

ERICSSON DISCUSSION PAPER

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ERICSSON



CHANGING THE GAME BEFORE THE GAME CHANGES YOU

More will change in the next 10 years than in the previous 100. This paper describes the foundational changes and attempts to explain how we can manage them to our advantage¹.

¹The paper references various online thought leadership articles and visuals and links to the original material wherever possible. Please contact the author if any of these references need updating or removing. We hope we increase visibility for all.

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INTRODUCTION

This paper attempts to place the massive business changes we are currently experiencing into a simple and understandable framework, that allows us to feel more comfortable with the future. The paper does this by presenting a series of insights and impacts.

Today large industry leaders are being challenged, seemingly overnight, powerless to control their own destiny despite their legacy, strength and footprint. Change is happening at an exponential rate and humans are not naturally engineered to cope with such exponential rates of change. Before the Industrial Revolution, technological change over a normal human life span of about 40 years was almost nonexistent. We now live in a world that is very different from even just five years ago.

Ray Kurzweil [ref]² predicts we will witness approximately 20,000 years of technological advance in the next 100 (when measured by the rate of progress in the year 2000). Or to put another way, we will see more change in the next 10 years than we have seen in the previous 100.

As the chart shows a \$1000 computer will have the computational

power of a human brain by 2025. By 2045 it will have the equivalent computing power of the total human population. It sounds like science fiction but the world we live in today looks like the science fiction of the 1960’s.

This means the impact of technical revolution starts to enter the immediate business planning cycles. There is a need to embrace the fantastic as part of the immediate future. Those who do will find competitive advantage. Those who do not will be challenged to maintain their status quo.

There are opposing views. Technology progress will slow. Impacts will not be as dramatic as predicted. All future statements have to be observed in a balanced and reasonable manner.

However it appears we are on an accelerating journey where the status of business today in all

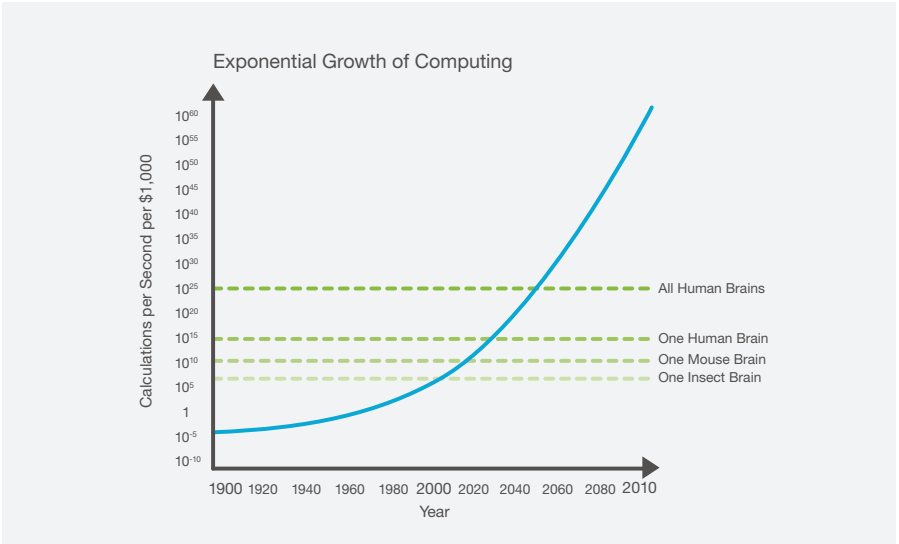
industries is being disrupted. This paper articulates a series of insights and impacts that we believe will drive a future state of change, a future state of real time collaboration and connectivity between human and machine, where frictionless interaction and scalability shall deliver a re-engineering of how we live, work and play.

Ericsson also acknowledges that all said in this paper applies equally to Ericsson and telecom. Ericsson must also embrace the same future challenges as others.

We hope you find it enlightening and appreciate any feedback at <http://facebook.com/ericsson>

Presentations of the material can be made on request.

²Kurzweil is a well known inventor who has received 17 honorary doctorate degrees, awarded to him by various universities, acknowledging his extraordinary accomplishments.



“We will see more change in the next 10 years than we have seen in the previous 100”

INSIGHT: “DEVICE TO POWER”

A birthday card that sings “Happy Birthday” to you has more computer power than all the Allied Forces of 1945. The card (and chip) is commonly thrown away. Your cell phone today has more computer power than NASA had back in 1969 when it landed two astronauts on the moon. Video games, which consume enormous amounts of computer power to simulate 3D situations, use more computer power than main frame computers of the previous decade. The Sony Playstation of today, which costs \$300, has the power of a military super-computer of 1997, which cost millions of dollars [\[ref\]](#).

As the chart shows, device CPUs have advanced from about 58 KHz as of 2000 to about 1.5GHz in a little over a decade. Each enhancement of device capabilities begets a high-powered expansion of apps and apps complexity. There is now a desktop computer in your pocket. In a few short years it will be the equivalent of a super computer. Processors have moved from single core to dual core to now quad core planned to be mainstream in 2013. The continuous play between compute power and battery life shall continue causing innovation to drive superior performance. Transistor size continues to decrease where silicon production processes are moving from the 28nm standard of today to 20 nm and even 14nm. The smaller the transistors,

the less power they use and the longer the battery lasts [\[ref\]](#).

Note the devices we have today are the least powerful devices we shall ever carry. They are the equivalent of Ford Model T’s when compared to today’s cars.

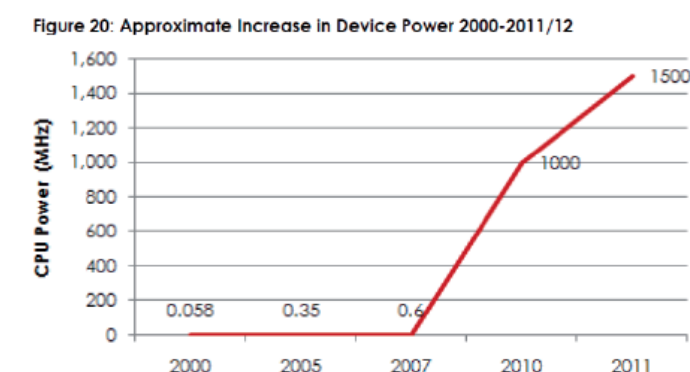
As power increases and price decreases the following effects will be seen:

- More powerful device applications
- Greater ubiquity of devices everywhere
- Devices that are in reality disposable

“... NASA launched a man to the moon. We launch a bird into pigs”



Figure 1 - Heavy Reading



INSIGHT: “INDUSTRIAL SCALE COMPUTE”

In parallel to the changes seen on the device side, there is a revolution happening in IT on the server side. Commonly referred to as cloud computing it is now possible to “rent” vast amounts of computer capacity and/or software services on demand, and only pay for what is used – at greatly reduced cost and lead time compared with traditional IT deployments. This has completely changed the economic landscape and removed barriers to entry for anybody wishing to bring a service to market. It has also created a whole new industry of cloud infrastructure providers. Traditionally any company would have needed to buy hardware, install software, and find somewhere to run it then employ people to manage it. Enough hardware and software would have had to have been bought to cope with a peak traffic level, irrespective of how often this traffic level was experienced (the classic online retail dilemma for Black Friday). Now “cloud service providers” remove that burden from the software developer’s realm.

The three disruptive effects of cloud computing are:

- Removal of the need to install and operate computing equipment, support software and hosting facilities, requiring less people, saving money and accelerating time to market (one person can now manage upwards of 10,000 servers)

- Only pay for what you use, very low up front investments required

- Scale (up and down) as slowly and/or quickly as your market dictates, the only worry left being a business plan that makes sense for the service provided (avoiding the Priceline “Internet bubble” scenario, where the more customers they created, the faster they lost money...)

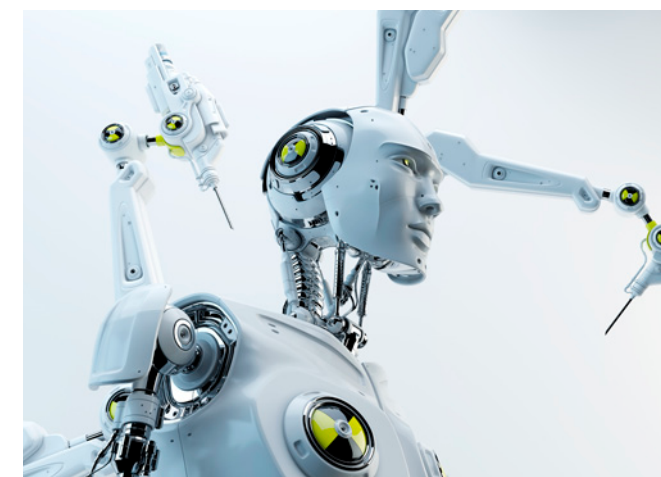
“ It took AOL 9 years to hit 1 million users. It took Facebook 9 months. It took Draw Something~9 days”

The net combined effect of all these is drastically lower production costs of compute capabilities combined with time to market. Two backend engineers can now scale a system to support over 30 million active users [\[ref\]](#).

This allows a service mania environment where very few people can deliver many services very quickly and very cheaply, that can scale in terms of users and usage faster than ever seen before. People can now let the market decide success on a scale that was not possible to consider even 10 years ago. It took AOL 9 years to hit 1 million users. It took Facebook 9 months. It took Draw Something~9 days [\[ref\]](#).

By 2011 “the industry had reached a point where it was realistic to form a start-up and launch an internet tech based product for less money and in less time than it would have taken to simply launch the website for such a company in 1997” [\[ref\]](#).

It is the very early days of cloud computing. Looking forward, never again will cloud computing capability be this hard to use, expensive or slow despite its already disruptive attributes in these spaces.



INSIGHT: “INFORMATION EXPLOSION”

In the next 48 hours more data will be created than previously in the past 30,000 years [\[ref\]](#). Users are now uploading 72 hours of video every minute to YouTube, compared to 48 hours just a year ago [\[ref\]](#). In the 5 seconds it has taken you to read the above 3 sentences, an additional 6 hours have been stored.

A scarcity of data has been replaced with an overwhelming abundance. However, the data is only valuable if interpretations can be gathered from it in a timely fashion and if the generated interpretations are possible to use in the ongoing business process. This is a reversal of previous generation's problems where insights had to be extrapolated from a limited set of data. Insight - “Information Explosion” Peter Sondergard, Head of Global Research, said “Information will be the Oil of the 21st Century. It will be the resource running our economy in ways not possible in the past” [\[ref\]](#).

Anticipatory businesses will be able to adapt their business operations in “as close to real time” as possible, to maximize their customer understanding and best position their core business value proposition towards them. Customers are more empowered from their access to information and big data provided by other businesses and service providers. It will be impossible to survive in the future without integrating the wealth of global knowledge into everyday business practice and procedures.

New skill sets that can manage and analyze such data shall be required inside the corporate structures of tomorrow. As Google's Chief Economist Hal Varian is quoted saying “the sexy job in the next 10 years will be statisticians” [\[ref\]](#).

Big data is only just beginning. Looking forward, never again will big data be this hard to understand, instrument or put into operation.



orders. There was no concept of common size since there was no concept of mass production. With the advent of steam and industrial capacity the world entered a phase of mass production. Normalization around sizes, shipping of products based on anticipated demand became the normal mode of operation that has been constant for the last 200 years. Our whole society, education and even organizational structure have been optimized to maximize the potential success of any company operating in the status quo. This is no longer true. The transformation from physical to digital completely disrupts the traditional constructs of mass production and replaces it with mass customization, we once again live in a market of one, and the only difference being each market of one can be delivered to with scale and efficiency. The compromises of the industrial revolution no longer apply.

Of all of the insights so far listed, this is the most disruptive and the most important for all companies to understand. The largest mistake a company could currently make is to consider their product not possible to digitize and thus could not be disrupted. The second largest mistake would be for a company to understand their product could be digitized but fail to change because of misunderstanding their true core business, confusing it with profit pools that had appeared due to the required physical requirements of delivery from the earlier phase (see chapter “Impact: End of the Fac-

tory Mentality”). Many companies likely feel safe from the disruption of digitization, especially those involved in the manufacturing of physical parts. The advice to these companies is to research the latest in 3D printing and re-visit those assumptions [\[ref\]](#).

“De-materialization forces companies (who want to survive) to re-visit their true core business is rather than focusing on what they physically deliver.”

INSIGHT: “DE-MATERIALIZATION”

The world is being transformed from a physical representation to a digital representation. This is the insight we all see around us, yet seems to be the most invisible to the naked eye. When it happens the effects tend to change industries and the leaders inside them, unless the leaders dematerialize first. There are three massive implications when digital representation of physical product happens:

1. Ability to deliver on demand anywhere moves into real time. A digital product can be delivered immediately when requested.

