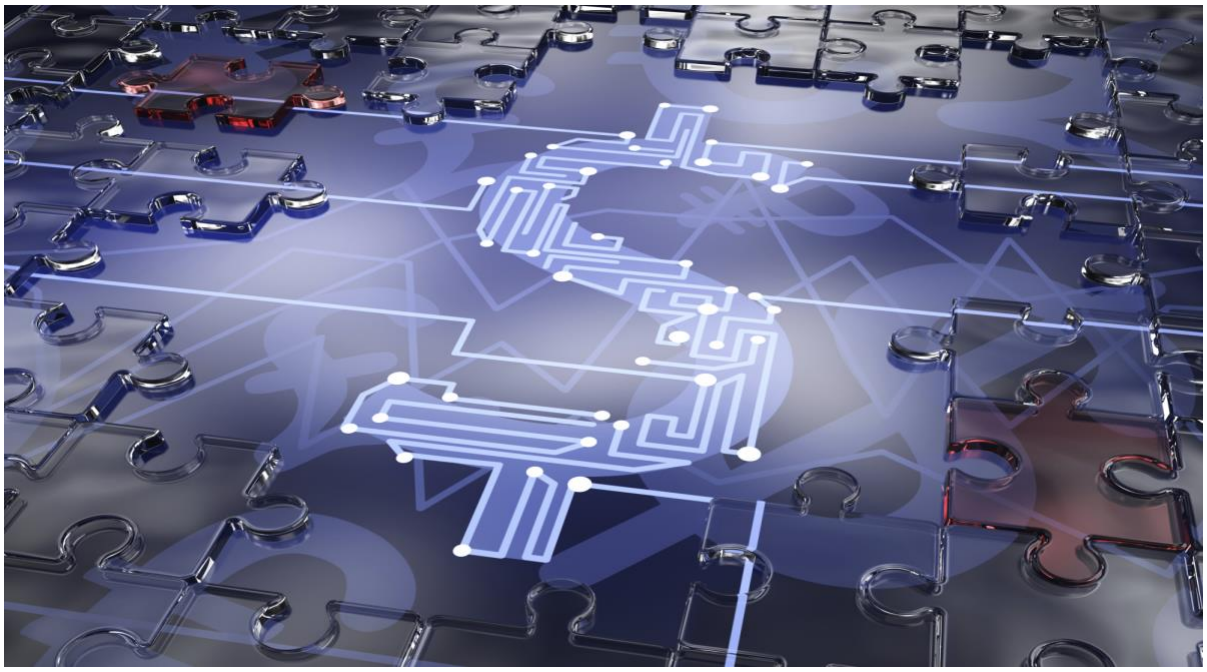

Understanding the Value of Information Assets

Sponsored by DocAuthority.

Independently conducted by Ponemon Institute LLC

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Understanding the Value of Information Assets
Ponemon Institute, November 2018

Part 1. Introduction

The purpose of this research, sponsored by DocAuthority and based on Gartner's Infonomics Data Valuation Model, is to determine whether organizations are capable of estimating the true value of their information assets that are critical to the successful execution of their business objectives. Such valuation enables the prioritization of information assets that if lost or stolen would cause significant harm to an organization. In this report, we surveyed 2,820 professionals in the United States and United Kingdom in the following seven functional areas. As part of their job responsibility, all respondents are involved in managing high-value information assets in their respective functions.

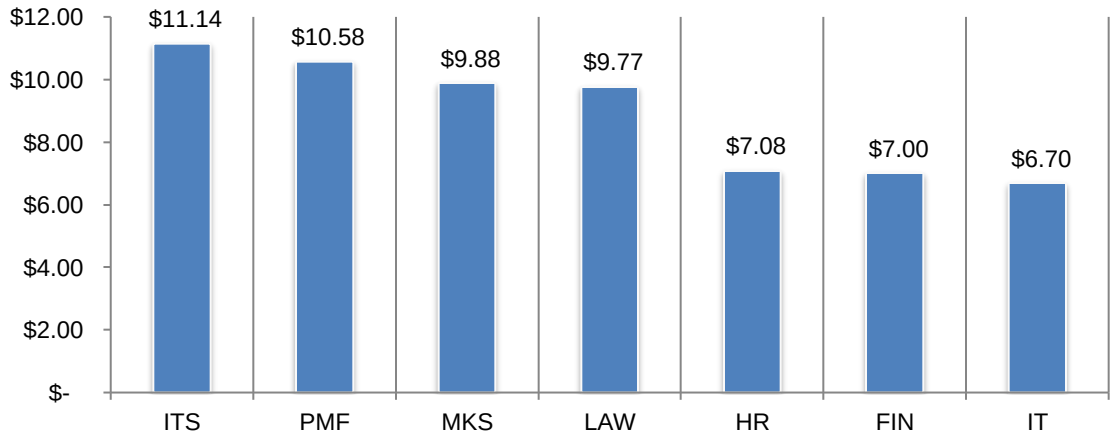
- IT security (ITS) - 530 respondents
- Product and manufacturing (PMP) - 263 respondents
- Legal (Law) - 336 respondents
- Marketing and sales (MKS) - 456 respondents
- IT (IT) - 459 respondents
- Finance and accounting (FIN) - 351 respondents
- Human resources (HR) - 425 respondents

In this study, we defined high-value information assets as information types that are proprietary and confidential to the organization. Further, if such information is leaked or deleted it would be costly to recreate and would have such negative consequences as loss of market share, reputational damage, loss of customers and business partners and diminishment of competitive advantage.

Respondents were asked to value 36 different information types on a per record basis that are unique to their functional areas. Such information types represented include research and design (R&D) documents, computer source code, merger and acquisition (M&A) documents and customer contracts.

Figure 1 presents the average cost of a data breach for each functional area based on respondents' valuation of information types. Specifically, the costliest data breach would occur in IT security at an average of $11.4 million per breach, and the least costly would be in IT at $6.7 million.

Figure 1. Cost of a data breach by functional area
Extrapolated values presented ($ millions)



Today, organizations struggle with assigning a dollar value to their information assets. This research provided the following guidance to assist respondents in determining the value of their organizations' information assets.

- The overall value of information types based on their importance to the organization
- The cost to the organization in the event that high-value information is lost and must be recreated
- The cost of dealing with negative consequences if high-value information was leaked to employees, competitors, cyber criminals and/or the public at large
- The effect that time has on the value of information assets
- The intrinsic value of information assets, which pertains to how correct, complete and exclusive the data are
- The business value of information assets, which is how good and relevant the data are for specific purposes
- The performance value of information assets, which is how the data affects key business drivers
- The market value of information assets if they are sold or traded
- The economic value of the information assets to the organization's bottom line

Following are key takeaways from the research:

Not all information asset types are equal. In this study, respondents were asked to rank the value of different asset types. The ranking is dependent upon the business, performance, market and economic value to the organization.

According to the findings, the most valuable information assets are R&D documents, M&A documents, pricing models, codes & scripts, financial reports and signed employment agreements. In contrast, the information assets that are not as valuable are product manufacturing and engineering workflows, signed customer contracts, marketing campaign information, system and network design documents, accounting and budgeting data and nonspecific human resource information such as open positions and policies.

The fresher the information, the higher the value. The research demonstrates that the value of information assets decreases over time. In part, this is due to the decline in relevancy and value to the bottom line. For example, in the manufacturing function, R&D documents that are less than one year old are valued at $873,386. However, if these documents are more than a year old, the value declines to $492,717. In the legal function, M&A documents less than a year old are valued at $508,641 per record. More than one year, the value declines to $120,911.

The cost to recreate different information assets varies significantly. According to the research, the uniqueness and complexity of certain information assets make reconstructing the information costly. For example, pricing models and customer lists in the marketing function are the costliest information assets to reconstruct. In human resources, pension data are the most expensive to recreate.

The cost to deal with the negative consequences of data leakage varies significantly. In each function, certain information assets have the potential to cause serious reputational and financial damage to the organization. For example, respondents in manufacturing say the leakage of R&D documents would be costlier than the leakage of product manufacturing and engineering workflows ($661,484 vs. $106,519). In the legal function, the leakage of M&A is costlier than the leakage of signed customer contracts ($347,920 vs. $11,979).

How information affects key business drivers has the most influence on its value. In 6 of the 7 functional areas, respondents agree that the performance value of information assets is the most important element when assigning a dollar value to the data. The least important element is market value that pertains to what the organization can earn when selling or trading this information. In finance and accounting, the economic value of the information has the most influence, and market value is the least influential.

The ability to value information assets has practical implications for organizations. The ability of organizations to succeed in a competitive and global economy depends upon the quality, accuracy and relevancy of their information assets. The findings of this research have several practical implications for organizations. These include making it possible to prioritize the information assets that would have the most negative financial consequences if lost, stolen or leaked. Further, the process of categorizing and assessing a value provides insights into what data are most critical to their operations and should receive the highest level of security.

The research also provides the following five insights into the valuation of information assets.

1. An automatic data discovery tool has a significant impact the value of an organization's information assets. Specifically, the value of companies' information assets were 15 percent higher than other companies if they used an automatic discovery tool. This means that organizations that use an automatic discovery tool increase business effectiveness (7.88/6.69) and sales and marketing (7.13/6.07) by 15 percent.

