NEW CYBERSPACE MANAGERS IN THE YEAR 2020

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The article deals with digital convergence and new segments in the ICT sector including data protection, virtual reality, voice command of computers, new marketing channels, computer justice etc. Dynamic development will possibly create new managerial positions like identity manager, E-government manager, chaos manager or technostress manager.

KEYWORDS:

ICT, digital convergence, technological forecast, identity manager, chaos manager, virtual reality manager, technostress

INTRODUCTION [1]

Digital convergence is one of the key trends in the development of IT, media and telecommunications. Any content can be converted into digital format and, afterwards, transmitted through internet, fixed and mobile networks, or even grid. Nowadays, telecom companies deliver content and cable TV operators provide broadband internet connection. This trend is accompanied by substantial number of new mergers, acquisitions, joint-ventures and strategic alliances. Consequently, horizontal as well as vertical integration among telecommunications, media, IT and power industry is taking place. Three main factors that made digital convergence possible were digitalization, the Internet Protocol and the development of the multimedia devices.

Firstly, digitalization allows transformation of any content into form that is fully transmittable in any data network, e.g. fixed and mobile networks, cable TV networks, primary data networks or electrical power network. In OECD countries, there are 27.7% of digital TV households and the number is growing quickly . By virtue of digitalization, the networks can be used more efficiently and interactive services, such as video-on-demand, can be offered.

Secondly, the Internet Protocol facilitates transmission of video, text and other data in the form of IP packets. Although the original networks were designed for specific service, such as telephony, they can be used for transmission of IP packets that is another very important step to digital convergence.

This trend is often referred to as horizontal integration . All existent networks are being integrated into one horizontal layer that creates the converged network for transmission of data. Equal competition among the various networks is becoming reality, since the content is not strictly bound to a particular platform. The Internet Protocol creates an environment, where any content can be transmitted anytime, anywhere and anyhow.

Thirdly, the emergence of the multimedia devices is another important milestone in the process of digital convergence. The content can be not only transmitted through various networks, but also received by many different devices. This development makes it possible to watch TV on cell phones or handhelds as well as play and store movies, music and video clips on our personal computers.

Consequently, there is an intensified competition among various infrastructures and providers of multimedia content in the market. Formerly, the analogue terrestrial network was the only infrastructure suitable for broadcasting. This traditional infrastructure is nowadays facing competition from cable TV and satellite networks.
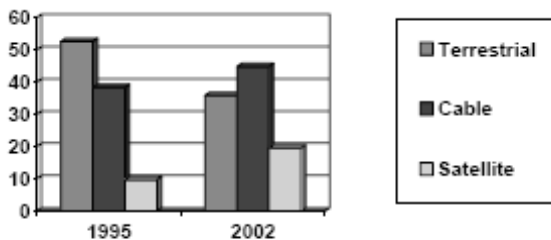
Source: OECD Communications Outlook 2005, fig 7.1 'Trends in media usage in the OECD areas', p.202.

This competition among providers of content is also the consequence of the structural changes in the transmission networks. The scarcity of frequency is not any more a major constraint for broadcasting. At this time, the huge amount of the data channels can be operated simultaneously. Ultimately, digitalization and internet technologies reduce spending on transmission of content to customers.

