Support for the implementation of the EU-Ukraine Association Agreement / A4U Project

Project Identification No.:
EuropeAid/137074/DH/SER/UA
Contract N: 2015/370-128

A4U Reviews-Comments-Briefs N19

Summary of a Workshop: Information Management in the Internet Age (14-12-2018)

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December 2018

Funded by
the European Union

Implemented by a
Consortium led by GFA
Consulting Group

SUMMARY of an A4U WORKSHOP on 14 December 2018: INFORMATION MANAGEMENT IN INTERNET AGE

WHAT IS AT STAKE

Gatov: "If the greatest battle of the twentieth century was the battle for freedom of information against censorship, then the greatest battle in the twenty-first century will concern the abuse of freedom of information and the use of information as a weapon by authoritarian rulers and aggressive non-state actors."

From creation to disruption: The term disruptive technologies was coined by Clayton M. Christensen and introduced in his 1995 article Disruptive Technologies: Catching the Wave. In his The Innovator's Solution, Christensen replaced the term disruptive technology with disruptive innovation because he recognized that few technologies are intrinsically disruptive or sustaining in character; rather, it is the business model that the technology enables that creates the disruptive impact. However, Christensen's evolution from a technological focus to a business-modelling focus is central to understanding the evolution of business at the market or industry level.

Your data is their business: trust in Facebook took a 66% Plunge in 2018. Over the past few years Facebook has been collecting vast amounts of data of all its users, which quite frankly is scary. You can see exactly what Facebook has on you by downloading your data zip file here. Alternative social networks (not collecting your data) https://makeawebsitehub.com/facebook-alternatives/

Corporation versus Individual (Neoliberal dream): great example as utilizing disruption, invent a new, successful strategic plan, its „cheap but a lot" tactic to stifle competition, how it manages its war houses, but also infamous how he treats its employees, even though it was the first global company to embrace the $15 minimal wage as a living one.

Crucial question (see the Case Study**)** whether "is the leader of the future going to control technology or is the technology going to control the leader"?

WHAT IS INFORMATION & KNOWLEDGE MANAGEMENT?

In the field of information and knowledge management the core concepts are: information management; knowledge management; information; knowledge; tacit knowledge and explicit knowledge.

In addition, there are many other important concepts (e.g. intellectual capital, social capital, learning organization, organizational learning, organizational culture, information culture, communities of practice, corporate memory). However, this learning object will discuss only the above mentioned core concepts.

Information management is a cycle of processes that support the organization's learning activities: identifying information needs, acquiring information, organizing and storing

information, developing information products and services, distributing information, and using information (Choo, 1995).

Information management is the management of organizational processes and systems that acquire, create, organize, distribute, and use information. According to a process view of information management, IM is a continuous cycle of six closely related activities: identification of information needs; acquisition and creation of information; analysis and interpretation of information; organization and storage of information; information access and dissemination; information use (http://choo.ischool.utoronto.ca/IMfaq/)

As with information management, there is no agreement on what constitutes **knowledge management** (Schlögl, 2005). There are many different definitions of knowledge management and there is a conceptual confusion of what KM precisely is. For example, knowledge management has been defined as follows:

- the process that govern the creation, dissemination, and utilization of knowledge…' (Newman, 1992).
- '… managing the organization's knowledge by creating, structuring, dissemination and applying it to enhance organizational performance…' (O'Leary, 1998).
- '…process to acquire, organize, and communicate knowledge of employees so others may be more effective in their work…' (Alavi and Leidner, 1999).

Knowledge management deals with what's in your head (people, tacit) while information management deals with what's in documents (explicit). Knowledge management is about learning how to ride a bike with your dad while information management is about reading a 150-page method on "how to ride a bike in 10 lessons" with some illustrations (http://wiki.km4dev.org/More_on_KM_and_IM_2007).

To sum up: **Knowledge management** is largely the management and support of expertise, it is primarily the management of individuals with specific abilities. **Information management** is more management of data and management of repositories of data and information.
The **organizational culture** is an important factor influencing whether it encourages the sharing of knowledge between employees or not. Organizational theorists are pretty much in agreement that one of the hardest things to change about an organization is its culture (Trice & Beyer, 1993 as cited in Blair, 2002).

Theoretical Framework:
http://www.tlu.ee/~sirvir/Information%20and%20Knowledge%20Management/Key_Concepts_of_IKM/knowledge_management.html

INTRODUCTION TO INFORMATION AGE

Some have begun to call it the Information Revolution. Technological changes brought dramatic new options to Americans living in the 1990s. From the beginning of the decade until the end, new forms of entertainment, commerce, research, work, and communication became commonplace in

the United States. The driving force behind much of this change was an innovation popularly known as the Internet.

Personal computers had become widespread by the end of the 1980s. Also available was the ability to connect these computers over local or even national networks. Through a device called a modem, individual users could link their computer to a wealth of information using conventional phone lines. What lay beyond the individual computer was a vast domain of information known as cyberspace.

The **INTERNET** was developed during the 1970s by the Department of Defense. In the case of an attack, military advisers suggested the advantage of being able to operate one computer from another terminal. In the early days, the Internet was used mainly by scientists to communicate with other scientists. The Internet remained under government control until 1984.

One early problem faced by Internet users was speed. Phone lines could only transmit information at a limited rate. The development of **FIBER-OPTIC** cables allowed for billions of bits of information to be received every minute. Companies like **INTEL** developed faster microprocessors, so personal computers could process the incoming signals at a more rapid rate.

In the early 1990s, the **WORLD WIDE WEB** was developed, in large part, for commercial purposes. Corporations created home pages where they could place text and graphics to sell products. Soon airline tickets, hotel reservations, books, and even cars and homes could be purchased online. Colleges and universities posted research data on the Internet, so students could find valuable information without leaving their dormitories. Companies soon discovered that work could be done at home and submitted online, so a whole new class of telecommuters began to earn a living from home offices unshaven and wearing pajamas.