2. A digital product re-defines the base product through a new wave of innovation. Removal of the physical limitations of the material the product was being distributed upon enables a new round of product regeneration and discovery.

3. Speculative production is removed thus producing the ultimate efficiency of supply versus demand, reducing waste and saving the planet's resources.

Our challenge is to understand what we no longer even think about. Before the Industrial Revolution, production was local and everything was tailored to individual

INSIGHT: “UBIQUITOUS NETWORK”

The end result of all insights to this point is a heightened dependency of society, business and individuals on a fully functioning real time connectivity fabric. What makes cloud truly transformative is mobile; the ability for any cloud based service using any device to be connected anywhere at any time.

The networks of the future shall focus on performance based execution of digital asset shipping when the integrity, reliability, security and transparency (real time introspection) of operation guarantees when something is shipped it gets there when it is suppose to , it is the same as when it started and no

unauthorized persons have had access during the journey. This is fundamental to people, businesses and society as more dependency is placed on the digital eco-system.

For example, the upside to the connected car is a better experience for the owner while giving an opportunity to transform the life time value of the car ownership from the perspective of the car manufacturer and the car dealer. However, there needs to be guarantees that cars cannot be “hacked”, insurance details cannot be modified in transit, performance is as specified and the operation is guaranteed to function.

The digital transformation is very similar to an earlier journey that happened in the physical shipping industry, that led to the transformation of the physical global supply chain. Before 1954 the global shipping industry was an ad-hoc orchestration where the cost and reliability of shipping was best effort. In 1954 the revolution of the shipping container began. Transport executive Malcolm McLean had watched teams of dock workers unloading goods from trucks and transferring them to ships and came up with a more efficient way of doing things. The new era of the shipping industry and the shipping container was born.

McLean's true innovation was to understand the core business of the shipping industry was not operating ships but delivering cargo and delivering cargo with the best performance possible. Before the container came along a typical ship might spend a week tied up at dock. "A typical cargo ship in the 1950s might have 200,000 individual items to be loaded. It was a hugely labor intensive business and hugely costly. What the container did was get rid of all that" [ref].

Loading loose cargo onto an average ship in 1956 cost \$5.86 per US ton. Container ports could load vessels for just under 16 cents per US ton. Ultimately "It costs less to ship a container between China and Felixstowe (England) than it does to then send it on the road to Scotland" [ref].

But more efficient use of shipping assets was not the only change the shipping container initiated. It became possible to start to guarantee delivery times. In digital terms this is the same as latency. Since the containers are secure, the items inside were guaranteed to be secure (digital equivalent – data security) and also the contents of the container were guaranteed to be the same as when the journey started (physical equivalent of data integrity). This changed what products could be shipped and delivered globally, opening up completely different global markets. Containers could start to be monitored and thus the contents inside could be tracked in real time to monitor delivery and give transparency to the product owners.

The advent of the shipping container also initiated changes required at the port to re-engineer the on-loading and off-loading of containers through crane infrastructure (a complementary business where break even business models drive the market efficiency of the core business of performance based cargo delivery – see "Insight: Economics of the Future").



“McLean’s true innovation was to understand the core business of the shipping industry was not operating ships but delivering cargo and delivering cargo with the best performance possible.”

IMPACT: END OF THE FACTORY MENTALITY

Large leaders of industries are being challenged as the physical fulfillment model of the last 200+ years is replaced with its digital children. Kodak is one such example. In 1976, Kodak commanded 90% of film sales and 85% of camera sales in the U.S and at its peak Kodak had a market capitalization of 31 billion USD (1997) [ref]. It also invented the world's first digital camera in 1975, the invention that would lead to its ultimate demise.

Kodak filed for bankruptcy in 2012 with a market value of only 145 million USD [ref]. It failed to Impact – “where did my business go?” remember its core business of enabling mass market photography. It had replaced its reason to be with the delivery mechanism it had created to deliver on the promise – that of film. Physical realization of the core business promise will not survive in the transformation of physical and digital, and companies that cannot disconnect their future from their physical representation of the past will fail.

The story is true for newspapers. Their core business is journalism. The question is how to monetize such reporting, not to protect a paper printed representation.

70% of today's cost structure lies in paper, printing, distribution. This can all be saved. A revenue stream is required, however.

For the music industry the same is already true for CDs. For the film industry the same is true for DVD's.

The key lesson for all to understand is the difference and dependencies between core business and physical production.



“Physical realization of the core business promise will not survive the transformation of physical and digital, and companies that cannot disconnect their future from their physical representation of past will fail”

IMPACT: “NEW BUSINESSES”

Some companies seem to be doing very well. Accounting for now more than \$960 billion in market capitalization, the Four Horsemen of Mobility have divided into three groups: Amazon and Google are all making billions each year from mobile devices, Facebook is still trying to figure out how to get there, and Apple is making more money from mobility than all three combined [ref].

These companies are all executing with growth because they understand where their core business lies and what adjacencies (or complements) their core business growth depends upon.

Apple sells premium hardware platforms. Google sells advertising. Amazon's core business is retail. Facebook's core business is their social graph. These companies are all examples of companies that, of course, are closely associated with the digital age (yet you could argue Apple is a legacy PC provider). However, later we will give other examples of traditional indus-

tries and companies. Through this paper we will show the most important differentiator is to understand core business and then to understand how the core business can move into the next generation of competition by leveraging new technology.



INSIGHT: “ECONOMICS OF THE FUTURE”

Two economic laws exist, the “economics of complements” and the “economics of network effects”. Both existed previously but in the world of the very low friction digital society, they increase in importance.

Understanding core business enables the economic law of complements, which accelerates rapid market adoption. The law of complements explains why some companies may give away services that other companies use to drive direct revenues. This is very clearly seen in the space of new communication services where some companies are giving away voice and video communications for free (Google) while others are charging their customers in very traditional models for very high margins (carriers). This clearly is creating tension in the marketplace.

The simple understanding of the law of complements states a good’s demand is increased when the price of another good is decreased. Conversely, the demand for a good is decreased when the price of another good is increased [ref].

A simple example of a complement is that of the relationship between the car and fuel (or gas). The Hummer car was tremendously popular when gas in the USA was under \$1 a gallon. When the cost of gas stayed above \$3 a gallon for a long time, the Hummer car stopped being manufactured. They were exposed to a complement that was beyond their control.