Further, I would like to demonstrate ongoing consolidation in the global telecommunication services market. We will consider the largest telecom companies according to the market share based on the FORBES2000 ranking . The market share of the top 10 companies was continually growing over the whole considered period. In 2003, the market share of the TOP10 group was 42.60%. In 2006, the market share exceeded 46%. Moreover, if the AT&T – BellSouth merger had taken place on 1st January 2006 instead of 29th December 2006), the share would have surpassed 50%.
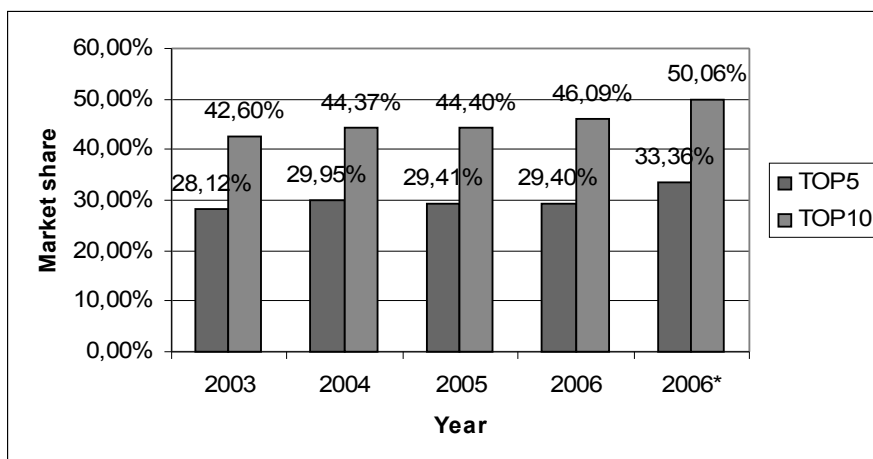
The market share of the largest telecom companies

* AT&T-BellSouth merger considered on 1st January 2006

The following diagram was created on the Future of Media Summit 2006. The diagram represents emergent network that comprises of media, tele-communication and technology companies.

Each node in the graph stands for one company and the size of the nodes signify the number of new relationships established within the considered

period. Width of lines is related to the number of joint-ventures, partner-ships and strategic alliances between any two considered companies. The graph represents rather dynamics than state of relationships among the companies. The companies that are most integrated in the network are de-picted in the middle.

At the first glance, it is apparent that media companies have become much more integrated in the network. The ever-rising amount of partner-ships reflects the need for close co-operation among media, telecom and technology companies.

Microsoft has maintained its central position. New internet companies, such as Google, Yahoo! and EBay, have acquired more prominent standing. Time Warner has established very strong relationship with Microsoft, CBS and Google. The cell phones manufacturers are now also much more integ-rated than in the beginning of the decade.
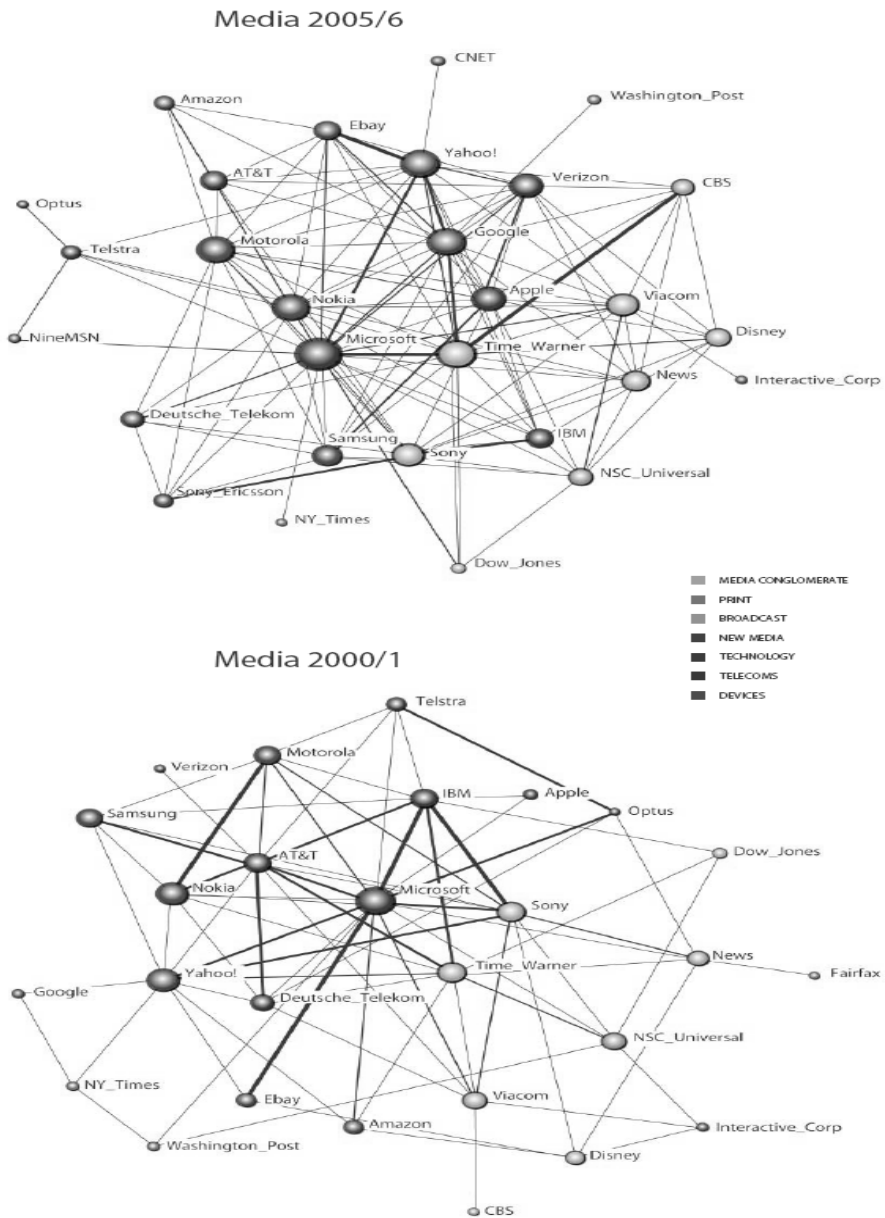
Network of strategic alliances, partnerships and joint-ventures among media, telecom and technology companies, Source: Future of media report

