

2010

PIRACY IMPACT STUDY: THE ECONOMIC BENEFITS OF REDUCING SOFTWARE PIRACY

Executive Summary

How Reducing Software Piracy Boosts Economic Growth

More than four out of 10 software programs installed on personal computers around the world last year were pirated. Most of this unauthorized software use occurs in otherwise legal businesses that may, for example, buy licenses to install a program on 10 PCs but then install it on 100 or 1,000. In other cases, software piracy involves more overt criminal enterprises selling counterfeit copies of software programs at cut-rate prices, online or offline.

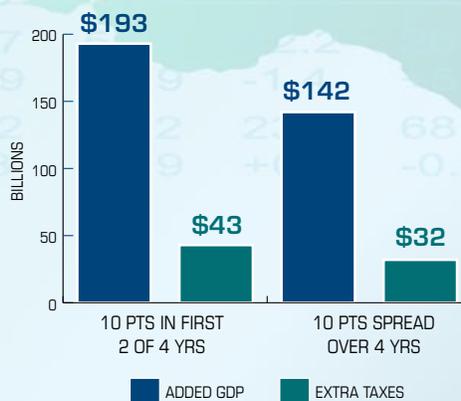
The cumulative impact of all these forms of software theft — representing a commercial value of more than \$51 billion in 2009 — is not typically mentioned among the many factors inhibiting economic growth globally. Yet the ripple effects are far-reaching. They go beyond the multinational software publishing industry itself to affect distributors and service providers in local markets worldwide, starving them of spending that would create new jobs and generate much-needed tax revenues for governments.

Curbing piracy has the reverse effect: It sends ripples of stimulus through the whole information technology (IT) economy. This study documents the extent of that effect in 42 countries where 93 percent of the world's PC software is currently in use.

- The study finds that reducing the piracy rate for PC software by 10 percentage points in four years would create \$142 billion in new economic activity — more than 80 percent accruing to local industries — while adding nearly 500,000 new high-tech jobs and generating roughly \$32 billion in new tax revenues.
- The economic benefits would increase dramatically if piracy were to drop at a quicker pace. In France, for example, reducing the piracy rate by 10 points in the first two years of the same four-year period would boost associated economic activity and tax revenues by 37 percent.
- If this quicker pace of reducing software piracy were repeated in all 42 countries studied, it could produce \$193 billion in new economic activity by 2013 and generate \$43 billion in new tax revenues.

The findings of this study, produced by the Business Software Alliance and IDC, the IT industry's leading market research and forecasting firm, underscore the central importance of effective intellectual property (IP) protection in today's information-driven economy.

Economic Benefits of Reducing Global Software Piracy Sooner vs. Later



The Big Picture: How Software Contributes to the IT Sector and the Economy

To understand the impact of software piracy and the potential benefits of curbing it, it is helpful to first take into account the economic contribution of the broader IT sector, which software helps drive. Consider:

- IT spending is pegged to grow nearly 60 percent faster than the rest of the economy in the 42 countries covered in this study.
- IT spending supports roughly 1.2 million companies that sell or distribute hardware, software or services in the 42 countries studied, and those companies employ roughly 13 million people.
- More than 21 million additional IT professionals work in-house at other companies and organizations that use IT as part of their operations.
- The IT labor force is expected to grow three times faster than the overall, non-farm labor force in the 42 countries studied. It will add 5.5 million new, high-skilled, higher-paying jobs by 2013.
- Together, IT companies and their employees in the 42 countries studied paid nearly \$1.2 trillion in taxes last year, and by 2013 that figure will grow to \$1.5 trillion.

Academics have documented how IT drives economic growth. For instance, Dale W. Jorgenson of Harvard University has found that the share of economic growth

attributable to IT rose from 11 percent in the late 1990s to 15 percent in the early 2000s. Jorgenson has also found that IT contributes an outside share of the growth in “value added,” a measure of an industry’s contribution to the economy that refers to the difference between the retail price of its products and the cost of the materials used to create them.

And just as IT helps drive the economy, software drives IT.

