

“Lessons from ICT pilot projects in rural Haïti for sustainable economy with four inferred coefficients for the GNH index”

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PASCAL (French philosopher): on “HAPPINESS”

**“Happiness is a marvellous thing: the more you give, the more
you are left with”**

French – « *Le bonheur est une chose merveilleuse: plus tu en donnes plus il t'en reste* »
Creole (Haïti) - *Ala yon bèl bagay se kontantman, plis ou bay ladan'l plis ou rete ladan'!*
Russian : **Счастье – волшебная вещь: чем больше ты его даришь, тем
больше тебе остаётся»**

Arabic: السعادة شيء رائع كلما أعطيتها كلما بقيت لك

Spanish - *la felicidad es un artículo maravilloso: cuanto más se da, más le queda a uno*

Italian - *la felicità è qualcosa di meraviglioso: più ne dai e più te ne rimane*

German - *Glück ist eine wunderbare Sache: je mehr du schenkst, desto mehr hast du*

Swedish - *lycka är något underbart: ju mer du har att ge, desto mer har du kvar av den.*

Occitan - *la felicitat es una chausa meravelhosa: mai ne'n donas, mai te'n rèsta*

Latin - *beatitudo res mira est: plus das plus tibi manet*

Esperanto - *felicxo estas io mirinda; ju pli multe da gxi vi donas, des pli multe al vi restas*

Flemish - *het geluk is iets fantastisch, hoe meer je ervan geeft, hoe meer je krijgt*

Basque - *zoriona gauza miresgarria da; zenbat eta gehiago eman, orduan eta
gehiago daukazu*

Christopher COLUMBUS

(Entry from his journal on his voyage of 1492)

**« Your Highness ...determined to send me, Christopher
Columbus, to the country of India...and furthermore
directed that I should not proceed by land to the East as is
customary, but by a Westerly route, in which direction we
have hitherto no certain evidence that anyone has gone »**

Introduction

We are living in a world where, in less than 20 years, some drastic changes occurred around four key factors:

- the end of both Soviet and American super powers with the raise of invisible walls among communities (with three key dates 9/11, 9/11 and 9/19) ;
- the rise of ICT (*Information Communication and Technology*) around a mobile Internet world platform for free ubiquitous access to information and WEB 2.0 leading to a globalization 2.0 digital future ;
- the watershed of Information in some areas of the world ;
- the people consciousness of our finite world in terms of traditional energetic resources and of danger of climate change due to ozone layer pollution bringing concern about a future with existing past models vanishing with the fall of the 2 superpowers..

We are facing the rising of key dangers which could lead to potential collapses of traditional energetic, financial and political systems (16). There are three major issues facing our planet in the future: ENERGY, WATER and EDUCATION. ICT will be the cornerstone for optimizing or providing solutions.

Based upon a 10 years experience in creating solid ICT foundations in Haiti with some pragmatic deployments in poor rural areas, we inferred four key coefficients to be developed in joint multi-disciplinary researches around the GNH index at the Bouthan and European level. We propose to enrich the GNH index and other European contributions like the one proposed in the Paradiso project (13) with the influence of our ICT and Mediterranean rim experience (Caribbean might be considered as the Mediterranean of America).

This paper is organized as follows:

- a summary of the recent paradigm ICT shifts in the last five years which represent a real opportunity for developing countries ;
- an overview of concrete bottom up approach of ICT in rural areas of Haiti for sustainable economy conducted within a long term-strategy leading to the crucial role of mobile-learning platforms ;
- a proposal of four inferred coefficients to be developed as a ICT Mediterranean contribution to the GNH or Paradiso Index.

1. A strategic ICT vision in a digital future of Globalization 2.0

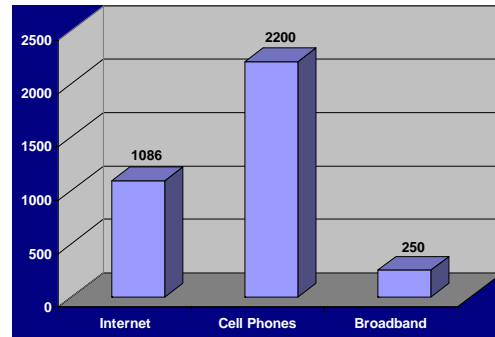
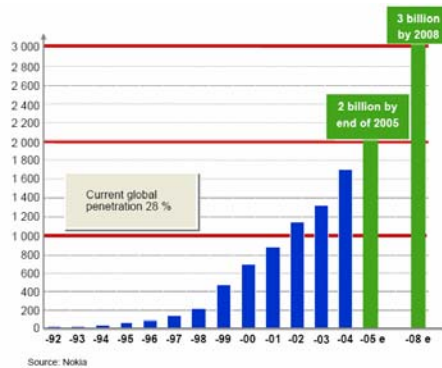
1.1 INFORM@TION : The new energetic resource of this millennium

"Mobile phones are cheaper than PCs, there are three times more of them, growing at twice the speed, and they increasingly have Internet access. What is more, the World Bank estimates that more than two-thirds of the world's population lives within range of a mobile phone network. Mobile is going to be the next big Internet phenomenon. It holds the key to greater access for everyone - with all the benefits that entails."

