions. These materials are the same that made it possible for mankind to develop the atomic bomb, and everything else of comfort and advance which we possess in our technological culture.

All of this movement conducted a change in the focus of the politics of materials. In the past, natural resources were synonymous of materials. Today, we have interest in the secondary stage as we employ sophisticated processes of production to obtain new types of materials. This new production moves the economy's centre of gravity downstream, as we apply advanced processes and aggregate value to the final products, be they derived or not from natural resources.

This is the concept of the new materials paradigm where the traditional products which used to reign are increasingly substituted by products rich in information and technology, built custom-built for their application, and with a new value added to them. This model creates the ideal conditions for research and development of the new, advanced, materials and techniques.

We can observe that the current economic panorama is related to the substitution of materials and their technological innovations. Therefore, technological performance becomes the factor of substitution as it provides, made-to-measure, the required properties for a specific function.

The intensity of material substitution is determined by the very speed of technological, industrial and economic development of society. Consequently, a new economic system emerges, supported by the diversification of materials and the variety of new products, signaling a phenomenon typical of a period of great technological transitions.

Beyond expanding the limits of industrial objects and being located exactly in the point of interaction between industry and development, the new materials also act by reorganizing the processes of production. In many aspects, the cataclysm in the processes of production, the result of new methods and manufacturing techniques, is a portent of transformations at least as important as those resulting from the use of information technologies. It is evident that the simultaneous dominion over the evolution of materials and information technologies is the only way to effectively manage the transition from an old industry, founded in standardization, to a new one supported in variety.

All of this can be considered a simple account of our recent technological history. However, these are the factors which led to the revolution of new materials in which we are currently immersed in, surrounded by computers, electronic equipment, vehicles of all kinds, satellites, etc. But, the sensation that must remain is that this revolution has been redefining our way of life for the better. Everything is in swift transformation for us to acquire more consciousness and capacity for mankind's evolution.

Therefore, the project of sustainable development arises in order to auto-regulate the material revolution, creating margins to try to channel the technology back towards society. This seems to be the main idea, that is, that technology must return to the people, showing us that we must be careful with the human species.

In this technological stage of human evolution in which we find ourselves, we begin to understand that the really crucial thing is the social satisfaction of human beings. The social result of a competitive environment is the variety of products, which excite human creativity and provoke a natural organization in the scope of science and technology. We don't consider the ancient concept of productive chains anymore, but do instead the reality of a new tri-dimensional cooperation between the realms of science, technology, industry and economics, as idealized in figure 2, where each one of these sectors contributes to the development of society.

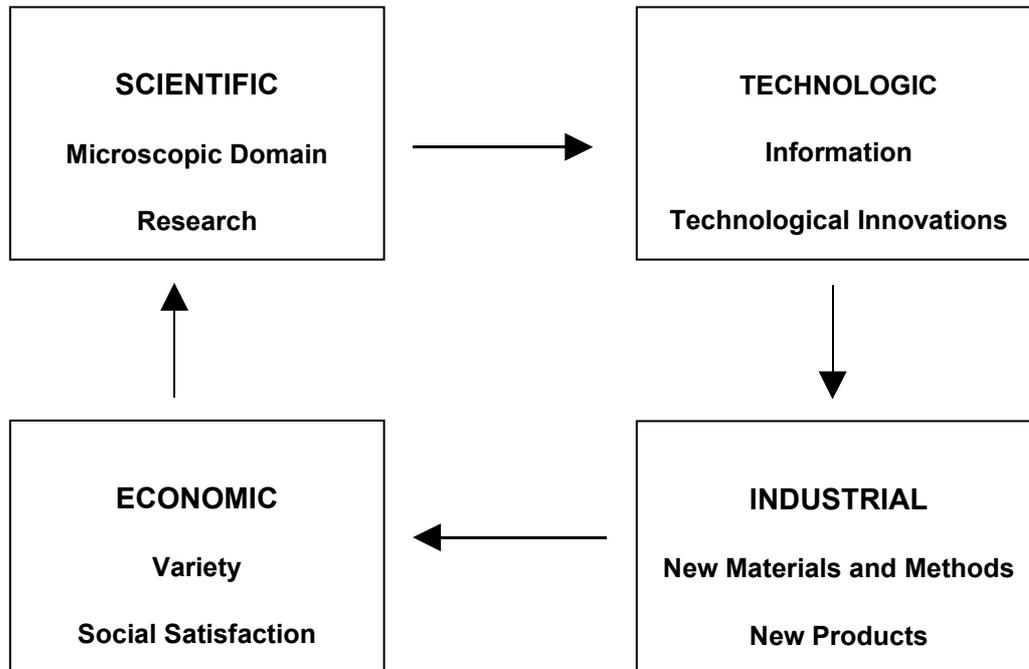


FIGURE 2 – Main sectors of the new concept of human development in the form of a tri-dimensional network of cooperation.

The scientific sector develops advanced research that results in information. The technological sector retains this information and develops new materials and techniques which will create the new technological innovations. The industrial sector uses the technology and supplies new products that generate variety, which in turn leads to social satisfaction to supply the economic sector. The economy, in turn, reinitiates the process by providing resources for scientific research, resupplying other movements in the chain, in the search for innovations, and so we see the technological development realize the evolution of society.

This scenario, constructed in the midst of intense transformations in the scientific, technological, industrial and economic pillars of societal development, undergone in the last decades, indicates that we are living in a revolution of new materials in all segments of our day-to-day lives.

All of the argumentation around the economics of new materials discussed so far signals how the world has already changed in its evolutionary structure. Something similar must happen in the aspects of communication, when a significant increase in the amount of people inserted in the connectivity happens, which should provoke natural changes in the way of making politics in the future.

When we think about information technologies, which have already promoted a revolution in the area of communications, an infinite horizon opens, for they will have immeasurable effects unto society across time. The technological innovations that already exist, or those which are still in research phase, or even those yet to come, each one increasingly improved and custom-made, will expand human connectivity much further and all of this is already an irreversible phenomenon.

Following this line of thought, we can say that information will be an increasingly expensive prime material. This can already be seen as we observe the phenomenon of unemployment. This is a complex reality, but in the same way that technology closes down work-places due to automation, it also creates new functions that will require more knowledge from individuals.

There hasn't been a work-force capacitation fast enough to keep up with the advance of new technologies, and our generation living in this revolution doesn't even realize what is happening, but feels it insofar as it can't handle the specific culture demands for a specific job.

There is a need for this new dynamics of modern life to be directed towards the acquisition of specialized cultures, which in turn will be translated as the possibility of reaching a desired lifestyle. Only with access to information via a mass connectivity will society be able to acquire more consciousness and identity in order to reduce social inequity. In a way, the fact that kids enjoy computers and cell phones so much is already a sign that we should expect this generation to come to be a lot more connected than any other before it... and all of this is nothing but the beginning of the "**connectivity era**".