Dilemmas new information global economy and indicator ICT

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1. Change information

"There's always been information," says David Weinberger[1]. I think that's probably not true, and it has implications for what we think our businesses are made out of. The term "information" only came into its current meaning with the invention of information theory and the rise of computers. Before that, "information" meant something very different. Initially, it was (as per the medieval appropriation of Aristotle) the way the essential nature of things shaped the pure potentiality that is our minds. Then it meant something like "news":

1. Do you have any information about the advance of the enemy?
2. Then it came to mean the basic set of facts about a topic, as in the "Information Please" almanac.
3. What exactly do we mean by information?

Team Raab says it's a harder question than it seems. As far as I can tell, the term got taken over twice in the past few decades, first by the information theorists who have a mathematical definition of it that few of us care about, and then by the computer scientists who wanted to be able to talk about something more grand than mere data, a term they'd previously hijacked. (It meant "the given," the pure sense data with which some philosophers believed consciousness begins). Then, of course, along came the knowledge management folks who wanted a term more grand than "information," and thus "knowledge" was stripped of 2,500 years of philosophical thought and thrown onto trade show booth signage and product packaging willy-nilly. We can only be thankful that the persistent attempts to trump "knowledge" with "wisdom" have not taken root. After all, how could vendors ever trump "wisdom"? "Omniscience management" is a non-starter because God presumably doesn't use a scalable, enterprise omniscience solution. The change in information is not merely a change in terminology (see Stephen Gill, *Power and Resistance in the New World Order (International Political Economy),* Palgrave Macmillan, 2007, pp. 67-98). Over the past 30 years, we have come to believe that information is not merely what we communicate and what computers manipulate. The idea that we live in information has come to make sense (Badore N. 2000 : 237). A generation ago, that simply would not compute. Now, even if we disagree with it, we think it's a coherent view. There are lots of drivers of this change in worldviews global economy, but two stand out:

A\ First, the ***radical idea*** that DNA is information now seems commonplace. When the idea was first introduced, it was a head-spinner. How could a molecule be information? But now we are so used to thinking that way that you can shock people by showing them photographs of actual DNA strands. The

[1] David Weinberger, *Was there Always Information?* Posted Feb, no 1, p. 1-2, 2006.

photos don't look anything like the mythologized depiction of beautifully twisting strands with color-coded ladder rungs running between them. DNA looks sort of lumpy in the photos. (Of course, maybe the photos I've seen were taken on a bad heir day). DNA, in fact, is not information. It's a set of atoms that produces complex effects on other atoms. Those atoms are no more information than is a sculptor's hand as she turns clay into art. They are no more information than is a magnet that attracts iron but not plastic or a mail slot through which large packages cannot fit. DNA certainly can be understood as information, and if we can learn more about our fates that way, more power to the geneticists and the stem cells that enable them. But DNA is not information (Bauman Z. 2005 : 123-243).

B\ Second, the ***Matrix*** expressed the old paranoid nightmare of information, and is notable not for the elegance of its expression (did you see the rave scene?) but because it has become a cultural reference point. It is an old idea, expressed notably by Plato and Descartes. But now we have the machinery that could conceivably make it real. How many petabytes of information are there in all the sensory input a person receives? A petabyte is no longer an impossible number. I've already got a terabyte of storage distributed among all the computers in my family. So, we no longer need the plot device of a lifelong dream or an evil god out to fool us. We just need a thousand families' worth of computers and we can imagine all of uman experience turning out to be nothing but information. But, even if *The Matrix* (or Ray Kurzweil) is right and our lives are nothing but the result of computer information being fed into our neurons, the illusion that convinces us is one in which the world is not made of information. It is a world in which our bodies press into the earth as we walk, and our cheeks are cool with the kiss of a loved one (Bauman Z. 2005 : 15-24).

J. Meyer and B. Rowan impression, the world is not information. Our lives are not information. By informationalizing the world, we impose a layer of translation between us and experience (Meyer R., B. De Wit (1998), *Structure. Process*, *Content*, *Context. An International Perspective*, London, p. 56). And by informationalizing our businesses, we oversimplify complex human interactions and relationships. We think of our businesses as input-output machines that succeed if we get the inputs and the processes right. But that's no more true of business than it is of politics, marriage and every other human endeavor. That life and business are information is a delusion we could do without (Badaracco J.L. Jr. 2002 : 288).

