



The Billion Euro Lost Laptop Problem

Benchmark study of European organizations

Sponsored by Intel

Independently conducted by Ponemon Institute^{LLC}

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Ponemon Institute, April 2011

Part 1. Executive Summary

Intel and Ponemon Institute are pleased to present the results of *The Billion Euro Lost Laptop Problem*, which is an independent benchmark study of 275 private and public sector organizations located in eight countries, including the United Kingdom, Germany, France, Netherlands, Belgium, Italy, Sweden and Spain. The purpose of the study is to determine the economic consequences to European organizations when laptops used by employees and contractors are lost or stolen.¹

The Cost of a Lost Laptop study conducted by Ponemon Institute in 2009 and sponsored by Intel was the first benchmark study to estimate full costs associated with a lost or stolen laptop. The benchmark analysis focuses on representative samples of organizations in the US that had experienced laptop loss or theft within the last 12 months. The analysis was based on 138 separate incidents involving laptops lost by employees, temporary employees and contractors.

To calculate the total economic impact we referred to *The Cost of a Lost*

Laptop benchmark study released in 2009 and also sponsored by Intel. In that study we were able to determine that the average value of one lost laptop is 35,284 Euros.²

According to the findings, the number of lost or stolen laptops among business organizations is very significant. Participating organizations reported that in a 12-month period 72,789 laptops were lost or missing. On average, 265 laptops per organization were lost or missing. Other salient findings include:

- The total economic impact for 275 participating companies is €1.29 billion or on average €4.7 million per organization.
- Out of the 265 laptops per organization lost or missing, on average only 12 laptops were recovered.
- Forty-two percent of laptops were lost off-site (working from a home office or hotel room), 32 percent say they are lost in transit or travel and 13 percent are lost in the workplace. Thirteen percent say they don't know where employees or contractors lose their laptops.
- Thirty-four percent of laptops lost had disc encryption, 26 percent had backup (imaging feature) and seven percent had other anti-theft features.
- Industries that experience the highest rate of laptop loss are education and research, health and pharmaceuticals followed by the public sector. Consumer products had the lowest loss rate.
- Laptops with the most sensitive and confidential data are the most likely to be stolen. However, these laptops also are more likely to have disc encryption.
- Average loss ratio over the laptop's useful life is 7.66 percent. That means more than nearly eight percent of all assigned laptops in benchmarked companies will be lost or stolen sometime during the useful life of the device.

¹ The present study is a direct extension of earlier work entitled, *The Billion Dollar Lost Laptop Problem*, which involved the benchmark analysis of 275 US organizations published in December 2010.

² See *The Cost of a Lost Laptop*, Ponemon Institute, February 9, 2009. The cost in this study is expressed in US dollars. We use conversation rates from the Wall Street Journal on March 15, 2011 to express all currency values in Euros.

- The rate of laptop loss varies by country. Specifically, companies in France and Italy experience the highest average a useful life loss ratios at 9.6 and 9.1 percent, respectively. Companies in Sweden and Germany have the lowest average useful life loss ratio at 6.1 and 6.2 percent, respectively.

It is important to point out that the smallest cost component is the replacement cost of the laptop. There are seven cost components used to arrive at the average value. These are: replacement costs, detection, forensics, data breach, lost intellectual property costs, lost productivity and legal, consulting and regulatory expenses. In the cases we studied in 2009, the occurrence of a data breach represents 80 percent of the cost of a lost laptop.

Applying the €35,284 value to the 72,789 laptops reported lost by the 275 organizations in this study, the total cost is a staggering €1.29 billion or an average of €4.7 million per organization.

Using benchmarking methods, we examined organizations that ranged in size from less than 1,000 to greater than 75,000 employees and represented more than 12 industry sectors. The three largest sectors participating in the study include public sector, financial services, and industrial.

Our benchmarks focused on the actual number of laptop computers lost or stolen over the past 12 months. We recruited a proprietary panel of organizations that shared confidential information. By design our instrument uses a fixed format template to ensure response objectivity and high accuracy. According to the organizations participating in this study, the total number of laptop computers assigned to employees and contractors on an annual basis is approximately 3.06 million. The average number of laptops for each organization is 11,146. Please note that our sample is skewed to larger-sized companies. Albeit a voluntary (judgmental) sample, we believe our results are representative of many organizations in eight countries.

Following are the key variables collected by the researcher for all participating companies.

