



Business and Industry Advisory Committee to the **OECD**

Comité Consultatif Economique et Industriel Auprès de l' **OCDE**

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Innovation and Growth

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Discussion on the emergence of a "new economy" can lead down various paths. At BIAC, we understand our subject of discussion to be focused around the following questions: How does the interaction between innovation, be it technological or managerial, and productivity vary across the OECD countries? Has there been a fundamental change in the kind and strength of innovation affecting productivity growth significantly in some countries? To what extent does that account for better growth performance and to what extent are other factors responsible? What can other countries do in order to experience a similar impact from technical innovation?

Innovation is the centre of focus for both business and the OECD.

At a more popular level, much of the "new economy" discussion confines itself to the impact of newly invented Internet-based business models on the economy. Important and fascinating as the latter discussion may be, it addresses only a limited facet of the ongoing technological and managerial transformations. The OECD's endeavour to distil evidence for what may be new factors affecting economic growth and a new understanding of how some of the other factors operate is an extremely welcome ray of light illuminating a debate that otherwise risks capturing only one part of a larger picture.

The real meaning of the term "new economy" is broader than the Internet technology itself, and has a scope that reaches everywhere in the "old economy" where the new technology is applied. The rest of the economy will grow more or less well in terms of vigour or performance to the extent that market incentives permit and innovation emerges. The key development to be studied is the transformation of commercial activity in general, especially business processes with attention to the raw speed with which change is occurring.

This velocity of innovation is enabled by technology, feeding on itself, permitting the management of the private enterprise model to alter its composition with remarkable speed. At the same time, that invention is opening new product and marketing possibilities for the customers of those goods and services, sometimes shifting demand so quickly that even the most sophisticated modellers cannot predict tomorrow. In the technology business, they have taken to thinking in “web years”, that is, periods of three months.

Empirically, we might observe that the micro-economy has increased its “revolutions per minute” and could postulate that its ability to right itself and stay on course has improved. This is the element that would be “new”.

The key driver of the technology-based part of the economy has been price performance of hardware and software, which is improving at a 20 percent per year pace. *The rate and remarkable persistence of downward price movement in ICT (information and communications technology) producing industries is perhaps one of the key distinguishing characteristics which sets this technology revolution apart from many others.* Thus those firms may be responsible for something “new” in their impact on the rest of the economy.

It should be pointed out that any development that will arrest or slow down the phenomenal quality/price performance in the ICT industry will jeopardise the spread of ICT-based services throughout the rest of the economy. "E-commerce" and "new economy" have become major political topics and, in some circles, there is an effort to craft a new form of industrial policy to nurture them. The single most important factor enabling widespread digitisation of economic activity - that phenomenal quality/price performance of ICT equipment - was made possible in a market environment that was characterised by fierce competition and a high degree of internationalisation.¹

Although government has been an important enabler mostly as a customer of products, efforts to steer the direction of technical innovation in this industry and "pick winners" have generally led to disasters. While important, the successes among those efforts have not been responsible for most of the commercially viable technological breakthroughs in the semiconductor and computer industries.² In this context, the current intensification of some of the political debates on e-commerce and related issues as bones of contention between states is not a good omen for the spread of this technological revolution from the ICT goods sector to the rest of the economy, the services sector in particular. On the other hand, the OECD can be credited for much work countering discrimination on the basis of technology.

On the other hand, it is undeniable that research sponsored or conducted by government has provided some of the crucial ingredients of current technological innovations. In the case of the Internet, such ingredients may include the original development of Arpanet and the World Wide Web. However, it is important to realise that such developments have been turned into innovation by actors other than their developers and in ways not anticipated by the original R&D effort.

It is also a potent question to ask the counter-factual question of what the impact of such inventions might have been on the development of electronic networks usable in a pervasive way, in the absence of telecommunications liberalisation and rapidly declining price of computing equipment. One would not want to place all of one's eggs in government-controlled technology development basket, certainly not as the principal driver of innovation. It is a significant ingredient, which can deliver results, only where it can be combined with entrepreneurship and favourable market conditions. Many policy makers who have recently turned their attention to the "new economy" need to hear this aspect more loudly and clearly than the well known, and well accepted merits of government funded and controlled basic science and R&D.