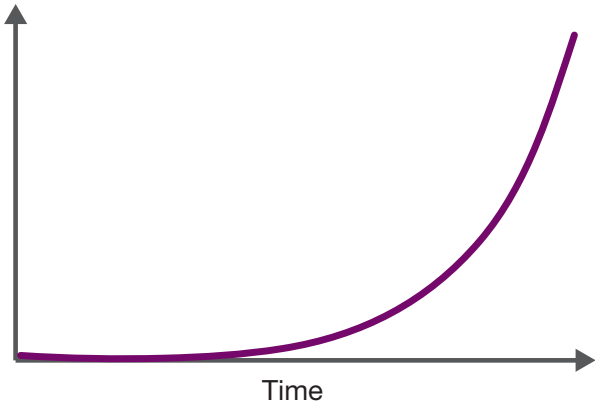
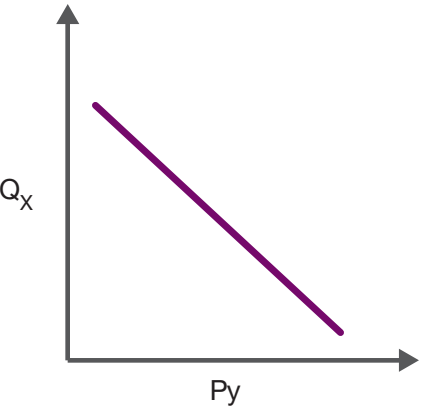
Successful companies will clearly understand their core business and thus clearly understand their complementary businesses. Google’s core business is advertising. Everything they do is to drive revenue to their core business. What will make customers spend more time with their inventory, how will they maximize the relevance of their inventory. This is why they are giving Android away, to ensure an “openness” of mobile, they are giving away communication services so people spend more time on their properties. Apple runs their

application store as a complement to increase the value of their hardware platform experience. Amazon prices the Kindle at a loss to drive their core retail business in the future. Facebook (still the most challenged from a real business point of view, despite already exceeding Amazon’s revenues) publishes its social network via API’s to drive the reach and insights they can generate from their social graph.

Understanding core business enables a company to understand its business complements, and place into execution a total strategy with awareness of what needs to be core and closed and what needs to be complementary and “open.”

Network effect states the more people taking part in a network the exponential increase in the value of that network. The traditional model for network effect was the telephone system where more people who have telephones increase the value for everybody who has a telephone. This is a one sided network effect. The current network effects are two sided and driven by software platforms (Microsoft, Apple, Google, among others). The more people using a platform, the more attractive it is for a developer to develop their applications for that platform. The more applications that exist on a platform, the more valuable it is to the people using the platform.

“Successful companies will clearly understand their core business and thus clearly understand their complementary businesses”



INSIGHT: “TRADITIONAL BUSINESSES CAN TRANSFORM”

Many industries are undergoing transformation. One example is the insurance industry, specifically vehicle insurance.

The core business of insurance is the management of risk. The traditional way (and the only way to manage risk in the past) has been statistical analysis of previous behaviors to manage financial coverage of behavior in the future. If the statistical calculation of risk exposure is wrong then the results are financial failure for those issuing the coverage [ref].

The new market offering of usage based insurance has changed this paradigm. For the first time insurance can be issued based on monitoring real time (driving) behaviors through connected cars.

The Pay as You Drive (PAYD) market already has over 2 million customers and has reached a tipping point. The expectation is that the market will be multiplied by 50 by the end of the decade. Telematic-enabled policies will then generate €50 billion in premiums to insurers who have seized the opportunity.

This is good news for consumers worldwide. Low mileage and safe drivers will stop subsidizing fraudsters, road warriors and dangerous drivers, translating savings to them of up to 50% on their car insurance premiums.

Frederic Bruneteau, Managing Director, describes the impact for insurers: “Everybody has a plan until they get punched in the face”, famously said Mike Tyson. Well, this is what could happen to numerous motor insurers if they do not reshape their strategy swiftly. The Internet is revolutionizing all sectors and this is now the turn of the auto insurance industry. By enabling insurers

to build their pricing based on the actual, real-time behavior of drivers, PAYD redefines entirely the way to charge for motor risks. Underwriters must adapt to the new connected way of doing business.”

After Italy, the wave is now reaching the UK and the US, where Moody’s recommended underwriters “adopt it sooner than later”. We expect all developed countries to embrace the new model, with local technology- and business variants” [ref].

Insuring the drivers of vehicles will never be the same again.

This is one example of an industry under business process transformation where the competitive landscape has changed due to the adoption of the next era of capability and growth.

Other industries such as healthcare (“Why do I need to be in hospital to be monitored? Why do I need acute symptoms before treatment starts?”), energy, retail, etc. will follow. All aspects of society, business and people will transform. Companies have to choose whether to lead the process of transformation or to follow the lead of transformation started by competitors. Our recommendation to all companies is to lead the transformation process.



“The core business of insurance is the management of risk”



CONCLUSION: A REAL TIME WORLD

The parallels between the physical shipping industry and the digital shipping industry are clear to see. The paths of the connectivity cables in the world of today have the same deployment patterns as the traditional global trade routes. The second part of this paper describes the core business model opportunities for this space, the required operational capabilities and the complementary businesses that will drive the growth.

The promise of the Networked Society depends on the performance based operational delivery of the underlying network. As seen with the revolution of the physical globalization revolution, the same shall be seen in the digital space going forward.

“The paths of the connectivity cables in the world of today have the same deployment patterns as the traditional global trade routes”

WHAT DOES IT ALL MEAN?

The world is changing and the speed of change is accelerating. There will be a transformation from industrial revolution led behaviors to information led behaviors. This will change individuals, businesses and society overall. In the business world changes are already visible as can be seen from new disruptive companies (Google, Amazon, Facebook) as well as traditional companies and industries re-discovering their core business (insurance, Xerox [\[ref\]](#)).

