

OPEN SOURCE SOFTWARE IN EASTERN EUROPE AND OTHER EMERGING MARKETS: THE MORAL ALTERNATIVE TO PIRACY?

By **Catalin Cosovanu**

Central and Eastern Europe countries have some of the highest software piracy rates of any region in the world.¹ At the same time, many business analyses have touted information technology as an area with a great potential for growth that could help the countries of this region jump some developmental stages and reduce the current economic gap that separates them from the developed countries. Can this potential come to fruition in an environment where the infringement of intellectual property rights (IPRs) remains so widespread in the very sector that should drive this new economic development? What are the relationships between the protection of IPRs, the local software industry, and the wider dissemination of and access to information technology? Are there alternative methods to address piracy without hurting the transfer and diffusion of this technology, and, if so, why aren't these methods currently used? Can open source software (OSS)² provide a moral and viable alternative?

This article will begin by making the case that, because of the economics of software development and the nature of the market segments for different categories of computer programs, IPRs (copyright in particular) are practically irrelevant as an incentive for domestic software development in these countries and emerging markets in general, as the often cited example of India will illustrate. Moreover, this situation is unlikely to change soon.

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Hence, the only effect that the current strategy against piracy (i.e., heavy-handed policing while mostly maintaining uniformly high prices irrespective of the local purchasing power) is likely to achieve is diminishing the diffusion of software technology in developing countries. This effect can be particularly negative because most of the economic benefits of the information technology (IT) revolution do not come from the IT industry alone, but from the boost in productivity and flexibility throughout the economy resulting from the use of software tools, irrespective of their domestic or international origin.

In another article,³ I explored the pros and cons of using a strategy based on price discrimination, which is differential pricing adapted to the conditions of the local market. This strategy would allow sellers to recoup at least the marginal cost (the research and development investments being recovered in the developed countries as it currently happens anyway), while moving customers out of the black market of pirated software without blocking the diffusion of technology. Such benefits notwithstanding, differential pricing remains mostly absent in the software markets (in puzzling contrast to other IPR-reliant sectors, such as the pharmaceutical industry) for economic and political reasons different from the favorite bogeyman of parallel imports.⁴ Considering the serious problems with the status quo, where piracy has turned out to be a necessary evil for the diffusion of software that is legally priced beyond the reach of most local users, this article will examine the open source alternative and the solutions it proposes for emerging markets, as well as the problems that it faces there.

There are two main sets of sources on which I rely in my analysis. First, I rely upon the economic and technological indicators provided by the EU Commission's European Survey of Information Society Projects and Actions,⁵ the European Information Technology Observatory (EITO),⁶ the US National Science Board,⁷ and the Organization for Economic Cooperation and Development (OECD) Information Technology Outlook.⁸ Second, I use the interviews I conducted as follows: in Romania with leading representatives of the domestic software industry,⁹ directors of executive agencies and state research institutes¹⁰ concerned with the elaboration of information technology related policies, members of Parliament who have authored the proposals providing a legal framework for the new technologies,¹¹ and local representatives of the Business Software Alliance (BSA),¹² an international group that represents large software firms such as Microsoft, Symantec, and Adobe on intellectual property issues; with Microsoft anti-piracy managers in the region;¹³ in Hungary and Romania with BSA and Microsoft representatives,¹⁴ as well as the director and deputy director of the

Romanian state agency for copyright protection (ORDA).¹⁵ I also conducted interviews in Silicon Valley with René Bonvanie, Marketing Vice President of Oracle;¹⁶ Bradford L. Smith, General Counsel of Microsoft;¹⁷ and US investors in the Romanian software industry, such as George Roth, CEO of Recgnos.¹⁸

THE SOFTWARE INDUSTRY AND ITS MARKETS

One of the conclusions suggested by the meetings I had in Central and Eastern Europe was that the evolution of the intellectual property regime for software in the past few years has been mostly a “foreign affair.”¹⁹ The managers of local companies have generally expressed little if any interest. The legislation has been to a significant extent imported, while BSA has become the most active promoter of enforcement.²⁰ Given the high international profile gained by intellectual property issues, the state agencies have been playing along. At the same time, under the severe budgetary constraints of transition economics, there is almost no room for sector-specific development policies.²¹ Budgets for research have stagnated or declined.²² Looking from a regional perspective, the picture of the software industry does not look much brighter²³ than the one of stagnant technological development in general:²⁴ “a loss of software technological capabilities through both external and internal brain drains, through the conversion of some software developers into software traders and through the conversion of some software custom-builders into software customizers.”²⁵

It is not surprising that local software developers would express only limited interest in IPRs in general (with the exception of trade secrets in the case of some firms doing offshore software development for Western companies) and copyright in particular (*i.e.*, precisely the type of intellectual property right infringed through software piracy).²⁶ Their position has very much to do with the distinctions between different categories of software products and their respective markets. “Software is really a variety of disparate activities lumped together under the same rubric. Leaving aside packaged software, a business that is almost impossible to break into unless a company starts with major marketing clout in the United States, the “custom side of the business” ranges from routine code writing, which is a low-return use of skilled intellectual labor, to the design and implementation of complex information systems.”²⁷ Copyright protection is relevant for the products that are pirated, that is, for off-the-shelf packaged software,²⁸ but the “network externalities,” as well as other obstacles detailed further in this section, make the barriers to entry in this market too high.²⁹ The

software industry in Central and Eastern Europe works mostly on the “custom side of the business,” to use Evans’s expression, where products are generally not a target of piracy, not to mention that much of these products are for Western corporate customers outsourcing their programming needs and not for the local market.³⁰ In other words, where copyright matters, the Eastern Europeans are not present, and where they are present, local copyright protection is not really relevant.

This point is particularly important because, to my knowledge, practically all the analysts who have examined the relationship between software industry development and IPRs have failed to consider thoroughly the important distinctions between different sectors of this industry with respect to their sensitivity to intellectual property protection and to copyright in particular.

PIRACY IS ABOUT PACKAGED SOFTWARE

In developing countries, piracy affects essentially only one category of software products, albeit the most visible by far for the general public (*i.e.*, off-the-shelf packaged software,³¹ and within this category it is mostly the general applications (*e.g.*, text processing, spreadsheets, basic graphics packages, etc.) that are targeted). The reasons for this are fairly obvious: (1) the size of the market in terms of the number of customers (there are many more potential clients for general packages than for niche applications, not to mention customized software); (2) the channels of distribution (with the type of mobile street stand commonly used by pirates it is practically impossible to reach specific clients); and (3) the mobility and especially the anonymity (these traits required by illegal distribution are easier to achieve for both pirates and their customers when the counterfeit products are sold by practically all unlicensed distributors and used by more than 90 percent of the clients.³²

At the same time, outside the sector of general off-the-shelf computer programs, there are several other products and services provided by the software industry that are *not* affected by the piracy taking place in the producing country.

LOCAL SOFTWARE PRODUCERS ARE NOT IN THE SECTOR AFFECTED BY PIRACY

With some narrow exceptions, the software industry in Central and Eastern Europe is practically absent from the packaged sector. As the EITO study concluded, the main categories of activity in this geographical area are: (1) custom software development, (2) localization, (3) body shopping,³³ (4) professional services (ranging from

software maintenance to some technical consulting), and (5) packaged application solution development.³⁴ The same study noted the absence of “any kind of long-term development of local packaged applications.”³⁵ This situation is not particular to post-communist Europe. It appears as a common characteristic among the developing countries, including even India, the country that has experienced the most impressive growth in this area.³⁶ Thus, with respect to off-the-shelf packaged products, “no Indian software firm has yet introduced a significant software product.”³⁷ While India has indeed earned “a substantial place in the world software industry,”³⁸ its activities are still concentrated in customized software, IT services, and a tremendous amount of “writing code on contract,” outsourcing for firms from Western countries,³⁹ a pattern which is very similar to Eastern Europe.