Eric Schmidt, Google CEO (2006)

We have been living since 1993 (1st commercial WEB site and Cell phone launching in Europe), two successful ICT revolutions of world magnitude: Internet and wireless

telecommunications (cell phones) which represent the tip of the iceberg of convergence between computer science, telecommunications and multimedia.



Mobile Internet is Next Big Wave (Figures from NOKIA)

Let us just give six figures to illustrate the digital era in which we are living today. In 2008 there are:

- 4 exabytes (10^{19}) of unique NEW information which will be generated (more than in the previous 5000 years)
- 3000 books published each day in the world.
- More computer transistors than RICE grains (with a lower cost of production) or ants!
- 100 000 New Internet users / a day (1st commercial WEB site in 1993)
- 1000 millions PC's connected to Internet
- 3 billions of cell phones (1st one in Europe in 1993) with the most important growing factor in “under developed” or “emerging” countries (30 millions new cell phone users a month in China)

In 2003, the world population was 6.3 billion, thus almost 800 MB of recorded information is produced per person each year. It would take about 30 feet of books to store the equivalent of 800 MB of information on paper (7). We are experiencing a watershed of information with a new world communication platform (Internet) having now a hand held information-delivery device: the cell phone.

“Information” is the raw resource of this millennium with positive properties (*enriched when shared like happiness as said Pascal*) making tomorrow managers specialists of abundance and not of scarcity (like oil or cash/finance). Mobile Internet will enable information access ubiquity. We ll call it “**mobiquity**”.

We proposed a new formula for information in the ICT future: “**E= MC³**” (14) to emphasize the fact that:

- Information is becoming a key Energetic resource with
- **M**ultimedia nature (text, picture, video, sound ... are digital),
- **C³** to sum up this convergence era between **C**ommunications, **C**omputing and **C**onsumer Electronics.

The cell phone of the future will be a real computer with Internet going mobile (just consider the arrival of Android, the operating system from Google at the end of 2008 !), a camera, a TV set, a payment tool, a key, a remote controller and occasionally a... telephone (80% of the traffic on a cell phone in Japan by 2010 will be data other than voice cf NTT Docomo Study).

The cell phone will host **a portfolio** of personal customized information **mobile services**: the **M-services**.

The mobile digital Web advent alters how we interact not only with computers but with one another. We are inhabiting a world where distance and time no longer matter and where communication becomes virtually instantaneous with potentially a mobile ubiquitous access to information (9). We can take the goldfield analogy: every increase in connectivity creates an increase in value which could be summarized by Metcalf's law: *the value of a network increases in direct proportion to the square number of its nodes*. The NETWORK effect integrates not only Metcalf's law but Moore's (power), Gilder's (bandwidth), Morris' (storage) laws to leverage the power of any network by the potential it carries for total connectivity. The heart of this transformation is virtuality (physical distance becomes irrelevant). After "tools" of the agricultural revolution, "machines" of the industry revolution, the world now gets computer "SERVERS" to open a new era of information virtual revolution. New paradigms to integrate a positive and optimistic attitude for our digital future are needed.

1.2 "We ll BIP and TAG the future"

We can sum up the salient features of this digital ICT era (14):

- *Broadband Internet in the pocket* ("BIP") with the arrival of WIMAX (rev"E" on cell phones) (U5) and other wireless technologies beyond 3G (meshed wifi networks, etc..)
- "*tagged*" objects with RFID tags (*Radio Frequency Identification*) replacing bar codes and opening the road to tracking objects for developing coffee fair trade in Haïti for instance (see U6); 1000 billion of objects will be tagged by 2020 with each one capable of having an Internet address (with the new IPv6 addressing Internet system enabling each atom of getting and address!). Objects will communicate more than human beings with new expected added-value information services for health and education. A cell phone embedding an NFC (*Near Field Communication*) chip (14) or (U4) will be able to read these tags and access information concerning the history of associated objects. More than 500 millions of NFC phones will exist in the world by 2011 (U4).

One of the most promising technologies lies with the WEB 2.0 enabling the creation of positive communities (see Wikipedia) to help each other; just let us give our project of "WIKIdeas" or "Face School" project (16) to enable teachers of this planet to share experimental positive practices in developing countries (cleansing, water preservation, health, energy with solar ovens, agricultural experiments, ..). Wikipedia (U3) enables schools with no books to get a free encyclopaedia if they have an Internet access.