Successful business transformation, irrespective of industry, will depend on the same set of basic understandings and capabilities:

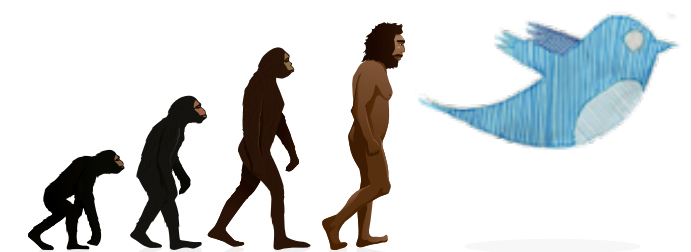
- Understanding of core business and complements
- Containment of existing business operations and processes (if existing)
- Creation of new business operations and processes (“Agile Framework”)
- Rapid execution capability that maximizes the disruptive value, cost structure and time to market created by the exponential technical advances happening (“New Business Factory”)
- A resulting real time data driven business operation and business processes

All businesses will construct a digital business operation that will be the replacement of the traditional IT organization of today. Predictable performance driven delivery of digital capability shall be a foundational building block for next generation competitiveness.

A performance driven delivery shall be the match of delivery + security + integrity + transparency to business need and price point.

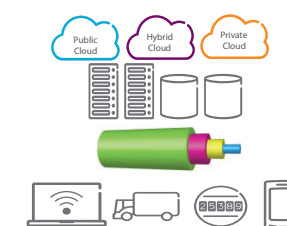
The most successful businesses of the future shall be the ones that execute with the greatest clarity on the above and can make the best data driven decisions as close to real time as possible.

We call this end state the Networked Society. Welcome...



“There will be a transformation from industrial revolution lead behaviors to information lead behaviors”

ITC Stages of Transformation



REALIZE

New Efficiencies and New Businesses



BUILD

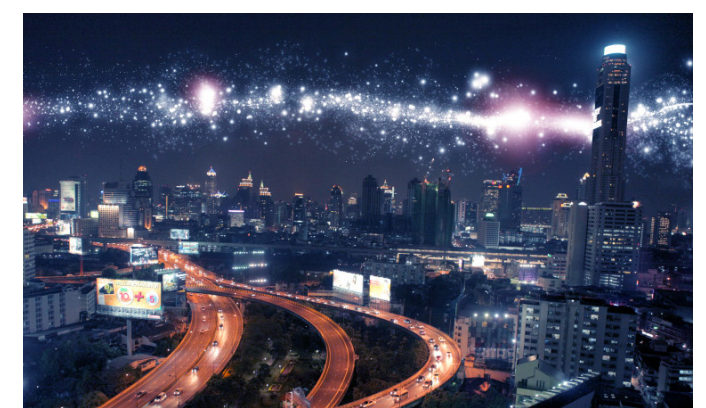
Digital Logistics Performance



PREPARE

From chaos of Today

WELCOME TO THE NETWORKED SOCIETY



WHAT THE NETWORKED SOCIETY MEANS TO THE NETWORK OPERATOR

The future is changing quickly. New capabilities are required to maximize and to ensure competitiveness and relevance. Using the insights presented in the first half of this paper; a proposal for core carrier business and required capabilities shall be presented. Traditional high margin services such as voice and messaging are under threat by disruptive players due the enabling capabilities described earlier while at the same time there is a larger growing dependence of all players on the network operator.

The digital shipping network today is the same as the shipping industry pre-1954 and before the introduction of the shipping container. The network is still managed as a wholesale capacity provider. Every day the equivalent of 200,000 “loose objects” are loaded into the system in the hope they are delivered as required. The future high performance networked society cannot have foundation on such a system.

One of two scenarios will evolve. Those shipping goods that require guaranteed delivery will engineer their own operations on top of the wholesale best effort network. While not impossible, it is extremely expensive, complicated and time consuming, especially over wireless. In the physical world this would be the equivalent of all industries/companies

engineering their own “Fedex” operation – not something a company would ever do.

The second alternative is network operators architect horizontal capability, to enable the performance shipping of any goods in an open and flexible, but dependable and predictable manner. We believe this is the future foundational opportunity for the carrier service provider market.

Digital shipping does not limit service providers from choosing to also ship their own digital products and moving further up the value chain. They will, however, be able to do that, on the same foundational knowledge of guaranteed performance as others, transforming their industries.

Networked Society

Understanding carrier core business and delivering on the value creation and capture

DEFINITION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

What is Information and Communication Technology (ICT)?

As defined by Wikipedia:
Information and communication technologies, usually abbreviated as ICT, is often used as an extended synonym for information technology (IT), but is usually a more general term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers, middleware as well as necessary software, storage and audio-visual systems, which enable users to create, access, store, transmit, and manipulate information. In other words, ICT consists of IT as well as telecommunication, broadcast media, all types of audio and video processing and transmission and network based control and monitoring functions.

The expression was first used in 1997 in a report by Dennis Stevenson to the UK government and promoted by the new National Curriculum documents for the UK in 2000.

Ericsson believes the ICT sector is leading a global transformation. Billions of connections between people and devices across the world are creating information societies in which learning and the ability to transact “as close to real time as possible” represents the key to success.

ICT OPERATOR CORE BUSINESS

We introduce the concept of the future service provider being known as an “ICT Operator”. This is service providers that will target the ICT markets that are created as a result of the impacts and insights presented previously. The Networked Society will depend on the performance and delivery of the ICT operators. ICT operators will combine all their assets to create seamless operation from a total end-to-end operation point of view (combining network plus compute).

To follow the economics of complements the core business of the network operator will remain closed while the complements shall be curated/open.

The ICT operator shall deliver the best performance digital logistics for its customers. Core business is “digital logistics customer delivery”. Note core business is not “running networks”. The network operations shall be engineered to enable best application delivery to meet the core business needs as effectively as possible (see next section).

“Openness is not a strategy, it’s a tactic”

Platform companies are closed around their core business and open around their complements.

				
Core business	Hardware sales	On-line ads	Premium video retailing	On-line ads
End-user	Open	Open	Open	Open
App developers, content & service providers	Curated	Open	Open*	Open*
Device vendor	Closed	Open	Curated	N/A
Platform control	Closed	Closed	Closed	Closed

Also: Microsoft (computing platform); eBay (trading platform); Paypal (payment platform); Flurry (analytics platform)
* some general content policies apply

	NETCO NETWORK	NETCO CUSTOMER	OWN, OTT SERVICES
Core business	Application Delivery	Digital Logistics (Indemnification)	Application Delivery
End-user	Curated	Curated	Open
App developers, content & service providers	Curated	Curated	Open
Device vendor	Curated	Curated	Open
Platform	Closed	Closed	Closed

The ICT operator will deliver OTT services, both its own and from others. These will use the interoperable services available via API's from its platforms to maximize the application delivery quality and yield management of network as much as possible. The ultimate customer service however shall be available to the “on net” customer where life time value and relationship can be maximized through investments in both next generation network and operational capabilities.