An important clarification is necessary here. What the aforementioned studies have found is not that firms from developing countries are absent from *every* stage in the development of packaged software products. The point is that, first, these firms by and large *do not* develop their *own* off-the-shelf products⁴⁰ (with some exceptions, generally targeting narrow, niche markets),⁴¹ and second, they *do* participate in the development of Western firms’ packages, but at rather low technical levels.⁴² Unfortunately, this “division of labor” in software fits with the bigger picture of high-technology research and development in general, which remains overwhelmingly concentrated in the West, especially in the United States.⁴³ Moreover, there is no clear trend suggesting an increase in overseas research and development spending. On the contrary, with respect to the United States, data from the National Science Board showed a reduction of “the overseas share to 8.9 percent of US companies’ funding total.” Out of this already small amount, developing countries capture only a marginal 6 percent.⁴⁴ Looking specifically at software, the situation is described in the OECD Information Technology Outlook as follows:

With very few exceptions, work outsourced does not involve the development of mission-critical applications, nor do projects involve very sophisticated technology. Often firms outsource work considered routine or uninteresting by their IT professionals. [...] From a life-cycle perspective, systems requirements, high-level design, and installation and testing are typically not outsourced, while low level design, coding, and post-installation maintenance (of older systems) are.⁴⁵

Clearly, the *local* protection of copyright is practically irrelevant for the latter, low-level activities, which are only a relatively marginal part in the development of products that are targeting mostly Western markets. This

is even more so when the outsourcing of programming needs for Western companies takes the form of “body-shopping.” A CEO of a USATART software company that has invested in Romania provided an illustration:

[B]usinesses are using the “Romanian bodies” to develop code in Romania. This type of business, which resembles the “sweat shops” of the textile industry, use the Romanians to do jobs that the people in the foreign countries don’t want to do or are much more expensive. [...] The main characteristics of these are that the activities are “no-brainers,” offer very little professional challenge and satisfaction to the workers. These businesses are using only one aspect of the Romanian personnel and companies: they are much cheaper.⁴⁶

Overall, this international division of labor in the software industry has been characterized by an Indian executive as follows: “It’s the old story. We are exporting cotton and buying back the finished cloth.”⁴⁷ This has many serious implications, but with respect to this article, the important point is that the software industry in Eastern Europe and most developing countries is working in sectors where the local level of copyright protection is practically irrelevant.

NO FORESEEABLE CHANGE

One possible counter-point to the previous argument could be that developing countries should invest in building strong protections for intellectual property rights in computer programs with the hope that in the future they could move into sectors such as packaged software where IPRs do matter. I reply to this argument in this subsection. There are tremendous, lasting obstacles not related to the protection of IPRs that prevent most software firms in the developing countries from moving into the more lucrative business of developing their own packaged products on a sufficiently large scale.

The Network Effect

The first and most important of these obstacles is the network effect (or “network externalities” as economists call it) that looms large over IT.⁴⁸ This effect is particularly strong with respect to packaged computer programs, which, to use Katz’s and Shapiro’s definition, are products for which the utility that a user derives from consumption of the good increases with the number of other agents consuming the good.⁴⁹ “There are many economic, social, and technological aspects involved in this relentless and mostly self-propagating effect, yet one can illustrate it simply with a typical example: If everybody you know uses Microsoft Word, then you will find life easier if you use it too.”⁵⁰

Related to the network effect is the lock-in effect on consumers. "Once a customer has learned how to use a computer program, [...] he is loath to switch because of the hassle of learning a new program. Users gain big benefits from common standards, so a newcomer has to show a huge advantage to persuade consumers to switch."⁵¹ With a few narrow exceptions, developing countries are newcomers almost by definition in the packaged software market, although Central and Eastern Europe have had a rather long experience in developing complex custom software. Moreover, because the network effect is global in scope, the software firms in these countries that try to develop their own packages would have to face this problem even in their domestic market: "Imported packages have that market wrapped up, and entry barriers for local firms remain formidable."⁵²

This situation is not limited to Eastern Europe. For example, many companies in India have tried developing off-the-shelf products as an entry strategy, but sooner or later either switched their business model to outsourcing, customization, technical consulting, and other services or at least included these activities as a substantial part of their business and the main revenue source.⁵³ Even the outstanding and rapidly growing global presence of India in other sectors of the software industry was not enough to help its firms break through the high entry barriers generated by the network effect in the packaged computer programs market.⁵⁴

High Costs

Even if there were no network effect to overcome, there is a second major obstacle to consider. It is very expensive to develop a high-quality software package and launch it successfully. Despite lower wages for local programmers, these costs can still be prohibitive in an economic context where domestic capital is scarce and foreign capital has consistently preferred the less risky outsourcing model. Moreover, financing is particularly difficult to find in a conservative banking environment for a type of business that has little collateral to show. Once again, a comparison with India suggests that this is a common problem for most developing economies, although there are variations of degree.

Telecommunications Infrastructure

Many authors have mentioned this obstacle, and its significance is fairly obvious in an IT context.⁵⁵ The limitations of the telecommunications infrastructure in Central and Eastern Europe are detailed by ESIS. Suffice it to say that the problem begins from the very basics, that is, the level of telephone lines penetration, and goes up to basic Internet access, not to mention broadband

access.⁵⁶ This barrier is becoming increasingly important in a technological context where network-based applications themselves appear ever more important, and even Microsoft, the giant that made its fortune providing software for individual PCs and failed to grasp at the beginning the full technological and economic significance of the Internet, is now attempting to re-focus its long term plans on the "Live model."⁵⁷

Size of Local Market

Another obstacle to the successful move of Central and Eastern Europeans into packaged software development concerns the small size of their own markets. Domestic markets remain significant even in our globalized world.

Unfortunately, *all* the non-OECD countries taken together (including the East-Asian tigers) represent an astonishingly low 6 percent share of the global software market.⁵⁸ Looking specifically at Central and Eastern Europe, its information and communications technology (ICT) expenditure (out of which less than 5 percent is spent on software) is growing, but it remains very low compared to United States' ICT spending and represents just 6.4 percent of Europe's total ICT spending.⁵⁹

It has been argued that piracy itself is the cause of this small market.⁶⁰ This may appear logical, but only if we assumed that those who use pirated software would be *able* to purchase legally distributed products at the current prices (more details on pricing and average wages are presented in the next section). Yet such an assumption would require a considerable stretch of imagination in countries where the purchasing power is ten to twenty times lower than in the United States or the EU.⁶¹ In other words, even if copyright would be perfectly protected, these markets would still be small.⁶²

The size of the domestic markets as determined by the low purchasing power is also pertinent to the argument made in this section, namely, the limited relevance of copyright for the local software developers, from another perspective. Even if local software firms were able to overcome the tremendous obstacles presented above and become significant players in the off-the-shelf sector, they would need to target mostly the developed countries, which comprise the bulk (over 94 percent)⁶³ of the global market. As producers of packaged proprietary computer programs, software firms in developing countries would obviously care about copyright protection. However, their concern would be naturally focused on where the main stream of revenue comes from, and in most cases that would *not* be the local market.

To sum up, this section has first pointed out that the relevance of IPRs protection in general, and of copyright

in particular, varies significantly across different software industry sectors and markets. Second, local companies in Central and Eastern Europe and in developing countries in general, as the examples from India illustrated, are mostly absent from the off-the-shelf packaged computer programs sector where copyright matters most, except as outsourcing firms providing inputs at a generally low technological level for Western packages. Third, there are tremendous and lasting non-IPR related obstacles that prevent software firms in developing countries from entering the off-the-shelf market at a significant level, at least for the short and medium term. Therefore, the benefits of copyright as an incentive to innovate are very limited in this particular area, and the only significant effect of stronger IPRs protection is the higher cost of packaged software products. This means a more limited diffusion of this technology because of the low local purchasing power, if prices are maintained high over marginal costs. Such a barrier to technology transfer poses a serious problem.