- Number of laptops to employees, temporary employees and contractors
- Number of laptops recorded as missing over the past year
- Number of laptops known to be stolen over the past year
- Number of laptops likely to be stolen over the past year
- Number of laptops missing (not believed to be stolen)
- Number of laptops recovered over the past year

In addition to frequency information on laptop loss, theft and recovery, we examined other normatively important variables, such as:

- Average useful life of assigned laptops
- Source of the laptop loss (in-transit, remote use, workplace theft and so forth)
- Percentage of laptops with disc encryption
- Percentage of laptops with anti-theft device or software
- Percentage of laptops with backup (imagining) device or software
- Percentage of laptops containing sensitive or confidential information

The two primary dependent variables calculated for each company and used in our analysis involves ratio measures, defined as follows:³

³ Our unit of analysis is the organizational unit or entity. Many of these are subsidiaries of larger parent entities. The sample of 275 participating organizations are part of 114 are companies.

- One-year loss ratio = $\sum^{n=275} \{\text{Total missing laptops}\} / \{\text{Total assigned laptops}\}$
- Useful life loss ratio = $\sum^{n=275} \{\text{One year loss ratio}\} \times \{\text{Average useful life of the lost laptop}\}$

In addition to these loss ratios per company, we utilized the percentage theft rate as a covariate measure. This is defined as follows:

- Percentage theft rate = $\sum^{n=275} \{\text{Total laptops known to be stolen}\} / \{\text{Total missing laptops}\}$

Finally, for tabled (chi-squared) analysis, the percentage theft rate is transformed into a theft index from ranging from 1 (low) to 4 (high) based on the quartile position of each company.

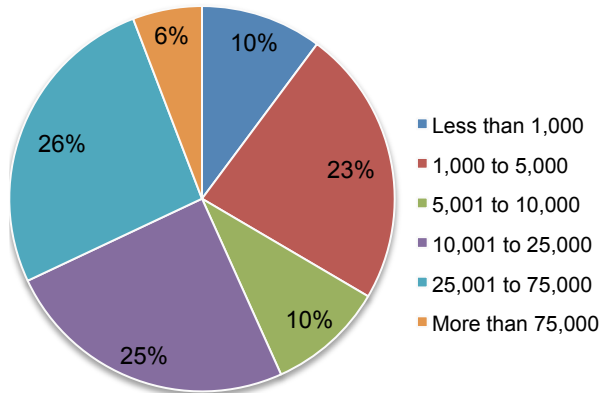
The following table summarizes several of our key statistics from this research:

Table 1: Key statistics from our sample	Sample average	Sample total
Sample of benchmarked companies		275
Number of assigned laptops	11,146	3,065,213
Recorded as missing over past year	265	72,789
Known theft	66	18,097
Likely theft	37	10,226
Missing	162	44,466
Recovered	12	3,233
Average useful life of laptops	3.3	
One-year loss ratio	2.30%	
Useful life loss ratio	7.66%	

Part 2. Key Findings: Understanding the billion euro problem

The following are the key findings from the benchmark interviews and illustrate the actual case histories of the 275 private and public sector organizations in the study. Pie Chart 1 summarizes the sample of participating organizations by organizational size (full-time equivalent headcount). Pie Chart 2 provides the percentage frequency distribution of participating organizations in eight European nations.