According to OECD studies, there is evidence for a significant secular speedup of productivity growth in the United States around 1995, considered unusual in a country at the productivity frontier in many sectors. *Business economists reckon that US economic growth was fully 100 basis points higher in 1999 due to ICT spending per se (representing a growth rate of 4.2 percent, instead of 3.2).* However, when we turn to measuring the impact of ICT on the productivity in the rest of the economy, conceptual and empirical issues render conclusions difficult. This is precisely where OECD's help is needed. In addition to the United States, only a small number of OECD countries have shown improved or continuing good performance in terms of productivity and/or GDP per capita growth. These countries populate the upper echelons of the ranking in Table 1 below.

Much of the available evidence regarding the linkage between ICT, innovation, productivity and growth is skilfully captured in the two main analytical papers produced by the OECD in the first half of 2000.³ The specific work on the impact of innovation and ICT on growth provides a good assessment of their contribution that is significant in some countries.

Given the limitations in the availability of data and its comparability, the OECD staff has done a job which is as good as it can possibly be on this subject at this time. Given the nature of some of the variables tracked, such as productivity or per capita real GDP, which behave in stochastic fashion (i.e., involving randomness), it will be some years before one can know whether there was a long term acceleration in the US productivity. The time period under study (1995-99) is just too short even if we had complete data for it. It is therefore incumbent on the OECD to lace enthusiasm with some caution, while continuing to promote policies which facilitate innovation.

It is crucial to understand what real combination of factors is accounting for the changing fortunes of some of the OECD countries in the area of productivity and growth, so that proper and helpful recommendations can be given to other countries who wish to emulate the former. In that context, there is every reason for the OECD to be clear and reliable, once again, by providing a factual assessment exploring the frontiers of current knowledge.

Productivity revolutions occurred before. The task at hand is to monitor and understand if there is indeed one taking place at present with the most current economic and industrial analysis methods. Unlike some past productivity gains brought by improved transportation technologies such as railways, that produced by ICT can be directly embodied in virtually every production process, including that of services.

Ultimately the current transformation of innovation and production processes in the advanced economies may be explained by a favourable combination of a number of factors, of which technological change is only one. Such a finding would make the present era not unlike the productivity improvements of the period 1950-73, which can not be accounted for by a single driver. In that period, a favourable combination of a number of factors, including the accumulated technical innovations of the first half of the century in a range of industries, a rapid and decisive movement to liberalise trade and otherwise widen the range of the economy subject to competition, and an international economic co-operation framework with clear common objectives and ideals all helped create the potential for a business environment which was broadly forward-looking, optimistic, as well as growth and innovation-oriented.

Despite the empirical and conceptual limitations in interpreting data, of what may only be the beginning of a return to a robust pace productivity growth (as in the period 1950-73), the OECD studies nevertheless chart very useful avenues for continuing and deeper analysis with a better coverage of countries.

Innovation is the enabler in the market and, at the OECD, there is opportunity for innovation in analytical tools.

OECD studies go a considerable way to clarify that, in the last decade, a significant portion of higher GDP growth experienced in some of the member countries is due to higher factor utilisation. This aspect should not be lost in the final political message. Ability to increase labour input clearly accounts for the major part of higher growth per person in a number of countries (such as Ireland, Korea, Netherlands), but it is also a significant contributor even in countries with accelerating multi- (or total-) factor productivity (MFP) growth.

However, it is much more difficult to specify long-run growth paths for physical and human capital. OECD studies explicitly recognise these difficulties and carry out reasonable approximations, including (in the Economics Department papers) an excellent treatment of the distinction between growth of capital stock and growth of services of capital. The resulting finding that capital services have grown at a higher rate than the capital stock (at least in the G7 countries) focuses attention on ICT investment, which has tended to have a higher depreciation. The extent to which that is so largely depends on the types of price depreciation used. However, these considerations should not lead to a bias in the choice of price indices that generate higher multi-factor productivity for short-lived assets. In other types of technology, such as

pharmaceuticals or biotechnology where investment cycles are long, this type of measure might underestimate productivity improvements.

Innovation in policy initiatives should be derived from fact-based analysis.