PRICE DISCRIMINATION AS AN INSTRUMENT OF TECHNOLOGY TRANSFER?

Information technology production accounts for only 7 percent of the US gross domestic product (GDP), 6.5 percent of Japan's, and 4 percent of Europe's.⁶⁴ Much of the dramatic development that has made us talk of an IT revolution in the past few years actually reflects the impact of the use of the new technologies, which has increased productivity throughout the economies of the developed countries.⁶⁵ This point emphasizes how important it is for developing countries to benefit from the diffusion of IT. Unfortunately, many of these countries have been on a declining slope so far, the global digital divide leading to an even wider economic divide:⁶⁶ "the spread of information technology across all types of industries and services in industrialized countries is so fast and pervasive, with consequent improvements in price competitiveness, design, and quality of products, that developing countries find it increasingly difficult to compete internationally."⁶⁷ As Jeffrey Sachs has emphasized, "[a]t the core of the global divide is the vast inequality in innovation and diffusion of technology."⁶⁸ At the same time, as the previous section argued with respect to packaged software, strong IPRs can end up being a costly barrier to this technology diffusion without providing the benefit of boosting local innovation and production.

This point relates to the idea of nourishing the crucially important, yet often forgotten, demand side of development and not just the supply.⁶⁹ "Unless a demand side can be cultivated that appreciates and exploits sophis-

ticated and advancing technology, economic growth can slow or, ultimately, fail to continue."⁷⁰ The most important factor in this respect is obviously the system of education, but having real (*i.e.*, economically affordable) access to the technology is also key. Concerning access to software, it can literally mark the level of computer literacy. The following example is chosen from the education system itself:

"We have no money," says Alexander Ostroumov, a professor of applied mathematics at Moscow State University. After purchasing a CD-ROM tutorial on an advanced programming language for \$5 (which legally retails for \$400), he said, "This is the only way to study it (the language), this is the only way to learn. Many of the colleagues I worked with, some of them University professors, are attempting to live on \$100-200 a month salary!"⁷¹

Unfortunately, this is a generalized problem. To illustrate it with some of the most popular computer programs (and favorite targets of piracy), Microsoft Office 2003 (Romanian version) is legally distributed in Romania for \$375. The Russian version of Windows XP Pro with Service Pack 2 costs \$244. These prices are fairly similar across Central and Eastern Europe. These prices are also similar to those charged in the United States on *Amazon.com*. Moreover, Microsoft is not an exception in this respect. Looking at the prices for software packages produced by other major companies, for example Adobe's graphics software, the same similarity appears between the pricing structure in Western countries and in Eastern Europe.⁷² Furthermore, Eastern Europe is just an illustration of the general uniformity of software package prices in both developing and developed countries. The exceptions to this uniform high pricing rule are very few.

The problem with these uniform high prices is that the purchasing power in Central and Eastern Europe is much lower than in the United States,⁷³ the European Union,⁷⁴ or Japan,⁷⁵ and therefore, with respect to proprietary software,⁷⁶ the choice for the majority of prospective users is between pirated software and no software.

Average earnings concern individual users, but it is a good proxy for purchasing power in general. Most firms are affected as well, especially the small and medium size enterprises. An American IT investor in Romania raised a related interesting point about affordability: "It is easy to say that if a company can afford a computer then they can afford the software, but it is not always the case in an economy such as Romania. A computer can be bought for \$600 but the average user requires a further \$600 for software, which is like saying that if a driver can afford a Ford he can afford a Mercedes!"⁷⁷

Given the economic conditions, the incentives to

disregard intellectual property rights are much greater for most people, as the choice is not just between a free ride and a paid, yet affordable ride, but between a free ride and none at all. What the heavy-handed enforcement of IPRs in these conditions can achieve is not a substantial increase in legitimate sales, but less access to the technology. However, selling instead at a lower price that reflects the marginal costs and the local purchasing power could displace even the most resilient pirates⁷⁸ without hurting diffusion, as the new discount clients would be encouraged in this way to abandon the black market for the legal one. Considering these benefits, as well as the low marginal costs for off-the-shelf software packages⁷⁹ (as opposed to, for instance, hardware), the absence of price discrimination appears counterintuitive, especially when compared to other IPR-reliant sectors, such as the pharmaceutical industry.

PRICE DISCRIMINATION: FALSE PROBLEMS, REAL PROBLEMS, NO SOLUTION? THE PATH TO THE IMMORAL COMFORT OF THE STATUS QUO

"If we were to sell our software at a much lower price in Romania, it would be bought wholesale and next week we would see it resurface in Germany."⁸⁰ This illustrates the typical first answer that I received (during interviews with representatives of BSA and legal software distributors) to my inquiry about why prices are generally so similar across markets that differ so much on purchasing power. This fear of potential parallel imports is hardly surprising looking from the perspective of the economics and legal literature on price discrimination, which tends to consider unrestricted parallel trade as the main threat to differential pricing.⁸¹

The empirical reality, however, tells a fairly different story with respect to software, due to readily available barriers that can block parallel trade. It is true that legal barriers are not bulletproof. Even though courts in developed countries tend, with some caveats, to find parallel imports to be illegal,⁸² some goods might still trickle in if the difference of price between markets in developing and developed countries is worth the risks of smuggling. A more effective (and easier to implement) option for software producers is self-help: using simple and cheap technical means to create a product differentiation that prevents parallel imports. The logic is simple. If a German user were able to save a few hundred dollars on a software package by learning enough Romanian (or Bulgarian, Russian, etc.) to use the version with a Romanian language interface, would he or she invest the

time and effort to learn the language? This is obviously a rhetorical question, considering that convenience is so important for the vast majority of non-technical users of general applications (e.g., text processing, spreadsheets, basic graphics packages, etc., precisely the typical targets of software piracy).⁸³ Unlike, say, pharmaceutical companies, producers of computer programs have the possibility to use a natural means of product differentiation that can be very effective against parallel imports: the language of the user interface (i.e., the language used in the program menus and in the help files).⁸⁴ Moreover, the technological implementation of this barrier can be achieved easily, with almost insignificant extra costs.⁸⁵

There are many developing countries (including *all* of Central and Eastern Europe) where different languages in the user interfaces can effectively prevent parallel trading. In these numerous cases, the quote with which I started this subsection makes no sense.⁸⁶ The producers of software could price discriminate as much as they want without fearing the main problem touted by the economic and legal literature on the topic: parallel imports. And yet, they do not. If parallel imports are less of a problem than expected with respect to software packages because of language differences and legal barriers, what could be the real reasons for the near absence of meaningful price discrimination?

One real problem concerns the economic feasibility of a strategy based on low prices, taking into consideration the local purchasing power, the marginal costs, and, most importantly, the competition with the easily available sources of pirated copies. Very low prices would expand the market and drive out the pirates, but would necessarily entail losing revenue from the few customers that are currently paying the high prices. Bradford Smith (General Counsel of Microsoft) confirmed in my interview that firms selling software packages in developing countries have been making such calculations, comparing the current stream of revenue from a few large customers willing to pay a high price, with the revenue that could be generated by a wider customer base at much lower prices. The conclusion was generally favorable to the status quo. "In developing countries, large businesses dominate the demand," Smith said.⁸⁷

Both René Bonvanie (Marketing Vice President for Oracle) and Bradford Smith pointed out in my interviews that another key reason why a software company would not charge a lower price in developing countries is that it would risk a marketing backlash in the home market. As they suggested, for companies that are producing general software applications, it is often difficult to explain the high prices to customers in developed countries. "If the same software package, maybe localized, would be sold

for a very low price in developing countries, how could a company justify charging much more in its primary markets?" Bonvanie and Smith asked rhetorically.⁸⁸ Even if this marketing backlash may turn out to be less serious, the developed countries markets are so much more important in terms of revenue for the software firms⁸⁹ that even a minor problem there would clearly outweigh any benefit in the developing countries.