2. Contexware records management support

Contexware has developed a new **Records Management Support** (RMS) Module designed to allow enterprises to derive significant additional value out of their existing records management software investments[2]. The company says

[2] See *When Context Counts*, Posted Jan, no 9, pp. 1-8, 2006.

Contextware RMS will connect seamlessly with most Web-based records management applications. The support module will allow users to activate Contextware RMS from any point in the records management taxonomy, enabling users to review the business processes and instructions that relate to the records providing a precise context for the records stored within the system, claims Contextware. Contextware describes itself as offering a software platform that uses business processes to manage content in context, integrating strategy, people, knowledge and infrastructure into a single framework. This convergence, it adds, improves productivity, employee retention, compliance, business continuity, the value of IT infrastructure, as well as capturing and managing intellectual capital (see Chris Baldry (Author), Peter Bain (Author), Dirk Bunzel (Author), Gregor Gall (Author), Kay Gilbert (Author), Jeff Hyman (Author), Cliff Lockyer (Author), Abigail Marks (Author), Dora Scholarios (Author), Philip Taylor (Author), Aileen Watson (Author) , *The Meaning of Work in the New Economy (The Future of Work)*, Palgrave Macmillan, 2007).

For several years, Delphi Group has been cautioning organizations about the danger of innocently assuming that their content is in any deep sense "secured" simply because they have an **Enterprise Content Management (**ECM) solution in place[3]. With the volume of content and the speed of business today, it's unreasonable to expect workers to be the watchful eye and point of enforcement, ensuring that information that should be kept private and/or protected remains in a secured state. Many organizations still have no way of differentiating between accidental content exposure (e.g. e-mailing private information to the wrong person--Joe Smith outside of the company rather than the Joe Smith inside), and the purposeful content leakage (e.g., selling credit reporting information to collections agencies), or for that matter, knowing that either scenario has occurred until well after the incident. The problem of "who is watching the watchers" is one of many that develop when the responsibility for content security is pushed down to individual workers. Scalability, simple awareness and enforceability of security policies are just not reliable through a purely human effort. With the flurry of news stories about identity theft, lost records and lawsuits revolving around the inappropriate handling of e-mail, Delphi Group wanted to quantify how organizations are securing their online content, and whether their existing policies and systems are serving them adequately. Therefore, we conducted a survey in which 458 individual companies responded to 22 questions. The results were astounding. When asked if corporate content was subject to intentional or unintentional unauthorized usage, 40 percent of respondents admitted they had no idea. Forty-one percent of respondents acknowledged that internal, external or both internal and external parties had accessed content without authorization. As many classic surveys (such as the oft-cited CSI/FBI surveys) have revealed over the

[3] See Carl Frappaolo, *Content Management Strategy put you at Risk*?, Posted Oct, no 1, pp. 1-5, 2005.

years, the "insider threat" is cited twice as often (14 percent) as external threats (7 percent) from hackers or crackers.

Diana Farrell says, in total, 81 percent of the survey respondents admitted to incidents of information leakage/exposure. Companies that had not experienced an incident acknowledged having reason to be concerned, simply because they have no idea of their level of exposure to a threat, nor confidence in their ability to prevent, detect or react if one should occur (Farrell D : 165). Clearly there is much work to be done. If that news weren't dire enough, the vast majority of respondents (63 percent) admitted they had no appreciation of the dollar value risk they faced from potential threats. How could they? Most had no compliance mandate or other external requirement to address the area of risk, and those who did saw compliance as an isolated issue. Indeed, it is difficult to balance return on investment (ROE, ROI) against the range of possibilities of zero risk to infinite risk. Risk management (risk identification and quantification being the first steps to managing risk) continues to play a fairly low role in organizations, judging from practical experience with clients and from the survey group's point of view. As a result, there is confusion in the marketplace over how to secure online information. Half (47 percent) of the survey respondents claimed they are directly addressing content security in their organizations. Half (a full 45 percent) reported that their implementation timeline for a strategy to secure business content is undermined at this time. Those seemingly diametrically opposed findings illustrate the confusion within client organizations today.