OECD studies still identify a significant role for MFP growth in most of the (small number of) countries, which are reckoned as having increased their GDP per capita growth rate. In turn, innovation is correctly recognised as the primary vehicle for the growth of MFP. *But*, typically, innovation does not take the form of a frontal wave of improvement starting in and moving through simultaneously in all enterprises producing a given good or service. *Instead, technical innovation, usually accompanied by the appropriate managerial innovation and adaptation, tends to be nurtured in a small number of firms and once it bursts, or proves its success, tends to spread to the rest of the sector by emulation.*

To do that, leading firms must show initially a significant performance gain above their competitors and *at the expense of them*. It is at this stage of the innovation-productivity linkage that the fortunes of countries are likely to start diverging, given widely different approaches prevalent within the OECD area to the treatment of success and failure in business by public authorities. *Indeed, to the extent that government policy and practice has a strong bias towards automatic and open-ended assistance to unprofitable enterprises, this is bound to act as a brake on incentives both to emulate innovation and respond by counter-innovation.*

Innovation replaces the obsolete with opportunities for faster growth.

Many executives in BIAC's membership have a strong impression that the diffusion of ICT has been playing a major role in driving innovation and growth performance in recent years. The study by the Directorate for Science, Technology and Industry provides an eloquent treatment of the various channels through which ICT and digital networks impact upon R&D and business itself ultimately enabling higher productivity. *But*, it is crucial to recognise that the impact of ICT can fuel improvement in productivity in the economy as a whole only when that is juxtaposed with a business environment which privileges ability to adapt.

This is especially true in the case of the new or newly popularised network technologies, the Internet in particular and new business models based upon them. At the initial stage, the most obvious and measurable impact of these tends to take the form of dramatic cost reductions in the business process.

By necessity, the "sector" which is subject to technology-driven innovation has to grow, albeit fast, from a small initial base. At that stage, therefore, economy-wide improvements in productivity are correlated with the ability of

that economy first to permit the dissolution of some activities and second, ability of the rest of the economy to move resources thus temporarily "freed" to another uses. To the extent that public policy is focused on the protection of existing activities, the process of new business and employment creation is likely to be made slower.

Let us clarify our argument at this stage. Business is all too aware of the acute shortages of labour experienced currently in the ICT producing industries *per se*. There may even be some evidence for net job creation by ICT-led business transformation in some places. The argument being made here is to focus attention on the appropriate policy environment for channelling and using creative destruction, rather than pretending it does not exist, for lack of political expediency in it.

It is also clear that, due to new technologies but also the new market environment (lower barriers to international movement of trade, capital and production processes and greater competition in most markets), the velocity of change with which innovation can spread in the economy is much higher today. That makes it even more important to get the public policy and attitude to "destruction" right. In this light, many companies traditionally thought to be "old economy" are rapidly becoming "new economy" companies as they turn to e-commerce to advance their business models and gain competitive advantage. The object of policy discussion ought to be to identify the right combination of factors which make that transformation more or less difficult.

Innovation in fathoming the complex market dynamic is a key role for the OECD.

In comparison to twenty years ago, today's market dynamic occurs in a significantly different environment. The degree of openness to trade is much higher in most countries and so is the degree of globalisation of production processes. Most product markets are characterised by a higher degree of competition or, where this may be lacking, by intensifying political pressures to open them up to competition, which may have a similar effect on the longer-term expectations of managers. Regulatory reform is now widening the range of competitive pressures to sectors which hitherto enjoyed significant immunity from them.

Many sectors are experiencing a rapid transformation through mergers and acquisitions and other forms of link-ups between enterprises, often across political frontiers. Indeed, the overwhelming majority of foreign direct investment is now reckoned to be associated with mergers and acquisitions, a rapid rise in share in the past few years.⁴ Irrespective of whether each and every merger is a success, this suggests a need to reorganise industrial capacity, including services, at geographical scales independent from the nation-state.

In some countries factor markets have been subject to significant amount of reform and there is significant political pressure brought to bear on countries

which lag behind in this respect. Intuitively all these factors are bound to have major effects on business climate and innovation climate. The very noticeable contribution of ICT and network technologies is being added to the equation as an additional - powerful and catalytic - factor.

