

# Cloud Computing and Virtualization: The “Entrepreneur without Borders” Workbench for 21<sup>st</sup> Century Enterprise Development

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## 1. INTRODUCTION

Norbert Weiner, one of the true great minds of the 20<sup>th</sup> century once said “Progress imposes not only new possibilities for the future but new restrictions.” (1) Like Charlie Chaplin before him brilliantly exhibited in his marvelous silent film, *Modern Times*, technology must become our servant and not our master. One of the major complaints we often hear of late revolves around just how absorbing technology has become in terms of consuming our time and energy.

Cloud computing represents an opportunity for businesses, individuals, not for profits, community groups, educators, professionals and those in a position of leadership to make a sea change in how we can better manage our lives and our responsibilities. Web 3.0 Virtualization removes the emphasis from the technology and places it more directly in the hands of the individual user and decision maker. Cloud computing if introduced and implemented properly can lead each of us into a cleaner more efficient and less time consuming way of accomplishing the goals and objectives we have both in our professional as well as our personal lives.

This paper looks at how entrepreneurial innovation and creativity can and will become a primary catalyst in the development and implantation of cloud systems in a wide variety of decision making environments. Following a brief introduction to the historical evolution towards Cloud Computing and Virtualization, we explore some of the original developments that have led to how this technological and philosophical way of thinking and planning our personal and professional lives has begun to come of age.

We attempt to build an argument that recognizes the existence of an infinite set of potential users of Cloud Computing, witnessed in the continued exponential growth in the number of internet users throughout the world. We look to the entrepreneurs of the world as the prime catalyst underlying its success. Many concerns surround the discussion as to just how Cloud Computing and Virtualization will ultimately serve us not the least of which involve data security, administration, and the technology itself in terms of efficiently managing the storage, distribution and retrieval of information. It is our conviction that while it will take time as new applications

and needs evolve, the creative talent of many entrepreneurial geniuses will rise to the occasion. They will not only meet the needs of users at all levels, they will do so through the creation of new business enterprises that will both serve those needs and be employment and career creators within themselves.

## 2. THE EVOLUTION OF THE WEB

Web 1.0, a path breaking advancement to be sure, was primarily an enhanced library where independent users could collect and pull down information. There was no opportunity to actually interact with servers as it was basically a series of independent events between user and resource.

Web 2.0, a term coined by tech publisher Tim O'Reilly, was an expansion into a more socialization of users and resources. 2.0 allowed a solid interaction capability with server feedback to original user as well as to others. A host of services hit the market, Twitter, Facebook, YouTube, Constant Contact, MySpace, a plethora of news services, blogs, and online publishers such as Huffington Press, Drudge Report, and many others. Facebook expanded its revolutionary services with the launch of Facebook Connect. Many of these technologies had high hopes for profit and an enormous user base but were generally lacking in a direct solid revenue base. Amazon.com launched and quickly became one of the world's largest retail outlets along with Barnes and Noble online, followed by numerous competitors such as Overstock and ProFlowers, among numerous interactive online retail establishments destined to become almost commonplace resources to the 2.0 user. With a rapid growth in online retail sales the consumer was beginning to see on line purchases as commonplace. During the 2009 holiday season, Amazon for the first time actually sold more e-books through their then one year old product, The Kindle, than hard copy books. Advancements in the cell phone, iPod, video film delivery technology, both machine and systems such as Netflix., Google and the recently released iPad foretell an even higher level of telecommunications and information retrieval then ever before imagined.

The socialization of the internet and the web was clearly established by 2009 with people of all ages interacting, passing

photographs, video's and text messaging as an almost accepted pattern of communications. The Web 2.0 period established the web as both a necessity and commonplace resource for people of all ages pretty much across the planet. The biggest problem was to find the means and processes to bring the capacity of the web to virtually all people everywhere at a cost and speed commensurate with those who already enjoyed its range of services, communication, information access and easing of a wide range of services and necessities of life.