Software is more complex to sell, service and support than is hardware, so software generates more downstream economic activity on a dollar-for-dollar basis. IDC’s analysis of the IT services market, for instance, shows that every dollar of packaged software that is sold generates approximately \$1.25 in additional revenue for IT service firms. Revenues from software sales and services also drive revenue into the distribution channel. Because of that force-multiplying effect, the 22 percent of IT spending that goes to software ends up driving 51 percent of IT employment.

It is, of course, no surprise that software has such an impact on the economy. It has become an indispensable tool of production for businesses in all sectors. It is also a critical component in everything from phones to cars. But software’s continued growth hinges on IP protection. Take that away and the incentive for technological innovation diminishes. Bolster IP protection and the reverse will happen: Technological innovation will continue to accelerate, propelling the information economy forward.

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Measuring the Impact of Piracy — and Estimating the Benefits of Curbing It

Globally, IDC estimates that the piracy rate for PC software last year was 43 percent, meaning that more than four out of 10 software applications installed on PCs were unlicensed. The commercial value of all that unlicensed software totaled more than \$51 billion.

In the 42 countries covered in this study, the figure came to \$45 billion — enough to pay for all the computers shipped to China, India and Brazil in 2009, according to IDC calculations.

Widespread software piracy translates to lost opportunities for the businesses and related sectors that depend on the software industry, especially the distribution and services sectors. In fact, IDC calculates that the \$45 billion worth of unlicensed PC software in the 42 countries covered here caused total losses of revenue, employment and taxes from related sectors in excess of \$110 billion.

IDC's analytical model factors in the relationship between spending on software and spending on related IT services and distribution using current, country-level market data and forecasts for the number of high-tech companies and employees; the taxes they pay; and the rate of PC software piracy and its commercial value.

Using this model, IDC estimates that lowering piracy 10 percentage points per country in four years would deliver a number of positive economic benefits, including:

- Nearly 500,000 new high-tech jobs
- More than \$142 billion in new spending
- Roughly \$32 billion in new tax revenues

Moreover, because IT distribution and services are local, country-specific activities, much of the revenue generated through reductions in software piracy would be captured at the local level. Even in a country like China, where less than half of the software sold is created by domestic companies, more than 90 percent of PC software services are delivered by local firms, and an even higher percentage of the distribution channel consists of local firms. Table 1 shows the local share of these economic benefits for all countries.



The Faster the Reduction in Piracy, the Greater the Economic Impact

Reducing software piracy by 10 percentage points in four years is an attainable goal. The software piracy rate in Russia fell 10 points between 2005 and 2007, for example. In China, it fell 10 points between 2003 and 2006, and in Qatar it fell 9 points between 2005 and 2008.

Countries have reduced piracy even more over longer periods of time. Russia, for example, actually reduced its piracy rate by 20 points between 2003 and 2009, and in that same period China and Qatar's rates dropped by 13 points and 12 points, respectively.

Yet the benefits of reducing software piracy are greatest when the reduction is accomplished quickly. That is because front-loading the new spending on legal software creates businesses and jobs that in turn produce steady streams of new revenues and taxes, thereby compounding the initial benefit over time. As table 2 illustrates, lowering the global piracy rate 10 points in four years would produce \$142 billion in new economic activity if the reduction were to happen at a steady rate of 2.5 points a year. But if the whole 10-point reduction were to be accomplished in the first two of those four years, the cumulative economic impact for the period would jump 36 percent to \$193 billion. Call this the rapid-reduction dividend.

Reducing software piracy by 10 points in two years is admittedly an ambitious goal, but not impossible. Russia posted its two-year, 10-point drop by cutting piracy 3 points in 2006 and another 7 points in 2007. Ukraine similarly scored a 6-point drop in 2005, and Iceland dropped 5 points in 2007. But the point is the same whether you compare a two-year reduction to a four-year reduction or a four-year reduction to an eight-year reduction: Front-loading the gain compounds the economic benefits.

And how significant are those benefits? Consider that reducing the piracy rate in the United States by 10 percentage points in two years would add more than \$52 billion to the country's gross domestic product by 2013, an amount close to last year's corporate profits for all US manufacturing of durable goods. It would meanwhile boost US tax revenues by more than \$8 billion, a figure on par with the amount the federal government budgets annually for pollution control and abatement.