However, there are important gaps between countries in terms of their status and pace of movement along the various dimensions in which the business environment is changing. It would be desirable to centre the analysis of a phenomenon so central to the economy as the evolution of innovation and productivity squarely within a framework which takes account of each of these dimensions and the interactions between them.

The OECD is well suited to conduct such an analysis, and indeed focus much of the follow up work of the "Growth project" in this fashion. *In particular, the Organisation is well positioned to draw upon the results of three of its well-known "horizontal" projects: the Jobs Strategy, Regulatory Reform, and Electronic Commerce. BIAC believes that there may be a high return to a project which synthesises the knowledge and understanding gained in these separate analyses in terms of how their combination and interaction affects the prospects for innovation and economic growth.* Indeed, the Growth Project Phase II should be primarily a beginning of this. In the following section we attempt to suggest a few directions in which such a project might be developed and explain further the motivation behind the idea.

Innovation in measurement is possible by means of a scoreboard.

Table 1. synthesises information from a number of different OECD studies to lay out a suggested path towards a "scoreboard" on readiness for growth in the new economic environment. As such, it provides a very rudimentary panorama. Ideally, one would prefer to have a composite indicator for labour market "adaptability" and another for "ICT/e-business readiness." An additional one should be on regulatory reform, or the conduciveness of the product market regulatory environment for business creation. While not spelled out in this paper, there has been valuable work done in PUMA and elsewhere as part of the Regulatory Reform project. Performance in terms of GDP per capita or MFP growth would then be compared with respect to these three "dimensions" to reveal inter-relationships of causality between the former and the latter.

We separate several groups of countries with respect to GDP per capita growth performance, comparing 1980s and 1990s. The first group from the top (Korea, Turkey, United States, Denmark, Luxembourg and Spain) is countries which have maintained a relatively high growth rate from the 1980s to 1990s. The next group (Australia, Norway and the Netherlands) has increased their growth rate from lower levels to an above average rate in the 1990s.

The subsequent groups contain, respectively, high performers who have lost some ground in the 1990s, and the rest. In each segment of the Table "better" performance is indicated in bold. Across the two decades under consideration

only two countries in the entire OECD area have experienced both a speedup of MFP growth rate, and increased labour utilisation and labour productivity, *Australia* and *the United States*. These countries are experiencing consequently the highest rates of per capita income growth in mature OECD economies of any appreciable size.

Both MFP growth and labour utilisation have increased in Denmark and Norway - in the latter, excluding the oil output outside the mainland, but not necessarily the impact of oil wealth on the rest of the economy. Netherlands has significantly improved GDP growth performance despite a fall in MFP growth, thanks to an increase in both labour utilisation and productivity. In Ireland, the star performer of the OECD in terms of increasing growth, the large increase in GDP per capita growth rate is mostly explained by an increase in labour utilisation, MFP growth was maintained unchanged at a high rate.

Lack of MFP data for Korea and Turkey make further analysis difficult, although both countries have relatively high per capita GDP growth, Korea slowing down from an even higher level. Perhaps Portugal could even be included in a special category of declining but still high GDP per capita growth with improving MFP growth.

Attempting to compare these observations with a measure of labour market adaptability, we then look at the structural unemployment rate and its change (columns (7) and (8) respectively) in the 1990s, as estimated by the OECD Secretariat.⁵ Column (9) provides, for information, the absolute number of country-specific recommendations made by the OECD Jobs Strategy and not yet sufficiently acted upon according to the assessment of the OECD Secretariat as of 1999.⁶ Each recommendation made for a given country does not point to a similar amount of labour market inflexibility, but in general, a large number of recommendations imply that a country's labour market conditions leave much to be desired.

As a third dimension the ICT is glimpsed, quite superficially, by measures of Internet penetration rates (column (12)) and the average price of 20 hours Internet access as a ratio of monthly GDP per capita at purchasing power parities (PPPs). There is at present, unfortunately, no comprehensive set of indicators for assessing general e-commerce- or information-society-readiness. BIAC wholeheartedly supports significant and prioritised OECD investment in developing such indicators and looks forward to its results.