From the human creative side 3.0 takes the entrepreneur beyond the remarkable socialization capacity of 2.0. Not only will there be an infinite amount of devices and software to aid our search they will also compile information and give the support needed to round out any entrepreneurial concept. 3.0 will redefine how the search process itself is defined and executed. That personal assistant we discussed above who will eventually blend right into the very character and personality of a user, will also begin to pull an ever expanding reservoir of information and data bases seemingly disparate, but not to the organizational structure of 3.0. Key words will rapidly be replaced by key concepts that will be able to dig deeper than ever thought possible into a fascinating database of information and knowledge that will be virtually unlimited and expanding by the second.

Web 3.0, largely undefined at this point, is unfolding as more of a philosophical concept within the multitude of rapidly developing structural and technologies. It is not as yet established enough to state exactly what this dynamic will look like once it unfolds as an accepted reality. One thing for sure is that while technology will play a significant role, we believe that the major advance with Web 3.0 will not be as technology based as defined and expanded under Web 2.0. The driving force with Web 3.0 will continue to be the socialization aspect of that technology with the focus on "human networking" components.

As an almost total reversal in the long term trend, dating back to as far as the 17<sup>th</sup> century invention of weaving machines in England, and later with the internal combustion engine, and the creation of the assembly line, the next generation of Web technology, in the opinion of your authors, will place the human much more at the center of the process. We envision a 21<sup>st</sup> century application of 18<sup>th</sup> and 19<sup>th</sup> century classical entrepreneurship where human innovation and creativity will lead the march.

Technology is not going to be the constraint in terms so how Web 3.0 will be maximized and utilized by the human spirit and its endless pool of creative and innovative skill base. Web 3.0 will focus at the individual user level with the universe of information significantly more conveniently organized and accessed. It is within this definition of the next generation of web applications that will be totally and precisely suited to the next generation of entrepreneurship and innovative thinking. Entrepreneurs from all corners of the planet find the new web their preferred playground for new ideas and enterprise development. This indomitable set of inventors will eventually become the preferred source for solving many of the problems current systems scientists are dealing with as Web 3.0 works its way into mainstream internet expansion. Solving problems

by creating new ways of meeting market as well as social and philosophical needs is what entrepreneurs do best.

Web 3.0 will bring a totally new dynamic between the teacher and the student as well as between the innovator and the market. Information as gathered by experts in specific fields will be available through even higher levels of informational and technological experts. This new class of experts will be fully informed and capable of bringing that ever expanding set of information to the market. The new seeker of information from virtually any topic or field will have access to a whole set of the worlds very best and most informed set of entrepreneurial geniuses. They will not only contribute to the creation of the most contemporary level of information, and the greatest ease of distribution to anywhere, anytime, and in any format desired, they will show us how to best use it for our specific needs. Those asking the question and seeking solutions to problems they seek to resolve will find themselves at the center of the process; controlling an unimaginable range of interactive data based resources. Entrepreneurial experts trained and prepared to bring whatever is needed or desired to user or market will become their intellectual tutor, personal shopper, analysts, project builder, and much more..

The constraint will lie only in the imagination of the user and how well we each begin to interact with and utilize their new "3.0 Sensei master" whose mastery of the universal, ever expanding database will have no limits.

### **3. EDUCATION, THE LOGICAL BIRTHPLACE FOR NEXT GENERATION TECHNOLOGY APPLICATIONS.**

The initial impetus for much of the applications development of the internet started at educational institutions. Many colleges and universities as well as K-12 schools have been successful early adapters of new information technology (IT), including the latest Web technologies. Schools not only used IT directly, the same as businesses, to help run their operations, but they have also made the teaching of technology and technology skills an integral part of their curriculum and the overall mission. Even more significantly, an elite group of public and private universities were partners with government agencies and corporations in the early development of the Web. One of the best examples of the kind of groundbreaking research role that higher education institutions were able to play was the DARPA Internet project, initiated by the US Government to avoid surprise technological advances detrimental to US security. [2].