2. Respondents in the Legal function are the most confident that they are fully prepared for a data breach (41 percent). However, the IT function is the least confident (25 percent of respondents). This discrepancy exists because the Legal function in many cases is responsible for compliance while IT implements the security controls. This might lead to false confidence, and organizations might under invest in data security, raising the likelihood of a breach.

3. IT Security values R&D documents less than 50 percent of how business values the data for reconstruction, $306,545 versus $704,619. This can lead to insufficient investment in protection and backup investments, which could lead to the loss of business data.

4. IT Security significantly underestimates the cost of financial report leakage, $131,570 versus $303,182 what the Accounting and Finance function values this information asset. This may result in not investing enough to protecting financial reports from leakage, potentially leading to a very expensive breach.

5. IT security overly values monthly salary lists of 1,000 employees at $94,148 whereas HR only values these lists at $57,477. Because IT security is overly focused on PII-related data, this may reduce the investment in protecting far more expensive data types such as product designs, pricing or financial data. This can lead to far more expensive data breaches.

Part 2. Key findings

In this section of the report we provide a detailed analysis of the research. The complete audited findings are presented in the Appendix of this report. For each of the seven functional areas we cover the following topics:

- Determining the value of information assets
- The time value of information
- The impact of data reconstruction and data leakage on value
- The value of information asset elements
- Other IT security information asset findings

1. Functional area: IT security

Determining the value of IT security information assets

The value of seven information types associated with the IT security function. IT security respondents were asked to estimate the total value of seven information types on a per record or file basis on a scale of 1 = highest value to 7 = highest value. As shown in Figure 2, R&D documents are the most valuable information asset entrusted to IT security. Still valuable, but less so, are signed employment agreements.

Figure 2. Ranking the value of information assets
1 = highest value to 7 = lowest value

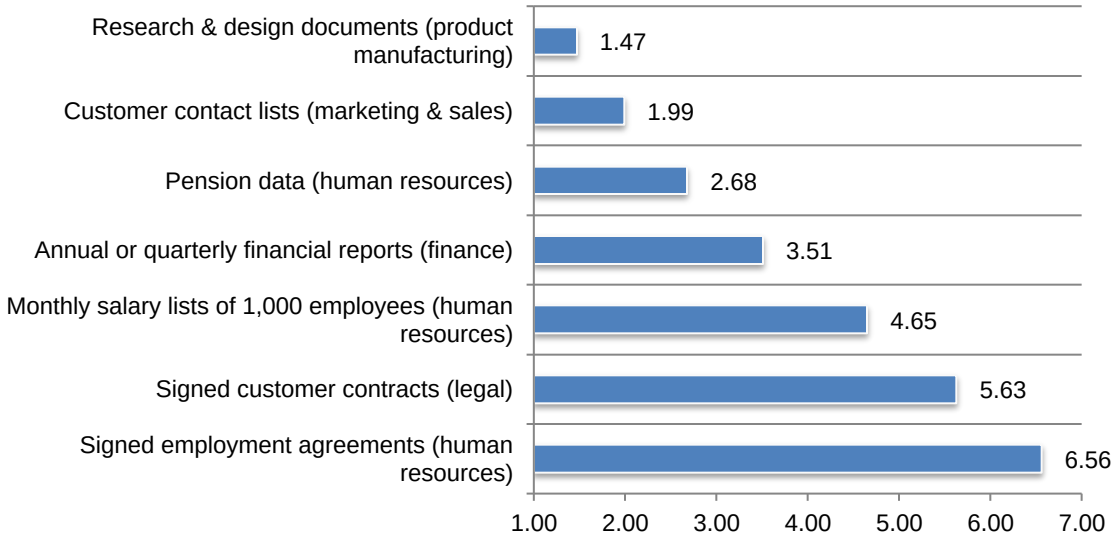


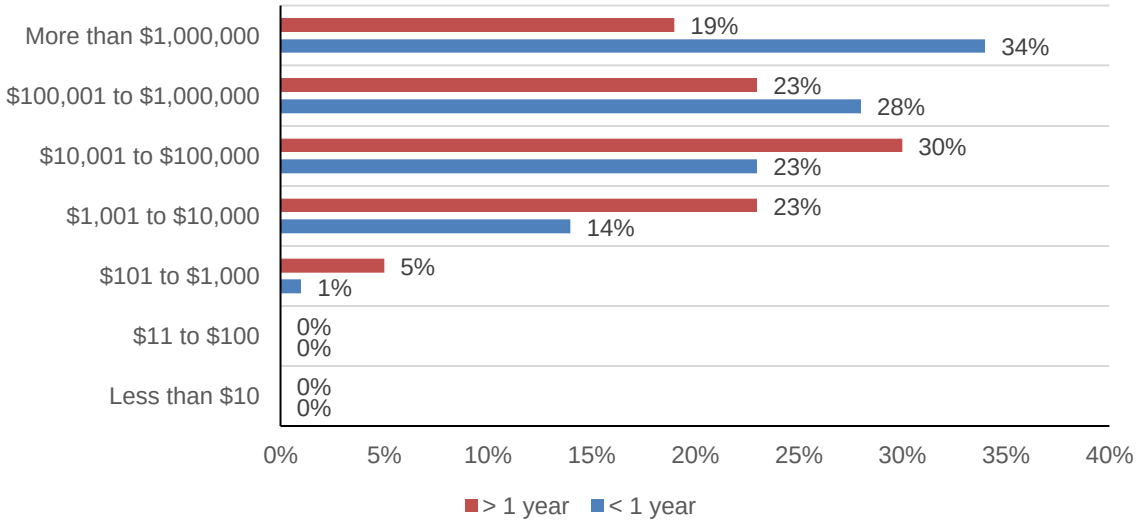
Table 1 reports the information asset values for a bundle of seven data types on a per record or file basis. As can be seen, R&D is not only the most important data type but has the highest value at $473,859. The total bundle of all IT security information assets is $1,098,263. Table 1 also shows that the value of information assets is time-sensitive**.** The total value of the bundle of IT security department data types that are less than one year is $1,316,148 versus $880,378 for data types more than one year old. The net difference is $435,770.

Table 1. The estimated value of IT security information assets

Document or file	< 1 year old	> 1 year old	**Average**
Signed employment agreements	$ 35,861	$ 30,395	$ 33,128
Financial reports	$ 150,315	$ 76,855	$ 113,585
Signed customer contracts	$ 44,986	$ 24,814	$ 34,900
Customer contact lists	$ 307,414	$ 248,908	$ 278,161
Research & design (R&D) documents	$ 575,426	$ 372,293	$ 473,859
Monthly salary lists of 1,000 employees	$ 87,947	$ 38,000	$ 62,974
Pension data	$ 114,200	$ 89,114	$ 101,657
Total bundled	$ 1,316,148	$ 880,378	$ 1,098,263
Net difference of the total bundled value			$ 435,770

The following chart shows the impact of age on the perceived value of R&D documents as rated by IT security practitioners on a less than $10 to more than $1 million scale. Documents that are less than 1-year old achieve a much higher rating than documents that are more than 1-year old. Thirty-four percent of respondents rated the value of R&D documents at more than $1 million versus only 19 percent.

Figure 3. Value of R&D documents rated by IT security



The impact of data reconstruction and data leakage on value. In the context of this research, data reconstruction occurs when an organization loses information and then has to recreate it, and data leakage occurs when information is leaked to employees, competitors, cyber criminals and/or the public at large. Respondents were asked to assign a cost to both the reconstruction of information assets and the negative consequences from data leakage.

As shown in Table 2, the cost impact on the value of the information asset is dependent upon whether data reconstruction or leakage occurred. However, some information types are more affected by data reconstruction, and others are more affected by data leakage. The largest net difference concerns R&D, wherein the economic impact of data leakage is $641,173 versus the impact of data reconstruction at $306,545 (or a net difference of $334,628).

Table 2. Impact of data reconstruction and data leakage on the value of information assets

Document or file	Data reconstruction	Data leakage	**Difference**
Signed employment agreements	36,515	29,741	6,774
Financial reports	95,600	131,570	(35,970)
Signed customer contracts	40,112	29,688	10,424
Customer contact lists	225,611	330,711	(105,100)
Research & design (R&D) documents	306,545	641,173	(334,628)
Monthly salary lists of 1,000 employees	31,799	94,148	(62,349)
Pension data	124,334	78,980	45,355
Total bundle	860,516	1,336,009	(475,493)

Information assets have six different elements that influence their value to the organization. Table 3 lists six different elements of an information asset. Respondents were asked to rank the importance of each element on a scale of 1 = not important to 10 = essential. As shown, performance value, which pertains to how the data affect key business drivers, has the highest value. In contrast, market value, which pertains to what the organization earns from selling or trading this information, has the lowest value.