In the meantime we have chosen to look at one facet of this dimension which may be more crucial than others. Internet is certainly the most popularised aspect of new information technology. *As ICT hardware and software prices are experiencing rapid decline, it is increasingly the cost of access to services which is likely to be the key determinant of uptake in this technology - making the need for effective liberalisation of basic and value-added telecommunications services even more important.* Even if the measure used here is quite simplistic - business usage of Internet, which is more important for innovation, and growth will not depend on the same price structure - we

nevertheless postulate that a higher price indicates higher inhibitors in the way of e-business.

By and large, all countries which are associated in some way with good or improving performance in GDP per capita growth are the ones which have relatively lower NAIRU (less than 8 percent, which is roughly the simple OECD average) and have lowered it in the 1990s. Some countries combine acceleration in MFP with a reduction in NAIRU. Those could be declared the stars of the new economy. All three countries, which have reversed their growth fortunes (Australia, Norway, the Netherlands), have also improved their labour market conditions appreciably. All countries with continuing high growth performance (for which there is NAIRU data) have also lowered their structural unemployment rate. Although in Spain the NAIRU still remains very high, and Spain is the only country in this group with a deteriorating MFP growth.

Turning to the Internet market readiness, there does not seem to be a clear correlation between cost of access and any growth indicator, though it is interesting to note that all three countries which have reversed their growth performance in the 1990s (Australia, Norway, the Netherlands) have relatively low Internet access costs. This is by no means shown as a proof of causality from Internet costs to growth. But there may be an element of policy symmetry in the sense that governments and countries which have been wise enough to implement appropriate policies for economic growth and labour market adaptability have probably also been good at creating the right conditions for a dynamic Internet market.

Nordic countries are associated with higher ICT penetration rates and greater presumed readiness for an e-business driven economy, which is illustrated by lower access costs in the Table 1. But, only Denmark and oil-rich Norway among them have been able to achieve a high or improved performance in terms of GDP per capita growth. Whereas both Finland and Sweden have experienced an accelerating MFP in the 1990s, this was coupled with a major reduction in labour utilisation manifest in a sharp rise in structural unemployment. However, empirical problems associated with trend adjustment after the early '90s recession may be greatest for Finland and Sweden and there may be serious risks in evaluating new-economy hypothesis using data for these countries in the 1990s. In other words, the jury may still be out regarding the impact of ICT on the economic performance of the Nordic area. Regarding the high-performing Denmark, let us note in passing that, although the country may share much of the welfare state tradition of the Nordic area, it is distinguished by one of the most flexible labour markets when it comes to job protection.

The Table is not free of paradoxes either. Canada is characterised by improving MFP and a labour market which has at least not worsened. Indeed, Canada also has relatively good indicators in Internet access and pricing. Nevertheless, Canada does not seem to be able to break through a modest GDP per capita performance in the last generation. Given the highly pro-active posture of Canada in world-wide e-commerce policy dialogue it will be

interesting to see further understanding on the impact of ICT on productivity and growth in that country. Canada's case also implies a deeper look into some of the other factors which are associated in recent studies with the success of a "new economy", namely a relatively younger and faster growing labour force and an open immigration policy. At least in theory, Canada has a greater ability to utilise a "US-style" policy and approach to innovation and growth. A similar story could be told about New Zealand and partly the United Kingdom.

Innovation must diffuse throughout the economy.

The examination of growth performance and market conditions provided above is very sketchy and inconclusive from a scientific point of view. Its humble intention is to suggest an avenue for more robust and in-depth analysis of interaction between factor markets, product markets and technology-readiness on the one hand and innovation and productivity on the other.

In any case, OECD growth studies this year only lead one on to better analysis of ICT-led technical innovation and its relationship to productivity growth. The treatment of the ICT embodiment in productivity growth and MFP-R&D linkages requires considerable faith in econometrics to constitute conclusive evidence. *Under these circumstances, it would be wise to bring the Growth Study endeavour to a broader context and explore the hypothesis that, "yes technology-driven innovation does improve productivity and economic growth, but only when other conditions affecting the adaptability of the economy to change are also conducive."*

If the line of reasoning of this discussion paper so far is generally accepted, then it should be clear that there are certain inherent risks in adopting the "new economy" as a Deus ex machina. Policymaking communities of OECD countries are not immune from such temptations. Therefore, it is crucial for the OECD to clarify the inter-relationship between what may be "new" factors and the "old" knowledge and understanding that the organisation has been the purveyor of on fundamental aspects of economic prosperity such as labour market adaptability or regulatory reform.