In an entrepreneurial fashion wealthy urban and suburban schools competed to be leaders in technology and the successful ones were rewarded with grants and took considerable pride in the fact that they were the recognized early adapters. Nearly every state throughout the United States had an annual K-12 educational technology conference of its own and some of these conferences, like the ones in Florida and Maryland, were regional and national in scope and attracted educators from all over. College professors came to some of the same events as did K-12 teachers. When Autodesk Corporation wanted to establish AUTOCAD as the standard

drawing software for engineers, the company reached out to high school and college students with aggressive pricing and generous grants.

As the society shift from information age into learning age- learning is no longer preparation for the job. It is the job. The industry is now focused on the next major productivity gain to derive from human capital management and a global alignment of talent. The education community is in response with a new framework for 21<sup>st</sup> Century Learning Initiative which is the focus on the 21<sup>st</sup> Century student's critical skills development. The main thrust was on student outcomes and the development of performance support systems. Too often the human side of education reform is overlooked. Recruiting and developing talent, building organizational capacity, redesigning human resource departments and tying them to school improvement plan must emerge as guiding paths to operational reform.

#### 4. BIG CORPORATIONS: THE INITIAL 3.0 MOTIVATOR FOR THE BUSINESS COMMUNITY

Since the introduction of e-learning management system, we have witnessed the double digit plus growth of the online learning communities for educational institutions. It begins as a value-added input to classroom instruction and evolves into a kind of disruptive technology which begins to almost totally replace traditional classroom instruction. For corporations, it begins as a learning platform purchased by training departments which then evolves into the next frontier in the human capital & talent management.

The need for major corporations to maintain the competitiveness and market share in an increasingly global and more open business environment has led to their taking the initiative in Cloud Computing. Commensurate with this has been a renewed expansion of entrepreneurial opportunities within the corporation, known as "Intrapreneurs". Larger corporations have reluctantly embraced the concept of providing entrepreneurial opportunities for their employees to better utilize their innovative skills in the creation of complementary enterprises with financial and other support from the parent company. These Intrapreneurial efforts are often found in the technology areas where small teams tend to be more effective in development and implementation to the advantage of the parent company. [3]

The convergence of the learning management, social networking and talent management into a more holistic learning approach by combining formal and informal learning is the foundation for the next generation e-learning systems. This new generation of "learners" will quickly transcend the traditional formal educational process and begin to gather significantly more e-knowledge through informal ways. We think of this as a "water cooler education"

While it remains to be seen at this writing exactly what the often dubbed "Semantic (3.0) Web" will actually be, the past year or so has given rise to much speculation as to what we can expect to experience as the relatively better

defined technologies of the 2.0 phase become part of our next generation lexicon. Nowhere can this transition be better witnessed then in some of our larger corporations which, given their considerable cash and resource reserves, have been able to capitalize on this emerging technology much more fluidly than have smaller more entrepreneurial enterprises. This actually represents a significant departure from recent history where most innovations and applications of new ideas have been generated much more rapidly within the small more flexible enterprises, rather than larger businesses. As we enter this transitional phase money talks and the cash starved entrepreneur must focus on learning and observing as they begin to position themselves for a whole new concept in entrepreneurial expansion; an opportunity mix that is surely on the horizon.

Global competition and a general heightened awareness on the part of contemporary corporations became the primary driver for the venturing into Web 3.0 capabilities. Many companies in America including IBM which launched its "collaborative web project", OpusUna in late 2008 and even more recently Apple has launched its new iPad which is destined to match its unique capabilities with that of the Semantic Web. Executives at Oracle announced their intentions to implement a Web 3.0 focus as the foundation for their recruitment strategy. They extended the 2.0, "*Software as a Service*" (SaaS) phase into what they defined as a "*Platform as a Service*" (PaaS) which they felt significantly extended their ability to create tailor-made applications as they sought to expand their technical and managerial labor pool. Corporations throughout Europe and Asia have already begun to identify applications of Web 3.0 as integral to their specific growth and development needs [3]

One of the most aggressive companies to date to implement a Web 3.0 philosophy into its strategic planning is that of Cisco Corporation whose American headquarters are located in San Jose, California. Along with their Asian headquarters in Singapore, and European headquarters in Amsterdam, Cisco has created an entirely new set of product and service developments which focuses directly on the approach we believe is going to represent the major advantages of the Semantic Web. [4]