How does an organization begin to resolve that risky issue? When is such an investment justified? The best approach is to develop a specific strategy that looks at needs across all user types, content types and business drivers. When that is done, an investment made in one area can be highly leveraged across other areas, and that generates a powerful and responsible ROI. For example, solution components used to meet compliance issues are leveraged into new business opportunities, which in turn stimulate the capture and sharing of internal knowledge. If on the other hand, an organization addresses security of content strictly as a compliance issue, the solution cost may indeed be smaller, but the solution will be siloed and the ROI will be more difficult to obtain, and in some cases, impossible. By addressing security of content as a silo, the potential for redundant efforts and holes in the content control between separate systems becomes a real threat.

It is far more effective to address content security holistically. Delphi Group calls that approach dynamic information access control. Policy-driven and implemented using a combination of multiple point technologies in tandem, dynamic information access control provides more than just a single business solution and more than just security of content. It is a life cycle approach that protects information (content or data) as it maximizes the value derived from that content. In doing so, the enterprise is able to extend the investment in technology across multiple business settings.

The approach begins with a diligent needs assessment across all sources of content enterprisewide. Each content source must be evaluated for the degree of risk it poses to the organization if it is inappropriately accessed, and/or made available without qualification and tracking. Consider whether the threat is well articulated and understood, and whether the current approach to managing the threat is valid[4]. The potential risk posed by access to specific content also needs to be factored against the cost and validity of the approach to security and the cost to inhibiting access. It is important that both security spending and the degree of security are balanced against the ability of the business to function. Tightening security too much merely threatens workers. The pressure to "get the job done" stimulates enterprising workers to find creative workarounds to overly zealous security. Ideally, security should transparently support both the worker and the organization, in accordance with its overall governing principles (see Peter Evans, Lowell Turner, and Daniel B. Cornfield, *Labor in the New Urban Battlegrounds: Local Solidarity in a Global Economy (Frank W. Pierce Memorial Lectureship and Conference Series),* ILR Press, 2007).

3. Indicator Information and Communication Technologies

Information and Communication Technologies (ICT) have contributed to an acceleration in GDP and labour productivity growth rates in a number of developed countries, in particular in the US5. Since ICT products and services are both outputs from the ICT industries and inputs into ICT-using industries, ICT can impact economic growth through four major channels:

1. Production of ICT goods and services, which directly contributes to the aggregate value added generated in an economy;
2. Increase in total factor productivity (TFP) of production in ICT sector, which contributes to aggregate TFP growth in an economy;
3. Use of ICT capital as in input in the production of other goods and services;
4. Contribution to economy-wide TFP from increase in productivity in non-ICT producing sectors induced by the production and use of ICT (spillover effects).

To measure the overall impact of ICT on growth, it is best to express the aggregate production function in the following form (1):

$$Y_t = Y(Y_t^{ICT}, Y_t^0) = A_t F(C_t, K_t, L_t) \qquad (1)$$

[4] Robert Perrucci (Author), Carolyn C. Perrucci (Author), *The Transformation of Work in the New Economy: Sociological Readings.* Oxford University Press, USA, 2007, pp. 78-99.
[5] See (Piatkowski 2004, pp. 4-23).

where, at any given time t, aggregate value added Y is assumed to consist of ICT goods and services ICT – YICT t, as well as of other production Y0t. These outputs are produced from aggregate inputs consisting of ICT capital Ct,, other (i.e. non-ICT) physical capital Kt,, and labor Lt. TFP (total factor productivity) is here represented in the Hicks neutral or output augmenting form by parameter A.

Assuming that constant returns to scale prevail in production and that all production factors are paid their marginal products, equation (1) can be expressed in the following form:

$$\hat{Y} = w_{ICT}\hat{Y}^{ICT} + w_0\hat{Y}^0 = v_{ICT}\hat{C}_t + v_0\hat{K}_0 + v_L\hat{L} + \hat{A} \tag{2}$$

where symbol ^ indicates the rate of change and the time index t has been suppressed for the simplicity of exposition. The weights wICT and w0 denote the nominal output shares of ICT and non-ICT production, respectively. The weights sum to one similarly as the weights vICT, v0, and vL, which represent the nominal shares of ICT capital, non-ICT capital, and labor, respectively.

Denoting the total employment by H(t) and labor productivity by Y(t)/H(t), the equation (2) can then be re-arranged to measure the contribution of ICT investment to growth in labour productivity (3)

$$\hat{Y} - \hat{H} = v_{ICT}(\hat{C}_t - \hat{H}) + v_0(\hat{K}_0 - \hat{H}) + \hat{A} \tag{3}$$

As shown in the above equation, there are three sources of growth in labor productivity: ICT capital deepening, i.e. increase in ICT capital services per employed person, non-ICT capital deepening, and exogenous growth of TFP, which is derived from increase in productivity in ICT-producing, ICT-using and non-ICT sector.