Table 3. Six elements on the value of information assets

Six elements on the value of information assets	Rating
Intrinsic value pertains to how correct, complete and exclusive these data are.	7.72
Business value pertains to how good and relevant these data are for specific purposes.	7.66
Performance value pertains to how these data affect key business drivers.	8.00
Cost value pertains to what it would cost the organization if the data were lost or leaked outside.	7.34
Market value pertains to what your organization earns from selling or trading this information.	7.00
Economic value pertains to how the information contributes to the organization's bottom line.	7.60

2. Functional area: Product and manufacturing information assets

The value of four information types associated with the manufacturing function. Respondents in this functional area manage such information assets as R&D documents, knowledgebases, computer source code and product manufacturing and engineering workflows. Respondents were asked to estimate the total value of four information types on a per record or file basis on a scale of 1 = highest value to 4 = lowest value. According to Figure 4, the most valuable information assets are R&D documents.

Figure 4. Ranking the value of product and manufacturing information assets
1 = highest value to 4 = lowest value

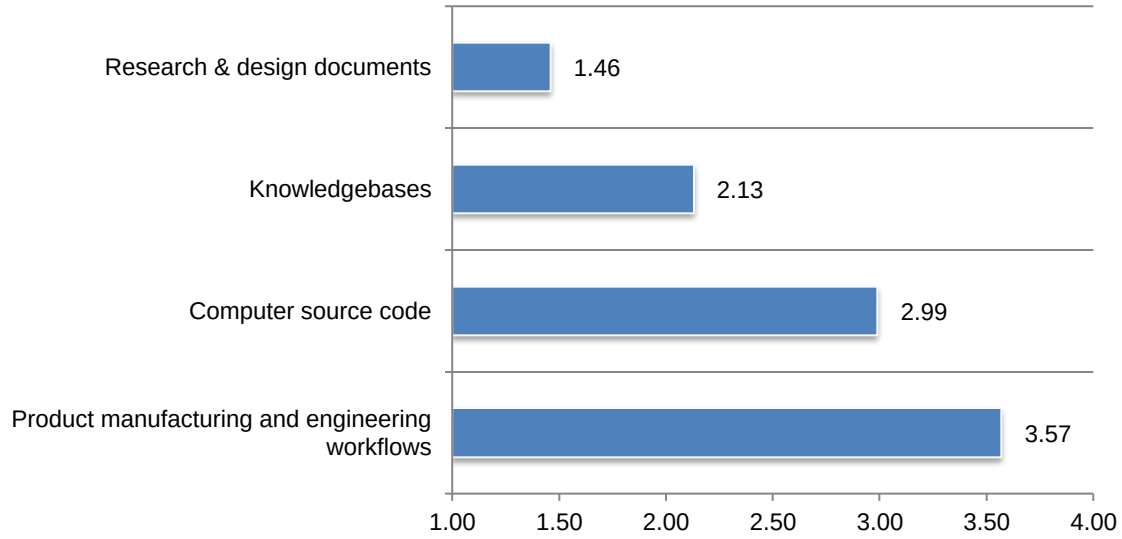


Table 4 reports the information asset values for a bundle of four function-related data types on a per record or file basis. As can be seen, R&D documents are the most important and have the highest value at $683,051. The lowest value concerns production and engineering workflows at $115,760 The total bundle of all four function-related data types is $1,433,147.

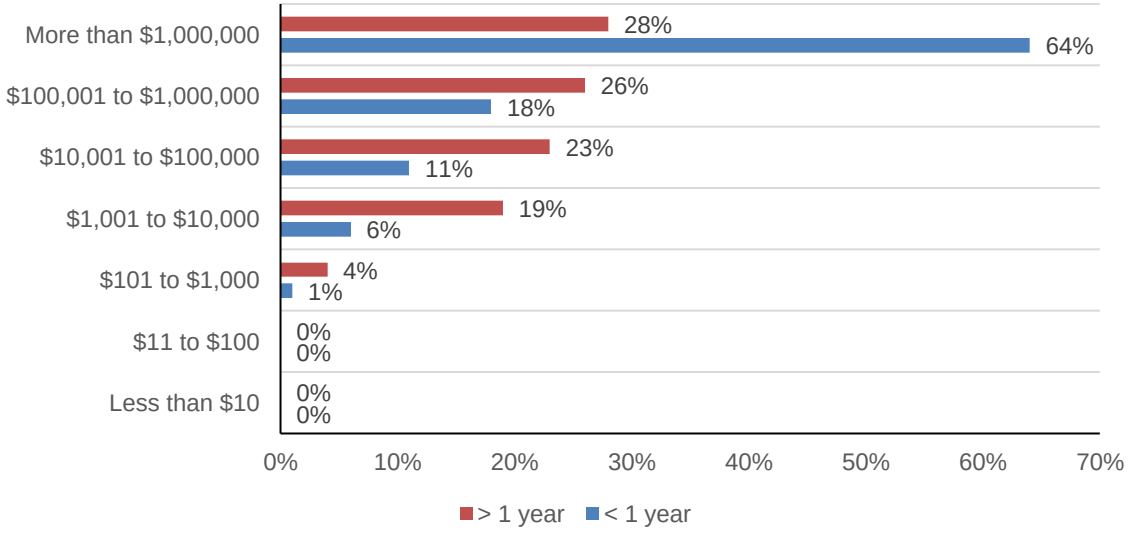
Respondents were asked to estimate the value of four data types that were more or less than one year old. As shown in Table 4, the total value of the bundle of four data types that are less than one year is $1,761,695 versus $1,104,598 for function-related data types more than one year old or a net difference of $657,097.

Table 4. The estimated value of product and manufacturing-related information assets

Document or file	< 1 year old	> 1 year old	Overall
Research & design (R&D) documents	$ 873,386	$ 492,717	$ 683,051
Product manufacturing and engineering workflows	$ 142,188	$ 89,333	$ 115,760
Knowledgebases	$ 522,117	$ 337,701	$ 429,909
Computer source code	$ 224,005	$ 184,847	$ 204,426
Total bundle	$ 1,761,695	$ 1,104,598	$ 1,433,147
Net difference of the total bundled value			$ 657,097

The next chart shows the impact of age on the perceived value of R&D documents as rated by respondents in the product manufacturing sample on a less than $10 to more than $1 million scale. R&D documents that are less than 1-year old achieve a much higher rating than documents that are more than 1-year old. Sixty-four percent of respondents rated the value of R&D documents at more than $1 million versus only 28 percent.

Figure 5. Value of R&D documents rated by product manufacturing



The impact of data reconstruction and data leakage on value. In the context of this research, data reconstruction occurs when an organization loses information and then has to recreate it, and data leakage occurs when information is leaked to employees, competitors, cyber criminals and/or the public at large. Respondents were asked to assign a cost to both the reconstruction of information assets and the negative consequences from data leakage.

As shown in Table 5, the cost impact on the value of the information asset is dependent upon whether data reconstruction or leakage occurred. However, some information types are more affected by data reconstruction, and others are more affected by data leakage. The largest net difference concerns computer source code, wherein the economic impact of data leakage is $153,409 versus the impact of data reconstruction at $255,443 (or a net difference of $102,034).

Table 5. Impact of data reconstruction and data leakage on the value of information assets

Document or file	Data reconstruction	Data leakage	**Difference**
Research & design (R&D) documents	$ 704,619	$ 661,484	$ 43,136
Product manufacturing and engineering workflows	$ 125,002	$ 106,519	$ 18,483
Knowledgebases	$ 475,663	$ 384,155	$ 91,508
Computer source code	$ 255,443	$ 153,409	$ 102,034
Total bundle	$ 1,560,727	$ 1,305,566	$ 255,161

Information assets have six different elements that influence their value to the organization. Table 6 lists six different elements of an information asset. Respondents were asked to rank the importance of each element on a scale of 1 = not important to 10 = essential. As shown, performance value, which pertains to how these data affect key business drivers, has the highest value. In contrast, market value, which pertains to what the organization earns from selling or trading this information, has the lowest value.

Table 6. Six elements on the value of information assets

Six elements on the value of information assets	Rating
Intrinsic value pertains to how correct, complete and exclusive these data are.	7.56
Business value pertains to how good and relevant these data are for specific purposes.	7.34
Performance value pertains to how does these data affect key business drivers.	7.60
Cost value pertains to what it would cost the organization if the data were lost or leaked outside.	7.32
Market value pertains to what your organization earns from selling or trading this information.	5.78
Economic value pertains to how the information contributes to the organization's bottom line.	6.60

3. Functional area: Law department information assets

The value of four information types associated with the law department function. Respondents in this functional area manage such law department information assets as signed customer contracts, signed supplier/vendor contracts, out-of-court settlements and M&A documents.

Respondents were asked to estimate the total value of four legal information types on a per record or file basis on a scale of 1 = highest value to 4 = lowest value. M&A documents are the most important information asset in this functional area.