As stated above, in the very near future, businesses large and small, as well as the next generation of workers will be required to adapt to an entirely new model of product and service delivery, and job creation. Just as the Semantic Web will be structured to bring information to the user, business will have to learn how to utilize a much more geographically as well as technically diverse worker to bring their product or service to their customers, and do so almost exclusively over the internet. Our concept of the 3.0 "*human network*" will consist of a pool of "experts" brought together for a specific task as required by a customer. They may never actually meet and most certainly will not be reporting to an office at some headquarter or branch of the company for whom they will be working. Indeed they might not even be working for any one company but merely selling their specific "expert" talent on a job by job basis to many companies. They will be working from their home or conveniently designated virtual labs in which they either rent or own space, in order to do their jobs.

Cisco has created a teaching/learning experience they call “TelePresence” which is a true virtual, interactive teaching and learning experience for students and educators that is totally transparent in terms of subject matter, location, or purpose. [4] Cisco has managed to capitalize on both the formal and informal aspects of learning in that each station sees exactly what every other station is experiencing in addition to having a technology where eye contact, facial expressions and body language prevail, all of which historically play a crucial part in the learning experience and are all integral to the process.

It is our contention that formal learning as traditionally experienced will continue to play a major role. However, what we think of as “*informal learning*”, those casual discussions over a beer, at the “water cooler”, or during lunch will prove to be where great ideas will most often be born. Systems like TelePresence with their virtual more intimate interaction capacity makes this critical learning experience possible.

TelePresence affords full access to experts in any field, wherever they might be located and due to that which they define as its “situational awareness” an optimal “human network” experiential education is achieved. In addition to the typical productivity gains in time and money saved by not traveling, TelePresence is so sophisticated that both student and educator feel as though they are all in the same room. In addition to having the built in capacity to download anything from the internet, the system incorporates various instructional presentation and media generated informational technologies and informational storage and retrieval techniques for every student to witness at the same time with full interaction among the students as well as with the instructor, no matter where on the globe either might be located.

While designed primarily as an educational tool, TelePresence can and most likely will eventually serve as an entrepreneurial without borders environment. As more professionals, students, and experts avail themselves of the system, Cisco can begin to build a cadre of professionals from a wide variety of fields all of whom will be inventoried according to their specific skills and eventually called upon as experts to assist in projects for either Cisco clients or for other firms, institutions, agencies etc. who choose to buy into the TelePresence system, for both educational or business development purposes.

## 5. SOME EMERGING MARKETPLACES: POTENTIAL NEXT GENERATION WEB APPLICATIONS

The maturing of Cloud Computing from Web 2.0 applications has laid the foundation for a new type of “*intelligent human network*”. Hundreds of millions of people (knowledge workers, creative workers, entrepreneurs, investors, and other stakeholders – including countless new virtual assistants or digital avatars) will routinely interconnect, share knowledge, collaborate, and communicate in real-time. New findings and new experiences, specific to many different subject domains, will be rapidly disseminated and assimilated. As additional insights are developed and fed back into the system, knowledge is rapidly transformed. A good description

for this dynamic technology-mediated process will be the “*global knowledge exchange*” or the “weaving of a web of knowledge”. The process requires a shared context (or shared space) to facilitate the building of new relationships as well as shared values and shared skills regardless of differences in geographic location or culture. And the process is certain to accelerate with the addition of a formal knowledge exchange mechanism which acts as a marketplace and delivery vehicle for the many outputs or products that result from the new collaborative knowledge work. However, the most significant obstacles to the realization of a large-scale global knowledge exchange process will always be the entrenched human and organizational factors, and not the technological limitations.

The key problem for the 21<sup>st</sup> century is human resource availability and the global misalignment of talent. The potential costs to companies big and small for not recognizing this evolution are staggering both in dollars and in lost opportunities. It’s a real problem today and it will only get worse. Billions are already being spent every year on recruitment, training, retention, and restructuring to address the problem. The new buzz words are “human capital optimization” and “talent management” solutions. Conventional wisdom would suggest that this is merely another cyclical problem, a temporary shortage of talents and skills in the contemporary knowledge workforce. But the truth is we have never had such a large number of highly qualified knowledge workers in the world as we have today either in terms of actual numbers or as a percentage of the total global workforce. The reality is that talent is abundant. But what is lacking is a mechanism (or system) to properly align (or match) this talent with the work.