The existence of complex and complicated systems is very often marked by eventual crises, sudden changes and unpredictable events. Such a turbulent environment can substantially destabilize organizations that were proven true in case of Enron or Maxwell Business Empire.

The potential problems are well demonstrated by the merger between America Online and Time Warner that took place on 16th January 2001, shortly after the dot-com bubble burst. The creation of the first fully integrated media of the new age became one of the biggest business failures in the history of the USA. After the merger, return on assets and on equity decreased, the ability to pay off debts worsened and rating agencies were considering lowering of company rating. Economic valued added fell in the red and share price substantially declined.

The main cause of the failure was undoubtedly the dot-com bubble burst. America Online turned out to be to a large extent overestimated. The changes in the market of internet service providers deepened the crisis, because the AOL major service was obsolete Dial-up internet connection. Last but not least, the clash of the companies' cultures and the inability of the top management to unify the new corporation contributed to this major failure.

The ongoing process of the integration of media, telecom, technology and even power industries to one fully converged system will cyclically create cartelized and chaotic states of the whole segment. The manager of chaos will eventually find sufficiently stable areas for economic and business activities by using modern management methods, such as neural networks, genetic algorithms, fuzzy logic etc.

TECHNOLOGICAL FORECAST [2]

The most respected technological forecasts were edited by Ian Pearson and Ian Neidl[1]. Some of the major hypotheses are following:

SECURITY, MILITARY AND LAW [2.1]

Table 1: Technology forecast for security, military and law

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[1]   Pearson, I., Ian Pearson's guide to the future. http://www.btinternet.com/%7Eian. pearson/docindex.htm
British Telecom. BT Technology Timeline. http://www.bt.com/technologytimeline