4. The contribution ICT

The contribution of ICT to the catching-up of CEE countries with the EU-15, or – in other words – to the convergence process between the two groups of countries, can be analyzed from the viewpoint of the four channels, through which ICT can impact output and labour productivity growth:

1. Contribution of ICT Production (tab. 1).
2. The Contribution of TFP Growth in ICT Production (tab. 2)
3. The Contribution of ICT Capital (tab. 3).
4. Contribution of Spillover Effects of ICT Production and Use.

Table 1: The contribution of ICT-producing sector, ICT-using sector and non-ICT sector to GDP growth in CEE countries, EU-15 and USA, 1995-2001 average

	UE-15	USA	Czech Republic	Hungary	Poland	Slovakia
ICT producing sector	0,51	1,01	0,75	0,99	0,28	0,37
Share in GDP growth	*19,4%*	*27,1%*	*36,6%*	*43,2%*	*6,8%*	*12,1%*
ICT using sector	0,93	1,83	1,55	0,20	1,56	1,31
Non-ICT sector	1,20	0,89	-0,25	0,89	2,37	1,36
GDP growth	2,64	3,73	2,06	2,30	4,22	3,04
Contribution of ICT producing sector: US ICT deflator	0,69	1,01	0,92	1,38	0,56	0,47
Share in GDP growth	*26,1%*	*27,1%*	*44,6%*	*59,9%*	*13,3%*	*15,5%*
Contribution of ICT producing sector: ICT national deflators	0,53	1,01	0,74	1,27	0,40	0,36
Share in GDP growth	*20,0%*	*27,1%*	*36,1%*	*54,9%*	*9,6%*	*11,7%*

Source: (Piatkowski 2004, pp. 5-21)

Table 2: The contribution of TFP growth in ICT sector to aggregate TFP in CEE countries, EU-15 and the UE, 1995-2001 average

Share in total value added (in %)	**UE-15**	**USA**	**Czech Rep.**	**Hungary**	**Poland**	**Slovakia**
ICT production (total)	0,68	1,48	0,49	1,16	0,26	0,29
Computers (30)	0,23	0,41	0,08	0,56	0,09	0,07
Electronic components (321)	0,17	0,65	0,24	0,33	0,03	0,13
Communications equipment (322)	0,28	0,41	0,17	0,26	0,15	0,09
Domar weights (in %)						
ICT production (total)	2,07	3,0	1,3	3,5	0,8	0,8
Computers (30)	0,8	0,9	0,29	1,99	0,30	0,25
Electronic components (321)	0,4	1,3	0,56	0,78	0,06	0,30
Communications equipment (322)	0,8	0,8	0,49	0,74	0,42	0,26
TFP growth (in %)						
Computers (30)	16,8	16,8	16,8	16,8	16,8	16,8
Electronic components (321)	18	18	7,2	7,2	7,2	7,2
Communications equipment (322)	7,2	7,2	7,2	7,2	7,2	7,2
Contribution to aggregate TFP growth (in % points)						
ICT production (total)	**0,26**	**0,44**	**0,12**	**0,44**	**0,09**	**0,08**
Computers (30)	0,13	0,15	0,05	0,33	0,05	0,04
Electronic components (321)	0,07	0,23	0,04	0,06	0,00	0,02
Communications equipment (322)	0,06	0,06	0,04	0,05	0,03	0,02
Aggregate TFP growth	0,31	1,05	0,62	2,38	2,05	2,75
Share of ICT in aggregate TFP growth	59%	55%	20%	19%	4%	3%

Source: (Piatkowski 2004, pp. 5-21)

Table 3: The contribution of ICT capital to GDP growth in CEE countries, UE-15 and the US, 1995-2001 average, in % points