Pie Chart 1: Distribution of participating companies by global headcount



Pie Chart 2: Distribution of participating companies by country

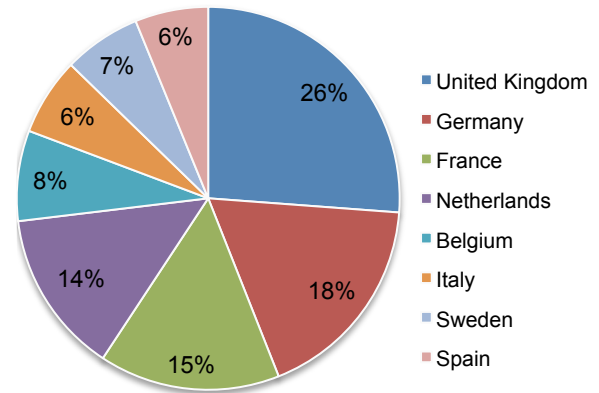


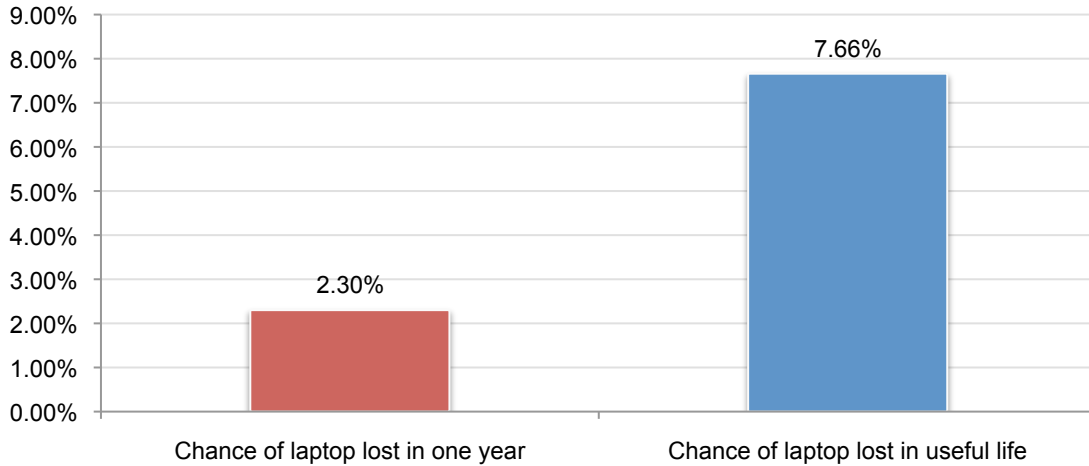
Table 1 reports the distribution of 275 benchmarked organizations by the primary industry classification. This table also reports the distribution of 114 unique organizations that participated in the study. As can be seen, public sector (14 percent), financial (13 percent) and industry (12 percent) represent the largest sectors for this study.

Table 1 Distribution of benchmark sample by primary Industry classification	Benchmark Cases	Pct%	Unique Companies	Pct%
Public sector	38	14%	11	10%
Financial services	37	13%	13	11%
Industrial	33	12%	9	8%
Education & research	24	9%	9	8%
Retail	23	8%	14	12%
Services	23	8%	15	13%
Health & pharmaceuticals	22	8%	12	11%
Technology & software	22	8%	10	9%
Consumer products	22	8%	8	7%
Communications	18	7%	6	5%
Transportation	10	4%	4	4%
Other	3	1%	3	3%
Total	275	100%	114	100%

Bar Chart 1 reports the average one-year and useful life loss ratios for benchmarked companies. As shown, 2.30 percent of all laptops assigned to employees, temporary employees or contractors are missing each year. The average loss ratio over the laptop's useful life is 7.66 percent. Hence, more than seven percent of all assigned laptops in benchmarked companies will be lost or stolen sometime during their useful life.

Bar Chart 1: Average one-year and useful life loss ratios

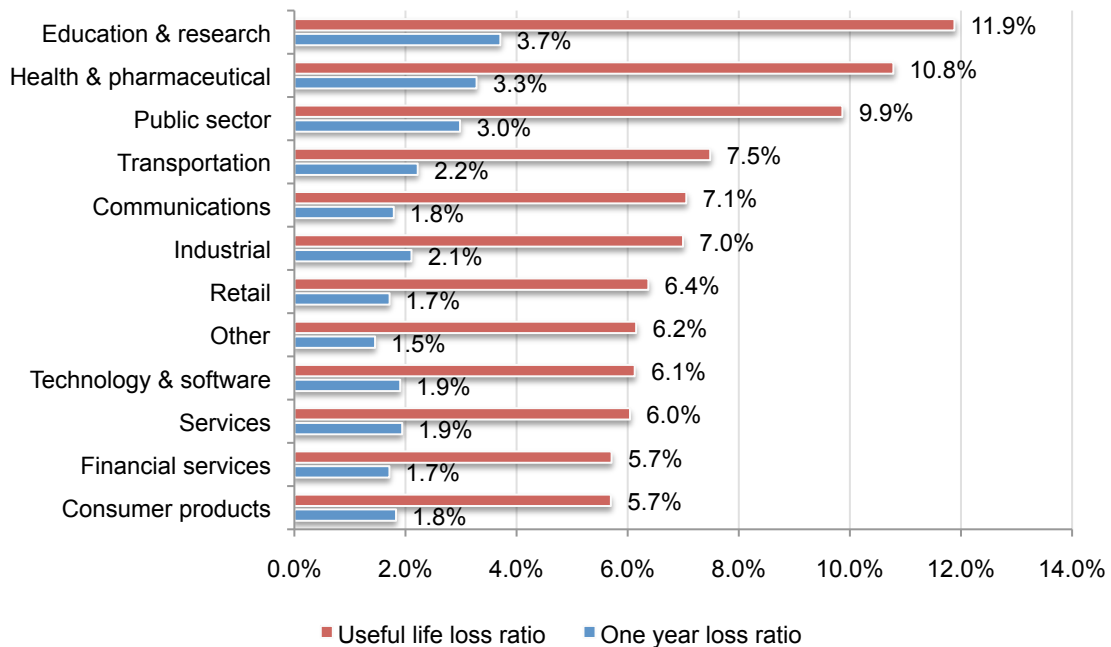
Compiled from 275 European organizations



Do lost laptops vary by industry? Results show the rate of laptop loss is related to industry classification. Bar Chart 2 shows marked differences among various industry sectors. Clearly, educational institutions have the highest loss ratios, while consumer products and financial service companies have the lowest loss ratios.