New forms of communication were introduced. **ELECTRONIC MAIL**, or **EMAIL**, was a convenient way to send a message to associates or friends. Messages could be sent and received at the convenience of the individual. A letter that took several days to arrive could be read in minutes. Internet service providers like America Online and CompuServe set up electronic chat rooms. These were open areas of cyberspace where interested parties could join in a conversation with perfect strangers.

Advocates of the Internet cited its many advantages. The commercial possibilities were limitless. Convenience was greatly improved. Chat rooms and email allowed individuals to converse who may never have had the opportunity in the past. Educational opportunities were greatly enhanced because of the wealth of knowledge now placed at the fingertips of any wired individual. **"SURFING THE 'NET"** became a pastime in and of itself.

Critics charged that the Internet created a technological divide that increased the gap between the haves and have-nots. Those who could not afford a computer, or a monthly access fee were denied these possibilities. Many decried the impersonal nature of electronic communication compared to a telephone call or a handwritten letter. Hate groups were using the Internet to expand their bases and recruit new members. The unregulated nature of the Internet allowed pornography to be broadcast to millions of homes. Protecting children from these influences, or even from meeting violent predators would prove to be difficult.

Regardless of its drawbacks, by the end of the 1990s, the world was fast becoming wired.

DIGITAL FOOTPRINT

Why it matters? Digital footprint is all the stuff you leave behind as you use the Internet. Comments on social media, Skype calls, app use and email records- it's part of your online history and can potentially be seen by other people or tracked in a database.

Online shopping: Retailers and product review sites often leave cookies on your system which can track your movement from site-to-site, allowing targeted advertisements that can show you products you've been recently reading about or looking at online.

Social Media: All those +1s, Retweets, and Facebook comments (even private ones) leave a record. Make sure you know what the default privacy settings are for your social media accounts and keep an eye on them. Sites often introduce new policies and settings that increase the visibility of your data. They may rely on you just clicking "OK" to whatever terms they are introducing, without reading them.

Mobile Phones, Tablets, or Laptops: Some websites will build a list of different devices you have used to visit those sites. While this can often be used as a way to help secure your account, it is important to understand the information being collected about your habits.

What it is useful for? For example, job hunting. What you want to do as much as possible is try to control the brand around your name. Search firms are taking note of the evolving awareness around having a digital footprint. Samantha Wallace, market leader of the technology practice, North America, for Korn Ferry Futurestep, says the rule of "seven degrees of separation" applies: If a client believes that a candidate's digital footprint does not show up in the "right" network, they might be excluded from consideration. Ultimately, whether a candidate gets knocked out depends on the importance of an online presence to that particular job type, and whether the search firm can provide context around why a particular candidate might be valuable even in the absence of an online presence. But it's significant to realize that the burden of proof — why someone does not have a strong online presence — is shifting.

The idea of curating your digital footprint is right on target because it gets to the heart of the matter, which is that this is a new aspect of our reputation that we have to work at. There is "a remarkable shift from corporate practice years ago when executives were discouraged from being involved in activities outside of their job because it was a distraction. While one's current employer may not want you to do it, that same employer expects it in candidates."

Where this is headed to? For example the Chinese social credit system. The Chinese state is setting up a vast ranking system that will monitor the behavior of its enormous population and rank them all based on their "social credit." The "social credit system," first announced in 2014, aims to reinforce the idea that "keeping trust is glorious and breaking trust is disgraceful," according to a government document.

The program is due to be fully operational nationwide by 2020 but is being piloted for millions of people across the country already. The scheme will be mandatory. Like private credit scores, a person's social score can move up and down depending on their behavior. The exact methodology is a secret — but examples of infractions include bad driving, smoking in non-smoking zones, buying too many video games and posting fake news online.

And in the West? A recent paper by Tobias Berg of the Frankfurt School of Finance and Management in Germany and his collaborators showed that a person's digital footprint can be as predictive of financial behavior as a credit score. One of their findings, for example, is that the difference in loan default rates between iPhone and Android owners "is equivalent to the difference in default rates between a median FICO score and the 80th percentile of the FICO score." iPhone ownership, apparently, is a reliable proxy for higher income and thus for creditworthiness.

Fintech companies already trust big data more than traditional scoring methods. The financial industry will increasingly make judgments about us from the minutest, most innocuous traces we leave on the internet. And it's likely the algorithmic decisions that use the statistical analysis of these traces will often be wrong. That means we should seek out research like Berg's and give the algorithms based on it much more thought.

People with regular habits and better self-control are relatively more reliable than those who lack those qualities. People who pay for services (and expensive devices) are likely more affluent than people who don't. According to the Berg paper, the model based on these parameters — the most rudimentary data we provide to any site on which we have to register — is slightly more predictive of default than the German equivalent of a FICO score. A model that uses both the digital footprint and the credit score is even more predictive.

How to delete your digital life? Wiping away your digital life means getting rid of the traces you've left – the mistakes you made, the embarrassing photos, the unwise comments, the flawed social media profiles where you've left too much visible. The following steps provide a start to reducing your digital footprint and taking back control of your online life.

1) If you have a Facebook account, change every setting in the Privacy tabs to "private" or "not shared" or "off" (there's a special "privacy settings" shortcut in the blue bar near the top).

2) Find out what photos you're tagged in on Facebook. These should appear in the Photos tab on the left hand side. If you hover over the picture, a star and a pencil appear in the top right. Choose "Report/remove tag" and pick "I want to untag myself" from the list.

3) If you have a Google Blogger account, delete your profile there. That means that blogposts or comments you've made there will vanish.

4) If you've got a Tumblr or WordPress blog, delete that too.