Figure 6. Ranking the value of law department information assets
1 = highest value to 4 = lowest value

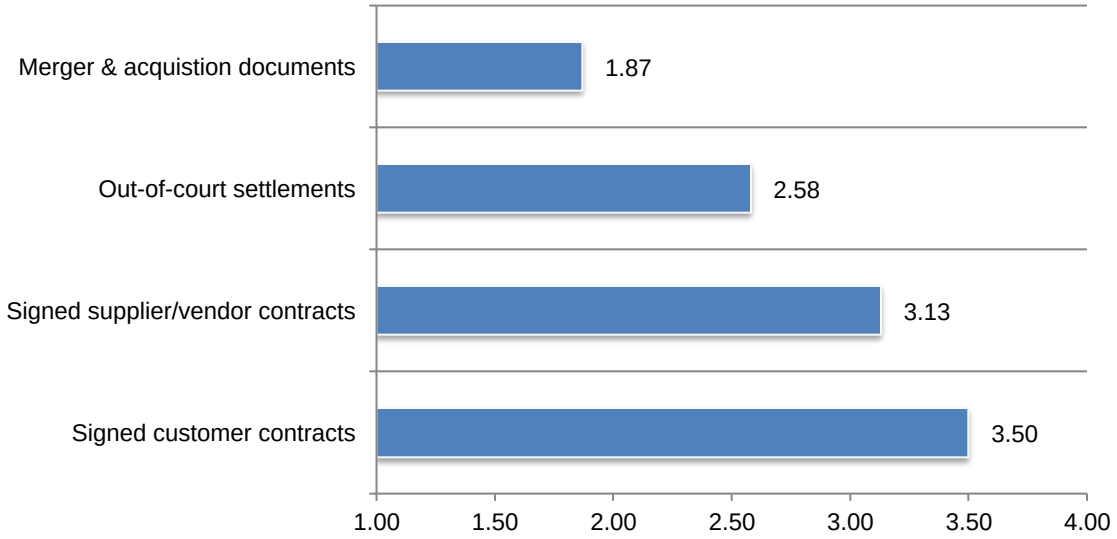


Table 7 reports the information asset values for a bundle of four law department data types on a per record or file basis. M&A documents are considered the most important and have the most value at $314,776. The total bundle of all law department information assets is $476,216.

Table 7 also shows that the value of information assets is time-sensitive**.** Respondents were asked to estimate the value for four data types that were greater or less than one year old. As shown, the total value of the bundle of law department data types that are less than one year is $720,124 versus $232,307 for data types more than one year old. The net difference is $487,817.
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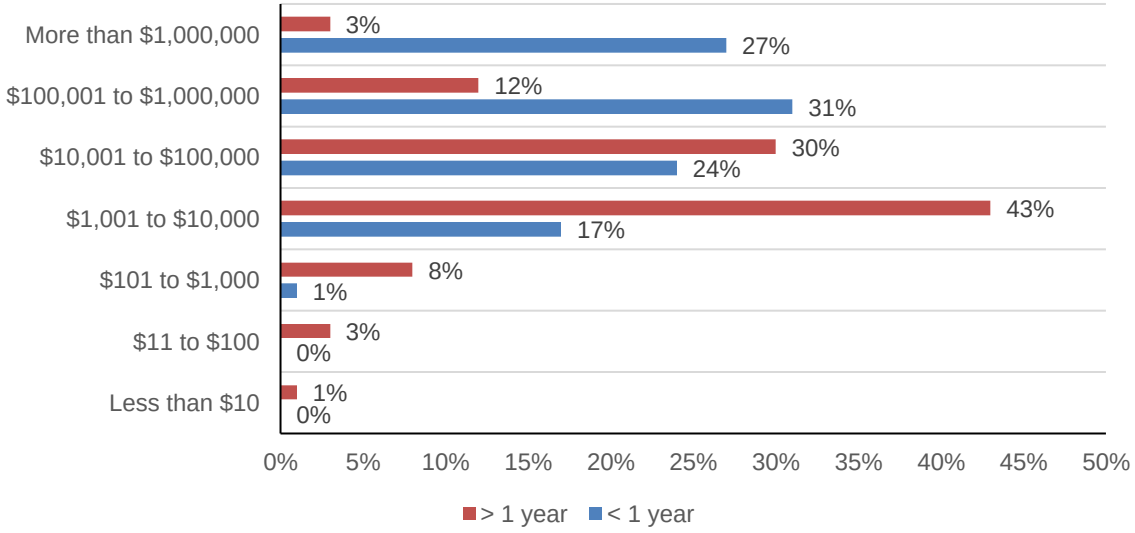
Table 7. The estimated value of law department information assets

Document or file	< 1 year old	> 1 year old	**Overall**
Signed customer contracts	$ 21,924	$ 14,958	$ 18,441
Signed supplier/vendor contracts	$ 23,434	$ 12,316	$ 17,875
Merger & acquisition	$ 508,641	$ 120,911	$ 314,776
Out-of-court settlements	$ 166,125	$ 84,122	$ 125,124
Total bundle	$ 720,124	$ 232,307	$ 476,216
Net difference of the total bundled value			$ 487,817

Figure 7 shows the impact of age on the perceived value of merger and acquisition (M&A) documents as rated by respondents in the law department sample on a less than $10 to more than $1 million scale. Once again, we see documents that are less than 1-year old achieve a much higher rating than documents that are more than 1-year old. Twenty-seven percent of respondents rated the value of M&A documents at more than $1 million versus only 3 percent.

Figure 7. Value of M&A documents rated by the law department (legal)



The impact of data reconstruction and data leakage on value. In the context of this research, data reconstruction occurs when an organization loses information and then has to recreate it, and data leakage occurs when information is leaked to employees, competitors, cyber criminals and/or the public at large. Respondents were asked to assign a cost to both the reconstruction of information assets and the negative consequences from data leakage.

As shown in Table 8, the cost impact on the value of the information asset is dependent upon whether data reconstruction or leakage occurred. However, some information types are more affected by data reconstruction, and others are more affected by data leakage. The largest net difference concerns M&A, wherein the economic impact of data leakage is $347,920 versus the impact of data reconstruction at $281,632 (or a net difference of $66,288).

Table 8. Impact of data reconstruction and data leakage on the value of information assets

Document or file	Data reconstruction	Data leakage	**Difference**
Signed customer contracts	$ 24,903	$ 11,979	$ 12,924
Signed supplier/vendor contracts	$ 21,450	$ 14,300	$ 7,150
Merger & acquisition	$ 281,632	$ 347,920	$ (66,288)
Out-of-court settlements	$ 105,443	$ 144,804	$ (39,361)
Total bundle	$ 433,428	$ 519,003	$ (85,575)

Information assets have six different elements that influence their value to the organization. Table 9 lists six different elements of an information asset. Respondents were asked to rank the importance of each element on a scale of 1 = not important to 10 = essential. As shown, performance value, which pertains to how the data affect key business drivers, has the highest value. In contrast, market value, which pertains to what the organization earns from selling or trading this information, has the lowest value.

Table 9. Six elements on the value of information assets

Six elements on the value of information assets	Rating
Intrinsic value pertains to how correct, complete and exclusive these data are.	7.72
Business value pertains to how good and relevant these data are for specific purposes.	7.66
Performance value pertains to how these data affect key business drivers.	8.00
Cost value pertains to what it would cost the organization if the data were lost or leaked outside.	7.34
Market value pertains to what your organization earns from selling or trading this information.	7.00
Economic value pertains to how the information contributes to the organization's bottom line.	7.60

4. Functional area: Marketing and sales information assets

The value of five information types associated with the marketing and sales functions. Respondents in this functional area manage such marketing and sales information assets as pricing models, sales quotes, customer lists, customer transaction history and marketing campaign information.

Respondents were asked to estimate the total value of marketing and sales information types on a per record or file basis on a scale of 1 = highest value to 5 = highest value. The most important and highest in value in this functional area is the pricing model.

Figure 8. Ranking the value of marketing and sales information assets
1 = highest value to 5 = lowest value

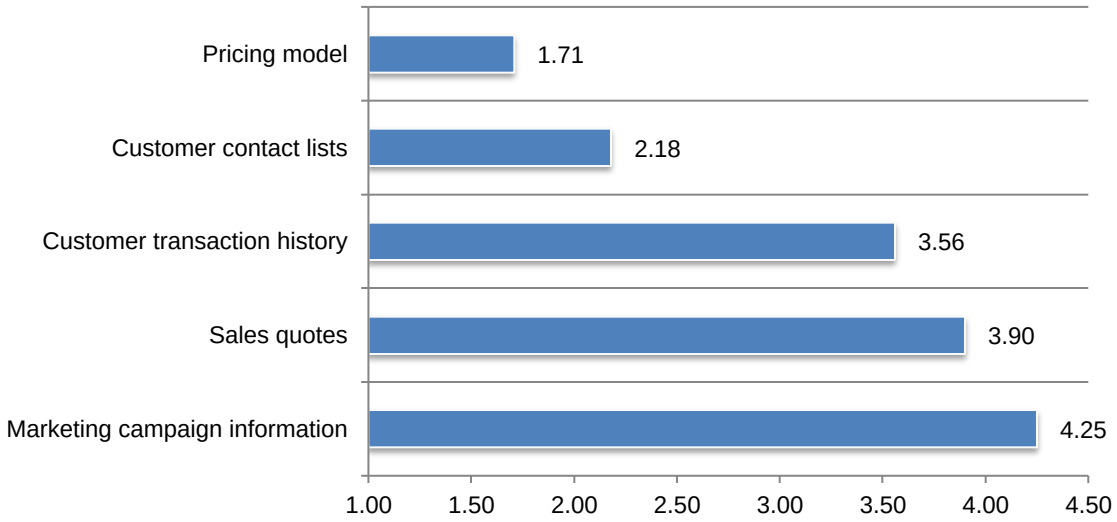


Table 10 reports the information asset values for a bundle of five data types on a per record or file basis. As can be seen, the most important and valuable data type is the pricing model at $470,035. The total bundle of all marketing and sales-focused information assets is $1,404,161.