Bar Chart 2: Lost laptops by industry

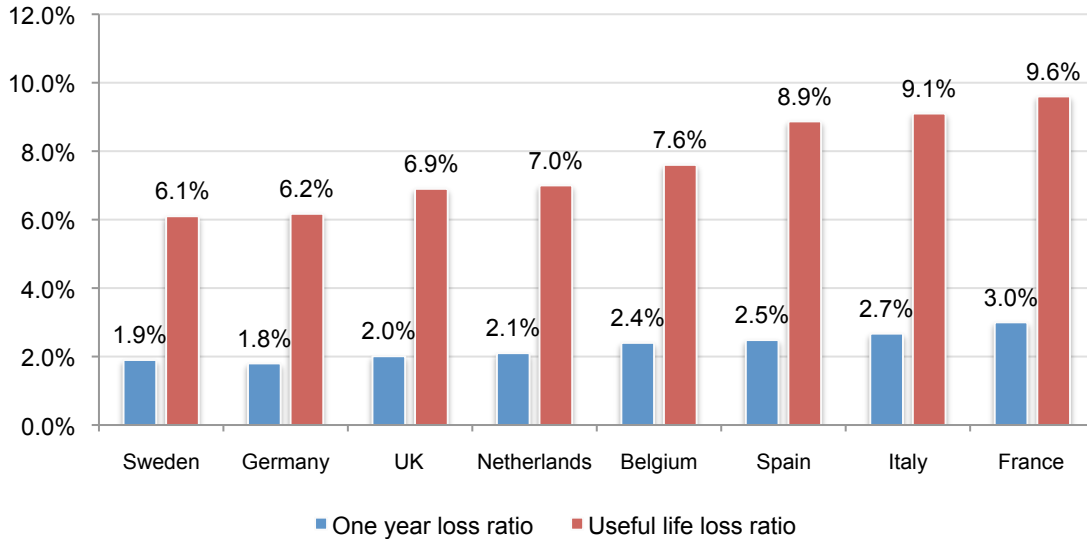
Compiled from 275 European organizations



Do lost laptops vary by country? Results clearly show variation in the loss ratios among the eight countries included in this benchmark analysis. Companies in France and Italy experience the highest ratios, while Sweden and Germany experience the lowest loss ratios.

Bar Chart 3: Lost laptops by country

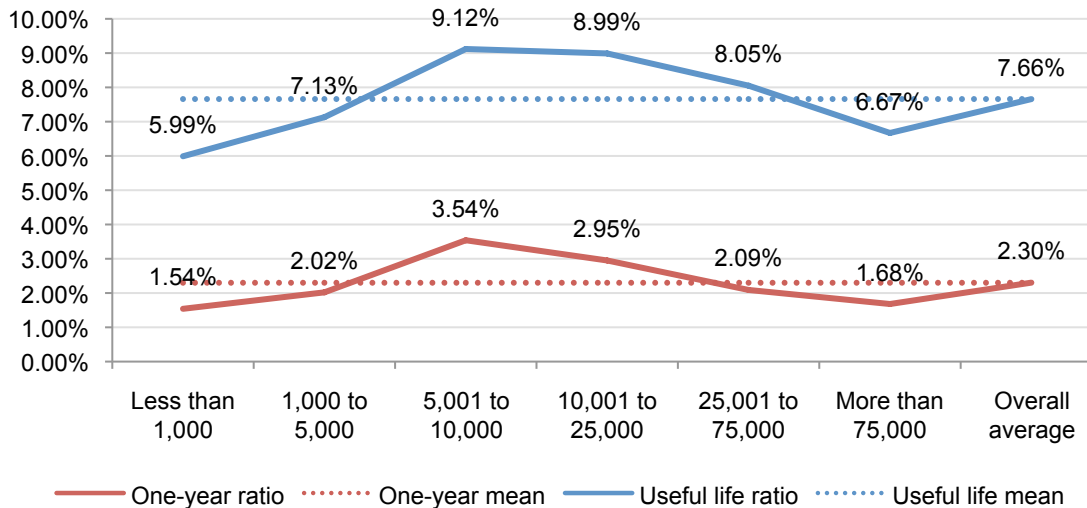
Compiled from 275 European organizations