Now start using a search engine and begin searching on your name (put the first name and surname together in quotes; this works in pretty much all search engines to identify that as a phrase you're after). Note that some sites, such as newspapers, generally won't agree to removing your name if you've appeared in a news or other story.

5) If you've posted in forums, go back and see if you can delete your posts. If you can't, try asking the administrators of the sites (nicely) if they can remove your post. Have a very good reason. You should always bear in mind the Streisand effect, which can have the reverse effect – spreading what you don't want to draw notice to around the internet, with the equivalent of a klaxon attached

to it. (In 2003 the singer Barbra Streisand tried to remove some aerial pictures of her California beach house from a collection, via a lawsuit. The outcry meant the pictures were more widely spread, rather than the reverse.)

6) Remove any photos you've added to sites such as Flickr or, of course, Facebook. Try searching on your name in Google Images (put quotes around your name) and see what comes up: then visit those sites and ask if they would remove the photos. Again, be aware of the Streisand effect.

7) Keep doing searches on your name and finding out what turns up and getting in touch with the owners of the sites. Be prepared to get rebuffed, especially if the site is in the US.

8) Be aware that anything that you've posted outside Facebook, Blogger or WordPress might still live on in the Internet Archive – which aims to crawl the entire web again and again and store what it finds, forever. The Internet Archive doesn't have an explicit way to remove sites once they're in its index – which is colossal. And as it sees itself as a repository of the web, which would otherwise be short-lived. It does take a case-by-case approach to requests for removal.

9) Be aware too that even if you remove explicit mentions of your name, a determined searcher may be able to dig up your past through leftover postings and hints of whatever sort. Mentions by other people, photos where even though you're not tagged, you're mentioned in related information.

In this, we've not taken the more extensive move of deleting your Google web search history – though if you don't want to be (silently) tracked by Google, then stop using Google's search (there are plenty of other search engines that won't track you, such as DuckDuckGo.com or Blekko.com. DuckDuckGo is improving all the time and saw a big jump in traffic with the change in Google's privacy policies last year.

Expunging yourself from the internet is very, very hard. As far as is known, nobody's succeeded – though of course if they had, how would we know?

What other tips, links and suggestions do you have for reducing your digital footprint? Do you think it should be easy for people to airbrush their digital footprint? Leave your ideas and views in the thread below.

Search Engines: Tell me what search you use, and I will tell you who you are.

Google is the reigning king of 'spartan searching' and is the single most used search engine in the world. While it doesn't offer all the shopping center features of Yahoo! or the human curation of Mahalo, Google is fast, relevant, and the largest single catalogue of web pages available today. The search giant also tracks an incredible amount of information that many people don't even know they are giving out.

DuckDuckGo.com looks like Google. However, there are many subtleties that make this spartan search engine different. DuckDuckGo has some slick features, like 'zero-click' information (all your answers are found on the first results page). DuckDuckgo offers disambiguation prompts (helps to clarify what question you are really asking). Plus, the ad spam is much less than Google.

Bing is Microsoft's attempt at unseating Google, and arguably the second-most-popular search engine today. Bing used to be MSN search until it was updated in summer of 2009.

Dogpile: Years ago, Dogpile preceded Google as the fast and efficient choice for web searching. Things changed in the late 1990's, Dogpile faded into obscurity, and Google became king. Today, however, Dogpile is coming back, with a growing index and a clean and quick presentation that is testimony to its halcyon days.

Yippy is a Deep Web engine that searches other search engines for you. Unlike the regular Web, which is indexed by robot spider programs, Deep Web pages are usually harder to locate by conventional search. That's where Yippy becomes very useful. If you are searching for obscure hobby interest blogs, obscure government information, tough-to-find obscure news, academic research and otherwise-obscure content, then Yippy is your tool.

Google Scholar os special version of Google, will help you win debates as it is focuses on scientific and hard-research academic material that has been subjected to scrutiny by scientists and scholars. Example content includes graduate theses, legal and court opinions, academic publications, medical research reports, physics research papers, and economics and world politics explanations.

Webopedia is an encyclopedic resource dedicated to searching technology terminology and computer definitions. Teach yourself what 'domain name system' is, or what 'DDRAM' means on your computer. Webopedia is an excellent resource for *non-technical people* (like me) to make more sense of the computers around them.

Yahoo! is several things: it is a search engine, a news aggregator, a shopping center, an email box, a travel directory, a horoscope and games center, and more. This 'web portal' breadth of choice makes this a very helpful site for Internet beginners. Searching the Web should also be about discovery and exploration, and Yahoo! delivers that in wholesale quantities.

The Internet Archive is a favorite destination for longtime Web lovers. The Archive has been taking snapshots of the entire World Wide Web for years now, allowing you and me to travel back in time to see what a web page looked like in 1999, or what the news was like around Hurricane Katrina in 2005.

ASK: One thing that Ask.com (formerly Ask Jeeves) was famous (or infamous, depending on how you want to look at it) when they first started out was the ability to search in "natural language",

or in non-searches, the ability to search in the same language that you would ask a friend, such as "am I wearing pants?" (and hopefully, the answer to this particular query would be "yes".). Ask doesn't promote the natural language bit as much anymore, but they still have a few searching tips that are good guidelines to keep in mind when searching with Ask.

Tracking Apps: According to a New York Times investigation, at least 75 companies in the US alone receive anonymous, precise location data from apps whose users enable location services to get local news and weather or other information, The Times found. Several of those businesses claim to track up to 200 million mobile devices in the United States — about half those in use last year. The database reviewed by The Times — a sample of information gathered in 2017 and held by one company — reveals people's travels in startling detail, accurate to within a few yards and in some cases updated more than 14,000 times a day. *You can learn how to stop apps from tracking your location.*

These companies sell, use or analyze the data to cater to advertisers, retail outlets and even hedge funds seeking insights into consumer behavior. It's a hot market, with sales of location-targeted advertising reaching an estimated $21 billion this year. IBM has gotten into the industry, with its purchase of the Weather Channel's apps. The social network Foursquare remade itself as a location marketing company. Prominent investors in location start-ups include Goldman Sachs and Peter Thiel, the PayPal co-founder.