Mass internet rallies	2006
Software companies sued for misuse of remotely controlled weapon	2006
War fought over water supply	2006
Logic checkers highlighting contradictory evidence	2006
SMS spam problem undermines mobile content market	2006
Biometric home access	2006
Expenditure on security exceeds expected cost of attacks prevented	2006
Autonomous weapons authorised to fire at own discretion	2008
War where own side kills more of its own than the enemy	2008
War for water	2008
Context sensitive bombs (waits for senior politicians)	2008
Weapons use biometric authentication of user	2008
Bacteria used to break down explosives in mine fields	2008
Terrorist are source of most on-line scams	2008
Communication networks severely disrupted by hackers	2008
Balloons used in terrorist attacks	2008
Radio controlled vehicle attacks on shipping, smart mines	2008
Cracking of public key cryptography within a few seconds using networked zombie machines	2008
Data mining use in trials	2008
Remote override capability on planes	2008
Household access by facial recognition	2008
Jargon translators	2008
Computer advice to jurors on probability issues	2008
Criminal tagging augmented with video and audio sensors	2008
Extensive use of electronics to monitor police behaviour	2008
Automated stenographers	2008
Jigsaw viruses	2008
Spam email volume forces charge based solutions	2008
Phishing destroys confidence in on-line banking, most on-line banks closed	2008
Terahertz video cameras become social nuisance due to privacy invasion	2008
Expert system based home law advisors	2008
Robot casualties reported routinely	2011
Corporate cyberwars	2011

Major utility brought down by hackers	2011
Universal ID cards in UK	2011
Most weapons attack systems rather than injure people	2011
Civil liberties revolt	2011
Anti-tech backlash	2011
2nd internet with guaranteed security for email, with no spam	2011
World War 2 thought of as a film rather than a real event by 30% of Americans	2013
War with zero own side human casualties	2013
Scalable AI as major military threat	2013
Positive clean ID required for access to many places	2013
Terrorist use of GM to pollute crops and damage economy	2013
Most fighters and bombers flown remotely	2013
Plastic stealth tank	2013
Use of network resonance as security threat	2013
Ambient intelligence detection of minor crimes & anti social behaviour	2013
Identity theft forces all transactions to use biometrics	2013
Domestic augmented reality used to give virtual makeovers	2013
Biometric ID required for every phone call	2013
Use of mutant insects for attack purposes	2013
War caused by global warming forcing mass migration from coastal areas	2016
War fought entirely between robot armies	2016
ID cards replaced by biometric scanning	2016
Emotion control chips used to control criminals	2016
Open city prisons for criminals and antisocial people	2016
First war without any casualties from friendly fire	2020
Robots outnumber soldiers on battlefield	2020
Smart bacteria used in warfare to alter behaviour of enemy	2020
Smart bacteria as military threat to mankind	2020
Attacks based on facilitating natural disasters	2020
Smart bacteria weapons	2020
Gated cities for civilised people	2020

ARTIFICIAL INTELLIGENCE & ARTIFICIAL LIFE [2.2]

Table 2: Technology forecast for artificial intelligence and life

Action man toys engage in war games over networks	2008
Toys with built in tracking technology	2008
People have some virtual friends but don't know which ones	2008
Mood-sensitive home décor	2008
Location devices implanted into pets	2008
First divorce due to virtual affair with computer game character	2008
Addiction to on-line games seen as a national problem	2008
DNA used to assemble electronic circuits	2008
First bacterium assembled from scratch	2008
Many drugs delivered via fruit	2008
AI football manager	2008
AI football teams as TV entertainment	2008
AI Entity passes A Level	2011
AI companies illegally cloned	2011
Highest earning celebrity is synthetic	2011
Dolls with personality chip and full sensory input	2011
25 % of TV celebrities synthetic	2011
Expert systems surpass average human learning and logic abilities	2011
Computer agents start being thought of as colleagues instead of tools	2011
Autonomous AI sales staff become AI stalkers	2011
Smart jelly babies	2011
Smart mammary memory	2011
First multi-celled organism assembled from scratch	2011
Drugs delivered in carbon buckyballs (burst open at destination under laser light)	2011
AI technology imitating thinking processes of the brain	2013
AI teachers get better results than most human teachers	2013
AI starts being noticed as a source of redundancy	2013
AI Entity gains Degree	2013
Computers that write most of their own software	2013
AI students	2013
Most software written by machine	2013