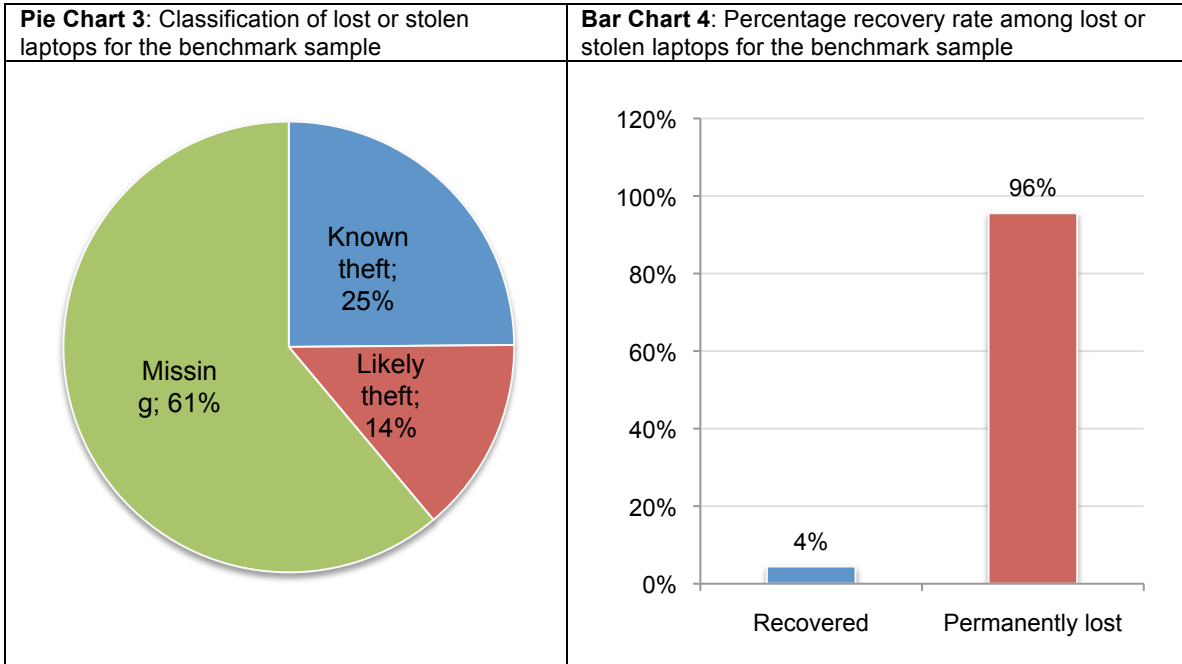
Do lost laptops vary by organizational size? Results show the rate of laptop loss is related to the size (headcount) of participating companies. Line Chart 1 shows organizations with less than 1,000 employees experience the lowest rate of laptop loss. Organizations with 5,001 to 10,000 employees appear to have the highest rate of laptop loss.

Line Chart 1: One-year and useful life loss ratios by organizational size (headcount).

Compiled from 275 European organizations

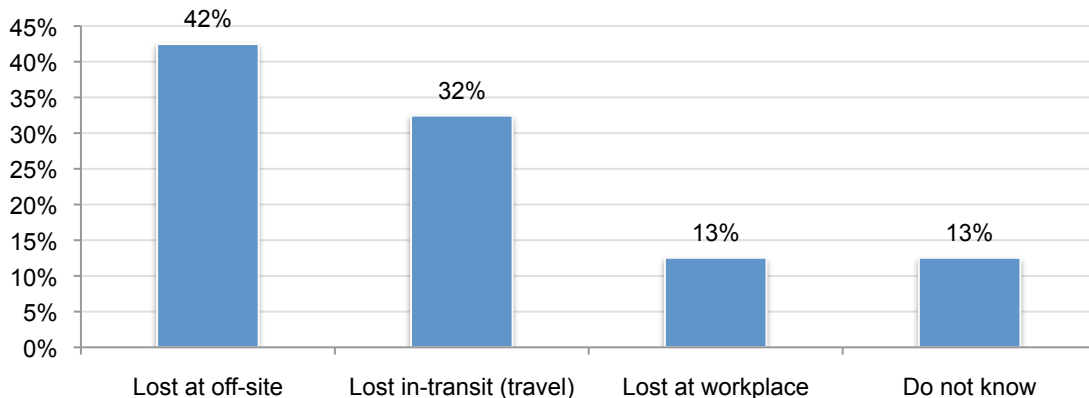


Pie Chart 3 reports the percentage classification of lost or stolen laptop computers over the past 12 months.⁴ For the overall sample, the number of laptops classified as stolen was 18,097, which represents 25 percent of all missing laptops. Another 10,226 laptops, which represent 14 percent, are likely to have been stolen. Finally, 44,466 laptops are classified as missing in action and this represents 61 percent of all missing laptops. The number of recovered laptops is 3,233, which represents only four percent of all missing laptops over the past 12 months (see Bar Chart 4).