In current debates regarding the old and new economy, we characterise the new as the old with a turbocharger, the turbo being not just a technological, static device but also the velocity of investment in innovation. Next step for the research community is to identify the necessary architecture of the test ring surrounding the turbocharger, so that the new machine does not run into a wall of social resistance or indifference.

Better data

Business recognises the value of data produced by national statistical organisations and international ones such as the OECD. Serious data, i.e. blessed by governments who use up-to-date, often expensive but thorough

methodologies are valuable and merit the expenditure. This is fundamental. To be able to develop the technology dimension of this debate, serious and internationally comparable data on such new indicators as software, e-business, ICT services, biotechnology and science and technology in general are necessary for a wide range of countries. Such data will enable productivity measures reflect reality better. *In particular, international harmonisation of ICT measures is essential to a good understanding of underlying trends. Internationally comparable data on services sector productivity is also a priority investment.*

As new and topical issues such as e-commerce, new economy or biotechnology arise in the policy agenda and benefit from concentrated attention of policy makers, the OECD should remain vigilant in terms of reminding them how crucially the correct understanding policy choices necessitates continuing investment in less glamorous work on statistical and other indicators. That is the bedrock of the OECD.

As an additional issue, there is a general tendency for OECD analyses on many aspects of the economy and the society to omit many of its member economies when it comes to more sophisticated indicators. For instance, there may be simple unemployment data for all member countries, but very often the more sophisticated measures such as standardised unemployment rates or the NAIRU are not calculated for many member states such as Korea, Mexico, Turkey or the new members from Central/Eastern Europe. Likewise, general GDP data may be available for all countries, but more detailed measures of GDP per hours worked, capital deepening, or MFP are unavailable for many member countries.

These are only illustrations of a general trend. Some member countries are covered in OECD statistics just about as well as non-member countries! This is not a desirable situation from the point of view of those who need to understand economic trends in the world, especially because some of these countries are experiencing more rapid change. To the extent that these omissions are due to the inability of the countries in question to provide the necessary underlying information, BIAC calls upon their ministers in charge of the economy to recognise the importance of connecting their countries to the OECD better in this regard and prioritise statistical work. The cost of ignorance is rising.

FUTURE WORK

On the Growth Project and Electronic Business

As stated, the OECD could usefully orient the Phase II. of the Growth Project on a cross-country analysis on the interaction between the new e-business or e-commerce policy agenda and the existing knowledge and understanding gained in some of the valuable OECD studies conducted in the past, in particular, the Jobs Strategy and Regulatory Reform.

Whereas BIAC emphasises greater interaction between different areas of work impacting on the growth outcomes, that should not lead to the mistaken impression that we do not prioritise specific OECD work on e-business readiness as such. The generally excellent work of the OECD Committee on Information, Computer and Communications Policies (ICCP) has been at the forefront of explaining how ICT transforms the economy and fighting irrational fears related to network technologies.

BIAC continues to believe that while ICCP's Working Party on Telecommunications and Information Services Policies (TISP) as over the years made a tremendous contribution to understanding how a competitive communications infrastructure - the foundation of information revolution - can and should operate, there is still much work to be done in this area to help policy convergence amongst the OECD countries.

BIAC hopes that the ICCP's Working Party on the Information Economy and the Working Party on Indicators of the Information Society, as well the various statistical bodies under the OECD Industry Committee, which together are trying to shed light on some of the central measurement and analytical issues on the impact of technology and innovation on the rest of the economy, will benefit from a more concentrated and prioritised attention of policy makers.

Regarding the general work on legal and regulatory infrastructure of the Information Society and user trust issues, there is a sentiment in the business community that at times the degree of strife that characterises some of the international discussions on these issues is unjustified by the intrinsic magnitude of the problems and solutions under consideration.

Some segments of governments are not doing a service to their economies by creating the impression that some of the disagreements - such as the transatlantic disputes on privacy, consumer protection or jurisdiction - are pursued with a quasi-mercantilist conviction and determination to segment world markets. The entire view that some of that is justified by a logic of "economic war", which is found among many commentators is erroneous and dangerous. OECD has generally been a positive and calming influence in this regard, not without substantial effort by business in helping them remain in sync with reality.