1.3 The crucial m-service-centrics ICT view of our digital future

The future belongs to M-services in the areas of health, education, m-government, ecotourism culture and finances (micro-credit, international fund transfer ...) with real opportunities in developing countries and mainly in Haïti as we experienced it.

Wireless information services of the future will be *location-based* and *touch-based* with new contents provided in the 4th screen of human history. Added value services could be pointed out like:

- m-learning (not only for teachers or peasants but also to fight illiteracy with new tools ; see for instance the AL ANDALUS project in Morocco, Haïti and Madagascar with NFC multi-touch virtual smart posters (17), (U9) or in IRAN (15) both for illiterate isolated populations in rural areas ; illiteracy is a key world issue and not just in developing countries

with severe negative long-term effects like terrorism booming in desperate populations ; almost 780 million people are considered to be illiterate in the world with a majority of women (U2) .

- m-alerts in case of flooding or hurricanes; see for example the SIMBI project for Haïti (U8) or the Early Warning System in the Dominican republic (U10).

Due to the widespread dissemination of cell phones in developing and emerging BRIC (Brazil, Russia, India and China) countries with touch-based capabilities opening their use by illiterate, we are aiming at M services - centrics future.

1.4 New world paradigm shifts in the digital future: from 11/9 to 9/11 and 9/19

We have to think, do, live, be the unpredictable. There are three key dates with creative and destructive foundations marking the death of predictability:

- **11/9** (1989): dismantling the Berlin wall posting the end of Russian/Soviet super power ;
- **9/11** (2001) : destruction of the World Trade Centre and construction of virtual walls raised among communities
- **9/19** (2008) : end of American superpower with the financial world collapse and the beginning of a new era for sustainability.

- **The fall of superpowers : 11/9 and 9/19**

11/9/1989, with the fall of the Berlin wall, marked the step of the end of the Soviet super power. It was a real wall built to physically separate communities. The future seems to be promising in terms of happiness with the threat of a new world war vanishing for ever.

9/11/2008: in a year where the world knew hunger riots in many countries due mainly to food speculation, we are facing collapse of the world financial system marking the end of the American superpower. Both were the results of “free” VIRTUAL (finance) and REAL (food) “free” speculations!

- **The rise of invisible walls : 9/11**

9/11/2001, with the rise of terrorism walls, marks the beginning of an instable era with issues which could be solved only at the world level with new referential models to be defined.

We identify the need for long term solutions in three key domains:

- Food, waste and water,
- education (illiteracy issue) and
- renewable energy.

We do believe ICT will play a kernel role due to the (mobile) ubiquitous access to Information. In our digital future walls and bridges will be invisible. We all have to work building **invisible bridges** among communities to build a “happier” world.

2. A long-term ICT vision for economic development of Haiti with the Casa Karibe Nova project

New wireless information technologies with broadband internet and communicating tagged objects thus represent a real chance to boost the reconstruction of the infrastructure of Haiti in every aspect, physical and virtual:

- Electricity
- Telecommunications (Wimax,..)
- water quality and environmental protection
- fair-trade commerce for coffee, mango, vetiver,... (with RFID used for tracking and quality certification labelling)
- biological agriculture
- Health (HIV control and prevention,..)
- education and training
- arts
- ecotourism,
- call and data centres for 1/7th of the population living in the USA or Canada
- etc..

There is an historical opportunity to pair the physical infrastructure reconstruction (electricity, roads, water, sea routes...) with a twin ICT infrastructure with short-term and long term benefits for the whole economy.

The CASA CARIBE NOVA (CCN) project, the “*House of the Information future in the whole Caribbean region*” is based upon strong foundations built during the last 10 years in Haiti and strong partnership with the IT industry. CCN aims at providing the beacon ICT project to demonstrate in real life the appeal of new technologies for the economic development of Haiti with a focus on the rural sector development based upon a network of WIMAX tele- centres. CCN emphasizes the 3 balanced dimensions of success in tackling new technologies: (added-value information) SERVICES, INFRASTRUCTURE and CONTENT. Such an economic development should reverse the population flow from the overcrowded capital (Port au Prince) to self sufficient and developing rural areas with broadband Internet in the future attracting also doctors and teachers while creating new jobs (call centres, data centres, ..).

The Frog technological leap is possible due to the recent ICT paradigms shifts (“*BIP and TAG*”) which could immediately benefit to the Haitian economy.

Due to the fruitful long-term partnership with a graduate master degree of the University of Nice (France ; see annex) which has been settled in Port au Prince, the State University of Haiti gets the know-how to master these new ICT technologies at every level in a dynamic manner.

More or less 100 MBDS master students recently graduated in Haiti in the data base and ICT fields; quantitatively and qualitatively, Haiti has the human resource to technically and directly support and deploy CCN projects.