Where are laptops lost? Forty-two percent say they are lost off-site (for example, working from a home office or hotel room), 32 percent say laptops are lost in transit or travel 13 percent say laptops are lost in the workplace. Another 13 percent say they could not determine where the loss actually occurred.

Bar Chart 4: Where laptops are lost
Compiled from 275 European organizations



⁴ Working in collaboration with the organization's security or IT personnel, the researchers evaluated the proper classification of known theft. While this determination is based on objective factors such as police reports there is a possibility that the true theft rate is lower because of over-reporting by employees.

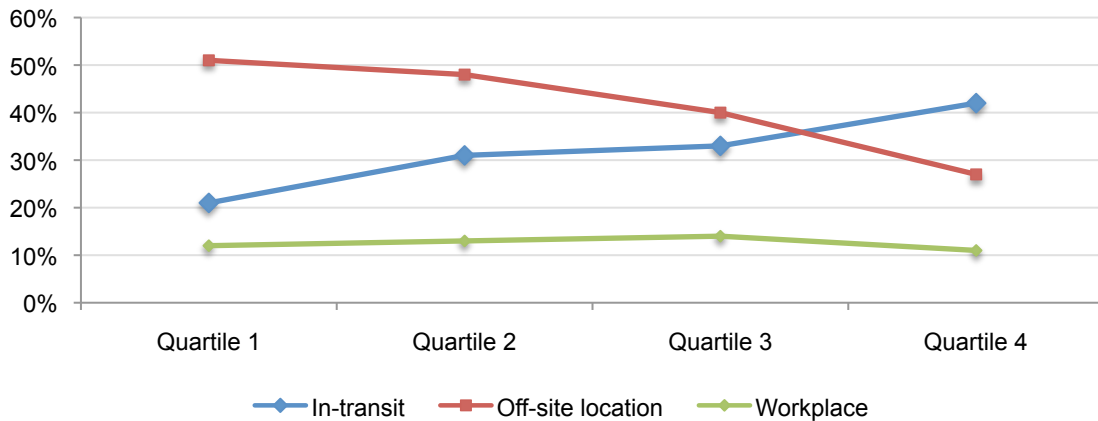
What is the greatest cause of laptop theft? As mentioned above, the theft rate was converted into an index and placed into one of four quartiles where 1 = lowest theft rate to 4 = highest theft rate. Table 2 records the percentage of laptop theft cases according to one of three venues. Line Chart 2 provides a graph of these percentages according to the theft index (quartile).

As can be seen, traveling laptops seem to be most vulnerable to theft. Organizations that report the largest number of stolen laptops have the highest percentage of laptops in transit. Conversely, the lowest theft rates appear to occur in the workplace. The pattern shown in the chart suggests theft rates are correlated with high rates of in-transit employees, and inversely correlated with high rates of employees working from off-site locations such as a home office.

Table 2: Theft index	Quartile 1	Quartile 2	Quartile 3	Quartile 4
In-transit	21%	31%	33%	42%
Off-site location	51%	48%	40%	27%
Workplace	12%	13%	14%	11%

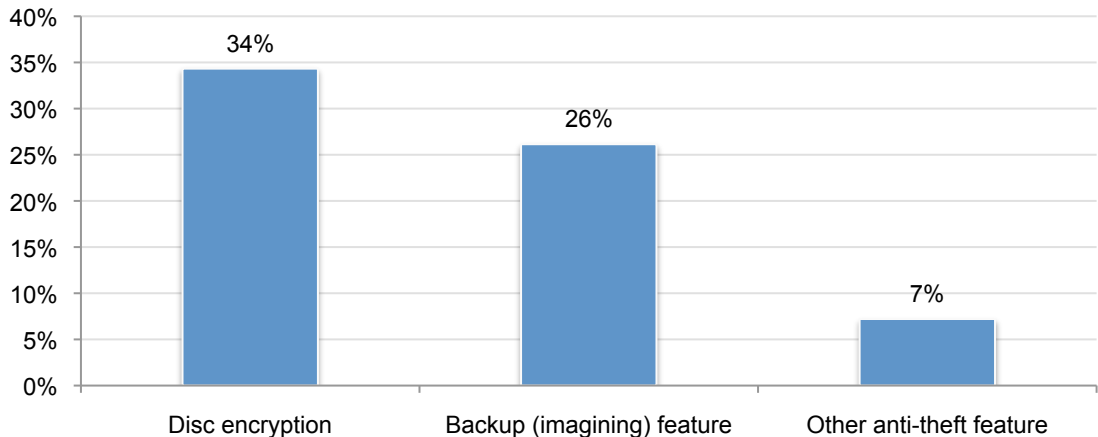
Line Chart 2: Three venues of laptop theft