In the past, most entrepreneurial start-ups involved just a small number of people, almost invariably from the same country, and with only a very narrow focus on their own local marketplace. But the internet empowers entrepreneurs to think massively and disruptively and outside this most confining and now obsolete box. The next generation of entrepreneurs will be global on a grand scale. Entrepreneurs will join together in large teams made up of hundreds or thousands or even tens of thousands of individual entrepreneurs and will look for customers in almost every country and market worldwide.

Looking at these developments from a global entrepreneurial perspective, the authors feel confident in predicting that the major primary growth sectors are education, health care, publishing, consulting services, particularly emerging companies dedicated to serving 3.0 and Cloud Computing users. The existence of a healthy, relatively more economically sound and curious “baby boomer demographic set will also give rise to many variations of life-long learning market opportunity for the deployment of a next generation of Web 3.0 applications. Furthermore, each of these markets is vital to every society and culture. Both mature and emerging economies are ripe candidates for a major disruption precipitated by innovative global integrated solutions that require almost perpetual and major productivity improvements. Since these targeted markets are also converging or consolidating among and within themselves there is a likelihood of valuable cross fertilization and significant economies of scale. [5]

### 5.1. Case studies in Entrepreneurial Applications

### **of Web 3.0 Technology and Human Networking.**

The individual human brain remains as our single most powerful computer system. But social networking allows us to begin to join together individual's brain capacity in so many ways and with such complete flexibility beyond that ever before imagined and certainly never before attempted.

What follows is only a representative sample of a few real world entrepreneurial case studies of firms that have already incorporated a 3.0 philosophy into their business plans. Even a brief exploration into the number of new and advancing enterprises that are emerging from this technological and its commensurate philosophical opportunity set leaving even the most seasoned researcher amazed at how quickly the market is responding to these changes.

The challenges that 21<sup>st</sup> Century entrepreneurs set for themselves are most often centered around the need to build a system that can connect virtually millions of knowledge workers, projects, or firms to form a large scale "intelligent human network" or what we like to refer to as a "NetBrain" – i.e. a knowledge sharing community embedded in its own total real time environment and operated with clear rules and expectations as to purpose. Knowledge itself (in its many forms) is rapidly becoming the most important "currency" in such an innovative environment.

### **5.2. e-Publishing Industry "Chinese NetBrain Initiative"**

Centrix Multimedia Publishing Co., a member of Global Knowledge Exchange (GKE), is a pioneer in cross-media publishing. Centrix recognized that the publishing industry in China was about to undergo a major transformation and Centrix set as its mission to assist a group of major Chinese publishers enter e-book publishing for the first time. Under the Centrix publishing model, each individual book is re-imagined as a small learning community consisting of publisher, author, and readers. Centrix's first project was a new joint venture with China Modern Economic Publishing House (China Modern). Their first task was to select 100 best sellers from the existing catalogue and develop a new cross media publishing software platform with access through a credit card much like a "reader card". In the process of converting the best sellers to the new software, Centrix and China Modern transformed each book by adding valuable new functionality, including audio, video, intelligent software, and standard Web 2.0 capabilities. Moreover, the readers can now access any of about one hundred books through a PC, a cellular phone, or other reading devices. Most of the *new reader* community was made up of knowledge workers with high levels

of buying power. The new publishing model also allowed access for advertiser-supported gift cards as a branding and customer retention tool. As a result of developing the new publishing platform for the 100 best sellers, Centrix as a by product, automatically aggregated a potential community of several million readers (mostly knowledge workers) in cyberspace.