Clearly, concerted action to reduce software piracy should be a priority for governments — and sooner rather than later.

HISTORY IS A GUIDE

BSA and IDC first conducted a software piracy impact study in 2003. Since then, six countries have lowered their piracy rates by 10 percentage points or more, most notably Russia and China.

Applying the analytical model behind this year's study to the time frame when those reductions occurred in Russia, IDC would have predicted that approximately 6,000 new jobs would be created in software sales, distribution and services. In fact, Russia added roughly 9,000 such jobs in that period as a direct result of lower software piracy. This was out of nearly 50,000 jobs added to the Russian IT industry as a whole through regular market growth.

In China, the model would have predicted that approximately 200,000 new jobs would be created in software sales, distribution and services. In fact, China added 220,000 such jobs as a direct result of lower PC software piracy (out of 780,000 jobs added to the national IT industry through autonomous market growth).

Those cases point the way forward for policy-makers, industry leaders and citizens looking to spur the global economic recovery: Curbing software piracy is a proven way to create extra stimulus.

Local Benefits

TABLE 1: Distribution of economic gains from reducing PC software piracy by 10 percentage points in four years

	2009 Piracy Rate	Total Impact (\$M)	Local Share (\$M)	Local / Total
North America				
 Canada	29%	\$3,481	\$2,952	85%
 US	20%	\$37,810	\$35,340	93%
Subtotal	21%	\$41,291	\$38,292	93%
Western Europe				
 Belgium	25%	\$879	\$695	79%
 France	40%	\$9,289	\$7,634	82%
 Germany	28%	\$9,080	\$7,126	78%
 Italy	49%	\$5,213	\$4,153	80%
 Netherlands	28%	\$3,260	\$2,659	82%
 Spain	42%	\$2,923	\$2,355	81%
 Sweden	25%	\$1,170	\$892	76%
 UK	27%	\$8,669	\$7,540	87%
Subtotal	34%	\$40,483	\$33,054	82%
Central/Eastern Europe				
 Czech Republic	37%	\$478	\$325	68%
 Greece	58%	\$512	\$348	68%
 Hungary	41%	\$239	\$150	63%
 Poland	54%	\$1,062	\$703	66%
 Russia	67%	\$4,199	\$2,578	61%
 Ukraine	85%	\$586	\$357	61%
Subtotal	63%	\$7,076	\$4,461	63%

	2009 Piracy Rate	Total Impact (\$M)	Local Share (\$M)	Local / Total
Middle East/Africa				
 Egypt	59%	\$254	\$161	64%
 Israel	33%	\$799	\$677	85%
 Jordan	57%	\$52	\$44	83%
 Saudi Arabia	51%	\$786	\$535	68%
 South Africa	35%	\$1,244	\$846	68%
 Turkey	63%	\$783	\$611	78%
 UAE	36%	\$425	\$275	65%
Subtotal	46%	\$4,343	\$3,149	73%
Latin America				
 Argentina	71%	\$949	\$456	48%
 Brazil	56%	\$3,900	\$2,896	74%
 Chile	64%	\$320	\$229	71%
 Colombia	55%	\$452	\$355	78%
 Mexico	60%	\$2,337	\$1,848	79%
 Peru	70%	\$214	\$159	74%
Subtotal	59%	\$8,172	\$5,943	73%
Asia Pacific				
 Australia	25%	\$2,253	\$1,582	70%
 China	79%	\$15,966	\$13,469	84%
 Hong Kong	47%	\$378	\$327	87%
 India	65%	\$4,662	\$3,526	76%
 Indonesia	86%	\$2,433	\$1,343	55%
 Japan	21%	\$8,907	\$6,903	77%
 Malaysia	58%	\$1,017	\$788	77%
 Philippines	69%	\$329	\$223	68%
 Singapore	35%	\$520	\$389	75%
 South Korea	41%	\$1,497	\$1,075	72%
 Taiwan	38%	\$531	\$388	73%
 Thailand	75%	\$1,297	\$599	46%
 Vietnam	85%	\$1,173	\$713	61%
Subtotal	59%	\$40,963	\$31,325	76%
TOTAL	42%	\$142,328	\$116,224	82%