AI Entity gains Masters Degree	2016
Human knowledge exceeded by machine knowledge	2016
Electronic pets outnumber organic pets	2016
Electronic life form given basic rights	2016
Artificial insects and small animals with artificial brains	2016
AI Member of parliament	2016
Smart bacteria, contains electronics and linked to net	2016
AI brings chimpanzee or dolphin up to human level intelligence	2020
AI Entity gains PhD	2020
AI Entity awarded Nobel Prize	2020
Remote control devices built into pets	2020
Virus wipes out half of the electronic pet population	2020
AI entities given vote	2020
Smart yoghurt, colony of smart bacteria linked together, IQ = human	2020

NEW MANAGERIAL POSITIONS [3]

Taking into consideration the aforementioned information, it becomes obvious that this development will lead to new managerial positions in the future. Let us briefly introduce some that are likely to appear:

IDENTITY MANAGER [3.1]

The identity manager will operate in the area of data protection and related legal restrictions. It will be necessary to identify, whether the business partner is a human being, a robot or a segment of the biosphere. A new scientific discipline related to identity will be developed.

Based on SearchVoIP definition, Identity management (ID management) is a very broad administrative area that deals with identification of the individuals in a system (e.g. country, network, or enterprise) and control of their access to resources within the given system by associating user rights, restrictions and constraints with the established identity. The licensing system for drivers can be a simple example of identity management: drivers are identified by their driving license numbers and their specifications (such as "can not drive after dark") are linked to the identification number.

In an IT network, identity management software is used to automate administrative tasks, such as creating, resetting and changing user passwords. Enabling users to change their own passwords can save substantial money and resources, since large deal of help desk calls are password-related. Password synchronization (p-synch) enables user to access resources across various systems with a single password. The more advanced version, called single sign-on, provides us with synchronization among applications as well as systems.

In a business environment, identity management is used to improve security and productivity, while reducing cost and redundant effort. Standards, such as Extensible Name Service (XNS), are being developed to enable identity management .

CHAOS MANAGER [3.2]

New inventions like 3D Internet (e.g., secondlife.com) will complicate the whole system. Special programs like neural or genetic software will be essential to specify new gaps in the market. Let us look at one of the significant segments: 3-dimensional, virtual reality format is emerging. This format was for the first time named the "Metaverse" by Neal Stephenson in his 1992 novel, *Snow Crash.* Nowadays, this concept is used to describe the vision behind current work on fully immersive virtual spaces. The Metaverse is a single entity that will be formed by various versions of VR all able to interact with each other. Similarly like the Internet is comprised of nodes or hosts and the Universe consists of galaxies, the Metaverse constitute a set of environments where people communicate and interact with each other and even with software agents in virtual cyber worlds representing the real world, but without its physical constraints.

To make this concept prosperous, users have to be able to create and modify their own content, compete freely in the open markets to support innovation, and create virtual wealth that can be favourably convertible to real wealth. Four major trends are driving the emergence of the Metaverse.

The advanced technologies like ADSL, TV cable, Ethernet, wireless, optical fiber, and satellite communications has passed the 30% penetration. The penetration level is expected to surpass 50% in industrialized countries

by 2010. The rise of broadband is especially important because it allowed new applications requiring big data volumes to be used, as seen in the recent boom of web 2.0 sites.

Virtual reality is related to the ability to immerse oneself in a fully artificial environment that enables the sensory experiences of commerce, warfare, education, medicine, architecture, entertainment, and space. VR is believed to be used by more than 30% of the public by 2015. VR is still costly and unwieldy, but it proves to be very useful and popular technology. Moreover, supporting technologies are improving and the number of applications is growing. The virtual online worlds - early versions of the Metaverse, such as Second Life, have become very successful. At this time, there are at least two other online worlds that directly compete with Second Life: Active Worlds and There.