CASA CARIBE NOVA represents a layered approach to capitalize on this already existing know-how in Haiti; it represents a converging project to federate such efforts and create a long-term foundation to ensure continuity and dissemination in the whole Caribbean region. It is leveraging existing high-level educational assets. We thus identified three steps.

2.1 Step1 (1998-2008): A long term investment foundation in Haiti around wireless information technologies with ICT university partnership around MBDS degree.

Implementation of the French MBDS graduate master degree in Haiti represents the proactive long-term kernel of CCN project. It took 10 years to successfully delocalize MBDS (see Annex), a CS master degree around new information technologies (20 Haitian students are formally enrolled in Nice). This MBDS graduate degree is unique in Europe by its relationship with industry which enables to prototype wireless information services of the future under industry contracts (500 K Euros a year in Nice). 5 Haitian professors and 5 groups of students (20 Haitian graduate students each group) were educated and now are disseminated in every economic sector of Haiti : the most important Haitian Software house (“Solutions Haiti”) was founded by Haitian MBDS students, the computing directors of major Haitian banks graduated from MBDS.

Thus, there exists a real Haitian know-how to master new ICT technologies in Haiti due to such partnership. This represents the strongest asset at the heart of proposed CASA CARIBE NOVA project and a warranty for any ICT deployment project.

Such education investment was mainly supported by the private Haitian sector (80% investment from Banks) with the support of AUF; this globally corresponds to minimum 100 K dollars a year including the restoration of a complete building inside the Campus to host it (in 2003-2004 the program was suspended for political turmoil and restarted in 2005)

Very advanced projects like wireless micro-banking, municipality and hospital management, GIS, data mining, etc. were conducted by MBDS Haiti during this period. Solutions Haiti was the local software house partner to deploy the coffee fair trade tracking system in rural Haiti inaugurated in March 2008. Then a pilot WIMAX and NFC project was prototyped (by MBDS and Imagine Institute in France) and deployed (by Solutions Haiti) in CAP ROUGE close to Jacmel city, an isolated rural Haiti without water and electricity with more than 2000 school boys and girls (Inauguration in March 2008).

2.2 Step2 (2008- 2012): A portfolio of real life m-services pilot projects in rural Haiti before deployment all over the country.

The Haitian telecommunication regulator (Conatel) decided to financially support the MBDS degree and Solutions Haiti to respectively prototype and deploy a portfolio of wireless information services in rural Haiti in 2008-2009 after the successful inauguration of Cap Rouge tele centre. Let us summarize 2 major achievements: coffee tracking with NFC and Wimax and literacy campaign using ICT.

2.2.1 Coffee tracking for fair trade in Haiti with NFC tags and Wimax

The first application deployed in Cap Rouge tele centre in March 2008 by the Imagine Institute of the university of Nice (France) concerns coffee tracking for fair trade from the local Haitian rural cooperative up to the Malongo factory in Nice (France). We deployed a WIMAX infrastructure (donated by Alcatel Lucent and VOILA an Haitian mobile operator) in Cap Rouge, a secluded rural coffee area, enabling to have high bandwidth Internet in a 20 miles circle around the telecommunication antenna. We used NFC/RFID technology to tag the coffee bags as soon as they leave the peasant cooperative.

This tracking enables first the peasants to be paid as soon as coffee bags are leaving the cooperative. Then Malongo Company can size the appropriate containers in Port of Prince and track the whole local coffee processing in dry and humid collectors. Finally, European customers thru 2D visual tags (“*flashcode*” derived from data matrix standard) could get multimedia information validating the Haitian origin of the coffee by just taking a picture of the *flashcode* using the camera of their cell phone (free Java applet).

The “BIP” WIMAX facility is used also by two local schools of the area equipped by PC and solar energy (by Solutions Haïti) and a doctor facility.

The tele centre is used to educate teachers and peasants to help them improving their agricultural know how. This running project is visible on a Switzerland TV broadcast at (U6).

2.2.2 Mobile Internet services 2.0 and education for illiterates in Haiti, Morocco and Madagascar

In summer 2008, at MBDS in Morocco, we developed an NFC multi-touch virtual education poster to learn how to read and write in French for illiterates having a cell phone (becoming a *tutor in their pocket*) using short video-clips from celebrities acting as teachers. By touching the virtual posters users can get (on the screen or their phones) the video clips explaining the letters and the words, exercises and personal practice. See (17) and (U9) for a video.

We proposed a generic literacy project (OMEGA 2.0) at OIF in September 2008 for enabling a complete deployment of AL ANDALUS with two extra features of the project to fight illiteracy:

- Synchronous and asynchronous Open Source platform for remote education in rural areas with WIMAX (both for teachers and peasants);
- a mobile WEB 2.0 site for teachers, (WIKIdeas or “Face Schools”) recording and sharing good practices in developing countries in a bottom up approach (health, education, water preservation, ..).