Compounded Returns

TABLE 2: Economic impact of reducing PC software piracy by 10 percentage points

		10-pt Reduction	10 pts in First 2 of 4 yrs (\$M)		10 pts Spread Over 4 yrs (\$M)		Rapid-Reduction Dividend, 2 yrs v 4 yrs		
		2009 Piracy Rate	New Jobs	Added GDP	Extra Taxes	Added GDP	Extra Taxes	Added GDP	Extra Taxes
North America									
	Canada	29%	6,445	\$4,770	\$2,014	\$3,481	\$1,473	37%	37%
	US	20%	25,431	\$52,084	\$8,425	\$37,810	\$6,094	38%	38%
Subtotal		21%	31,876	\$56,854	\$10,439	\$41,291	\$7,567	38%	38%
Western Europe									
	Belgium	25%	1,125	\$1,207	\$391	\$879	\$284	37%	38%
	France	40%	14,599	\$12,697	\$4,721	\$9,289	\$3,442	37%	37%
	Germany	28%	12,136	\$12,471	\$3,352	\$9,080	\$2,427	37%	38%
	Italy	49%	7,538	\$7,130	\$2,450	\$5,213	\$1,785	37%	37%
	Netherlands	28%	3,815	\$4,456	\$1,095	\$3,260	\$799	37%	37%
	Spain	42%	2,244	\$3,994	\$739	\$2,923	\$538	37%	37%
	Sweden	25%	1,962	\$1,603	\$690	\$1,170	\$502	37%	37%
	UK	27%	13,011	\$11,870	\$3,258	\$8,669	\$2,373	37%	37%
Subtotal		34%	56,430	\$55,428	\$16,696	\$40,483	\$12,150	37%	37%
Central/Eastern Europe									
	Czech Republic	37%	1,085	\$650	\$157	\$478	\$116	36%	36%
	Greece	58%	1,313	\$690	\$213	\$512	\$157	35%	36%
	Hungary	41%	885	\$326	\$83	\$239	\$61	36%	36%
	Poland	54%	1,812	\$1,433	\$209	\$1,062	\$155	35%	35%
	Russia	67%	5,708	\$5,456	\$412	\$4,199	\$317	30%	30%
	Ukraine	85%	1,957	\$755	\$116	\$586	\$88	29%	31%
Subtotal		63%	12,760	\$9,310	\$1,190	\$7,076	\$894	32%	33%

		10-pt Reduction	10 pts in First 2 of 4 yrs (\$M)		10 pts Spread Over 4 yrs (\$M)		Rapid-Reduction Divi- dend, 2 yrs v 4 yrs	
2009 Piracy Rate		New Jobs	Added GDP	Extra Taxes	Added GDP	Extra Taxes	Added GDP	Extra Taxes
Middle East/Africa								
 Egypt	59%	1,978	\$338	\$44	\$254	\$33	33%	34%
 Israel	33%	3,207	\$1,079	\$582	\$799	\$430	35%	35%
 Jordan	57%	375	\$71	\$19	\$52	\$14	35%	34%
 Saudi Arabia	51%	1,420	\$1,041	\$25	\$786	\$19	32%	33%
 South Africa	35%	1,650	\$1,670	\$178	\$1,244	\$132	34%	34%
 Turkey	63%	2,180	\$1,041	\$205	\$783	\$154	33%	33%
 UAE	36%	841	\$566	\$23	\$425	\$17	33%	31%
Subtotal	46%	11,651	\$5,806	\$1,076	\$4,343	\$799	34%	34%

Latin America								
 Argentina	71%	4,420	\$1,280	\$271	\$949	\$202	35%	34%
 Brazil	56%	12,333	\$5,223	\$1,189	\$3,900	\$888	34%	34%
 Chile	64%	762	\$434	\$67	\$320	\$50	35%	35%
 Colombia	55%	1,449	\$608	\$100	\$452	\$74	34%	34%
 Mexico	60%	6,189	\$3,124	\$513	\$2,337	\$383	34%	34%
 Peru	70%	3,593	\$284	\$35	\$214	\$26	33%	33%
Subtotal	59%	28,746	\$10,953	\$2,175	\$8,172	\$1,623	34%	34%