The new core business requires the operators to become a platform and reclaim their original position as the center of gravity for the overall industry. Because they have not made this shift to date they are currently a commoditized component of platforms that are operated by OTT players.

Platforms are simple to understand, yet are rarely executed well. A successful platform must do three things well

- Give something away for free, ideally the free offerings are what the competition is charging for and considers to be their core business,
- Have a group of customers that pay directly
- Generate payment for partners

The last point, getting partners paid, is frequently overlooked or not executed. To use Google’s advertising network as a simple example

- Google offers free search
- Adwords is where people pay them
- Adsense is how they get people paid

Adsense is part of the full circle offering that really allows the Google advertising network to ramp as a successful platform.

THE INTERDEPENDENT NEEDS OF THE END USER, APPLICATION AND ICT OPERATOR

All players, including the end user, have very similar needs from their digital logistics providers:

- “Make the business model as favorable as possible for me”
- “Maximize my end user experience”
- “Minimize my cost”
- “Make sure it works the way it is suppose to”

The end user has this expectation from its application and application service provider. The application service provider cannot afford to not deliver on its customer promise and therefore has the same request to the ICT operator. By exposing capability from its core operations, the ICT operator can enable the application provider to not only meet the needs of their end customers but also maximize the use of the network assets to increase margin and revenue while positively improving utilization of the underlying network from a yield management perspective.

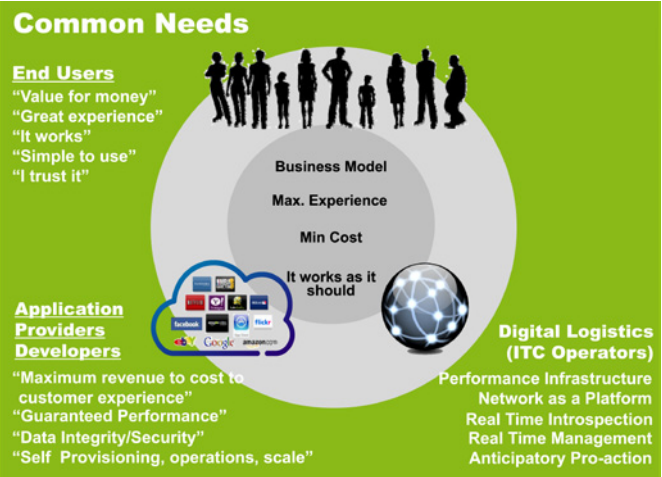
The network exposure layer can be seen as the digital equivalent of the physical shipping container, where each container can be customized to meet the needs of the application’s content inside.

The application (client and server) can be seen as the digital equivalents of the original and destination end ports in the physical world³.

The core business of the ICT operator is high performance digital logistics. The ultimate business model is one of indemnification. With the correct operational

capability the ICT operator should be able to indemnify any customer from loss of data, failures in data integrity, security breaches, performance guarantees. The largest barrier for enterprises to adopt next generation ICT solutions is one of risk management and risk exposure. The removal of this barrier will be the number one accelerator for adoption, given the proven cost benefits.

³ Note in reality in the new P2P mesh era of web development, both client and server end points may be have many “API endpoint dependencies” that make the routing and correct positioning of compute capability much more complex



KEY CAPABILITY: AGILE SERVICE DELIVERY – CLOUD

Core operational capabilities require managed exposure via API's to enable the building of the digital shipping container.

The Interdependent Needs of the End User, Application and ICT Operator) that will deliver the required performance. The right capabilities need to be exposed. The core business needs to be protected. Scale (up and down) delivery of own API's (and any inter-operable API's), own network and own compute needs to be managed. Usage needs to be monitored and used to enable anticipatory pro-action. This is becomingly commonly known as "Network as a Platform".

Control and operations of deployment should be in the hands of the customer. The customer should be able to:

- Manage what is deployed where
- Observe performance on demand
- Change deployment on demand
- Be in real time control of cost to performance

The real time operational model requires the ability to be able to operate very flexible agile business support solutions that enable rapid introduction of new capabilities and the self service management of customers. Different business processes and business models must be easy to introduce and integrated into the other operations to enable effective offering of differentiated capabilities that can be monetized while maximizing yield management of the underlying capability set in parallel.

KEY CAPABILITY: COMPLIANCE AND GUARANTEE

As businesses become more dependent on digital asset management and delivery it must be guaranteed that performance and any regulatory compliance is satisfied.

- Is my data secured?
- Is my data the same as when I put it there?
- Is my data the same as when I put it there 10 years ago?
- Is my data stored in a legally compliant location?
- Am I still compliant with any regulatory or business requirement?

If there is any debate or question on the above then it will slow down adoption. Ultimate business opportunity is for an ICT operator to indemnify any client against risk for the above, if the correct technical and operational support can be placed in execution

CORE ICT OPERATOR CAPABILITIES

The purpose of this paper is not to cover in detail the required capabilities to deliver on the core opportunity of the ICT operator and digital logistics. The core capabilities are already covered in whitepapers and workshops that can be provided upon request. The purpose of this paper is rather to place them all in the context of the changing landscape and resultant business opportunity.

KEY ICT OPERATOR CAPABILITIES

Performance Infrastructure
Network as a Platform
RealTime Introspection
RealTime Management
Anticipatory Pro-action

KEY CAPABILITY: NEXT GENERATION OPERATIONS

The networks of today are no longer being constructed to carry voice and messaging. They are being constructed to deliver the digital assets of people, businesses and society. Existing planning, operations and models do not work. A transformation of operation is required to ensure the business of digital logistics can

be guaranteed in terms of performance to need, the yield of network is as effective as possible and the customer's cost structure versus required performance is as lucrative as possible. This is the construction of the high performance digital delivery operation.

KEY CAPABILITY: PERFORMANCE INFRASTRUCTURE

Infra-structure of the future will require to be allocated dynamically depending on performance requirements (bandwidth, jitter, latency requirements). Cloud is the existing virtualization of compute infra-structure. Software Defined Networking is the virtualization of network infrastructure. The combined dynamic operation of both aspects, dependant on demand and status, will lead to much better return on investment of the underlying capability. Cloud virtualization should be as efficient as possible in terms of:

- Throughput to footprint
- Vertical scaling

- Speed of spin up, spin down
- Efficiency of virtualization
- Distribution of compute throughout the network

Operations should be as secure as possible from an architectural perspective as well as an auditor, standards perspective. Data integrity should be guaranteed – that data will be there and it will not be compromised without knowledge – now and ten years from now. For both data security and data integrity, indemnification is the ultimate business model and accelerator.