On Innovation in Biotechnology

Any discussion about innovation and new technologies would be incomplete without touching on biotechnology. Biotechnology is a subject area where properly addressing new policy challenges is key to the ability of the economy to turn new technology into innovation and growth.

The OECD, as one of many organisations dedicated to biotechnology safety and regulatory reform, has an important role to play related to biotechnology. This work, if properly crafted, can augment, rather than supplant, existing work in other forums. OECD's activities related to biotechnology continue to increase in importance when viewing biotechnology as an important driver of the new economy.

BIAC recommends a number of work items focused on the benefits of biotechnology in the new economy. These include economic impact analyses of the various policy recommendations now emanating from various bodies, e.g., voluntary vs. mandatory labelling, relative to its value for informing the public, reviewing economic impact of food safety programs, and assessment of the opportunity costs of not using biotechnology in agriculture.

Along with economic analyses, the OECD has a critical role to play in necessary regulatory reform and development to provide for the free flow of biotechnology products. To this end, OECD should expand its current analytical work in the area of environmental risk assessment, increase its co-ordination with Codex Alimentarius, especially in the area of substantial equivalence, and enhance co-ordination activities so that there is a maximum use of resources and more effective communication.

BIAC is your partner. The Secretariat is pleased to present these thoughts and looks forward to working with you.

Douglas C. Worth
Secretary General
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(BIAC)

SOURCES OF DATA IN TABLE 1.

By Column:

(1) - (3): ECO/WP1(2000)6/ANN1, Economic Growth in the OECD Area: Recent Trends at the Aggregate and Sectoral Level, 2000, Table 1 and ANN4, Table A4.5.

(4) - (6): Knowledge, Technology and Economic Growth: recent Evidence from OECD Countries, Andrea Bassanini, Stefano Scarpetta, Ignazio Visco, May 2000, mimeo, Table 4.

(7) - (8): ECO/WP1(2000)2/ANN1, The Concept, Policy Use and Measurement of Structural Unemployment, 2000, Table 1.

(9): OECD, *Implementing the OECD Jobs Strategy. Assessing Performance and Policy*, Paris, 1999. Table B.5., pp. 182-183.

(10) and (12): DSTI/ICCP/TISP(2000)1, Local Access Pricing and E-Commerce, 2000, background data of Figure 5 kindly provided by the OECD Secretariat.

(11): Column (10) recalculated as a percentage of monthly GDP/capita at PPPs from OECD in Figures, 1999, p. 79.

NOTES

¹ An approximate calculation shows that international trade in ICT goods (including software) is at least 59 percent of world-wide ICT production (including software and ICT services). This is almost double the ratio of world trade (exports plus imports) in goods to world GDP, which is 37 percent. Excluding services from the denominator (world-wide ICT production) as well would increase the share international trade even further. All data are for 1998. Sources: trade in ICT from OECD *IT Outlook 2000*, tables 3 to 7; ICT production from *European Information Technology Observatory 2000*; World trade and GDP from World Bank, *World Development Indicators 1999*.

² For a recent recapitulation of evidence on this theme the following is highly recommended: Richard N. Langlois and Edward Steinmueller, "The evolution of competitive advantage in the worldwide semiconductor industry, 1947-1996", and Timothy F. Bresnahan and Franco Malerba "Industrial dynamics and the evolution of firms' and nations' competitive capabilities in the world computer industry", both in David D. Mowery and Richard R. Nelson, eds., *Sources of Industrial Leadership. Studies of Seven Industries*. Cambridge University Press, 1999.

³ "A New Economy?: The Changing Role of Innovation and Information Technology in Growth" (DSTI/ICCP/IND/STP(2000)/FINAL) and "Economic Growth in the OECD Area: Recent Trends at the Aggregate and Sectoral Level" (ECO/WP1(2000)6), and a number of supporting analyses such as "The Contribution of ICT to Output Growth" (DSTI/EAS/IND/SWP(99)4).

⁴ Source: UNCTAD *World Investment Report 1999*, pp. xxi-xxii.

⁵ Source: "The Concept, Policy Use and Measurement of Structural Unemployment" (ECO/WP1(2000)2/ANN1/CORR1) Table 1. Structural unemployment rate refers to the "Non-accelerating inflation rate of unemployment" (NAIRU).