Asia Pacific								
 Australia	25%	3,786	\$3,062	\$768	\$2,253	\$564	36%	36%
 China	79%	250,102	\$21,053	\$5,774	\$15,966	\$4,397	32%	31%
 Hong Kong	47%	2,222	\$511	\$213	\$378	\$158	35%	35%
 India	65%	59,728	\$6,132	\$676	\$4,662	\$512	32%	32%
 Indonesia	86%	1,884	\$3,175	\$162	\$2,433	\$124	31%	30%
 Japan	21%	9,576	\$12,286	\$2,518	\$8,907	\$1,829	38%	38%
 Malaysia	58%	3,452	\$1,360	\$306	\$1,017	\$229	34%	34%
 Philippines	69%	1,097	\$436	\$39	\$329	\$30	33%	33%
 Singapore	35%	1,978	\$701	\$173	\$520	\$128	35%	35%
 South Korea	41%	10,229	\$2,028	\$934	\$1,497	\$692	35%	35%
 Taiwan	38%	1,734	\$718	\$103	\$531	\$77	35%	35%
 Thailand	75%	2,175	\$1,711	\$96	\$1,297	\$73	32%	32%
 Vietnam	85%	2,100	\$1,490	\$77	\$1,173	\$60	27%	27%
Subtotal	59%	350,063	\$54,663	\$11,839	\$40,963	\$8,873	33%	33%
TOTAL	42%	491,526	\$193,014	\$43,415	\$142,328	\$31,906	36%	36%

Market Spotlight

TABLE 3: Economic impact of reducing EU PC software piracy by 10 percentage points

	2009 Piracy Rate	10-pt Reduction	10 pts in First 2 of 4 yrs (\$M)		10 pts Spread Over 4 yrs (\$M)		Rapid-Reduction Dividend, 2 yrs v 4 yrs		
		New Jobs	Added GDP	Extra Taxes	Added GDP	Extra Taxes	Added GDP	Extra Taxes	
European Union									
 Belgium	25%	1,125	\$1,207	\$391	\$879	\$284	37%	38%	
 Czech Republic	37%	1,085	\$650	\$157	\$478	\$116	36%	36%	
 France	40%	14,599	\$12,697	\$4,721	\$9,289	\$3,442	37%	37%	
 Germany	28%	12,136	\$12,471	\$3,352	\$9,080	\$2,427	37%	38%	
 Greece	58%	1,313	\$690	\$213	\$512	\$157	35%	36%	
 Hungary	41%	885	\$326	\$83	\$239	\$61	36%	36%	
 Italy	49%	7,538	\$7,130	\$2,450	\$5,213	\$1,785	37%	37%	
 Netherlands	28%	3,815	\$4,456	\$1,095	\$3,260	\$799	37%	37%	
 Poland	54%	1,812	\$1,433	\$209	\$1,062	\$155	35%	35%	
 Spain	42%	2,244	\$3,994	\$739	\$2,923	\$538	37%	37%	
 Sweden	25%	1,962	\$1,603	\$690	\$1,170	\$502	37%	37%	
 United Kingdom	27%	13,011	\$11,870	\$3,258	\$8,669	\$2,373	37%	37%	
Subtotal	35%	61,525	\$58,527	\$17,358	\$42,774	\$12,639	37%	37%	

TABLE 4: Economic impact of reducing BRIC PC software piracy by 10 percentage points

	2009 Piracy Rate	10-pt Reduction	10 pts in First 2 of 4 yrs (\$M)		10 pts Spread Over 4 yrs (\$M)		Rapid-Reduction Dividend, 2 yrs v 4 yrs		
		New Jobs	Added GDP	Extra Taxes	Added GDP	Extra Taxes	Added GDP	Extra Taxes	
BRIC Markets									
 Brazil	56%	12,333	\$5,223	\$1,189	\$3,900	\$888	34%	34%	
 Russia	67%	5,708	\$5,456	\$412	\$4,199	\$317	30%	30%	
 India	65%	59,728	\$6,132	\$676	\$4,662	\$512	32%	32%	
 China	79%	250,102	\$21,053	\$5,774	\$15,966	\$4,397	32%	31%	
Subtotal	71%	327,871	\$37,864	\$8,051	\$28,727	\$6,114	32%	32%	