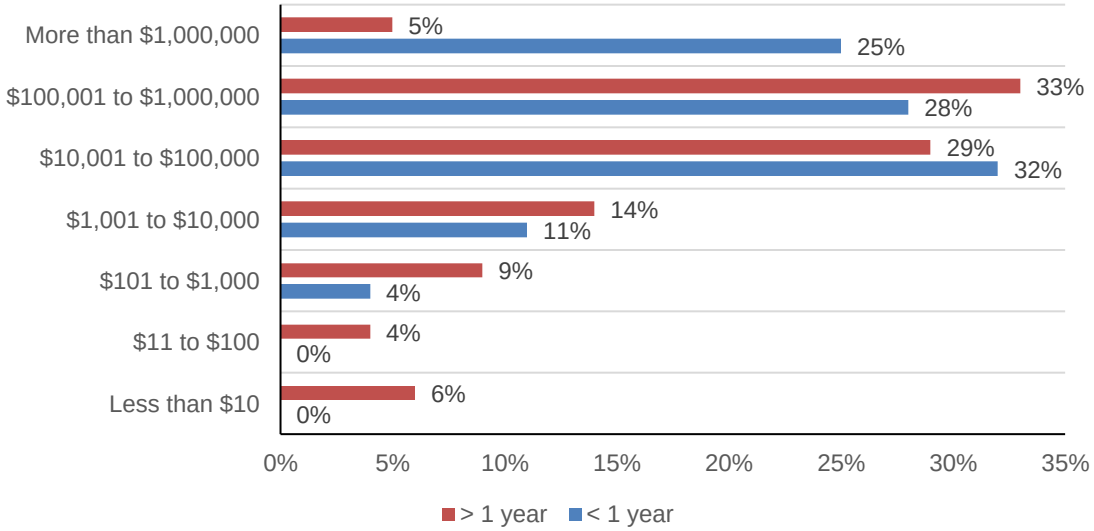
Table 10 also shows that the value of information assets is time-sensitive**.** Respondents were asked to estimate the value of five data types that were more or less than one year old. As shown, the total value of the bundle of all data types that are less than one year is $1,790,244 versus $1,018,077 for data types more than one year old. The net difference is $772,167.

Table 10. The estimated value of marketing and sales information assets

Document or file	< 1 year old	> 1 year old	**Overall**
Pricing model	$ 583,757	$ 356,313	$ 470,035
Sales quotes	$ 241,192	$ 146,686	$ 193,939
Customer lists	$ 472,227	$ 258,272	$ 365,250
Customer transaction history	$ 286,728	$ 175,688	$ 231,208
Marketing campaign information	$ 206,340	$ 81,118	$ 143,729
Total bundle	$ 1,790,244	$ 1,018,077	$ 1,404,161
Net difference of the total bundled value			$ 772,167

Figure 9 shows the impact of age on the perceived value of customer contact lists as rated by respondents in the marketing and sales function on a less than $10 to more than $1 million scale. Customer contact lists that are less than 1-year old achieve a much higher rating than documents that are more than 1-year old. Twenty-five percent of respondents rated the value of customer contact lists at more than $1 million versus only 5 percent.

Figure 9. Value of customer lists rated by marketing and sales



The impact of data reconstruction and data leakage on value. In the context of this research, data reconstruction occurs when an organization loses information and then has to recreate it, and data leakage occurs when information is leaked to employees, competitors, cyber criminals and/or the public at large. Respondents were asked to assign a cost to both the reconstruction of information assets and the negative consequences from data leakage.

As shown in Table 11, the cost impact on the value of the information asset is dependent upon whether data reconstruction or leakage occurred. However, some information types are more affected by data reconstruction, and others are more affected by data leakage. The largest net difference concerns sales quotes, wherein the economic impact of data leakage is $262,876 versus the impact of data reconstruction at $125,002 (or a net difference of $137,874).

Table 11. Impact of data reconstruction and data leakage on the value of information assets

Document or file	Data reconstruction	Data leakage	**Difference**
Pricing model	$ 404,619	$ 535,451	$ (130,832)
Sales quotes	$ 125,002	$ 262,876	$ (137,874)
Customer lists	$ 357,652	$ 372,847	$ (15,195)
Customer transaction history	$ 245,912	$ 216,504	$ 29,408
Marketing campaign information	$ 125,443	$ 162,015	$ (36,572)
Total bundle	$ 1,258,628	$ 1,549,693	$ (291,065)

Information assets have six different elements that influence their value to the organization. Table 12 lists six different elements of an information asset. Respondents were asked to rank the importance of each element on a scale of 1 = not important to 10 = essential.

As shown, performance value, which pertains to how the data affect key business drivers, has the highest value. In contrast, market value, which pertains to what the organization earns from selling or trading this information, has the lowest value.

Table 12. Six elements on the value of information assets

Six elements of the value of information assets	Rating
Intrinsic value pertains to how correct, complete and exclusive these data are.	6.64
Business value pertains to how good and relevant these data are for specific purposes.	6.10
Performance value pertains to how these data affect key business drivers.	6.74
Cost value pertains to what it would cost the organization if the data were lost or leaked outside.	6.64
Market value pertains to what your organization earns from selling or trading this information.	6.40
Economic value pertains to how the information contributes to the organization's bottom line.	6.50

5. Functional area: IT information assets

The value of four information types associated with the IT function. Respondents in this functional area manage such IT information assets as system and network design documents, configuration logs, IT project and change management documents and codes and scripts.

Respondents were asked to estimate the total value of four information types on a per record or file basis on a scale of 1 = highest value to 4 = lowest value. The most valuable and important information asset is codes and scripts.

Figure 10. Ranking the value of IT information assets
1 = highest value to 4 = lowest value

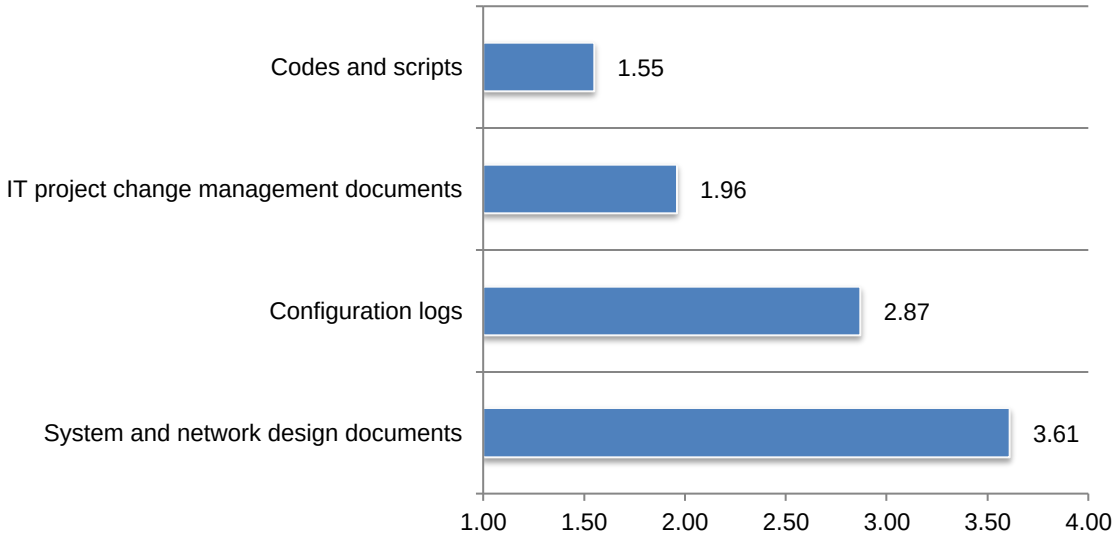


Table 13 reports the information asset values for a bundle of four IT data types on a per record or file basis. Codes and scripts is not only the most important but also the most valuable at $66,034 per program/application, and the lowest value concerns system and network design documents at $20,597. The total bundle of all four data types is $187,971.

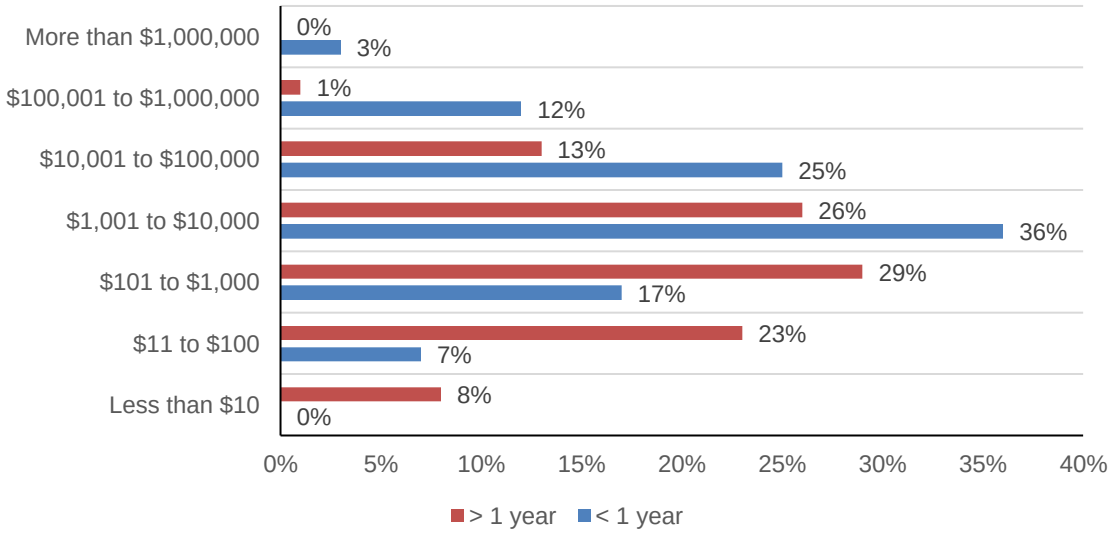
Table 13 also shows that the value of information is time-sensitive. Respondents were asked to estimate the value of four data types that were greater or less than one year old. The total value of the bundle of IT data types that are less than one year is $310,271 versus $65,672 for IT data types more than one year old or a net difference of $244,599.