Considering these problems, as well as the insignificance of the developing countries as markets, software producers may simply find the status quo comfortable enough. The passivity of governments in developing countries also plays a role, especially when compared with the situation in the pharmaceutical sector. For medicines, international differential pricing is quite common. Often, prices can be even ten times lower in developing countries.⁹⁰ As most analysts of parallel trade in pharmaceuticals agree, there is an important factor that drives these prices down in spite of the greater risk of parallel imports in this market: "countries achieve low pharmaceutical prices by aggressive regulation."⁹¹ This factor is obviously missing with respect to computer programs. According to Bradford Smith, more political pressure from developing countries to ensure technology access would likely increase if the supply of pirated software was seriously curtailed,⁹² but that is not the case, hence, the reason for the status quo. From the perspective of the developing countries, the technology transfer that could be achieved legally through price discrimination is accomplished by piracy. It is not a perfect instrument, there are numerous firms caught in the middle, too large to avoid the police and BSA raids and yet too small to afford the IT they need at Western prices.⁹³ Generally, though, it works, especially for individual users.⁹⁴ From the perspective of the software producers, they get some revenue from the few that can afford the high prices. In the short run they would probably not make more money by lowering the prices enough to increase the number of customers. Moreover, the conventional wisdom that resulted from the interviews I conducted,⁹⁵ with the obvious exception of the Microsoft and BSA managers,⁹⁶ is that piracy creates a network effect for the dominant software packages, building a large captive user base and eliminating the risk that cheaper rival computer programs, proprietary or open source, would gather a significant following. Later, if the economy and the purchasing power grow to the point where the respective market can become a major source of revenue, a more vigorous anti-piracy campaign can be conducted. Until then, the status quo, although morally dubious, seems to work. The next section will look at an alternative that can work *and* avoid the moral discomfort of the status quo.

OPEN SOURCE SOFTWARE: A VIABLE ALTERNATIVE?

Given that price is such a central concern for the Central and Eastern European software market and for developing countries in general, why isn't there a significant move away from the expensive Windows monopoly and proprietary software packages in general to the legally free OSS, such as the Linux operating system or the Open Office suite? This section will try to answer this question, explore the circumstances that may determine a shift away from the status quo, and then search for the actors that could promote such a change.

Quite a few representatives of the open source movement have expressed optimism about the spread of free software into the developing world. For instance, Miguel de Icaza, founder of the GNOME project, is counting on wide acceptance outside the United States, especially in developing countries that can't afford Microsoft products.⁹⁷ Similarly, John Maddog Hall said: "Because Linux is a low-cost alternative to other operating systems, I think there will be a lot of growth in what I call the emerging countries."⁹⁸ Some open source advocates, including those within friendly companies such as IBM, have suggested that we should expect a faster and wider spread outside Western countries for another important reason besides price. They claim that proprietary systems and Windows in particular are not yet well established. Therefore, Kakutaro Kitashiro (president of IBM Asia-Pacific) argues that developing countries are potentially more open to Linux if you move quickly.⁹⁹

The problem is that currently the market looks different from these open source optimistic accounts, both with respect to the real price of proprietary software, and the Microsoft monopoly and the corresponding network effect already working powerfully in its favor.

First, very cheap pirated copies of proprietary software are still widely available in Eastern Europe.¹⁰⁰ This situation is common in most emerging markets.¹⁰¹ Indeed, some of the more realistic free software advocates, with actual experience of doing on-the-ground "open source evangelism" in developing countries, consider widespread piracy as one of the key obstacles to the spread of free software.¹⁰²

Second, Microsoft's operating system and its main application suite have achieved an overwhelming market share of well over 90 percent among PC users¹⁰³ through, ironically, the wide diffusion of pirated copies.¹⁰⁴ The network effect, is ensuring for the time being the stability of this market domination. "Force-of-habit and 'what the users are accustomed to' are two of the more important reasons why a computer user (or indeed, the operators

of a computer network at a business or an educational institution) will decide upon a particular computer operating system or application program or, just perhaps even more importantly, why they will be reluctant to switch computer systems.”¹⁰⁵ The aforementioned open source optimists’ point about Windows not being well established yet is wrong because the limited use of Microsoft and other proprietary software simply reflects the much more limited use of computers in developing countries generally. Among those who actually represent the market for IT, Microsoft has already established its monopoly, and so far, the increase in PC sales has only brought more users into its fold.¹⁰⁶

Convenience is an important part of the story, just like in the developed countries. Ordinary users do not buy operating systems. They buy computers, which come with Microsoft Windows pre-installed.¹⁰⁷ If it ain’t broke, why fix it? The consequences can be seen both in Central and Eastern Europe and in other developing countries. For instance: “Windows OS and Microsoft’s localized software remain the most widespread, user-friendly and available software in the Chinese PC market, and most users are likely to stick with whatever is most convenient. Especially when they can get it from their neighborhood street merchant for next to nothing.”¹⁰⁸

Finally, one other barrier on the free software path is the conservative bias of many businesses and most state bureaucracies, sometimes even within the structure of agencies that are supposed to be on the cutting edge of science and technology.¹⁰⁹ This problem is related to the issue of accountability. In the words of an open source evangelist: While choosing Microsoft for a project that results in bursting budgets and missed deadlines might be acceptable because ‘everyone else does it that way,’ one can’t use that excuse when choosing Linux. In other words, at a certain level it’s all about which operating system helps you cover your tracks better, regardless of which choice is in the better interests of the company.¹¹⁰

Given these obstacles, under what circumstances should we expect to see a major increase in the use of OSS in developing countries? One strong push in this direction would likely (and very ironically) come from a more effective crack down on piracy, because this would cut the access to the current main source of affordable software. As an open source advocate put it:

I wish commercial vendors would step up their efforts to curtail piracy [...] because the more consumers are forced to confront the real cost of proprietary commercial software, the more they’ll be encouraged to look at free software and other open alternatives.¹¹¹

Regarding costs, there are studies commissioned by

Microsoft which claim that, looking beyond the initial software acquisition, the total-cost-of-ownership of proprietary software can be competitive with that of OSS. However, with respect to developing countries, such claims can be easily rebutted when the lower labor costs are taken into consideration. A software license that costs say, \$500, is not a great barrier for most UK companies; it is worth paying to save a few days (or even hours) of employee time. In the developing world, this is not true and free desktop software looks much more attractive.¹¹²

Security concerns about hidden access for inimical countries or commercial competitors through back doors implemented in the closed source code of proprietary software packages also tend to tip the balance in favor of free software, precisely because its source code is open. China, for instance, has been vocal about its concern over the alleged back door in Microsoft Windows, which is kept open for the US National Security Agency,¹¹³ and therefore has taken an official position in favor of Linux.¹¹⁴ Furthermore, the Chinese “don’t want one company to monopolize the software market.”¹¹⁵ Chen Chong, a deputy minister of information industries who oversees the computer industry in China, added: “[w]ith Linux, we can control the security [...] so we can control our own destiny.”¹¹⁶ China has “likened dependence on Microsoft to leaving the keys to the country’s increasingly computerized economy in the hands of a potential enemy.”¹¹⁷ Some may be skeptical about the reliability of complaints coming from the Chinese government, but similar security concerns have also been expressed, albeit solely as unofficial leaks, by sources that we now tend to regard as more trustworthy, such as the German army.¹¹⁸