⁶ OECD, *Implementing the OECD Jobs Strategy. Assessing Performance and Policy*, Paris, 1999. Table B.5., pp. 182-183.

Table1. A New Economy? A Scoreboard

Column number:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	GROWTH			Hours adjusted MFP growth % p.a.			LABOUR MARKET			ICT		
	Trend Growth of GDP/capita			Change			Structural U	Change in	Jobs Strategy	Internet avg price for 20 h	As a % of '98	Internet
	1980-90	1990-98	Change	1980-90	1990-98	frm '90-98	1999:I	90-98	recommendations still to implement	in US\$ at PPPs	GDP/month	No. of Hosts
										1995-2000		Sept 1999
Ireland	3,0	5,6	2,6	3,9	3,9	0,0	7,4	-7,5	14	88,31	4,7	14,09
Turkey	2,0	2,3	0,3						11	60,21	10,8	1,21
United States	2,0	2,2	0,2	1,0	1,4	0,4	5,4	-0,4	7	33,56	1,3	160,13
Denmark	2,0	2,1	0,1	1,0	1,8	0,8	7,7	-1,4	13	60,92	2,8	59,94
Luxembourg	4,0	4,0	0,0						10	87,08	3,0	40,00
Spain	2,3	2,2	-0,1	2,2	0,6	-1,6	16,5	-1,0	31	86,11	6,2	9,64
Australia	1,6	2,4	0,8	0,9	2,1	1,2	7,6	-0,5	7	38,63	2,0	55,44
Norway (GDP: Mainland)	1,4	2,2	0,8	1,1	2,1	1,0	4,1	-0,4	21	48,96	2,1	87,97
Netherlands	1,6	2,1	0,5	2,2	1,7	-0,5	4,5	-2,2	20	51,46	2,7	51,95
Portugal	2,9	2,5	-0,4	1,9	2,2	0,3	5,0	-0,7	22	72,32	5,7	6,60
United Kingdom	2,2	1,8	-0,4		1,3		7,2	-1,5	5	54,96	3,1	35,28
Austria	2,1	1,7	-0,4	1,2	1,1	-0,1	5,6	0,5	30	81,62	4,1	28,04
Finland	2,2	1,3	-0,9	2,4	3,2	0,8	10,8	5,6	25	31,48	1,7	122,81
Italy	2,3	1,3	-1,0	1,5	1,2	-0,3	10,1	1,4	19	52,52	2,9	9,31
Japan	3,3	1,6	-1,7	2,0	1,6	-0,4	3,7	1,2	13	63,34	3,2	18,76
Korea	7,2	5,3	-1,9						12	51,46	4,6	6,85
Mexico	0,1	0,8	0,7						20	68,14	10,2	2,06
Greece	1,3	1,3	0,0	0,6	0,3	-0,3	9,7	1,7	18	59,83	5,0	6,56
Belgium	1,9	1,7	-0,2	1,4	1,0	-0,4	8,6	0,3	19	82,00	4,1	29,79
Canada	1,5	1,2	-0,3	0,5	1,1	0,6	8,1	-0,6	13	29,25	1,4	76,01
New Zealand	1,2	0,8	-0,4	0,7	1,1	0,4	5,8	-1,0	9	42,78	2,9	63,05
France	1,6	1,2	-0,4	2,1	1,1	-1,0	10,4	1,6	28	57,72	3,1	13,22
Sweden	1,5	0,9	-0,6	0,8	1,3	0,5	6,4	4,2	23	39,26	2,2	69,13
Iceland	1,7	0,8	-0,9						14	34,52	1,6	96,58
Germany (FRG throughout)	1,9	0,9	-1,0	1,6	1,4	-0,2	8,1	0,7	35	69,96	3,7	20,39
Switzerland	1,6	0,1	-1,5		0,2		2,6	2,0	15	74,53	3,4	42,89
OECD 26 simple average	2,2	1,9	-0,2	1,5	1,5	0,1	7,4	0,1			3,8	
Czech Republic									17	88,17	8,1	10,55
Hungary									15	94,23	10,7	11,49
Poland									27	68,65	10,3	4,01
OECD 29 average										49,65		52,18