Table 13. The estimated value of IT information assets

Document or file	< 1 year old	> 1 year old	Overall
System and network design documents	$ 25,329	$ 15,864	$ 20,597
Configuration logs	$ 71,587	$ 12,032	$ 41,809
IT project change management	$ 95,528	$ 23,535	$ 59,531
Codes and scripts	$ 117,827	$ 14,241	$ 66,034
Total bundle	$ 310,271	$ 65,672	$ 187,971
Net difference of the total bundled value			$ 244,599

The following chart shows the impact of age on the perceived value of codes and scripts as rated by respondents in the corporate IT function on a less than $10 to more than $1 million scale. Codes and scripts that are less than 1-year old achieve a higher rating than documents that are more than 1-year old. Only 3 percent of respondents rated the value of customer contact lists at more than $1 million versus zero.

Figure 11. Value of codes and scripts rated by IT



The impact of data reconstruction and data leakage on value. In the context of this research, data reconstruction occurs when an organization loses information and then has to recreate it, and data leakage occurs when information is leaked to employees, competitors, cyber criminals and/or the public at large. Respondents were asked to assign a cost to both the reconstruction of information assets and the negative consequences from data leakage.

As shown in Table 14, the cost impact on the value of the information asset is dependent upon whether data reconstruction or leakage occurred. However, some information types are more affected by data reconstruction and others are more affected by data leakage. The largest net difference concerns codes and scripts, wherein the economic impact of data reconstruction is $85,987 versus the impact of data leakage at $46,081 (or a net difference of $39,906).

Table 14. Impact of data reconstruction and data leakage on the value of information assets

Document or file	Data reconstruction	Data leakage	**Difference**
System and network design documents	26,553	14,641	11,913
Configuration logs	58,521	25,097	33,424
IT project change management	76,322	42,741	33,581
Codes and scripts	85,987	46,081	39,906
Total bundle	247,383	128,560	118,823

Information assets have six different elements that influence their value to the organization. Table 15 lists six different elements of an information asset. Respondents were asked to rank the importance of each element on a scale of 1 = not important to 10 = essential. As shown, performance value, which pertains to how these data affect key business drivers, has the highest value. In contrast, market value, which pertains to what the organization earns from selling or trading this information, has the lowest value.

Table 15. Six elements on the value of information assets

Six elements on the value of information assets	Rating
Intrinsic value pertains to how correct, complete and exclusive these data are.	6.54
Business value pertains to how good and relevant these data are for specific purposes.	6.44
Performance value pertains to how these data affect key business drivers.	6.90
Cost value pertains to what it would cost the organization if the data were lost or leaked outside.	6.82
Market value pertains to what your organization earns from selling or trading this information.	6.34
Economic value pertains to how the information contributes to the organization's bottom line.	6.64

6. Functional area: Finance and accounting information assets

The value of four information types associated with the finance function. Respondents in this functional area manage such financial or accounting information assets as financial reports, accounting and budgeting data, billing and collection information and banking transaction data.

Respondents were asked to estimate the total value of these four information types on a per record or file basis on a scale of 1 = highest value to 4 = lowest value. The most important and valuable information asset is an organization's financial report.

Figure 12. Ranking the value of finance and accounting information assets
1 = highest value to 4 = lowest value

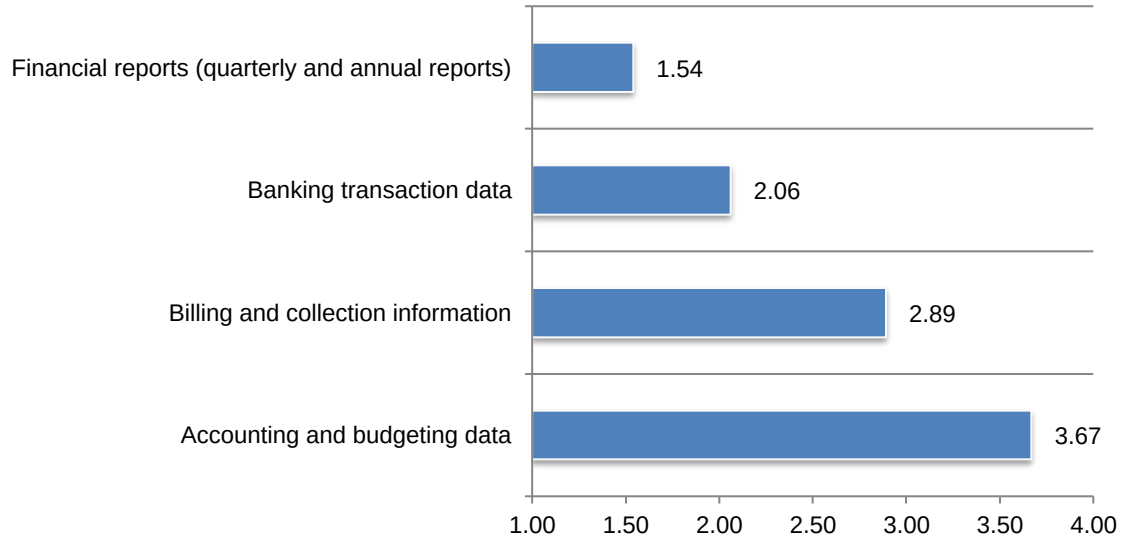


Table 16 reports the information asset values for a bundle of four finance-related data types on a per record or file basis. Financial reports are the most important and valuable at $236,885 per report and the lowest value concerns accounting and budgeting data at $110,741. The total bundle of all four finance-related data types is $623,993.

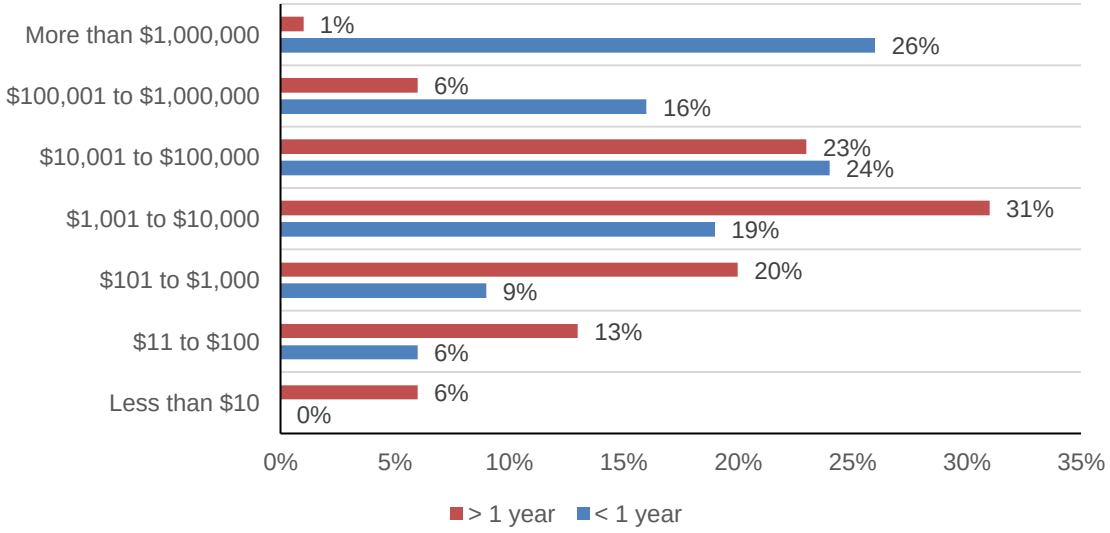
Respondents were asked to estimate the value of four data types that were more or less than one year old. As shown in Table 16, the total value of the bundle of finance data types that are less than one year is $1,054,149 versus $193,837 for finance-related data types more than one year old or a net difference of $860,312 .

Table 16. The estimated value of finance-related information assets

Finance-related data types	< 1 year old	> 1 year old	Overall
Financial reports	$ 414,298	$ 59,472	$ 236,885
Accounting and budgeting data	$ 159,882	$ 61,600	$ 110,741
Billing and collection information	$ 253,656	$ 37,207	$ 145,431
Banking transaction data	$ 226,314	$ 35,558	$ 130,936
Total Bundle	$ 1,054,149	$ 193,837	$ 623,993
Net difference of the total bundled value			$ 860,312

Figure 13 reports the impact of age on the perceived value of financial reports and statements as rated by respondents in the corporate finance and accounting function on a less than $10 to more than $1 million scale. Financial reports that are less than 1-year old achieve a higher rating than documents that are more than 1-year old. Twenty-six percent of respondents rated the value of customer contact lists at more than $1 million versus only 1 percent..