### **5.3. New and Emerging Cloud Computing Efforts Set the Pace.**

It would be difficult to classify Huawei Technologies Co. Ltd headquartered in Shenzhen China as an entrepreneurial company given its approximately 95,000 employees worldwide, the company did start in 1988 as small telecommunications company producing PBX switches. Huawei is however, representative of the new 3.0 business strategy in terms of its mission and in the creation of numerous partnerships with other businesses to form a global and seamless interaction systems of laboratories all designed to speed the flow of information to the users of their systems.

Cisco, mentioned above has also developed through its Telepresence technology many opportunities for innovators to expand upon their ideas in an exponential manner with virtually no constraints in terms of global connections, partnerships, and market penetration.

As with anything new, 3.0 applications face many challenges as even the most innovative entrepreneurs begin to seek ways of creating new opportunities and markets for their ideas.

Firstly, the challenge of getting a whole new approach to doing business introduced into any existing enterprise can be most daunting. It is hard to get managers and administrators off the dime when they feel that what they are doing is working.

Once again, this is a classic challenge met by entrepreneurs through generations of change and one that will be met as the vast array of 21<sup>st</sup> century enterprises begins to unfold. Companies like Team HALO <http://www.halobusiness.com/teamhalo/> headquartered in Clinton Mississippi and started in 1999 as service consultants to the hospitality industry for mostly local companies. They quickly learned not only to use the vast capacity of social media technologies to reach a wider client base, they also advise their clients how they can use the same dynamic and ever changing technologies Team HALO uses to reach a wider market for themselves. The key factor here is that entrepreneurs, as well as mature companies are going to find a vibrant group of highly informed consultants who are themselves entrepreneurs to guide them through the maze of knowledge management systems they need if they hope to survive in the 21<sup>st</sup> century global

marketplace. Makara (makara.com), Soasta (<http://www.soasta.com/>) are other examples of successful start up entrepreneurial companies whose sole purpose is to bring their clients into the 21<sup>st</sup> century as painlessly and profitably as possible.

#### 5.4 Security and System Confidence: A Challenge being met.

One major concern on the part of both providers and users of Cloud technologies centers on the issue of security. Much like the mainframe of old, Cloud Computing asks users to put all their sensitive and otherwise data on an amorphous cloud along with many other uses and “trust me” all will be safe. Clearly, if users can not be totally comfortable knowing that their data are completely secure cloud computing will suffer a short and ignoble existence. To be effective from a cost and administrative standpoint, companies switching to Cloud Computing will have to surrender almost all of their most sensitive data in terms of marketing, financial, personnel, strategic planning and much more to their system however defined.

Many variations in Cloud computing security are currently being constructively and professionally debated and designed. There is probably no single issue higher on the concern scale of any current or potential user than that which leaves them with absolutely no doubt that each and every data set placed on a Cloud will not only open up the infinite possibilities for them to utilize the perpetually expanding universe of information in an efficient and constructive manner, they will also need to know that the security from all unauthorized sources is absolute.

Here again, the innovative entrepreneur is going to play a critical role, not only in the design and implementation of specialized security systems and software but also in the independent verification of how well alternative security systems offered by host companies and other providers are performing. This will turn out to be a profitable and high growth area for creative entrepreneurs, all of whom will inadvertently also contribute to the overall level of comfort on the part of all Cloud users.

A recent article in SC magazine has redefined SAAS as Security-as-a-Service and stated that “a new generation of high-performance security appliances with specific goals has entered the market. Programmable chip technology advances have led to the emergence of firmware-based techniques capable of supporting multiple security tasks for hundreds of individual customers on a single appliance without any impact on performance. Bloomberg recently highlighted Qualys, Inc ([www.qualysinc.com](http://www.qualysinc.com)) which specializes in “vulnerability management

solutions” and just announced a joint venture with Semantic who will be a Qualys Inc. reseller as a cloud security company on the rise. Alertlogic ([www.alertlogic.com](http://www.alertlogic.com)) also provides cloud competent security systems for service providers. Both Qualys Inc and Alertlogic have received the prestigious and internationally recognized PCI (Peripheral Component Interconnect) Security endorsement. Another company, Confidela ([www.crunchbase.com/company/confidela](http://www.crunchbase.com/company/confidela)) offers WatchDox which allows its users to protect, control, and track documents when sharing them with partners, customers, and other parties (10)

New innovative companies and systems are coming forth from entrepreneurs throughout the world at an almost dizzy pace. Each of which will hopefully leave all current and future users of Cloud Computing fully comfortable as they expand virtually every aspect of their companies with this technology.