2.2.3 Haiti ICT Lessons

Following the successful WIMAX pilot project in rural Haiti launched in March 2008, decisions were taken by the Minister of Telecommunications of Haïti to provide broadband Internet in the whole country. Haïti decided to create the BIP telecommunication infrastructure with free Internet connexion to schools and public places.

Second lesson, education should represent the kernel domain of major investment to give 50% of the population a future without loosing any generation and avoiding collapse of the country (see (16) for an historical perspective of Haïti danger to collapse).

The INFORMATION economy requires skills. There is no shortage of work or opportunity in the digital world, just a shortage of skills and ideas. Haiti is rich of intellectual culture and artist creativity with a syncretism religion (voodoo). What is needed is thinking skills, service skills which will fuel the future jobs. No economy can grow a 5% p.a. with a 60% illiteracy rate. Basic literacy plus entrepreneurial skills can create economic sparks! Illiteracy issues could be overcome by video and audio streams as we demonstrated it with virtual NFC multi-touch posters in the AL Andalus project (U9); the OMEGA 2.0 project we defined in 2008 is aimed at this goal (17). We could create economic fever for the new skills and jobs (from web master to ecotourism manager).

ICT Education will concern teachers, peasants and illiterates. Most of the schools do not have books. More than 50% of the population owns a cell phone. Providing M-learning and mobile Internet services is long-term economic development prerequisite. Concerning energy renewable energy will be a primary focus with solar and wind (!) potential. Extending a famous Lenin’s sentence concerning Russia in 1924, we might say that **the future of Haiti** will be **“SCHOOLS + Electricity + internet”**.

Final ICT lesson stems from the present situation of Haïti and the identified potential of ICT with a large portfolio of M-Services: M-alerts (*800 deaths in September this year after 4 hurricanes*) of SIMBI project prototyped in 2008 (U8), M-government, M-ecotourism, M-health, M-learning, M- culture (*virtual Caribbean museum with Cuba*), M-payment, M-fund transfer...

As a side effect, broadband Internet paired with education should enable to develop new economic platforms like call centres and data centres anywhere in the country to support the diasporas activity in the USA and Canada. Finally the country islands and beaches are “raw diamonds” which should be preserved from mass building and mass tourism. There exists a real potential to attract tourists from neighbouring islands (Dominican Republic, Cuba, Jamaica) to make them discover (using their cell phones as teasing tools) **Caribbean authenticity**. Ecotourism has a great potential in this preserved island and should be addressed in a strategic people development framework.

2.3 Step3 (2012-2020) : A “moon project” : A science park in South East Haiti around CASA KARIBE NOVA

A Haitian science park around CASA CARIBE NOVA could exist within 10 years. In less than 10 years Haiti should become an ICT country leading the way in the whole Caribbean. ICT could be the pivotal kernel of a balanced global economic development of the country.

3 GNH with two 2 key contributing areas : The Mediterranean (and Caribbean) rims and 4 technical, economic and philosophical proposed coefficients to be studied

Let us take the definition of GNH found in Wikipedia . *Gross National Happiness (GNH)* is an attempt to define quality of life in more holistic and psychological terms than Gross National Product. The term was coined by Bhutan's King Jigme Singye Wangchuck in 1972 in response to criticism that his economy was growing poorly. It signalled his commitment to building an economy that would serve Bhutan's unique culture based on Buddhist spiritual values. Like many moral goals, it is somewhat easier to state than to define. Nonetheless, it serves as a unifying vision for the Five Year planning process and all the derived planning documents that guide the economic and development plans of the country. While conventional development models stress economic growth as the ultimate objective, the concept of GNH claims to be based on the premise that true development of human society takes place when material and spiritual development occur side by side to complement and reinforce each other. The four pillars of GNH are the promotion of equitable and sustainable socio-economic development, preservation and promotion of cultural values, conservation of the natural environment, and establishment of good governance.

We were totally seduced by the appeal of such a human-centrics index putting aside the unique “money” resource to evaluate the well-being of a country; moreover in a world where recent crisis demonstrated it (the “9/19” financial collapse !), finance cannot be the neutral reference of happiness or stability. Who could say today that a present “rich” country having some oil and gas reserves could bring a referential model of happiness or democracy?

After looking at poverty and happiness in the digital world, we propose 3 coefficients of prime importance coming from our ICT experience in Haïti. We then propose some vision of a potential Mediterranean rim contribution to the GNH index.

3.1 “Poverty” and Happiness

Paul Collier points out, poverty is actually developing quite rapidly for about eighty percent of the world. The real crisis lies in a group of about 50 failing states, the bottom billion, whose problems defy traditional approaches to alleviating poverty (11).