Figure 13. Value of financial reports managed by finance and accounting



The impact of data reconstruction and data leakage on value. In the context of this research, data reconstruction occurs when an organization loses information and then has to recreate it, and data leakage occurs when information is leaked to employees, competitors, cyber criminals and/or the public at large. Respondents were asked to assign a cost to both the reconstruction of information assets and the negative consequences from data leakage.

As shown in Table 17, the cost impact on the value of the information asset is dependent upon whether data reconstruction or leakage occurred. However, some information types are more affected by data reconstruction, and others are more affected by data leakage. The largest net difference concerns financial reports, wherein the economic impact of data leakage is $303,182 versus the impact of data reconstruction at $170,588 (or a net difference of $132,594).

Table 17. Impact of data reconstruction and data leakage on the value of information assets

Document or file	Data reconstruction	Data leakage	**Difference**
Financial reports	$ 170,588	$ 303,182	$ (132,594)
Accounting and budgeting data	$ 115,403	$ 106,078	$ 9,325
Billing and collection information	$ 116,790	$ 174,073	$ (57,283)
Banking transaction data	$ 109,505	$ 152,367	$ (42,862)
Total bundle	$ 512,286	$ 735,700	$ (223,414)

Information assets have six different elements that influence their value to the organization. Table 18 lists six different elements of an information asset. Respondents were asked to rank the importance of each element on a scale of 1 = not important to 10 = essential. As shown, economic value, which pertains to how the information contributes to the organization's bottom line, has the highest value. In contrast, market value, which pertains to what the organization earns from selling or trading this information, has the lowest value.

Table 18. Six elements on the value of information assets

Six elements on the value of information assets	Rating
Intrinsic value pertains to how correct, complete and exclusive these data are.	7.80
Business value pertains to how good and relevant these data are for specific purposes.	7.50
Performance value pertains to how does these data affect key business drivers.	7.84
Cost value pertains to what it would cost the organization if the data were lost or leaked outside.	7.58
Market value pertains to what your organization earns from selling or trading this information.	6.50
Economic value pertains to how the information contributes to the organization's bottom line.	8.02

7. Functional area: Human resources information assets

The value of eight information types associated with the HR function. Respondents in this functional area manage pension data, monthly salary lists, hiring data, employee evaluations, discipline notes, signed employment agreements, draft employment agreements and nonspecific information such as open positions or policies. Respondents were asked to estimate the total value of eight HR information types on a per record or file basis on a scale of 1 = highest value to 8 = lowest value. The most important and valuable information asset is pension data.

Figure 14. Ranking the value of human resources information assets

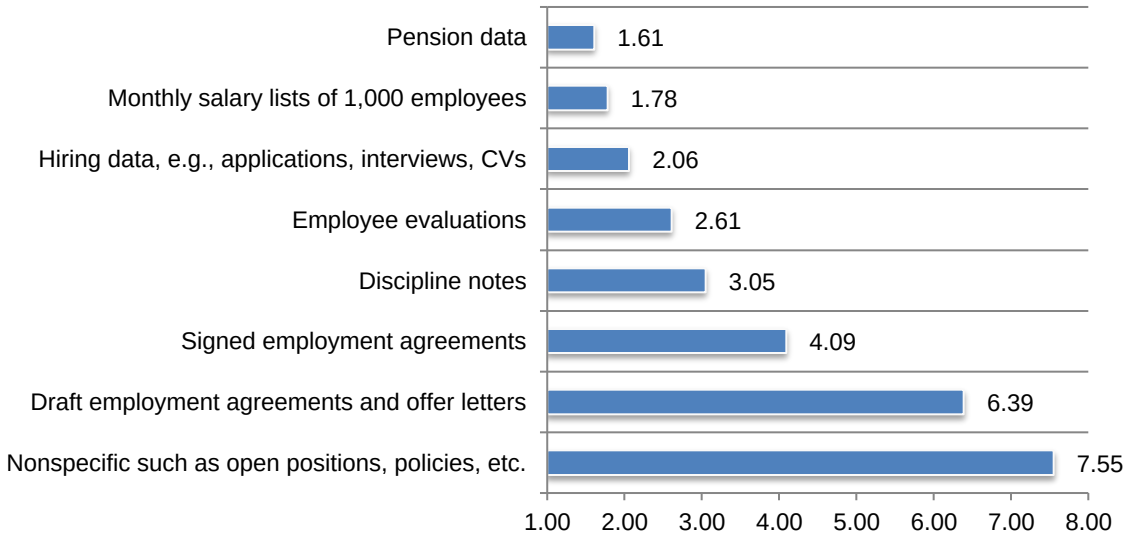


Table 19 reports the information asset values for a bundle of eight HR-related data types on a per record or file basis. The most important and valuable information asset is pension data at $96,364 per file and the lowest value concerns draft employment agreements and offer letters at $3,732. The total bundle of all HR-related data types is $179,524.

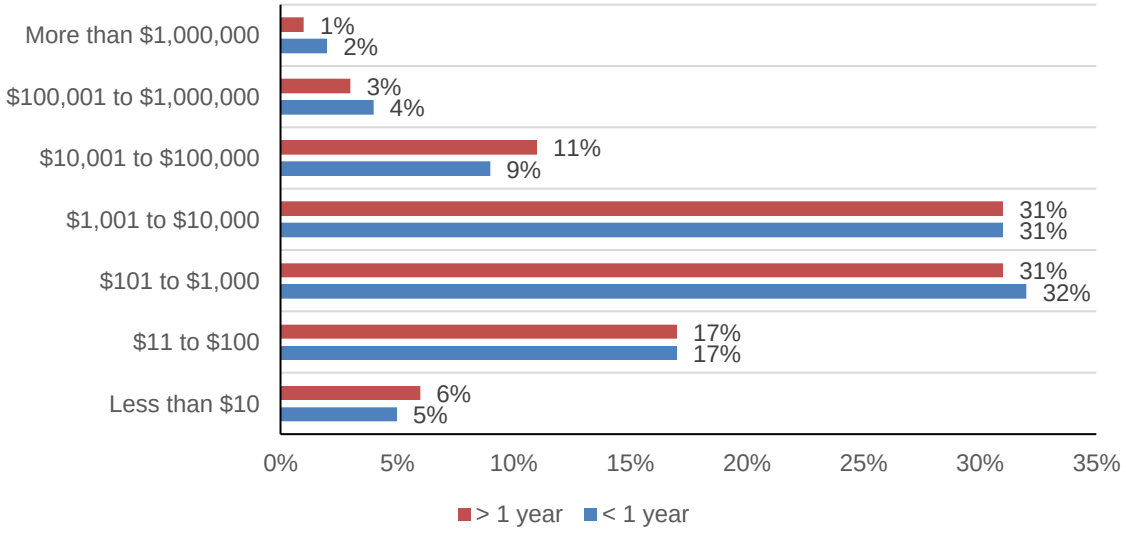
Respondents were also asked to estimate the value of eight data types that were greater or less than one year old. As shown in Table 19, the total value of the bundle of HR data types that are less than one year in $209,995 versus $149,054 for data types more than one year old. The percentage net difference is 34 percent.

Table 19. The estimated value of HR information assets

HR-related data types	<1 year old	> 1 year old	**Overall**
Signed employment agreements	$ 8,966	$ 2,361	$ 5,664
Draft employment agreements and offer letters	$ 6,044	$ 1,421	$ 3,732
Employee evaluations	$ 9,617	$ 3,016	$ 6,316
Discipline notes	$ 10,099	$ 7,839	$ 8,969
Hiring data, e.g., applications, interviews, CVs	$ 13,337	$ 6,878	$ 10,108
Monthly salary lists of 1,000 employees	$ 52,841	$ 36,435	$ 44,638
Nonspecific such as open positions, policies, etc.	$ 5,353	$ 2,114	$ 3,734
Pension data	$ 103,738	$ 88,990	$ 96,364
Total bundle	$ 209,995	$ 149,054	$ 179,524
Net difference of the total bundled value			$ 60,941

Figure 15 shows the impact of age on the perceived value of monthly salary lists as rated by respondents in the human resources function on a less than $10 to more than $1 million scale. Financial reports that are less than 1-year old achieve a higher rating than documents that are more than 1-year old. Unlike other information assets presented herein, we see very small differences based on document age. Only 2 percent of respondents rated the value of salary lists at more than $1 million versus only 1 percent..

Figure 15. Value of month salary lists managed by human resources (HR)



The impact of data reconstruction and data leakage on value. In the context of this research, data reconstruction occurs when an organization loses information and then has to recreate it, and data leakage occurs when information is leaked to employees, competitors, cyber criminals and/or the public at large. Respondents were asked to assign a cost to both the reconstruction of information assets and the negative consequences from data leakage.