KEY CAPABILITY: ANTICIPATORY PRO-ACTION

Deployment of applications in the virtualized environment is extremely complex. With hundreds of thousands of virtual servers operating millions of applications across distributed compute (or data) centers leads to challenges in answering performance issues:

- Why is my application down?
- Why is my application slow (worse)?
- Is it the network?
- Is it the storage?
- Is it the compute?
- Is it the application?

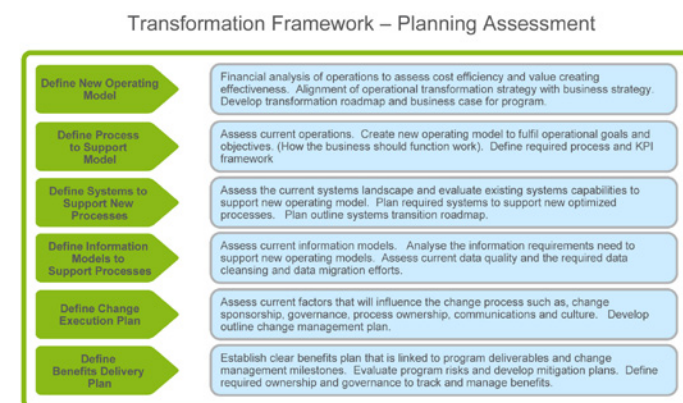
The ability to investigate performance in real time is crucial to managing high performance SLA requirements. Operational margins and customer satisfaction will depend on the ability.

The successful operation of the real time ICT operator will be driven from the utilization of the operational data generated both directly and indirectly. This will be used to further optimize performance for the ICT operator, also to generate new business offerings of value and also as a value add service to customers who also could derive business value from the operational data contained.

OVERALL BUSINESS TRANSFORMATION

Ultimately we are discussing business transformation of the operator of today who delivers voice and messaging to the ICT operator of tomorrow who delivers performance digital logistics. As seen in the physical world of performance shipping (for example Fedex), optimization of internal capabilities will also translate into optimization of customer capabilities that will lead to their differentiation in their own marketplace and deep ICT operator, customer relationship and dependency.

Overall Business Transformation



IN SUMMARY

The world is changing faster than ever before. The combined forces of devices, computing, dematerialization, big data and network will change the landscape of next generation competitiveness. We already see companies that are failing to change alongside companies that are re-inventing their businesses. The clock is ticking for all companies to understand their true core business, their complements and what they need to drive the next level of business differentiation in the “Networked Society” of tomorrow. Business models will change and business operations will need to transform.

Carrier Service Providers are no different from any other businesses. Core business must be understood and business operations changed to reflect the need to deliver on the new core business requirements. Ericsson believes we are on the brink of a “Networked Society” where real time performance digital logistics will become the core delivery of the networking industry.

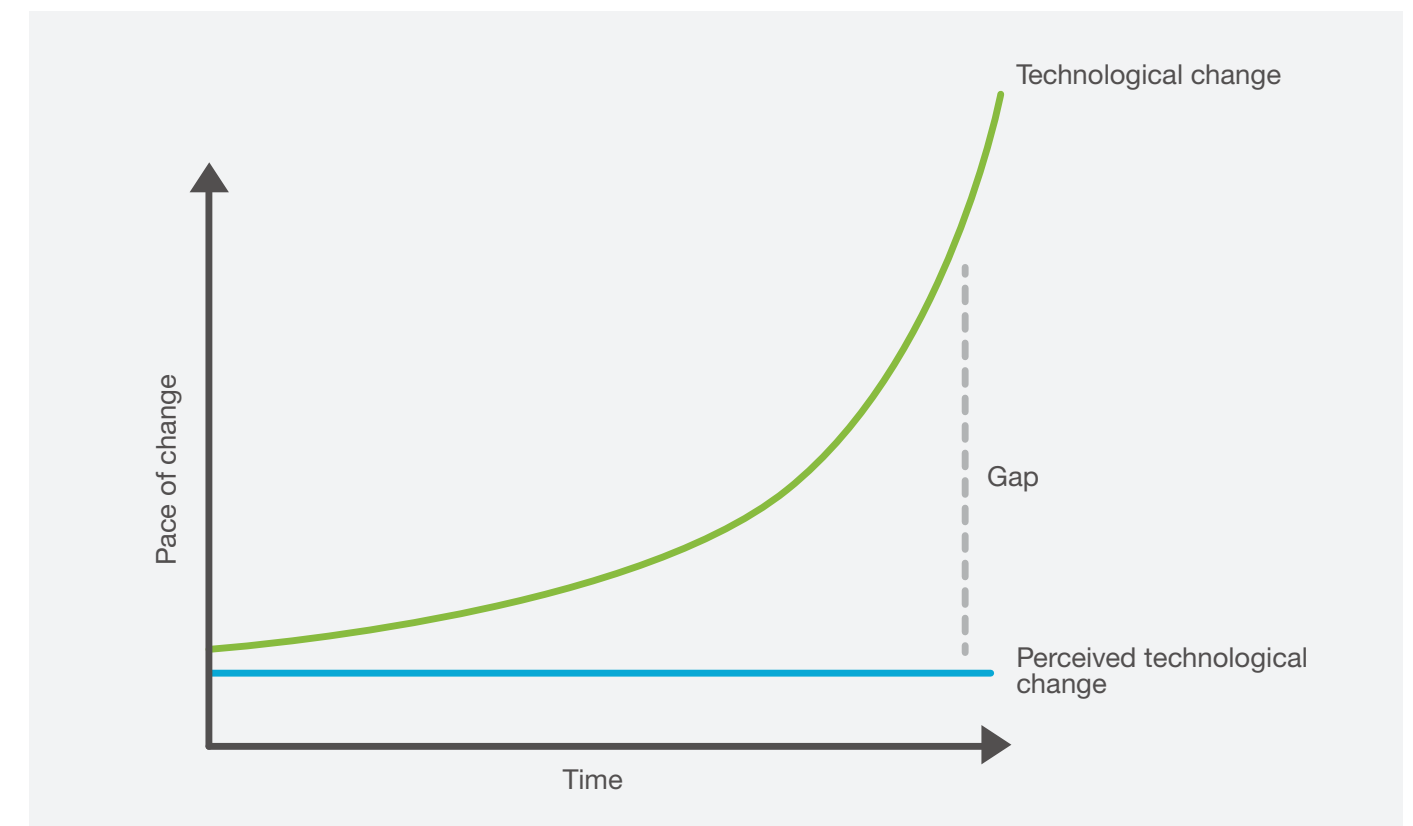
Ericsson believes this is a pre-requisite for the successful deployment of the next generation of businesses, societies, and us as individuals, where operation cannot be best effort due to the mission critical nature of what is being delivered.