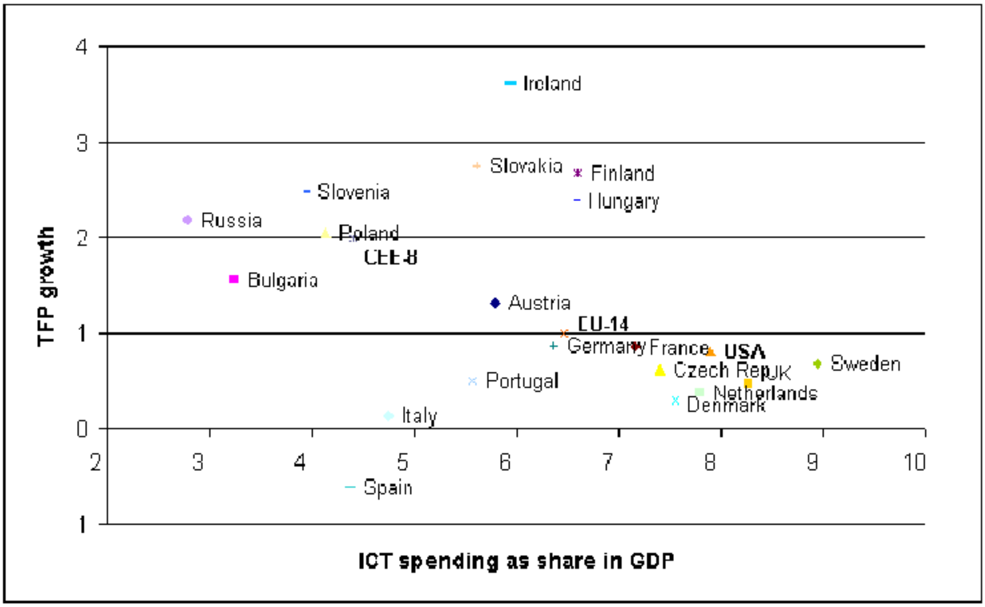
	GDP growth	Non-ICT capital	ICT capital	Labour force	TFP	Share of ICT capital in GDP growth
CEE-8	**2,67**	**0,47**	**0,48**	**-0,27**	**1,98**	**18,0%**
Bulgaria	0,51	-0,89	0,45	-0,60	1,55	88,4%
Czech Republic	2,27	1,20	0,73	-0,28	0,62	32,2%
Hungary	3,64	0,37	0,71	0,18	2,38	19,4%
Poland	4,81	1,98	0,55	0,23	2,05	11,5%
Romania	0,79	0,08	0,22	-1,35	1,84	28,3%
Russia	1,12	-0,97	0,09	-0,17	2,17	8,3%
Slovakia	4,10	1,15	0,55	-0,35	2,75	13,5%
Slovenia	4,10	0,87	0,54	0,20	2,49	13,1%
USA	**3,52**	**0,75**	**0,82**	**0,90**	**0,82**	**23,2%**
EU-15	**2,42**	**0,81**	**0,46**	**0,84**	**0,46**	**18,8%**

Source: (Piatkowski 2004, pp. 5-21)

ICT can add to growth also through the so-called spillover effects of ICT production and use. Spillover effects can be defined as acceleration in TFP growth on either macro, industry or micro level due to indirect productivity-stimulating effects of ICT production and/or use. The end of the decade of the 1990's was fraught with speculations about the "extraordinary" characteristics of ICT, utilization of which was believed to indirectly increase TFP growth There were also efforts to link the increase in TFP growth in the US, Australia, Sweden, Canada and Denmark with apidly growing ICT investments. However, the neoclassical economics does not allow for existence of spillover effects. It assumes that TFP growth is exogenous and hence it can not be related with any of the production factors. This assumption can be verified as long as it would be possible to prove that the use or production of ICT led to an increase in TFP growth. If there is no increase, then either ICT has no impact on TFP, so the spillover effects do not exist, or the positive contribution of ICT was more than offset by negative impact of other factors (fig. 1).

ICT had a large role in stimulating growth in CEE countries, yet its impact was still smaller than the impact of other non-ICT capital, labour force and TFP. It is however worth noticing that the contribution of ICT to growth in Czech Republic, Hungary, Poland, Slovakia and Slovenia was higher than the EU-15 average. This suggests that in these countries ICT have contributed to an acceleration in the convergence process and consequently to the catching-up with the EU countries. However, in the case of Bulgaria, Romania and Russia, the contribution of ICT to growth was much lower than both in the other CEE countries and the EU-15 average. Hence, in these countries ICT led to a divergence in growth and to a slowdown in catching-up with the more developed countries.

Figure 1: Relationship between ICT spending intensity (as % of GDP) and TFP growth in CEE, EU-15 and the US, 1995-2001 average



Source: (Piatkowski 2004, pp. 5-21)

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