More than 1,000 popular apps contain location-sharing code from such companies, according to 2018 data from Mighty Signal, a mobile analysis firm. Google's Android system was found to have about 1,200 apps with such code, compared with about 200 on Apple's iOS.

POTENTIAL & RISKS

Potential: big data, virtual work, gig-economy, AI.

Big data works for those hyping it: In 2011, McKinsey & Co. put out a report hyping up big data's business potential, predicting it would become "a key basis of competition." The company said retailers could increase their operating margins by 60 percent if they could harness its potential. It would be a direct result of microtargeting and "the automatic fine-tuning of inventories and pricing in response to real-time in-store and online sales."

In December 2016, McKinsey returned to those predictions in another report, saying U.S. retail had only realized between 30 and 40 percent of big data-related potential due to a "lack of analytical talent" and "siloed data within companies." Even that, however, is a generous assessment. The U.S. retail industry's operational margins are slightly lower today than they were in 2011. Even Walmart, praised by McKinsey as an early adopter of big data-based technology in the 2016 report, hasn't seen any discernible increase in operating margin in recent years.

Gig-economy: with a name appropriated from performance culture where musicians play a limited engagement, or a "gig," the gig economy describes the expanding labor market comprised of contract workers, freelancers, crowdsourced workers, and others who are hired for limited engagements, as well as platform-based systems—think ride sharing, delivery, and property

rentals. Independent work is growing with the internet and expanding from developed to developing economies as more of the world becomes digitally connected.

Many workers who engage in the gig economy choose independent work, and others do so out of necessity. Organizations that employ independent workers are finding the gig economy a valuable resource for addressing short-term needs and filling temporary skills gaps in their organizations.

The economics of the gig economy are fairly straight-forward. Contingent workers generally are paid per piece, per project, or per hour. For an expense perspective—these individuals are not paid an hourly rate, they are usually paid a bit higher, but they don't receive benefits that a permanent full-time hire would receive such as cash bonus, equity, long-term incentive plan, paid vacation or personal time off, or health benefits. So, the cost to the employer is much less.

In the traditional economy businesses provide capital and employees provide labor. This is being challenged by the disruption wrought by technology, specifically the multitude of digital matching platforms.

At the same time to secure work in the gig economy, workers often have to contribute not just their time and labor but also their capital. This means workers are not only shouldering the risks associated with insecure employment but also the risks associated with investing capital into businesses which they have little control over.

In its recently released report into digital disruption, the Productivity Commission described gig work as a model of hiring labor on demand. This is facilitated through platform websites (think Uber, TaskRabbit, Amazon Mechanical Turk), enabling work to be broken down into components which allows tasks to be allocated as needed. The Commission's report warns that while "gigging" might increase flexibility of work it means workers bear more risk because of fragmented, insecure employment.

Risks: virtual reality/identity, fake news, hacking, artificial intelligence

- Creating/living in virtual reality and its impact on human psychology
- Virtual identities – not the real world.
- invasion of privacy.
- identity theft
- cyberbullying (bullying using digital technology)
- Phishing, hacking - stealing your data
- your child seeing offensive images and messages.
- Sharing inappropriate personal information, pictures, or video.
- Finding/searching inappropriate material.
- Unsafe communities
- Scams.

FAKE NEWS AND STRATEGIC COMMUNICATION

Media Literacy - Penn University **Media Literacy Course**:
https://www.coursera.org/learn/media

Irex`s **Learn to Discern** program https://www.irex.org/project/learn-discern-l2d-media-literacy-training. Case Study with video: https://www.irex.org/project/learn-discern-schools-l2d-s

CASE STUDY: INFORMATION AGE AND STRATEGIC DECISION MAKING

As the future is uncertain, the only thing relatively clear is that much of what we will experience in the future will be different from the past. We must understand it is not information or even technology that will produce this unprecedented change, but the impact of technology on all aspects of human life; not computers or even bits and bytes, but the ability to apply and integrate rapid technological change. The focus must not be on the World Wide Web, but instead on how the Web influences values, beliefs, social and economic structures, politics, our view of the world and the way we think and behave.

Futurist John L. Peterson forewarns that, "We are living in a period of time that will produce more change for humanity than any previous era in history." Peterson and many others believe that wholesale change is and will continue to take place in every segment of the world and that the pace of that change will continue at an unprecedented rate, gaining momentum with time. If this futurist is correct, the coming decades will have staggering implications for the environment and present both hazard and opportunity for the strategic leader. In fact, Moore's law suggests that memory capacity will continue to double every 18 months. If senior leaders want to take advantage of this fast paced, changing world and avoid the pitfalls associated with it, Peterson believes they must understand at least three things.

- Have a broad understanding of what this new environment is all about.
- Understand the major forces that are driving this monumental change.
- Understand how they can think and see the world differently than they have before.

IN THIS NEW WORLD:

Will leaders focus on shaping a fast changing environment to their organization or will they focus on creating an adaptive organization that will adjust to meet the fast changing environment?

- What will be the new demands and pressures placed on senior leaders of the future?
- How can leaders hope to cope with this "permanent white water" environment?
- How can leaders absorb and use the vast amounts of information needed for the complex, fast moving, decision making environment?
- Can leaders be found that already have the requisite cognitive skills required to process massive amounts of information quickly and efficiently for competent decision making in the strategic environment?