This relates to a broader concern. “Many administrations are still using communication standards tightly linked to a single private provider, which forces citizens and public organizations to become customers of the same provider and, in the end, significantly stimulates abuses of dominant position in the market,” reads the preamble to one bill promoting OSS.¹¹⁹

This concern suggests the first answer to the last question addressed in this section, *i.e.*, who are the actors that could promote a major shift toward OSS in developing countries against the strong barriers raised by the network effect that currently favors the dominant proprietary packages? Governments are the obvious first answer because of their position as major consumers of software, especially for their administrative bureaucracy, the military, and for the education system. There have been numerous initiatives to promote OSS in recent years both in developed and developing countries, both at national and at local levels.¹²⁰ However, to my knowledge, such initiatives are still the exception rather than the rule. Microsoft’s

opposition, sometimes with US backing, plays a role in preventing or delaying such projects.¹²¹ Tellingly, besides political pressure, the main method to halt the advance of OSS is to offer much lower prices,¹²² the same method that has been missing in action when fighting piracy. Some governments are already learning to leverage the competitive pressure of OSS to obtain deep discounts from Microsoft.¹²³

There is tremendous variation in the states' capacity to promote open source.¹²⁴ The most often cited case of China, for example, is actually quite extreme in this respect, because the "government influence over the market is still so strong, that Beijing's support can turn almost any product into an industry standard domestically."¹²⁵ Nevertheless, in China as well as any other country, there is often a frustrating gap between launching an OSS initiative and implementing it effectively. "The use of free software is a noble idea, but government agencies typically do not have the technical expertise to ensure rapid adoption."¹²⁶

The second set of actors that could play an important role in the promotion of OSS as an affordable and legal alternative to proprietary computer programs is the international organizations that are involved in education and development assistance in general. There are interesting examples.¹²⁷ Unfortunately, just as in the case of governments, these examples are still the exception rather than the rule, and Microsoft's opposition, using US representatives to exert political pressure against OSS initiatives, plays a role.¹²⁸ As a disappointed open source advocate put it: "[t]he World Bank is used to signing off on loans that include a line item for software, which really gets under my skin because all this Linux software really costs nothing."¹²⁹ It is therefore necessary, first of all, to further educate such organizations as well as the governments of developing countries about the benefits of OSS. It is a difficult and long-term task, but it is certainly more worthwhile than wasting precious financial resources or continuing to play the degrading cat-and-mouse piracy game.

CONCLUSION

The international intellectual property regime has been heralded by its supporters as the key that would open the door to technological advancement in developing countries. So far, in Central and Eastern Europe it has failed to deliver on this promise, especially with respect to the software industry. Local programmers have little to gain from a stronger protection of copyright in their domestic markets, and this situation is not likely to change soon. At the same time, piracy has turned out to

be a necessary evil for the diffusion of proprietary software that is legally priced beyond the reach of most local users. Price differentiation could have provided a solution for this conundrum, but there are important economic and political factors that support a morally dubious status quo. These problems clearly require more innovative thinking. Open source software is likely to be a central part of the answer, but it is an uphill battle in a context where the dominant proprietary software packages already have a lock-in on most of the emerging markets, the network effect in their favor working, ironically, through piracy. The initiation and effective implementation of open source projects will require serious efforts to change the approach of governments in developing countries and the international organizations involved in development assistance.

NOTES

1. Software & Info. Indus. Ass'n, SIIA's Report on Global Software Piracy 2000 (2000) [hereinafter SIIA's Report], <http://www.siaa.net/piracy/pubs/piracy2000.pdf> (last visited Nov. 2, 2002); see also Bus. Software Alliance, Sixth Annual BSA Global Software Piracy Study, 2001, at <http://www.bsa.org/resources/2001-05-21.55.pdf>, and Bus. Software Alliance, Second Annual BSA and IDC Global Software Piracy Study, 2005, <http://www.bsa.org/globalstudy/> (last visited Nov. 14, 2005).
2. OSS provides access to the program's source code, the right to make copies of the computer program and distribute them, and the right to modify the program. See Open Source, The Open Source Definition, Version 1.9, at http://www.opensource.org/docs/definition_plain.html; see also Bruce Perens, "The Open Source Definition," Open Sources: Voices from the Open Source Revolution (Chris DiBona, Sam Ockman, and Mark Stone, eds., 1999). While acknowledging the philosophical distinctions between open source and free software, for purposes of this article free software is encompassed in OSS. See http://en.wikipedia.org/wiki/Open_source_vs._free_software.
3. Catalin Cosovanu, "Piracy, Price Discrimination and Development: The Software Sector in Eastern Europe and Emerging Markets," 31 AIPLA Q.J. 165 (Spring 2003), http://papers.ssrn.com/abstract_id/497902. Parts of my AIPLA Q.J. publication represent the basis for this article.
4. Goods sold abroad (in a low price market) with the consent of the IPR owner and subsequently imported into a high price market without the consent of the IPR owner. See also Cosovanu at 195-210.
5. European Survey of Info. Soc'y, [hereinafter ESIS], <http://www.eu-esis.org/> (last visited Nov. 20, 2004).
6. European Information Technology Observatory 2000 [hereinafter EITO]; European Information Technology Observatory 2004 [hereinafter EITO 2004], <http://www.eito.com>.
7. Nat'l Sci. Bd., Science and Engineering Indicators 2000, <http://www.nsf.gov/statistics/seind00/>; Nat'l Sci. Bd., Science and Engineering Indicators 2004, <http://www.nsf.gov/statistics/seind04/> (last visited Nov. 14, 2005).
8. Org. for Econ. Cooperation & Dev., OECD Information Technology Outlook 2000: ICTs, E-Commerce and the Information Economy [hereinafter OECD ITO].
9. Interview with Vlad Tepelea, President, National Association of Software Enterprises (ANIS), in Bucharest, Rom. (June 20, 2000); Interview with Vasile Baltac, President, and Dan Mihalca, Member of the Board of Directors, Association for Information Technology and Communications of Romania (ATIC), in Bucharest, Rom. (June 21, 2000); Interview with Alexandru Borcea, President, and Florin Vrejoiu, Executive Vice-President, Romanian Association for the Electronics and Software Industry (ARIES), in Bucharest, Rom. (June 22, 2000).
10. Interview with Dan Dascalu, Member of the Romanian Academy,