Companies grouped by theft rate (Quartile 1 = low to Quartile 4 = high)



What protections or safeguards do these lost laptops have? Bar Chart 5 shows 34 percent of laptops lost had disc encryption, 7 percent say they had some other anti-theft feature, and 26 percent say the laptops lost had backup imaging feature.

Bar Chart 5: Safeguards in place to protect laptop computers



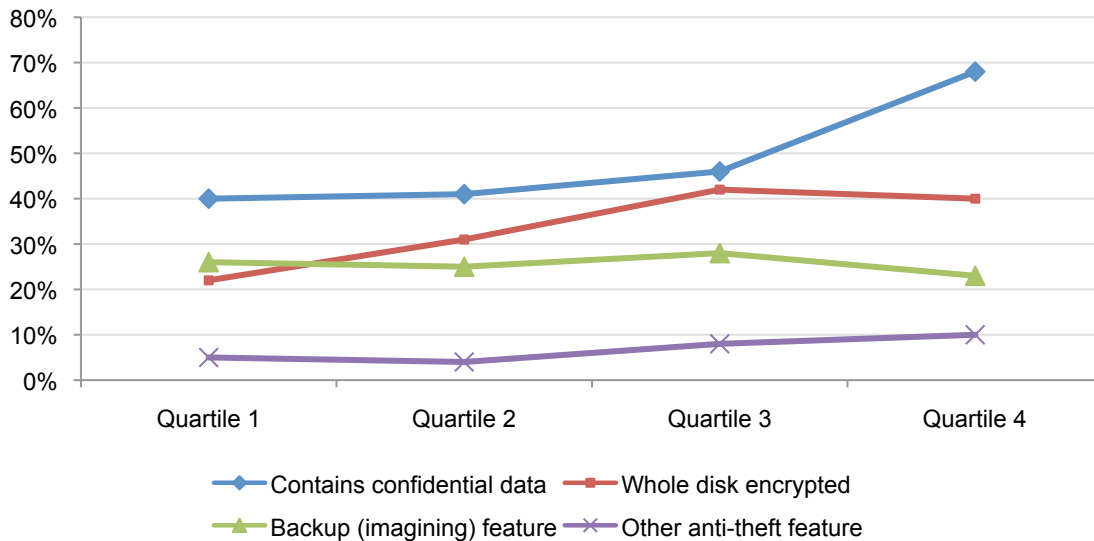
What laptops are most likely to have disc encryption? Laptops with the most sensitive and confidential data are the most likely to be stolen. These laptops also are more likely to have disc encryption.

Using the theft index as mentioned above, we calculated the percentage of laptop safeguards into one of four quartiles where 1 = lowest theft rate to 4 = highest theft rate. Table 4 records the percentage of laptop theft cases according to safeguards and confidential data at risk. Line Chart 3 provides a graph of these percentages according to the theft index (quartile).

Table 4: Theft index	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Contains confidential data	40%	41%	46%	68%
Whole disk encrypted	22%	31%	42%	40%
Backup (imagining) feature	26%	25%	28%	23%
Other anti-theft feature	5%	4%	8%	10%

Line Chart 3: Confidential data at risk and security safeguards in-place

Companies grouped by theft rate (Quartile 1 = low to Quartile 4 = high)



As can be seen, both confidential data at risk and the rate of disc encryption is correlated with theft rate. Thus, our results suggest companies experiencing a higher theft rate are more likely to use disc encryption as a safeguard. In addition, companies choosing disc encryption are likely to have employees who routinely carry sensitive or confidential data on their laptop computers.

Part 3: Calculus for economic impact

Table 5 provides the variables used to extrapolate the total economic impact of the lost or stolen laptop computers benchmarked in this study of 275 organizations. The average costs used to determine the economic impact is derived from our earlier research. The analysis divides the sample of missing laptops into three trenches: total encrypted laptops, total non-encrypted laptops and the total of laptops not carrying confidential data.