## 6. THE 21<sup>ST</sup> CENTURY ENTREPRENEUR WITHOUT BORDERS

We see Web 3.0 Cloud Computing as a major change in the classical environment for innovation and entrepreneurial development. The industrial age of the late 19<sup>th</sup> century gave rise naturally to the entrepreneurs of that period who, through technological change and innovation, went on to create the behemoths of the later 19<sup>th</sup> century that gave us the giant oil, chemical, railroad, airline, telecommunication, automobile industries and countless other entrepreneurial endeavors that eventually defined the 20<sup>th</sup> century. The computer and its many derivatives and extensions opened the door for another generation of entrepreneurs whose inherent innovative talents helped them capitalize on an electronic revolution that gave us “The Information Age”. “The Information Age” of the 1990’s helped transform virtually every service and industrial sector throughout the world. The rise of and enhancements of the internet over the last several years has expanded our capacity creating new ways of storing, retrieving, and disseminating information in ways only dreamed of prior to the existence of this technology. The latest generation of the internet which we have labeled Web 3.0, will soon establish a true “human Network that will place an infinite set virtually unlimited amounts of data and information at our fingertips, a set that we have only begun to mine and understand.

The bricks and mortar creator of the industrial age gave way to the megabyte software and hardware wonders of the information age. The age of internet digitized socialization and knowledge exchange unfolded unlike anything ever witnessed or even envisioned by those who came before. 3.0 will be no less of a sea change for those who seek to exploit what will soon represent an entirely new philosophy as to how ideas and innovation morph into useful marketable ideas, products and services.

From the human creative side 3.0 takes the entrepreneur beyond the remarkable socialization capacity of 2.0. Not only

will there be an infinite amount of devices and software to aid our search they will also compile information and give the support needed to round out any entrepreneurial concept. 3.0 will redefine how the search process itself is defined and executed. That personal assistant we discussed above who will eventually blend right into the very character and personality of a user, will also begin to pull an ever expanding reservoir of information and data bases seemingly disparate, but not to the organizational structure of 3.0. Key words will rapidly be replaced by key concepts that will be able to dig deeper than ever thought possible into a fascinating data base of information and knowledge that will be virtually unlimited and expanding by the second.

Entrepreneurs will no longer be confined to their labs, shops, or garage. Each will begin to learn to interact with other entrepreneur's of like mind and purpose, virtually, unconstrained, and without borders. Each linkage by its very nature will expand the opportunity set for new ventures and will no longer be subject or limited by the proverbial "re-invention of the wheel". A whole new better, smoother, cheaper, stronger wheel will evolve. A wheel that can be located anywhere in the world, thereby allow the 21<sup>st</sup> century inventor the time and resources to explore ever more opportunities for that same or improved wheel to be used in an infinite number of ways.

## 7. SUMMARY AND CONCLUSIONS

Imagine 123 (8) reviewed the conditions and opportunities for creative entrepreneurship in 10 different countries. They found that it takes more than a willing and able demographic to make innovation a part of economic expansion and stability. Entrepreneurs need access to capital, knowledge, inspiring educators, political leaders as well as a strong socio-economic environment to thrive. Thomas Freidman in a recent editorial in the New York Times (9) called for a significantly enhanced effort focused on innovation and competitiveness on the part of the administration if America wishes to remain a world leader in technological innovation and enterprise creation. The United States has every resource available to it to be the leader in creating the most vibrant and viable entrepreneurs.

One thing is however, clear and not debatable, and that is that the nation that most quickly and efficiently responds to the rapidly expanding telecommunications, knowledge management, and 21<sup>st</sup> Century enterprise development opportunities, all of which are solidly embodied in Cloud Computing and Virtualization, that is the nation that will be the next leader of the world.

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