Crucial question: "Is the leader of the future going to control technology or is the technology going to control the leader"?

Alvin and Heidi Toffler have been writing about the emergence of a "new civilization" where humanity advances a quantum leap forward to a future fraught with deep social upheaval and massive restructuring. The Tofflers call this new civilization the "Third Wave."

Think about a wave in a large body of water and you will begin to see Toffler's model of change. Multiple waves may exist at the same time, one following another, building momentum and crashing into the shore across many fronts. Often one wave will crash into others creating a violent and chaotic milieu. The global environment also can be turbulent, full of currents, eddies, and maelstroms which conceal deeper, historic waves. Conversely, a wave may cancel out another. In the real world, crests and crosscurrents created by waves of change exist in work, family life, attitudes and even morality. The human race has already undergone two great waves of change, the Agricultural and Industrial Ages. The third, Information Age, wave suggests a new civilization, new ways of working, living, and competing. It will produce new economic structures, new politics, new security issues and new ways of thinking and decision making.

It is important to understand the impact of not only just information and technology on industry or the economy, but about change in all aspects of human life. This "New World" will have its own distinctive outlook, its own way of dealing with time, space, logic, and causality.

WAVE	PERIOD	ACTIVITIES	TIME SPAN(years)
****	Hunter/ Gatherer	Nut/berries/ game	Tens of Thousands
First Wave	Agriculture Age	Farming	Thousands
Second Wave	Industrial Age	Mass production	Hundreds
Third Wave	Information Age	Specification/info	Decades

Alvin and Heidi Toffler see this as a revolutionary period of change. Moreover, they assume that the coming decades will be filled with turbulence, upheaval, and violence. They also believe that the third wave world will not destroy itself but instead transform the way people all over the globe live, work, play, and think. The old ways of doing things simply will not work any longer in this new environment.

The information age is upon us! None of the items in the list below existed just three decades ago.

THE LAST THREE DECADES HAVE PRODUCED:

Cellular phones	Super Bowl
Cable TV	Microsoft[@]
Home Computers	Federal Express[@]
Compact Discs	TV[@]
VCRs	Internet or the WWW
Fiber optics	Laser guided Munitions
Broadcast satellites	Stealth
CNN[@]	GPS
Automatic tellers (ATM)	M1, F15/16/117, B1/2

If we look at John Petersen's discussions of the future, they begin much like the Toffler's. He also describes humankind as hunter-gatherers for the first 35,000 years but opens his first period with the agriculture era about 5,000 years ago. Petersen identified this era with the beginning of formal written communications and the first movement of people into towns and cities. Only 500 years have passed since the beginning of the third era, "the industrial revolution," an era much like the second wave of Toffler's wave theory but marked primarily by the invention of the printing press. Peterson, like many others, calls the current era the "information age". He marks the beginning of this era with the arrival of the microcomputer about 25 years ago.

PETERSON'S PARADIGM SHIFTS

25,000	First notational	Hunter-gatherer
5,000	Writing system	Agriculture
540	Printing press	Industrial
27	Microprocessor	Information

The 15th and 16th centuries characterized a renaissance, an age of enlightenment. The changes the world had a profound effect. According to John Peterson, the information age will characterize the

"super renaissance." Much like the renaissance of the 15th and 16th centuries, the "super renaissance" will have long-term implications:

15th and 16th Centuries	1980 - 2020
Newtonian Physics	Quantum Mechanics
Renaissance/enlightenment	- Microprocessor
Printing Press	-Super Renaissance
	Ecological Threats

One of the most interesting aspects of the Peterson's model concerns the length of each succeeding era. A review Peterson's time pattern implies that the information age might only be 40-50 years long. We may already be half way through the shortest and most explosive era of human history.

TECHNOLOGY AND THE STRATEGIC LEADER

One of the most important functions of any strategic leader is to think and communicate ideas effectively. A leader must understand the basis of today's information systems and the relevance of technology to today's strategic environment.

The basic nature of most organizations is to resist change. Many have not yet recognized that the explosion of technology is forcing a tidal wave of change that is profoundly affecting both organizations and leaders. The national security environment is no exception and may be feeling the effects of this change sooner than the rest of society as a whole.

Looking at the strategic environment in the information age, we recognize the information age flood of technology has made it possible to provide more complete, accurate, and timely information to the decision maker. Information technologies are being used more frequently as the cost of processing information improves. Many tasks are enhanced by application of computers, communications, and information management systems; yet, random unskilled application of these tools can lead to disaster for leaders and their organizations. Many senior leaders have not yet realized the full implication, both positive and negative, of the evolving technology in the global information age:

- "Computers are too complex and I'm too old to learn about them now."
- "I tried it once and computers don't like me!"
- "Don't fix it if it ain't broken and besides I've gotten along without a computer for years."

Even though some senior leaders initially feel this way, experience shows that when new information technologies are introduced, executives realize the systems indeed help with even the most difficult decision making tasks and issues. Today, computers and information systems are necessary to all aspects of the strategic environment and senior leader work.

INFORMATION PROCESSING

As the Army moved into the late1980s, a major technical report was released to the Chief of Staff of the Army. It was a long-term research program that studied information, and systems theory in large organizations. If you are interested in the detailed research results of the study, you can obtain the complete report (X=H 1979).

Like most leaders then and now the Army was searching for factors or sets of factors that make up the elusive shortfall between "what is" (where we actually are) and "what could be" (the potential of the organization, "Be all you can be").

But what was the factor or factors? They knew it had something to do with "organizational performance." They knew it was also based on how an organization was run, and how its processes were coordinated, integrated, and controlled. It was not just management, leadership, and organizational development. It was all of these factors and more.

They also knew X had to be related to the fact that the organization must work through people. X was the conceptual binder, the thing that provided the synergy, the thing that brought powerful notions together.