In addition, the Open Source Metaverse Project is developing an open source engine for the Metaverse on account of strong user demand. The following graphs from Second Life represent the interest and suggest that users are willing to spend time and even real money in the online worlds:

4 Exchange rate between Linden and Us Dollar
and the volume of trades on 23rd October 2007,
source: www.secondlife.reuters.com

**5 Total USD spendings in
Second Life over the 5 day period, source:
www.secondlife.reuters.com**

A related trend is the increasing popularity of 3D mapping software, such as Google Earth and Microsoft's Virtual Earth 3-D. Google Earth has registered millions of downloads since it was released in 2005 and has inspired endless mash-ups by posting pictures, make comments, and other references to locations.

One of the most important trends is the increased investment activity in these worlds from companies, such as IBM. As part of its $100 million InnovationJam initiative, IBM is researching existing virtual worlds. The user experience will probably improve by the time we do more research and find out how to better use these virtual worlds to solve real problems in business and society.

E-GOVERNMENT MANAGER [3.3]

"E-Government" refers to the use of information technologies (such as Wide Area Networks, the Internet, and mobile computing) by the government agencies that, consequently, will very likely transform their relations with citizens, businesses, and other structures of government.

Economic and revenue-related concerns include e-government's effect on taxation, debt, Gross Domestic Product (GDP), commerce and trade, cor-

porate governance, and its effect on non-e-government business practices, industry and trade, especially Internet Service Providers and Internet infrastructure.

From a technological standpoint, the implementation of e-government has impact on e-enablement, interoperability (e.g., e-GIF) and semantic web issues, "legacy technology" (making "pre-eGovernment IT" work together with or be replaced by e-government systems), and implications for software choices (between open source and proprietary software, and between programming languages) as well as political blogging especially by legislators.

There are also management issues related to service integration, local e-government, and Internet governance including ICANN, IETF and W3C, and financial considerations, such as the cost of implementation / effect on existing budgets, effect on government procurement, and funding. Legal implications include freedom of information and privacy (e.g. UK Data Protection Act) concerns.

In the future, e-government will include the whole integrated UN. E-government manager will be using special techniques to ensure the contracts from this inexhaustible area.

TECHNO STRESS MANAGER
(THE STRESS OF ADJUSTING TO NEW TECHNOLOGIES) [3.4]

Global computer networks may cause more injury accidents in the future than transport today. In 1966 Gordon Moore, the founder of Intel, stated that the power and complexity of the silicon chip would double every 12-18 months. This 18-month prediction has proven true. Today's computer chip is four million times as powerful as its predecessor of 30 years ago. These powerful processors have ushered us into the Information Age.

The net result is that in modern society we have increasingly powerful machines to manipulate and process an ever-increasing amount of information. New products, inventions, procedures, and policies, all based on the new rapidly available information, are announced every day.

Computer technology, the information highway, and the Internet are creating something new – techno-stress. Techno-stress is stress of adjusting to the new technologies. There is also the concept of "time sickness" which

comes from trying to juggle too many options with too little time. We experience events happening faster and faster. It is difficult for us to slow down. We actually become impatient with the "slower computers" (which are in fact amazingly fast) when we have to wait that extra few seconds for something to happen. Frustration and stress arrive as we wait for the monitor screen to change. "Future shock" (too much change in too short of a time) has arrived.

In the future the techno stress manager will reduce the damage of techno stress to the minimum by using expert systems.

CONCLUSION [4]

There are many fundamental developments taking place in the area of telecommunications, media, and information technology. Consequently, the entire global market is undergoing rapid transformation.

These dynamic changes in the ICT sector will probably create new managerial positions that will address the business challenges of the future. Supposedly, some of the following managerial positions will appear in the time to come: identity manager, e-government manager, chaos manager, and techno-stress manager.

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