As shown below, the total economic value or cost to the 275 benchmarked organizations is approximately €1.29 billion. The average economic value or cost for each benchmarked organization is nearly €4.7 million.

Table 5: Calculation of economic impact	Amount
Total number of lost laptops	72,789
Total lost laptops not encrypted	47,800
Not encrypted carrying confidential data	22,856
Average cost of lost laptops not encrypted*	€40,233
Economic value for benchmark sample	€919,567,567
Total encrypted lost laptops	24,989
Encrypted carrying confidential data	11,949
Average cost of encrypted lost laptops*	€26,822
Economic value for benchmark sample	€320,483,884
Total laptops not carrying confidential data	37,984
Average cost of laptops without confidential data*	€2,934
Economic value for benchmark sample	€111,446,235
Total economic value for benchmark sample	€1,351,497,686
Average cost per lost laptop	€18,567
Minus value of recovered laptops	€60,956,558
Adjusted total value for benchmark sample	€1,290,541,128
Average value per benchmarked organization	€4,692,877

*Value obtained from previous research on the average cost of a lost or stolen laptop computer (see footnotes 1 and 2).

Part 4: Caveats

Our study utilizes a confidential and proprietary benchmark method that has been successfully deployed in earlier research. However, there are inherent limitations to benchmark research that need to be carefully considered before drawing conclusions from findings.

- **Non-statistical results:** The purpose of this study is descriptive rather than normative inference. The current study draws upon a representative, non-statistical sample of organizations – all Europe-based entities experiencing laptop losses over the past 12 months. Statistical inferences, margins of error and confidence intervals cannot be applied to these data given the nature of our sampling plan.
- **Non-response:** The current findings are based on a small representative sample of completed case studies. An initial mailing of benchmark surveys was sent to a reference group of organizations, all believed to have experienced laptop losses over the past 12 months. A total of 275 companies provided usable benchmark surveys. Non-response bias was not tested so it is always possible companies that did not participate are substantially different in terms of the methods used to manage the loss containment and recovery process, as well as the underlying costs involved.
- **Sampling-frame bias:** Because our sampling frame is judgmental, the quality of results is influenced by the degree to which the frame is representative of the population of companies being studied. It is our belief that the current sampling frame is biased toward larger-sized companies with more mature information security programs.
- **Company-specific information:** The benchmark information is sensitive and confidential. Thus, the current instrument does not capture company-identifying information. It also allows individuals to use categorical response variables to disclose demographic information about the company and industry category. Industry classification relies on self-reported results.
- **Unmeasured factors:** To keep the survey concise and focused, we decided to omit other important variables from our analyses such as leading trends and organizational characteristics. The extent to which omitted variables might explain benchmark results cannot be estimated at this time.
- **Estimated cost results.** The quality of survey research is based on the integrity of confidential responses received from companies. While certain checks and balances can be incorporated into the survey process, there is always the possibility that respondents did not provide truthful responses. In addition, the use of a cost estimation technique (termed shadow costing methods) rather than actual cost data could create significant bias in presented results.

Part 5. Implications for organizations

We believe this study is important because it reveals the significant cost to organizations as a result of lost or missing laptops. Based on previous Ponemon Institute research completed in May 2009, the total economic impact of one lost laptop is \$49,256 (or €35,284). If we apply the figures from this earlier research to the present sample, this would be a combined cost of €1.29 billion for the 275 organizations participating in our study. This yields €4.8 million per organization, on average.

In addition to convincing employees and contractors of the importance of keeping a careful watch over their laptops, it is also important to protect the sensitive data contained on the computer. Not surprisingly, lost or stolen laptops are costly to organizations. But it is not the replacement cost that should have companies concerned. Rather it is the data and the risk of a data breach that can have serious financial implications for companies. The cost of a data breach, as we determined in the 2009 study, represents 80 percent of the total cost of a lost laptop compared to two percent for replacing the computer. We also found that encryption on average can reduce the cost of a lost laptop by nearly half.

We also recommend training and awareness programs for all employees who have laptops. Only 13 percent are lost in the workplace. Thus, special attention should be paid to instructing employees who take their laptops off-site such as when traveling or working from home.

Another important recommendation is to have policies that require employees to report a lost or stolen laptop as soon as possible. In addition, anti-theft and data protection solutions are available to secure laptops and the sensitive and confidential information they contain. Based on the costly consequences of lost laptops, the business case can be made for allocating the necessary resources to stop the loss and protect the data.

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