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WHAT COULD BE (POTENTIAL)

|

X=?

|

WHAT IS! (ACTUAL)

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The end result of all of their research and work was that the unknown factor was "H," and **H** was **INFORMATION!!** Information made the difference. It was nothing more than the concept of **MATTER and ENERGY, ORGANIZED BY INFORMATION**. The task is to increase the efficiency and effectiveness of how we use information in our organizations.

The X=H research was conducted by HUMRO over a five year period. It compared over 150 organizational events that clearly demonstrated a direct link between efficiency of information flow and the effectiveness of the organization. Some argued that difference of information flow is no more than good leadership and that good leadership is nothing more than turning information into action. If this is true, then information management should answer the common sense notions of how to run an organization, as it is the conceptual binder pulling all of these ideas of leadership, organizational development, resource management, command and control and communications together.

However, information as we have described it so far seems to be a specific thing. **Bits and bytes**. **Measure this and measure that**. If the clear, precise, and factual cognitive dimension was

the only one, then putting H to work to solve for X would be simple and we could use information management alone to get the job done. Consider the phrase:

"SON OF A BITCH"

There are two dimensions at work here. One dimension of this declaration is cognitive and one affective. This phrase used strictly from a cognitive dimension is a clear statement of fact about a hound dog. However, it probably triggered an affective dimension in you giving it a different meaning. The affective dimension is the one that carries feelings, sentiment, and emotion. It is this function of context, culture, and values; group norms, gestures, and expressions; as well as modulations of volume, rate and lag time that gives it meaning. Information is a function of both cognitive and affective dimensions.

How important is the affective dimension in the transfer of information? Research suggests that only about 7% of total meaning comes from words, inflection 38%, gesture and expression about 55%. Since information must flow through people there is always an affective dimension. If we choose to ignore the affective dimension and look at only the cognitive flow of information, solving for X answer is easy. However, one of the most important findings of the research was that the "greatest" breakdown of organization performance was not the cognitive or technical dimension but rather the social and human (the affective dimension). The human dimension is certainly important to the leader for planning and transferring information in the organization. This approach to understanding information processing begins to clarify the important differences between just employing data and information, versus skillful information management.

Amid an ever-expanding availability of information at every level of management, the leader is faced with the responsibility of managing information while providing valuable data to the organization. General Colin Powell, while Chairman of the Joint Chiefs of Staff, shared his thoughts about the important role of information management for strategic decision making.

At the height of the Persian Gulf Conflict, the automated message-processing network passed nearly two million packets of information per day through the gateways in Southwest Asian Theater of Operation. Efficient management of information increased the pace of combat operations, improved the decision making process, and synchronized various combat capabilities. The technology developed to support these networks proved to be a vital margin that saved lives and helped to achieve victory. (Joint Training for Information Managers, 1996)

Col Paul T. Haig discussed the transformation both minds and culture in his article in *Parameters* (1996). He believes that as technology transforms culture it will also transform the way people think. Information management and manipulation are replacing knowledge acquisition and inference. Experts are defined by their ability to recognize underlying patterns so that more accurate facts can be acquired. It is becoming more important to know what to ask for to avoid being overrun by a variety of answers.

Second, the basis for learning is changing. The battle began over "real world learning" versus the information age "virtual reality." The ability to "what if " learn from mistakes and repeat the task by computer analysis over and over, has changed the way we learn.

Third, systemic decision making is taking over the use of intuition. If we are not careful technology also can cause paralysis through analysis and incline leaders to neglect intuitive skill commanders use as an important advantage in the often uncertain and ambiguous environment of the strategic leader. Possible over-reliance on automated and structured systems can stunt intellectual growth and limit executive effectiveness in unfamiliar environments.

NATIONAL SECURITY ENVIRONMENT

Admiral William A. Owens, former vice chairman of the Joint Chief of Staff, suggests that three simultaneous revolutions have pushed the national security community and, more specifically the military, toward major change. The first came from the revolution in world affairs brought about by the implosion of the Soviet Union and the end of the cold war. The second, a related revolution, was the reduction of the defense budget, accelerated because of the Soviet demise. The third, called the "revolution in military affairs" or the "revolution in security affairs" at the strategic level, happened in part because of the early investment in technology by the military. That investment has accounted for leveraging improvements in using military force more effectively. Owens suggests that the U.S. military will be the first to pass through the revolution in military affairs and will emerge with great technological strengths. These strengths will provide an edge across the entire spectrum of contingencies against which the U.S. may need to commit its military forces. This U.S. technical revolution in military affairs is based on a "system of systems" approach and is broken into three major categories:

- Intelligence
- Command and Control
- Precision force (*Dominant Battlespace Knowledge*, 1996)

ALONG CAME THE INFORMATION AGE

What is it about the information environment that makes such an impact on the senior leader/executive environment? In order to better understand the implications of information age and where it may be going, we need to understand how it got here.

It seems that in the evolution process only occasionally has human thinking and intellect developed in historical proportions and quantum leaps. The links between various tools and human thought account for much of it. Dr. Douglas C. Engelbart, at the Stanford Research Institute, Augmenting Human Intellect Research Center, examines these relationships::

More than 20,000 years ago, humans developed spoken language abilities. This allowed them to pass knowledge along from generation to generation. Therefore, people were able to accumulate more knowledge than any one person could learn in a lifetime and allowed people to deal better with more complexity. But the amount of information that could be accumulated was bounded by the memory capacity of any given individual. The use of myths and ballads made memorization easier, but the limits of memory restricted the evolution of intellect. About 6,000 years ago, humans developed the ability to write- not only pictures that represent whole ideas, but also pictures that represented part of ideas. The next jump was in about 3100 BC, when the Sumerians began combining these pictures with phonetics to look like abstract ideas. These written sounds,

represented a massive leap in human ability to express complex thoughts in writing. As a result, we were able to be more and more specific communicating complex, abstract ideas.