Amartya Sen (18) after analyzing dramatic famines in India in 1943 while food was available emphasized the role of poverty; from a capitalistic point of view, people were totally free to buy food ...but only if they could afford! He then introduced the concepts of *positive and negative* freedom. Positive freedom integrates the concept of *capabilities*. A poor person should be capable to buy or receive food, to vote, etc...This concept led to the IDH index used today by UN to evaluate individual and collective well being.

This capability factor should apply to information *mobiquity*: “*Poverty is a denial of access to information*” said F.Verela in his visionary speech in Haiti during the inauguration of the Casa Karibe Nova project in Marc 2008; therefore we propose the CUC coefficient. Poverty deals also with economic development and job creation; the CBC coefficient is attached to it. Then ecological concern should exist in a paradigm shift where *prosumers* should buy and waste in a different way: this is proposed thru the CRC coefficient. Finally poverty leads to renunciation and hopeless future; thus we need an intangible coefficient which leads to positive action and it is the CDC youth factor.

3.2 Contribution with Quantitative and qualitative coefficients for a GNH Index : CIC, CBC and CDC

We plan to conduct research on four complementary coefficients which stem from our ICT experience in Haiti: CUC, CBC, CRC and CDC

CUC: Coefficient of information (access) Ubiquity Communication

“Humankind created a new world platform of communication, entertainment, infotainment and business: the Internet. Mankind can work together with constructive goals” (9)

Information watershed is the symbol of speed and acceleration; ten paradigm shifts are attached to the digital era inflexion point (5). Future focus is on intelligence which does not need expensive physical industrial infrastructure. Meshed Wimax and Wifi networks could provide low cost communication in developing countries with free Internet access to information in school and public places. We are entering the age of the individuals and communities (2.0). Education information system is the primary target in developing and emerging countries: an extra year of complementary education makes 1.3% per capita increase.

Internet is both a new continent to be explored in a balanced manner, and a globalization platform for health and education and any service development. Universities represent the first companies of the digital economy.

To “BIP” the digital economy, we need a mobile ubiquitous access to information: any where any time any how; this means the capability of delivering information and education in the cell phone: “*Mobiquity*” is the future. Developing world joins digital ecosystem via mobile phones.

CUC coefficient should represent this capability. The portfolio and spectrum of M-services available on the cell phone then represents a great potential of people inclusion in our globalization 2.0 digital world. M-learning service will play a centre role to fight illiteracy. M-learning is the gateway to e-learning for most Africans and Haitian as the rapidly growing wireless infrastructure fulfils the access needs more and more. Africa and Haïti are actually leapfrogging from an unwired, non-existent e-learning infrastructure to a wireless m-learning infrastructure. If the technology is top down and predictable, m-services are bottom up and unpredictable. The sky is the limit in terms of creativity. As pointed out in AL ANDALUS project, literacy means not just reading and writing skills but it also refers to the appropriation of the 4th screen in the history of mankind, a set of cognitive skills that are necessary for knowledge acquisition, structuring, comprehension and learning. Such skills can exist independent of literacy also but then they are not well groomed.

CBC : Coefficient of Business Creation ;

We cannot discard real economic indicator in any index evaluating “happiness” in a country. First of all people facing poverty need to survive in front of hunger as 2008 riots in poor countries sadly demonstrated it when food became a matter of financial speculation. We could prevent them by ruling out food speculation at the world level and avoiding some agricultural transformation for short term benefits (for instance agricultural oil) or meat production to meet some new standards of living in BRIC Countries.

Countries grow out of poverty when they create an economic environment that eases people and poor people to start business, create jobs, raise (micro) capital while they do not have necessarily a bank account nor being bankable. In this respect, M-microcredit services could be helpful in a future where “*bank will be in the pocket*” (the cell phone itself).

The real issue is not just employment per se, but increasingly *PRODUCTIVE EMPLOYMENT* that enables living standards to rise.

Deng Xiaoping, the Chinese leader did not hesitate to say “*to get rich is glorious*” or “*Black cat, white cat, all that matters is that it catches mice*”. What matters is JOBS and INCOMES not ideology. The World Bank gave the following figures for China:

- 1990 : 375 millions people living in extreme poverty (less than 1 dollar a day)
- 2001 : 212 million Chinese
- 2015 : expected 16 million

We then need to point out the CBC coefficient with CBC time and CBC Cost: Using World Bank International Finance Study (IFC) (“*Doing Business in 2004*”), it takes 2 days to start a business in Australia but 203 days to start one in Haiti; no monetary cost to start a new business in Denmark, 5 times income per capita in Cambodia and 13 times in Sierra Leone or Thailand! If we examine Credit History, then every adult in Norway, USA, New Zealand got a credit while only 1 percent of adults in Africa and Serbia.