- Executive Director, National Institute for Research and Development in Microtechnologies of the Ministry of Education and Research, in Bucharest, Rom. (June 22, 2000).
11. Interview with Varujan Pambuccian, Member, Chamber of Deputies, Romanian Parliament, in Bucharest, Rom. (June 20, 2000). Mr. Pambuccian is the initiator of legislation on software technology parks, special economic areas, electronic commerce, and electronic signature. He is also the President of the Commission for Information Technology and Telecommunications.
 12. Interview with Nicolae Burchel and Ema Catichi, Attorneys and BSA Representatives for Romania, in Bucharest, Rom. (June 21, 2000). For more information about the BSA, see <http://www.bsa.org>.
 13. Email Interview with Viorel Apetrei, Anti-Piracy Manager, Microsoft Romania (Jan. 4, 2001); Email Interview with Teodor Todorov, Anti-Piracy Manager, Microsoft Bulgaria (Jan. 22, 2001).
 14. Interview with Judit Gillemot, Anti-Piracy Manager, Microsoft in Hungary, in Budapest, Hung. (July 5, 2001); Interview with Erzsebet Sebok, Head of BSA Hungary, in Budapest, Hung. (July 5, 2001); Interview with Viorel Apetrei, Anti-Piracy Manager, Microsoft Romania, in Bucharest, Rom. (July 17, 2001); Interview with Ema Catichi, attorney and BSA representative for Romania, in Bucharest, Rom. (July 17, 2001).
 15. Interview with Rodica Pirvu, General Director, ORDA, in Bucharest, Rom. (July 18, 2001); Interview with Adrian Ghimpu, Deputy Director, ORDA, in Bucharest, Rom. (July 18, 2001).
 16. Interview with Rene Bonvanie, Marketing Vice President of Oracle, in Redwood Shores, CA (Feb. 21, 2001).
 17. Interview with Bradford L. Smith, General Counsel of Microsoft, in Stanford, CA. (pr. 2001).
 18. Interview with George Roth, Chief Executive Officer, Recognos, Romania, in Los Gatos, Cal. (Jan. 2001).
 19. This is a predictable, common scenario for IPR policy-making in developing countries. "The impetus for policy changes in IP typically comes from international agreements to which the country is signatory, without necessarily having a coherent idea of how they can be implemented nationally [...] Moreover, some foreign governments may exert formal or informal pressure where they see their interests as being at stake. At the same time, the reality in many developing countries is that institutional capacity is generally weak, and in particular there is a lack of experienced and well-qualified officials. As a result, governments of developing nations often rely on foreign IP expertise. Consequently, the consistency of the IP legislation with development policies may not be subject to adequate scrutiny." Commission on Intellectual Property Rights (CIPR), Final Report (2002), Chapter 7, http://www.iprcommission.org/graphic/documents/final_report.htm.
 20. See, e.g., the Mar. 22, 2001 posting by Pirvu Ionica on the ITC (Information Technology and Communications) Lobby online discussion list (archived at <http://www.agora.ro/tic/> and on file with the author) (statement by Romanian Government Representative acknowledging that BSA has been the only organization consulted for the elaboration of an important government regulation regarding the implementation of copyright protection for software products (Ordinance 124/2000), while the local software producers and their organizations were ignored).
 21. See Cosmin Ghinea, "Facilitate pentru firmele de IT, incremenite în proiect," *Ziarul Financiar*, Mar. 28, 2001, <http://www.zf.ro>.
 22. In Romania, for instance, by the mid-1990s the total budget for R&D on electronics, higher education, telecommunications, and IT and computing applications, was less than U.S. \$20m. Of this, less than U.S.\$1m was allocated specifically for informatics R&D. Mihaela Grundey & Richard Heeks, *Romania's Hardware and Software Industry: Building IT Policy and Capabilities in a Transitional Economy*, at 48 (Inst. for Dev. Policy and Mgmt., Development Informatics Working Paper Series No. 2, 1998), http://idpm.man.ac.uk/wp/di/di_wp02.htm.
 23. See European Information Technology Observatory 2000 [hereinafter EITO]; European Information Technology Observatory 2004 [hereinafter EITO 2004], <http://www.eito.com>.
 24. See *The Technology of Transition: Science and Technology Policies for Transition Economies* ch. 1-7 (David A. Dyker ed., 1997); Roderick Martin, "Central and Eastern Europe and the International Economy: The Limits to Globalization," 50 *Europe-Asia Studies* 7 (1998); David A. Dyker, "Learning the Game B Technological Factors of Economic Transformation," 49 *Europe-Asia Studies* 445 (1997); David A. Dyker, "The Computer and Software Industries in the East European Economies B A Bridgehead to the Global Economy?," 48 *Europe-Asia Studies* 915 (1996); Esther Dyson, "How Eastern Europe Is Starting Over," *Datamation*, Mar. 1, 1993, at 67; Slavo Radosevic, "Alliances and Emerging Patterns of Technological Integration and Marginalization of Central and Eastern Europe within the Global Economy, in Foreign Direct Investment and Technology Transfer in the Former Soviet Union" 27 (David A. Dyker ed., 1999); "A Survey of Information Technology," *Bus. Cent. Eur.*, Mar. 1997, at 41; "Survey E-Commerce: Brave New World," *Bus. Cent. Eur.*, Mar. 1999, at 43.
 25. Grundey & Heeks at 28.
 26. While software piracy may sometimes infringe other intellectual property rights, piracy in this area means copyright infringement. See *SIIA's Report*, at 5-6.
 27. Peter Evans, *Embedded Autonomy: States and Industrial Transformation* 194 (1995).
 28. Datamonitor defines packaged software as software that is sold in a stand-alone form to the home or the office where a second party does not modify the source code. This can be contrasted with bespoke software, where code has been modified or generated solely for a single or very limited number of projects. Examples of packaged software include Lotus Notes, Microsoft Windows, office suites, desktop publishing software, and even computer games. "The Economic Impact of the Packaged Software Industry in Western Europe" 5 (Oct. 2000) (proprietary report available for fee from Datamonitor).
 29. "The New Economy Survey," *The Economist*, Sept. 23, 2000, at 5, 30. Another major problem is that the Anetwork externalities helping first-movers to establish a dominant position will favor American giants, so that local firms in emerging economies will be frozen out. *Id.* at 34-37.
 30. Evans at 194.
 31. SIIA's Report at 8.
 32. Interview with Burchel and Catichi.
 33. See George Roth, "How To Do IT Business in Romania, Presentation at the Romanian-American Business Network Conference" (Jan. 15, 2000).
 34. EITO at 287. Development of a Asolution means, in this study's parlance, development of an adaptation, often fairly superficial, for a specific business environment of a pre-existent product, not of the design and creation of the packaged software itself. To quote from the source: Aspecific design and tailoring activities on packaged software developed abroad.
 35. EITO at 290-291.
 36. OECD ITO at 131.
 37. OECD ITO at 131.
 38. OECD ITO at 132.
 39. Bruce Einhorn, et al., "India 3.0: Its Software Outfits Take on the World," *Bus. Wk.*, Feb. 26, 2001, at 44, http://www.businessweek.com:1/2001/01_09/b3721015.htm.
 40. This point is also important in measuring what really counts as a packaged software business (i.e., creating and selling your own package or just contributing to the development of another company's product).
 41. For example, in the case of Romania: "Narrow, vertical package markets do exist [...] in public administration, manufacturing, health administration, hotel management, insurance, accounting, etc. Local software firms are addressing these markets but their packages are often just a set of menu or window interfaces that are used as a marketing or development platform for further customization. In addition, the growing competition from multi-national imports (both legal and pirated) increasingly threatens even these local developments." Grundey and Heeks at 55.
 42. OECD ITO at 137.
 43. *Id.* See also Nat'l Sci. Bd. 2004, Chapter 4.
 44. Nat'l Sci. Bd. 2000 at 2-59 and 2-60.
 45. OECD ITO at 137-138.
 46. George Roth, "How To Do IT Business in Romania, Presentation at the Romanian-American Business Network Conference" (Jan. 15, 2000).
 47. Evans at 196. The current dominance of proprietary software developed abroad has played an important role in limiting many local programmers in developing countries to computer janitor positions. Alan Story, "Copyright, Software and the Internet," Study Paper 5, Commission on Intellectual Property Rights (2002), http://www.iprcommission.org/graphic/documents/study_papers.htm.