Ericsson is in active dialog around the world about what is required to successfully transform the service provider business model as well as the business model of the service provider’s customers.

For more information about detailed whitepapers and/or interest in workshops to discuss what is contained in this paper, please contact

<http://www.ericsson.com/feedback>

An Ericsson representative will contact you back.



WHO IS ERICSSON?

Ericsson is a world-leading provider of telecommunications equipment and services to mobile and fixed network operators. Over 1,000 networks in more than 180 countries use our network equipment, and more than 40 percent of the world's mobile traffic passes through Ericsson networks.

We are one of the few companies worldwide that can offer end-to-end solutions for all major mobile communication standards. Our networks, telecom services and multimedia solutions make it easier for people, across the world, to communicate.

And as communication changes the way we live and work, Ericsson is playing a key role in this evolution. Using innovation to empower people, business and society, we are working towards the Networked Society, in which everything that can benefit from a connection will have one. Our vision is to be the prime driver in an all-communicating world.

**Our vision is to be the prime driver
in an all-communicating world.**

In recognition of the scale of change currently underway Ericsson has instituted a global evangelist program consisting of seven thought leaders distributed around the world. Follow and message Geoff Hollingworth, the evangelist responsible for this perspective at [@geoffworth](#).

WHO IS JOYENT?

Joyent is a global cloud computing and systems software provider that offers an integrated technology suite designed for enterprises and developers. JoyentCloud.com delivers public cloud services to some of the most innovative companies in the world, including LinkedIn, Gilt Groupe and Kabam.

Node.js, the open source server-side JavaScript project owned and stewarded by Joyent, provides developers and enterprises such as Microsoft with the most powerful runtime for developing dataintensive, real-time apps.

Joyent is also the key contributor to and sponsor of Joyent SmartOS, an open source project dedicated to the complete, modern operating system. SmartDataCenter orchestrates Joyent's technologies into a cohesive, reliable and distributed system that can stand up to the compute demands of the modern world.

A global ecosystem of leading technology partners assists Joyent in enabling customers to leverage the performance, scalability, reliability and security inherent in the company's cloud solutions.

REFERENCES:

1. Schnee, V., Boschulte, A., (2012) "The Mobile Cloud: Ready or Not, Here It Comes", Heavy Reading, research report.
http://www.heavyreading.com/details.asp?sku_id=2823&skuitem_itemid=1390
2. DeGrasse, M., (2012) "Three reasons smartphones are getting smarter", RCR Wireless.
www.rcrwireless.com/article/20120608/uncategorized/3-reasons-smartphones-are-getting-smarter/
3. (2012), "Entrepreneurship And The Singularity", 33rd square.
<http://www.33rdsquare.com/2012/04/entrepreneurship-and-singularity.html>
4. Avinash Celestine, A., (2012) "Cloud computing: How tech giants like Google, Facebook, Amazon store the world's data". The Economic times.
http://articles.economictimes.indiatimes.com/2012-05-27/news/31860969_1_instagram-largest-online-retailer-users
5. Annan, G.K., (2012) "Radio took 38 yrs to get 50 million users, Angry Birds Space took 35 days" Trickle-up blog.
<http://innovation.gkofiannan.com/radio-took-38-yrs-to-reach-50-million-users-o>
6. Harris, D., (2012) "Why 2013 is the year of 'NoOps' for programmers", GigaOM.
<http://gigaom.com/cloud/why-2013-is-the-year-of-noops-for-programmers-infographic/>
7. Middleton, C., (2012) "Make Britain Count: Google head Eric Schmidt supports our campaign", The Telegraph.
<http://www.telegraph.co.uk/education/maths-reform/9288256/Make-Britain-Count-Google-head-Eric-Schmidt-supports-our-campaign.html>
8. Roettgers, Y., (2012) "YouTube users upload 72 hours of video every minute", GigaOM.
<http://gigaom.com/video/youtube-72-hours-video-per-minute/>

9. "Unlock the Value of Big Data", BigDataBytes.
<http://www.bigdatabytes.com/unlock-the-value-of-big-data/>
10. LOHR, S., (2009) "For Today's Graduate, Just One Word: Statistics", The New York Times.
http://www.nytimes.com/2009/08/06/technology/06stats.html?_r=3
11. (2011), "The printed world", The economist.
<http://www.economist.com/node/18114221>
12. Poston, T., (2006) "Thinking inside the box", BBC News.
<http://news.bbc.co.uk/2/hi/business/4943382.stm>
13. "Eastman Kodak", From Wikipedia.
http://en.wikipedia.org/wiki/Eastman_Kodak#History
14. (2012) "Kodak preparing to file for bankruptcy protection stock prices plunge 28.19%", Industry Information Station.
<http://www.netxt.com/kodak-preparing-to-file-for-bankruptcy-protection-stock-prices-plunge-28-19/>
15. Howe, C., (2012) "The Four Horsemen Gallop Into 2012", Yankee group.
<http://maps.yankeegroup.com/ygapp/content/58812/54/REPORT/0>
16. "Complementary good", From Wikipedia.
http://en.wikipedia.org/wiki/Complementary_good
17. Bernstein, P., (1998) "Against the Gods: The Remarkable Story of Risk".
<http://www.enteleky.com/ag.html>
18. (2012) "Global Telematic Insurance Market to Overtake €50 Billion by 2020", PR Newswire.
<http://www.prnewswire.com/news-releases/global-telematic-insurance-market-to-overtake-50-billion-by-2020-150584575.html>
19. (2012) Xerox CEO: "If You Don't Transform, You're Stuck", NPR.
<http://www.npr.org/2012/05/23/153302563/xerox-ceo-if-you-don-t-transform-you-re-stuck>