BSA Blueprint For Reducing Software Piracy

Increase Public Education and Awareness

Reducing software piracy can require a fundamental shift in public attitudes toward software and IP. Public education is critical, therefore, to increase awareness of the importance of managing software assets and respecting creative works through compliance with software licensing. Experience has shown that public-private awareness campaigns about piracy and the value of IP can be extremely effective. In addition, support for industry-led initiatives to promote the business practice of managing and optimizing software purchases, utilization and maintenance — a process known as software asset management (SAM) — can reduce piracy while helping governments, businesses and other organizations derive greater value from software assets. For example, BSA offers a framework called SAM Advantage (www.bsa.org/samadvantage).

Implement the WIPO Copyright Treaty

In 1996, in direct response to the growing threat of Internet piracy, members of the World Intellectual Property Organization (WIPO) concluded new copyright treaties to enable better enforcement against digital and online piracy. Since then, nearly 90 countries have joined the WIPO treaties. Close to 2 billion people around the world now have Internet access — increasing the power and potential of software, but also opening new doors for pirates to distribute their wares. To ensure protection of copyrighted works in the digital age, countries need to update copyright laws to implement their WIPO obligations. Among other things, these measures ensure that protected works are not made available online without the author's permission and that copy protection tools are not hacked or circumvented.

Create Strong and Workable Enforcement Mechanisms as Required by TRIPS

Strong copyright laws are essential — but meaningless without effective enforcement that crosses international borders and extends to all computing platforms. Governments must fulfill their obligations under the World Trade Organization's Trade-Related Aspects

of Intellectual Property Rights Agreement (TRIPS) by adopting and implementing laws that meet international norms for IP rights protection. IP laws should also provide for clear protection against and vigorous enforcement of misappropriation and infringement of new software innovations, such as cloud computing technologies.

Step Up Enforcement with Dedicated Resources

Too often, software thieves are not treated as seriously as other criminals and the punishment is too insignificant to be an effective deterrent. Countries can elevate their enforcement of intellectual property by:

- Creating specialized IP enforcement units at the national and local level and providing dedicated resources to investigate and prosecute IP theft;
- Increasing cross-border cooperation among police and other enforcement agencies to improve coordination for law enforcement in multiple countries; and
- Supporting the training of law enforcement and judiciary officials (including establishment of specialized IP courts where appropriate) and providing better technical assistance to ensure that the people on the front lines of piracy enforcement are equipped with the tools they need to deal with the changing nature of IP theft.

Lead by Example

Because governments are the largest users of software in the world, one of the most effective mechanisms for public persuasion stems from governments actively managing their own software assets and sending a clear message that they will not tolerate piracy. Governments can set an example for the private sector to follow by implementing SAM policies, requiring the use of legal software by all government agencies, and promoting the use of legal software by state-owned enterprises, contractors and suppliers.

Methodology

The method for estimating the country-by-country economic impact of reducing PC software piracy involves five steps:

1. Understanding the local IT economy — IT-related revenues, employment and taxes.
2. Determining the ratios between spending on legal software and spending on related IT services and distribution in each market.
3. Calculating the difference between revenues lost to software publishers, IT services firms and distributors at the current software piracy rate and a piracy rate that is 10 points lower.
4. Analyzing the impact of increased spending on legal software in terms of software-related job creation.
5. Computing the IT-related tax revenues that would be generated by that increased economic activity and job creation.

Understanding Local IT Markets

IDC compiles a wide range of data on country-by-country IT markets, including baseline measures and forecasts for total IT spending, software spending, and service and distribution spending. IDC also creates a picture of IT employment, including the number of high-tech companies and jobs in each country, and the wages and taxes paid by IT employees.

Country-by-country software piracy data is compiled annually for the BSA/IDC Global Software Piracy Study. The model uses PC sales data, software shipments, consumer surveys and other market indicators to determine the total quantity of PC software that was deployed in each market and its commercial value. IDC subtracts the amount known to have been legally acquired from the total, and the remainder is what was pirated. A detailed explanation of that methodology is available at www.bsa.org/globalstudy.