Writing continued to develop and soon began to match spoken language in its richness. This allowed us to save significantly more information than could be remembered in stories and songs, and in turn expanded our ability to deal with a complex world.

We all know that just over 500 years ago, Gutenberg developed the movable-type printing press, and widespread dissemination of information became possible. In combination with improved communications and trade, the printing press led to the spread of knowledge across social and political boundaries and put books in the hands of the masses. The general education level of the population increased, society could now focus studies on more advanced subjects.

Although technology continued to advance during the second wave industrial world, the birth of the computer and the computer chip has signaled the beginning of the "information age" and the quest for a new era of data, information and knowledge collection.

TOOLS FOR THINKING

The information age has recently begun to develop tools for leveraging, thinking, and decision making. Even though most information systems professionals are concentrating on automating routine transactions, a small group of information systems experts have pursued a different course.

Dr. Douglas Engelbart at Sandford's center for Augmenting Human Intellect has begun to develop tools that were **not** designed to capture more keystrokes or process data into reports, but to help people think. His research led to the invention of many of the devices and tools now considered the leading edge of computing, including the mouse, windows, hypertext, and electronic publishing: all tools designed to leverage the individual's ability to think.

In the 1970s, the idea of enhancing human thought through computers wasn't a popular notion. People saw the computing world through an administrative lens. The environment changed some in the 1980s with the infusion of the PC into the home and business, but it was still very much a word processor, or database tool understanding of technology. The view has changed some since the 80s but not dramatically. Many still connect computing with office administration. However, those who truly understand the potential of computers for thinking and communications are doing business differently. These visionaries are proving that improvements in our ability to work with information can lead to significant leaps in intellectual abilities and organizational productivity. Much like the findings of the X=H research, government and industry are leveraging their leaders and organizations with management techniques.

The information age has arrived globally. The Internet is growing by leaps and bounds, and President Clinton's current budget includes a $2 billion dollar technology initiative to connect every classroom, library, and hospital in the United States to the Internet by 2000.

INFORMATION PROCESSING, COGNITION, AND DECISION MAKING

Since senior leader and executive worth is measured by what they know and the success of the decisions they make, a look at how information technology can enhance cognitive capacity and decision making is imperative.

Using systems theory, we'll relate this process to a systems model you will learn in SLDM. (INPUT - PROCESS - OUTPUT) Thinking or cognition can be described as a process of gathering data and information (Input), sorting and relating it (Process), and creatively and critically viewing it to induce or deduce new ideas (Output). Don't forget feedback is an essential part of any system to grow and learn.

Computer and information systems work the same way. They are systems. **Input** devices bring information into the computer system. The input devices would be the keyboard, the scanner, or various types of drives. The **processor** (CPU - computer-processing unit) is the computer itself. The **output** (devices like the monitor/screen or printer) rounds out the system. All computer systems must have these components (like the human decision process) It is the speed and accuracy of the computer executing this process that has promoted its success.

INPUT ------> PROCESS -------> OUTPUT

<-------- FEEDBACK <----------

Like the computer, human processing of information is limited by the capacity of the machine. Human processing is biologically limited by two major factors: First, the capacity of long-term memory (a constraint of how much information we can accumulate without the help of aids such as writing), and second, short-term memory (how long we retain information). The mind is like a mental "scratch pad" that can hold only a limited number (usually 7 to 12 clusters) of thoughts at a time. (And you thought the "chunking" of telephone numbers or the clustering of the SSNs was just an accident.) These constraints of our memory can limit our ability to distill, relate, and view ideas. As we improve our ability to structure and organize symbols (such as language) outside our heads, we expand our ability to think. This ability to manipulate information has far reaching implications for advances in human cognition and decision making. With the help of information technology as a lever we are preparing for the next leap in the evolution of human cognition.

What can computing and information management offer the strategic leader?

- It gives immediate, direct and focused access to millions of ideas, publications, and documents from around the world. (WWW has >160,000 servers or networks around the world).
- It allows almost unlimited capacity to store everything known and access it at will. Storage capacity has grown at an unbelievable rate.
- It allows communication with local, organization-wide, and global networks.
- It allows exploration of ideas in a variety of forms and the free manipulation of those ideas. (E-mail forums, chatrooms, bulletin boards, and powerful search engines on the web freely expose ideas from all around the globe.)

- With the advent of expert systems, the computer can now interact as a peer or instructor would, distributing more creative, effective, efficient, and thoughtful ideas and solutions to problems. ("Wizards" and decision support systems influence all aspects of our lives.)

As computers began to do more resource intensive processing of data, they allow time for people to process more complex issues and thoughts. And, as computers provide a higher knowledge and comprehension level of information, there also is more time for leaders to concentrate on senior level tasks requiring social interaction and complex information processing.

Computers have dramatically extended our memory capability, and memory and cognitive capacity are the two elements that form the basis of our thinking process. Computers are supplements to this process and, although they will not take the place of strategic leaders, they can become a powerful tool to help senior leaders become more efficient and effective. The correct use of information tools can certainly leverage strategic leadership and decision making when properly applied.

The only hope for successfully dealing with the complex "third wave" global environment is to outsmart it. Intelligence is the best bet for surviving in the complex strategic environment, therefore, leveraging intellect with technology is a must. Similarly, the organizations we construct can no longer depend on size to be successful. Today, small organizations tend to be as efficient and productive as large ones. Small organizations are inherently more flexible and better able to respond to the complex environment. Companies are quickly moving away from mass production toward specialty products, and custom military units like special operations units and cross-attached units for specific purposes are all part of the fast moving "third wave" world. Strategic leaders will encounter an environment that has less bureaucracy, smaller staffs and a faster moving and changing world to operate in.