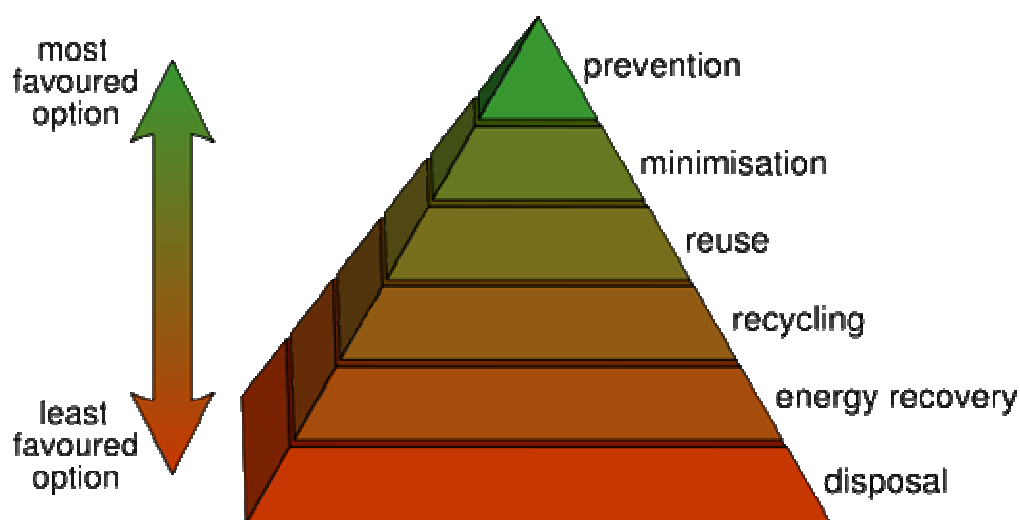
In this respect, non-existing land property titles represent a crucial issue in Haïti and other poor countries which could be solved with a WEB 2.0 approach (like in a couple of African countries showed it): A location-based map centrics M-service could be easily prototyped and deployed.

CRC : Coefficient of “R’s” Concern : *from the 3 “R’s” to the 5 ”R’s”*

The Three R's (*Reduce, Reuse Recycle*) of "reducing" waste (and consumption), "reusing" and "recycling" resources, waste and products is often called the "3Rs; *Reusing* involves the repeated use of items or parts of items which still have usable aspects; *Recycling* means the use of waste itself as resources. Waste minimization can be achieved in an efficient way by focusing primarily on the first of the 3Rs, "reduce," followed by "reuse" and then "recycle." This 3 R's initiative deals with people ecology concern and more precisely trash or garbage processing through a coordinated mix of practices that includes source reduction, recycling (including composting, bio gaz, energy production), and disposal. Any country is concerned. The 3 R's refer to a sound-material-cycle society through the effective use of resources and materials. It was agreed upon at the G8 Sea Island Summit in June 2004 as a new G8 initiative in Japan in 2005.

In general, segregation of waste is done by exception rather than rule. We need to keep in mind that nature's resources are not unlimited and we should adopt the 3Rs' sensibly.

The waste hierarchy (cf Wikipedia) *refers to the 3 R's of reduce, reuse and recycle, which classify waste management strategies according to their desirability. The 3 R's are meant to be a hierarchy, in order of importance. The waste hierarchy has taken many forms over the past decade, but the basic concept has remained the cornerstone of most waste minimisation strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste.*



However, we could enrich the 3R's by two others "R's":

- the 4th R is "RE-THINK" ; we have to rethink the whole consumerism model both in developed and developing countries, to rethink the waste model;
- the 5th one R we propose is "RE-BUILD"; in Haiti or other developing countries digital economy to build could play a central role to REBUILD the entire economy of the country on long term values with an education and knowledge centrics approach.

CRC coefficient deals with this 4 or 5 “R’s”; it represents the consciousness of the limited raw resources capabilities, the world pollution and climate change and needed concern of our planet preservation. The time would come where each large housing society would have to handle its own waste and dispose of it in an environmentally friendly manner. ICT like RFID tracking could help. Consumers have to be responsible enough to invest in eco-friendly products that are energy efficient, easy to maintain and easier to dispose off. Otherwise, waste generated could become man’s unbearable footprint on planet earth.

“We don’t inherit the planet from our parents but borrow it from our children” said L. Senghor a great African poet.

CDC: Coefficient of Dream Collection

Finally cultural intangible factors are of prime importance (12). Having strong culture and openness enable “to adopt and adapt” from others.

“Countries without natural resources are much more likely to develop the habits of openness to new ideas because it is the only way they can survive and advance” (9)

With this CDC coefficient, we would like to stress one important intangible factor among others (strategic vision of political leaders, etc...): the DREAM factor! Society with more DREAMS than MEMORIES, have a future, the same way a teenager has one compared to an old person. Forty years ago, a dreamful visionary speech (“*I have a dream*”) by Martin Luther King (before his racist assassination!), opens the road to a major evolution of the American society enabling today a black American to (potentially) become president of the USA!