The Relationship Between Software & IT Spending

IDC has concluded that software revenues lost to software piracy would be recouped dollar for dollar if piracy rates were lowered. To arrive at this conclusion,

IDC conducted an analysis of the PC software markets in many countries with different piracy rates and found that countries with lower piracy rates have proportionally larger software markets, consistent with what this model would suggest.

In addition, IDC uses historical data to determine the ratios between spending on software and spending on related IT distribution and services — such as installation, maintenance, customization, training or other activities that add value to software. PC software sold through resellers and stores, online or otherwise, creates revenues that fund employment and investment in distribution.

IDC has determined that, on average, for every dollar paid to software publishers another \$1.30 is spent on related services and \$2.50 is spent on distribution.

Estimating Losses & Projecting Gains

With the piracy rate, the commercial value of pirated software and the relationship between software spending and IT services and distribution, it is possible to calculate the value of IT services and distribution revenue lost to software piracy. As an example, below are the steps for determining the economic impact on software-related services of reducing software piracy to a target rate.

First, IDC determines the percentage and value of services spending that is software-related using data on IT submarkets. With this information and the known rate of software piracy, IDC calculates the total size of the software-related services market, legitimate and pirated. Multiplying the total software-related services market by the current piracy rate provides the software-related services revenues lost to software piracy.

$$\begin{aligned} &\text{Current Piracy Rate} \\ &\quad \times \\ &\text{Total Software-Related Services Market} \\ &\quad = \\ &\text{Software-Related Services Losses} \\ &\quad \text{at Current Rate} \end{aligned}$$

By adjusting the piracy rate, IDC can determine changes in software-related services losses at a lower piracy rate.

$$\begin{aligned} &\text{Target Piracy Rate} \\ &\quad \times \\ &\text{Total Software-Related Services Market} \\ &= \\ &\text{Software-Related Services Losses} \\ &\quad \text{at Target Rate} \end{aligned}$$

Subtracting the losses at the lower piracy rate from the losses at the current piracy rate provides the potential software-related services spending benefit at the lower piracy rate.

$$\begin{aligned} &\text{Losses at Current Rate} \\ &\quad - \\ &\text{Losses at Target Rate} \\ &= \\ &\text{Potential New Spending on} \\ &\quad \text{Software-Related Services} \end{aligned}$$

However, services firms may make money working with pirated software—and the higher a country's piracy rate, the greater the likelihood that they do. To compensate for this effect, IDC assumes lower commercial losses for distributors and service providers in higher-piracy countries than in lower-piracy countries. This sliding scale is called the "piracy effect," and it reflects the percentage of the losses expected to be recouped through activity tied to new software sales.

$$\begin{aligned} &\text{Potential New Spending on Services} \\ &\quad \times \\ &\quad \text{Piracy Effect} \\ &= \\ &\text{Net Benefit of Lowering Piracy on} \\ &\quad \text{Software-Related Services} \end{aligned}$$

Determining New Jobs

To determine the net new jobs created by lowering piracy, IDC multiplies the net benefits in each category of spending (software, services and distribution) by the ratio of spending on software and software-related services and distribution per employee.

$$\begin{aligned} &\text{Net Spending Benefit at Lowered Piracy Rate} \\ &\quad \times \\ &\quad \text{Ratio of Spending Per Employee} \\ &= \\ &\text{Net New IT Jobs From Lowering Piracy} \end{aligned}$$

Computing Tax Revenues

New spending on software creates new streams of IT tax revenue, including VAT or sales-tax revenues from the sale of hardware, software and services, as well as business and personal income, social and consumption taxes.

VAT and business income taxes are determined by multiplying net tax rates by the new IT spending and business income.

IDC calculates social and personal income taxes by taking total income and social taxes within a country and determining the portion attributable to IT activities based on the percentage of total wages paid to IT employees compared to total wages paid to the entire country's workforce. This ratio begins with the ratio of IT employment to total employment and is adjusted for the wage differential between IT jobs and all jobs.

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