In the information age, organizations must find ways of increasing intelligence and learning and use various systems of feedback loops to adjust the decision process of the organization. Computer information systems are ideally suited to assist with all phases of the decision making process: input, processing, output and enhancing the feedback of the system.

A primary question a leader must ask is: How do we make our organizations "smarter"? Part of that answer has to be: How do we make our leaders smarter? How do we build on the "Human Capital" that our leaders and experts in our organizations possess? Senior leaders' knowledge depends not only on the power of the leaders' mind, but on their ability to leverage that knowledge with proven tools and methods during the decision making process.

In this post-industrial era, the success of organizations seems to lie in human capital (HC) and systems capabilities of the organization rather than in actual physical assets. The capacity to manage human knowledge-and to convert it into useful products and services-is fast becoming the "critical" leader skill of the age. Despite the growing importance of expertise, few systematic answers to even basic questions are available:

- What is senior executive knowledge?
- How can it be developed?

- How can we better leverage it?
- What role do computer and information systems have to play in this leveraging process? What tools are available to leverage these valuable assets?

ALTERNATIVE FUTURES?

The Air University's 2025 research team created a number of possible separate worlds for the future. The four most challenging, interesting, and difficult for the United States served as guides for their research. Two additional worlds--an intermediary world with selected characteristics of other worlds and a world that was a partial evolution to the future of 2025, Crossroads 2015--served as baselines for the 2025 analysis. The worlds that emerged follow. That a look at the proposed environments of the future, the unique opportunities and challenges in each world for the strategic leader.

Gulliver's Travels. This is a world of rampant nationalism, state and nonstate sponsored terrorism, and fluid coalitions. Territorialism, national sentiments, the proliferation of refugees, and authoritarian means flourish.

The United States is overwhelmed and preoccupied with such worldwide commitments as counterterrorism and counterproliferation efforts, humanitarian assistance, and peacekeeping operations. The United States is attempting to be the world's policeman, fireman, physician, social worker, financier, and mailman.

This situation forces the U.S. military to devise concepts of operation for meeting expanding requirements while maintaining a high operational tempo during a period of constrained budgets. The U.S. world view is global, the difference in rate of growth and proliferation of technology (TeK) is constrained-evolutionary, not revolutionary-and the world power grid is dispersed.

Zaibatsu. In Zaibatsu, multinational corporations dominate international affairs and loosely cooperate in a syndicate to create a superficially benign world. Economic growth and profits are the dominant concerns.

While conflict occurs, it is usually through proxies and is short lived. Military forces serve more as "security guards" for multinational interests and property rights. Technology has grown exponentially and proliferated widely. Global power is concentrated in a few coalitions of multinational corporations.

The main challenge to the U.S. military in this world, which is becoming unstable due to rising income disparities, is to maintain relevance and competence in a relatively benign world where the United States is no longer dominant. The U.S. world view is limited as domestic concerns take precedence.

Digital Cacophony. This is the most technologically advanced world resulting in increased individual power but decreasing order and authority in a world characterized by fear and anxiety. Advances in computing power and sophistication, global databases, biotechnology and artificial organs, and virtual reality entertainment exist.

Electronic referenda have created pseudo-democracies, but nations and political allegiances have given way to a scramble for wealth amid explosive economic growth. Rapid proliferation of high technology and weapons of mass destruction provide individual independence but social isolation. The U.S. military must cope with a multitude of high technology threats, particularly in cyberspace. The U.S. worldview is global, technological change exponential, and the world power grid dispersed.

King Khan. This world contains a strategic surprise in the form of the creation of a Sino-colossus incorporating China, Taiwan, Malaysia, Singapore, and Hong Kong. U.S. dominance in this world has waned as it has been surpassed economically by this entity and suffered an economic depression. This has led to a rapidly falling defense budget and hard choices about which national priorities (core competencies) to maintain in a period of severe austerity.

The American Century has given way to the Asian Millennium and the power, prestige, and capability that were once American now reside on the other side of the Pacific Rim. The U.S. world view is decidedly domestic as it copes with problems at home, the growth in technology is constrained and world power is concentrated in a Chinese monolith whose economy, military, and political influence dwarfs those of the United States. The United States has come to resemble the United Kingdom after World War II-a superpower has-been.

Halves And Half Naughts. This is a world in which there are both changing social structures and changing security conditions. The main challenge to the military is to prepare for a multitude of threats in a world dominated by conflict between haves and have-nots. The world has split into two unequal camps: a small, wealthy, technologically advanced, politically stable minority of the states and peoples of the world (roughly 15%) and the poor, backward, sick, angry, unstable vast majority of the world's states with people who have little, and therefore have little to lose, in seeking redress of their grievances.

The U.S. world view is global but only because of the threats to its security represented by these masses. Technology and power are bifurcated exhibiting trends in both directions in the divided world.

Crossroads 2015. In Kurdish areas of Eurasia, the US uses programmed forces from 1996-2001 to fight a major conflict. The choices and outcomes made at this juncture have much to do with determining which of the worlds of 2025 will emerge a decade later. The American world view is global, TeK is constrained, and the world power grid is seen as concentrated but beginning to become dispersed. Potential future conflict centers on events involving disputes between the Ukraine and a resurgent Russia and the reaction of the rest of the world to such a conflict.

The United States in 2015 still has global commitments and concerns, but a constrained rate of economic and technological growth. Whether the US chooses a more isolationist path because of these pressures or chooses a more activist role with the sacrifices that would require, is the major question to answer in shaping the world of 2025.

CONCLUSION

No one can predict where the information age will lead us. No one can reliably predict whether technology will ultimately enhance or impair the human dimension of senior leadership, but one thing is sure-technology is here to stay. Either we master technology or technology will master us.

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