48. See generally Michael L. Katz & Carl Shapiro, "Network Externalities, Competition, and Compatibility," 75 *Am. Econ. Rev.* 424 (1985) (discussing the concept of Anetwork externalities).
49. Michael L. Katz & Carl Shapiro, "Network Externalities, Competition, and Compatibility," 75 *Am. Econ. Rev.* 424 (1985); see also S.J. Liebowitz & Stephen E. Margolis, "Network Externalities: An Uncommon Tragedy," 8 *J. Econ. Persp.* 133, 133 (1994) (stating that computer software is a good that exhibits network externalities).
50. *The New Economy Survey* at 30.
51. *The New Economy Survey* at 30-31.
52. Grundey and Heeks at 54.
53. OECD ITO at 134-35.
54. OECD ITO at 134-35.
55. See World Bank, "The Networking Revolution: Opportunities and Challenges for Developing Countries," <http://www.infodev.org/library/working.html>; see also "World Bank, Global Information technology Report 2002-2003: Readiness for the Networked World," http://www.weforum.org/pdf/Global_Competitiveness_Reports/Reports/GITR_2002_2003/Contents.pdf.
56. ESIS; see also Internet World Stats, Internet Usage in Europe (2005), <http://www.internetworldstats.com/stats4.htm#e>.
57. Allison Linn, "Gates Warns of Sea Change in Memo," *Business Week* (Nov. 8, 2005), <http://www.businessweek.com/ap/financialnews/D8DOLKHGA.htm>.
58. OECD ITO at 67.
59. EITO at 255, 273.
60. See, e.g., Datamonitor, "The Impact of the Software Sector on the Economies of Eastern Europe" 42 (June 2001). This study also asserts that less software piracy leads to more jobs, a greater tax base and many other economic benefits. The nicely colored graphs and charts illustrating these claims look impressive. However, after a closer look at the actual analysis and empirical support, one is dismayed to find that a key relationship on which the study rests (*i.e.*, the relationship between the growth of the software market and the reduction of piracy) is simply assumed by the author, with no empirical evidence whatsoever. The study just mentions in an appendix that "a linear progression in the growth of the software market is an acceptable approximation of the growth of the software market due to the reduction of piracy." A similar trick is employed by a more recent study, IDC & BSA, "Expanding Global Economies: The Benefits of Reducing Software Piracy" (April 2, 2003), <http://www.bsa.org/idcstudy/>. Such software piracy studies commissioned by BSA and related organizations have an established tendency to seriously overstate the consequences of piracy to suit the policy goals of their sponsors. Unfortunately, their absurd jaw-dropping figures are regularly cited in government documents and used to justify new laws. "Software piracy: BSA or just BS?," *The Economist*, May 19th, 2005.
61. See generally US Census Bureau, U.S. Dep't of Commerce, Statistical Abstract of the United States: 2003, <http://www.census.gov/prod/www/statistical-abstract-04.html> (last visited May 2, 2005).
62. To illustrate this point, imagine that the price of Microsoft Office in the United States was actually \$4000. How many copies would still be sold at this price, ten times higher than the current one? Unfortunately, these are the kind of numbers that a person or a business has to deal with in economies where the monthly income averages \$400 or less. And this is a happy scenario compared to other developing countries. For instance, the total effective price (*i.e.*, taking into account local purchasing power) of Microsoft Office and Windows XP in Congo would be almost \$200,000. An average wage earner would have to work more than five years to obtain these two packages legally. Alan Story, "Intellectual Property and Computer Software," at 18 (UNCTAD-ICTSD Project on IPRs and Sustainable Development, Issue Paper No. 10, 2004), http://www.iprsonline.org/unctadictsd/docs/CS_Story.pdf (last visited Nov. 20, 2005).
63. OECD ITO at 25.
64. *The New Economy Survey* at 32.
65. Stephen D. Oliner & Daniel E. Sichel, "The Resurgence of Growth in the Late 1990s: Is Information Technology the Story?," at 22 (Finance and Economics Discussion Series, 2000), <http://www.federalreserve.gov/pubs/feds/2000/index.html> (last visited Jan. 27, 2003). For the assessment and analysis of the impact of IT on overall economic productivity and growth, see Paul Schreyer, "The Contribution of Information and Communication Technology to Output Growth: A Study of the G7 Countries" (Directorate For Sci., Tech. and Indust., Working Paper No. 2000/2, Mar. 23, 2000), <http://www.oils.oecd.org/oils/2000doc.nsf>; Andrea Bassanini, *et al.*, "Knowledge, Technology And Economic Growth: Recent Evidence From OECD Countries" (150th Anniversary Conference of the Nat'l Bank of Belg.: How to Promote Econ. Growth in the Euro Area, May 31, 2000), <http://www.oecd.org/media/release/NBB29May.pdf>.
66. In essence, it is a vicious circle: using less IT means making less money, which in turn means getting less IT.
67. Nagy Hanna, *et al.*, "The Diffusion of Information Technology: Experience of Industrial Countries and Lessons for Developing Countries" 10 (World Bank, Discussion Paper No. 281, 1995).
68. Jeffrey D. Sachs, "A New Map of the World," *The Economist*, Jan. 3, 2001, at http://www.cid.harvard.edu/cidinthenews/articles/sachs_on_globalisation.htm. Jeffrey Sachs is Director of the Center for International Development and professor of international economics at Harvard University. He has advised the governments of many developing and Eastern European countries.
69. The World Bank study of IT diffusion put it bluntly and stated that for most developing countries, the development of local IT suppliers should be encouraged only as necessary to improve the competitiveness of IT users. Developing countries need early, inexpensive experience to build a critical mass of local users and start them on a cumulative learning path.
70. Danny Quah, "The Weightless Economy in Economic Development" 29-30 (The United Nations University, World Institute for Development Economics Research, Working Paper No. 155, 1999), www.wider.unu.edu/publications/wp155.pdf (last visited Nov. 7, 2002).
71. Duane Goehner, "Ponderous Piracy Problem B Russia" (1997), at <http://www.goehner.com/piracyru.htm> (last visited Nov. 5, 2002).
72. Adobe Sys. Inc., Adobe Systems B Central, Eastern Europe and Middle East, at <http://www.adobeceea.com> (last visited Oct. 9, 2003).
73. See generally US Census Bureau, US Dep't of Commerce, Statistical Abstract of the United States: 2003, <http://www.census.gov/prod/www/statistical-abstract-04.html> (last visited May 2, 2005).
74. See generally Statistical Office of the European Communities, Eurostat Yearbook 2004, http://epp.eurostat.cec.eu.int/portal/page?_page-id=1334,47410048,1334_47410066&_dad=portal&_schema=PORTAL (last visited May 3, 2005).
75. See generally Ministry of Internal Affairs and Communications Stat. Bureau, Family Income and Expenditure Survey, <http://www.stat.go.jp/english/index.htm> (last visited Nov. 16, 2005).
76. Hence the argument that choosing to use proprietary software (s opposed to OSS) in developing countries is fueling piracy. See Alan Story, "Intellectual Property and Computer Software," at 18 (UNCTAD-ICTSD Project on IPRs and Sustainable Development, Issue Paper No. 10, 2004), http://www.iprsonline.org/unctadictsd/docs/CS_Story.pdf (last visited Nov. 20, 2005) at 31. In effect, it is a vicious circle, as piracy itself expands and reinforces the use of the dominant proprietary software packages.
77. Softlock Int'l Ltd. Software Piracy in Romania (2002) (emphasis added), http://www.softlok.com/general/piracy_ro.htm (last visited Nov. 6, 2002).
78. Why would businesses or even individual users continue to buy pirated products if the cost of legal licenses would be competitive with the black market prices?
79. For software, just like for many other information intensive products, the marginal cost of making and distributing additional units is trivial. The large research and development expenses are recouped in the developed countries' markets. See Cosovanu at 212.
80. Interview with Burchel and Catichi.
81. See Cosovanu at 196-201.
82. See Cosovanu at 201-205.
83. Interview with Burchel & Catichi.
84. It is interesting to note that using product differentiation to prevent parallel imports is not exactly a new idea in the computer industry, both in hardware and software. For example, in Rothnie's *Parallel Imports*, setting forth a set of interviews concerning the European computer industry in 1990, when dealing with parallel trade, one of the respondents' strategies was localization B adapting the product so that the version sold in one market would not work (or was less attractive) in other markets. The demand for localization was given as a reason why parallel imports were