“If you can dream it you can do it”, “*The American dream*” founding American attractiveness are representatives of this intangible factor. Dream is the mark of life, long term life, longevity. Lack of dreams is a mark of short-term collapse. This is true in personal or collective relationship and a cornerstone of happiness.

3.3 Islam, Judaism, Christianity and Voodoo vision of “Happiness” and TIME value between Buddhism and Judeo Christianity

The TIME value is linear in the Judeo Christian world while it is cyclic in the Buddhist world thus leading to different expectations from the future. This is an example of strong differences of value among world cultures. We plan to investigate how the Mediterranean roots could enrich the GHN Index.

4) Conclusion

Bhutan is a well-known example of a country where a strong political impetus does exist to develop a “*Beyond GDP society*” which is the motto of the Paradiso European project.

The Center for Bhutan Studies is presently working on specifying in detail a set of indicators (then aggregated into a single index) in 9 GNH domains: psychological well-being, cultural diversity and resilience, **education**, health, time use and balance, **good governance**, **community vitality**, ecological diversity and resilience, **living standards**.

We proposed 4 key coefficients to contribute both to the GNH index and the Paradiso European project. GNH is rooted in the Buddhist notion that the ultimate purpose of life is inner happiness. Bhutan being a Buddhist country, Bhutan's King felt the responsibility to define development in terms of happiness of its people, rather than in terms of an abstract economic measurement such as GNP. The measurement of countable limited material resources (money, oil, etc ...) cannot be eligible to identify the happiness of individuals, communities and countries. "Information" has the same property of love and happiness as sais Pascal: it cannot be measured; there is information abundance in the future; information is enriched when shared. We are entering a digital world where information is the raw resource with new promising wireless ICT platforms bringing positive values and invisible bridges. That is why we are definitively optimistic (major difference with other philosophers like Hans Jonas) about the future per se which is part of any moral or political framework.

As said in the Paradiso report : *ICT in general and "the Future Internet" in particular, can be instrumental in moving forward new societies in which social, economic and environment issues will be addressed with a stronger determination than today in order to avoid major risks of breakdowns of our societal models, and thus ensure a true sustainable future*" (13)

In the era of globalization 2.0, development is a voluntary process with a top down approach for technology and a bottom up approach for m-services (and culture). Creativity for m-services is unlimited.

There exists an old French saying that *"tells the story of a man looking for his roots and who found a treasure"* and another pointing out *"the need of having roots to exist and wings to fly"*. We could contribute to the GNH framework and a European vision beyond GNP that we are embracing in two complementary aspects:

- the crucial role of ICT and the information lessons we inferred from our concrete 10 years-experience in Haiti to "fly" in this new digital future of *mobiquity* by proposing to study four indicators;
- the role and the contribution of the Mediterranean roots (and thus the Caribbean culture) to enrich the Buddhist initial influence of the GNH index whose value transcends religions and philosophy and to build a synergy with European Paradiso-like efforts expected in this area.

In a world which needs new foundations and a sound referential positive vision of the future, both GNH and Paradiso represent a global stimulating challenge; it would be a passionate goal for us to proactively contribute to GNH and bring our ICT, European and Mediterranean (including Karibe) experience.

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- (U6) TV Report on fair trade coffee tracking in Haiti (TVSR, Switzerland, <http://www.nouvo.ch/140-3> with Interview of F.Verella and S.Miranda)
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ANNEX : MBDS and Jmagine foundation in the University of Nice (France)

Since 1992, MBDS, the graduate computer science degree of the University of Nice Sophia Antipolis has been conducting innovation and research on wireless information services of the future for which creativity is unlimited. Since 2002, we have been using a cell-phone centric approach to imagine and prototype (proof of concept) mobile services of the future with a focus on NFC (Near Field Communication) technology and applications in the area of travel, tourism, healthcare (elderly people), m-payment, culture and sustainable economy. (www.mbds-fr.org and www.youtube.com/mbdsimagine). MBDS degree has been delocalized in Morocco, Haiti and Russia since 1998.

MBDS developed a unique and original partnership business model between industry and university in a bottom up approach. MBDS service prototyping, which is the kernel of the curriculum, has a strategic objective of bringing together telecommunication (wireless), internet and multimedia to prototype mobile SERVICES of the future.

In 2006, we started the Imagine Institute in the University of Nice with the same innovation business model (bottom up approach and sponsored tutored projects) with a twofold extension:

- Real-life pilot projects (like the one conducted in Haiti for fair trade coffee tracking using NFC and WIMAX in March 2008)
- Interdisciplinary research and development (economics, sociology, etc..).

The university Jmagine foundation (www.jmagine.org) launched on Dec 2008 will leverage the financial support of the Imagine institute with important industry partners during the next five years.