- not a very significant problem within the EC. Warwick Rothnie, *Parallel Imports*, at 522, 588 (1993).
85. See Cosovanu at 206-208.
 86. If we were to sell our software at a much lower price in Romania, it would be bought wholesale and next week we would see it resurface in Germany. Interview with Burchel and Catichi.
 87. Interview with Smith.
 88. Interview with Smith. Interview with Bonvanie.
 89. OECD ITO at 67.
 90. "A War Over Drugs and Patents," *The Economist*, Mar. 10, 2001, at 43. Claude E. Barfield & Mark A. Groombridge, "Parallel Trade in the Pharmaceutical Industry: Implications for Innovation, Consumer Welfare, and Health Policy," 10 *Fordham Intell. Prop. Media & Ent. L.J.* 185, 195 (1999); David A. Malueg & Marius Schwartz, *Parallel Imports, Demand Dispersion, and International Price Discrimination* 20 (US Dep't of Justice, Antitrust Div., Econ. Analysis Group Discussion Paper No. 93-6, 1993); Frederick T. Schut & Peter Van Bergeijk, "International Price Discrimination: The Pharmaceutical Industry," *World Development*, Sept. 1986, at 1141-1150.
 91. Patricia M. Danzon, "The Economics of Parallel Trade," 13 *PharmacoEconomics* 293 (1998); see also Rothnie at 494.
 92. Interview with Smith.
 93. See Roth.
 94. Easy access to pirated proprietary software remains widespread. See Cosovanu at 210-211.
 95. See interview with Bonvanie.
 96. Although Bill Gates chirped in the 1990s that piracy in China was useful to Microsoft, because once the nation was hooked, the software giant would eventually figure out a way to monetise the trend. "Software piracy: BSA or just BS?," *The Economist*, May 19th, 2005.
 97. Thomas E. Weber, "A Plan to End Microsoft's Dominance (No Lawyers Needed)," *Wall St. J.*, May 15, 2000.
 98. "Linux Tipped to Open Source," *Reuters/The Age*, Apr. 18, 2000, 2000 WL 17150885.
 99. Chin Wah Wong, "IBM to Spend \$200M on Linux Development in Asia," *IDG Communications*, Feb. 16, 2001, at http://www.idg.net/ic_429743_4394_1-483.html.
 100. See Cosovanu at 210-211.
 101. *SIIA's Report*.
 102. Evan Leibovitch, "Watching the World Get Linux," *ZDNet News*, Nov. 8, 2000, at http://news.zdnet.com/2100-9595_22-503108.html. See also Alan Story, "Intellectual Property and Computer Software," (UNCTAD-ICTSD Project on IPRs and Sustainable Development, Issue Paper No. 10, 2004), http://www.iprsonline.org/unctadictsd/docs/CS_Story.pdf (last visited Nov. 20, 2005) at 30.
 103. See EITO.
 104. See Lily Nguyen, "Linux Fans Greet Torvalds: Creator of Open-Source Computer System Greeted Like a Pop Star," *The Toronto Star*, June 1, 2000, and accompanying text.
 105. Alan Story, "Intellectual Property and Computer Software" (UNCTAD-ICTSD Project on IPRs and Sustainable Development, Issue Paper No. 10, 2004), http://www.iprsonline.org/unctadictsd/docs/CS_Story.pdf (last visited Nov. 20, 2005) at 30.
 106. Email interview with Apetrei.
 107. The pre-installation of pirated copies of Windows on new PCs remains widespread. Interview with Apetrei. Email interview with Todorov.
 108. See Greenberg.
 109. Interview with Marius-Ioan Piso, Chief Executive Officer of the Romanian Space Agency (pr. 2001).
 110. See Leibovitch.
 111. See Leibovitch.
 112. Alan Story, "Intellectual Property and Computer Software" (UNCTAD-ICTSD Project on IPRs and Sustainable Development, Issue Paper No. 10, 2004), http://www.iprsonline.org/unctadictsd/docs/CS_Story.pdf (last visited Nov. 20, 2005) at 20.
 113. See Lea; Greenberg; Craig Smith, "China Moves to Cut Power of Microsoft," *N.Y. Times*, July 8, 2000, at A1; Steven Chase, "Linux System Finds a Friend in China," *The Globe and Mail*, Nov. 16, 2000.
 114. See Greenberg.
 115. See Smith.
 116. See Smith.
 117. See Smith.
 118. "Bundeswehr verbannt Microsoft-Programme," *Der Spiegel*, Mar. 17, 2001, at <http://www.spiegel.de/netzwelt/politik/0,1518,123170,00.html>; John Lettice, "German Armed Forces Ban MS Software, Citing NSA Snooping," *The Register*, Mar. 17, 2001, at <http://www.theregister.co.uk/content/archive/17679.html>. There is also an official denial. See John Lettice, "Microsoft Nein Danke: Snoop Scares Dog US IT In Europe," *The Register*, Mar. 17, 2001, at <http://www.theregister.co.uk/content/archive/17710.html>.
 119. Paul Festa, "Nations Uniting for Open Source," *CNet News*, Aug. 30, 2001, <http://news.zdnet.co.uk/software/0,39020381,2094089,00.htm>.
 120. Alan Story, "Intellectual Property and Computer Software," (UNCTAD-ICTSD Project on IPRs and Sustainable Development, Issue Paper No. 10, 2004) at 13-16; David Becker, "Governments Vote Against Microsoft," *CNet News*, Jan. 22, 2004, <http://news.com.com/2100-7344-5145332.html>.
 121. See, e.g., Agustin d'Empaire, "Microsoft's Big Stick in Peru," *Wired*, July 29, 2002, <http://www.wired.com/news/business/0,1367,54141,00.html>.
 122. David Becker, "Governments Vote Against Microsoft," *CNet News*, Jan. 22, 2004, <http://news.com.com/2100-7344-5145332.html>.
 123. David Becker, "Governments Vote Against Microsoft," *CNet News*, Jan. 22, 2004, <http://news.com.com/2100-7344-5145332.html>.
 124. Not to mention that even in cases where this capacity is high, government promotion of open source may take a long time to lead to widespread individual use: A massive installation of Linux in government departments and schools across the country could be a precursor to family use when today's rural youth grow up, make money, move into the cities and buy computers for their children. But that scenario is still far away.
 125. See Smith. The impact of such a move, however, would most likely not be limited to China or even the developing countries in general: If the world's biggest potential market went Linux, it is easy to envisage a consequent domino effect that would not just strengthen Linux in the rest of Asia, but have a profound effect in the western world as well.
 126. Paul Festa, "Nations Uniting for Open Source," *CNet News*, Aug. 30, 2001, <http://news.zdnet.co.uk/software/0,39020381,2094089,00.htm>; see also Alan Story, "Intellectual Property and Computer Software," at 18 (UNCTAD-ICTSD Project on IPRs and Sustainable Development, Issue Paper No. 10, 2004), http://www.iprsonline.org/unctadictsd/docs/CS_Story.pdf (last visited Nov. 20, 2005) at 35, 15 regarding the importance of going beyond OSS-favorable laws and grandiose-sounding projects to actually implementing such programs and providing the necessary training required to make such projects a success.
 127. See e.g. United Nations Development Programme's International Open Source Network, <http://www.iosn.net/>.
 128. Lawrence Lessig, *Free Culture*, 262-265 (2004).
 129. Dan Shearer, quoted by David M. Walker, "Open Up to the World," *The Age*, Mar. 28, 2000, 2000 WL 17149150.