As shown in Table 20, the cost impact on the value of the information asset is dependent upon whether data reconstruction or leakage occurred. However, some information types are more affected by data reconstruction and others are more affected by data leakage. The largest net difference concerns monthly salary lists of 1,000 employees, wherein the economic impact of data leakage is $57,477 versus the impact of data reconstruction at $31,799 (or a net difference of $25,678).

Table 20. Impact of data reconstruction and data leakage on the value of information

HR-related data types	Data reconstruction	Data leakage	**Difference**
Signed employment agreements	$ 6,500	$ 4,827	$ 1,673
Draft employment agreements and offer letters	$ 4,042	$ 3,423	$ 619
Employee evaluations	$ 5,310	$ 7,323	$ (2,013)
Discipline notes	$ 6,998	$ 10,940	$ (3,942)
Hiring data, e.g., applications, interviews, CVs	$ 12,064	$ 8,151	$ 3,913
Monthly salary lists of 1,000 employees	$ 31,799	$ 57,477	$ (25,678)
Nonspecific such as open positions, policies, etc.	$ 3,881	$ 3,586	$ 295
Pension data	$ 105,653	$ 87,076	$ 18,577
Total bundle	$ 176,247	$ 182,802	$ (6,555)

Information assets have six different elements that influence their value to the organization. Table 21 lists six different elements of an information asset. Respondents were asked to rank the importance of each element on a scale of 1 = not important to 10 = essential. As shown, performance value, which pertains to how the data affect key business drivers, has the highest value. In contrast, market value, which pertains to what the organization earns from selling or trading this information, has the lowest value.

Table 21. Six elements on the value of information assets

Six elements on the value of information assets	Rating
Intrinsic value pertains to how correct, complete and exclusive these data are.	7.72
Business value pertains to how good and relevant these data are for specific purposes.	7.66
Performance value pertains to how these data affect key business drivers.	8.00
Cost value pertains to what would it cost the organization if the data were lost or leaked outside.	7.34
Market value pertains to what your organization earns from selling or trading this information.	7.00
Economic value pertains to how the information contributes to the organization's bottom line.	7.60

The following table provides the mean value and standard deviations for seven functional areas. As can be seen, the standard deviations are low relative to mean value. As a general rule, a low standard deviation indicates within group homogeneity. With respect to across group variation, analysis of variance (ANOVA) F-tests revealed inequality of means across the seven functional areas.

Table 22. Standard deviations for information assets within seven functional area

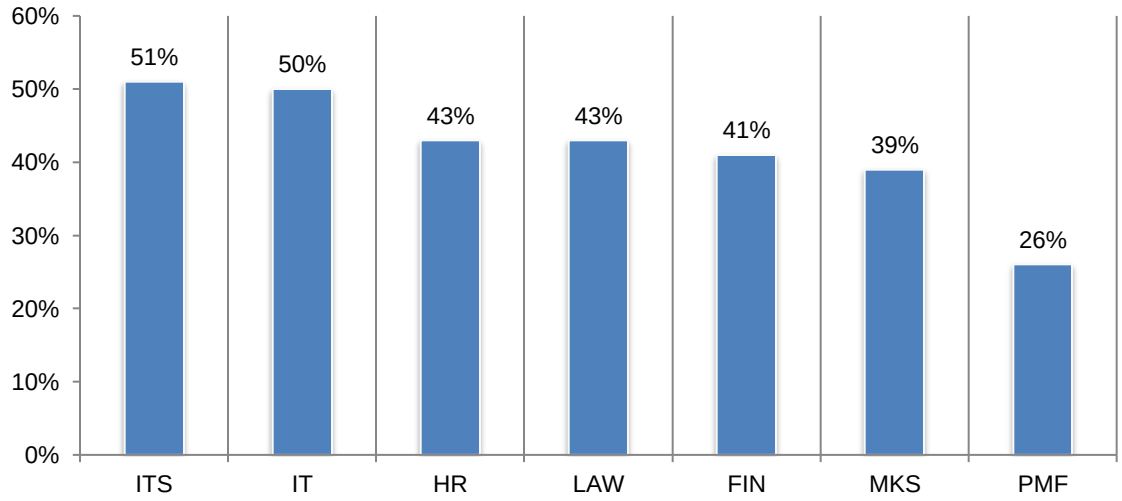
Functional Areas	Mean	Standard Deviation
Product Manufacturing	$358,287	$84,567
IT Security	$156,895	$54,283
Legal	$119,054	$46,629
Marketing and Sales	$280,832	$44,639
Finance	$155,998	$18,590
Human Resources	$22,441	$10,934
Information Technology (IT)	$46,993	$6,786

Part 3. Differences in GDPR compliance and data breach readiness

In addition to estimating the value of information assets, respondents were asked questions about automation, compliance with GDPR, data breach readiness and how much unstructured information needs to be safeguarded.

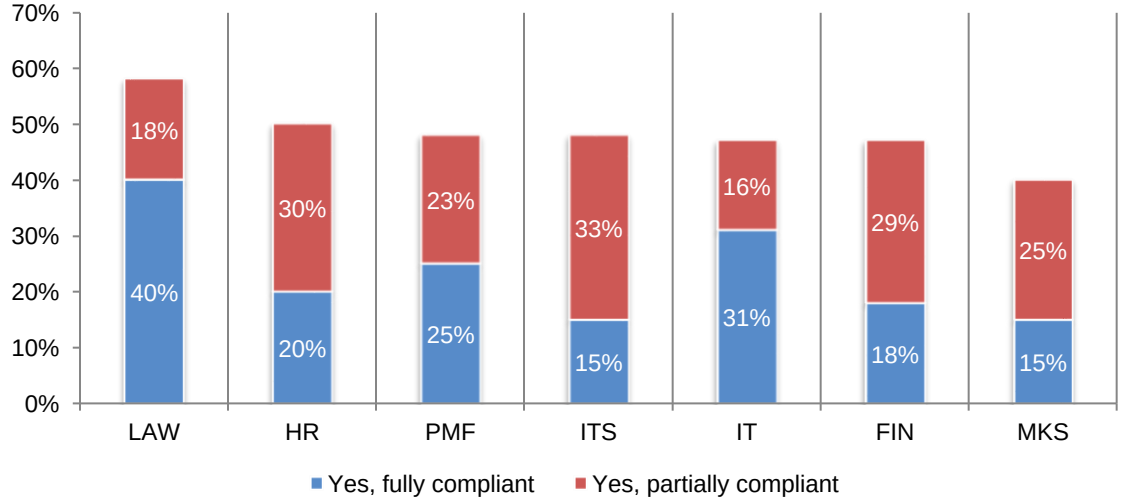
IT security and IT are the functions most likely to use an automated tool. According to Figure 16, 51 percent of IT security respondents and 50 percent of IT respondents say they use automation in their data discovery efforts. Only 26 percent of respondents in product and manufacturing have used automation.

Figure 16. Did you use an automated tool to help undertake data discovery work?
Yes responses



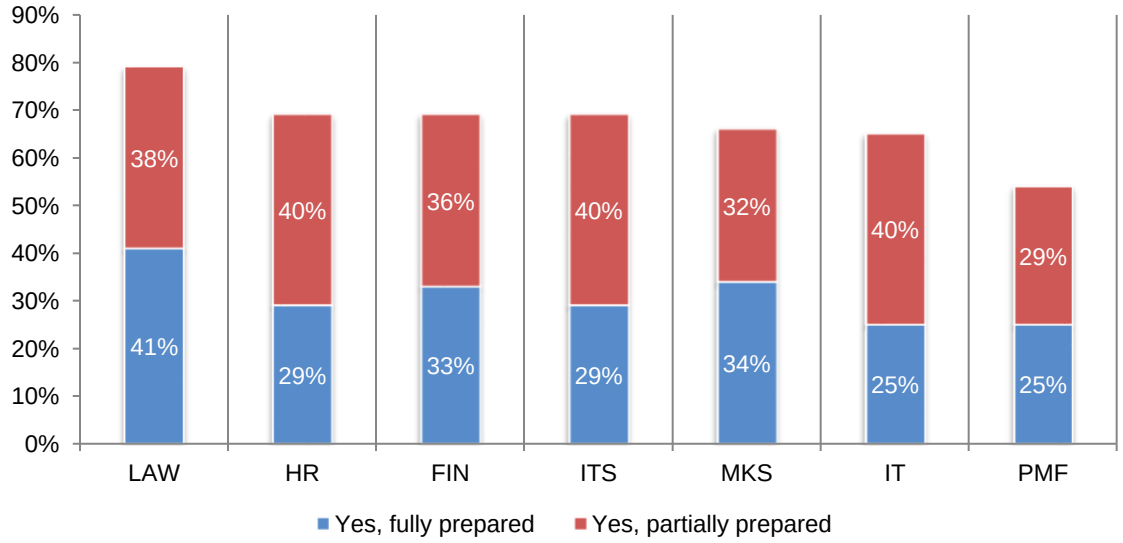
Legal is the most likely function to achieve compliance with EU General Data Protection Regulation (GDPR). As shown in Figure 17, 58 percent of respondents in the legal function say they have achieved compliance with GDPR. In contrast, despite the potential negative consequences of not meeting the GDPR requirements for the use of customer information, only 40 percent of respondents say their marketing and sales function is in compliance.

Figure 17. Is your organization compliant with GDPR?
Yes responses



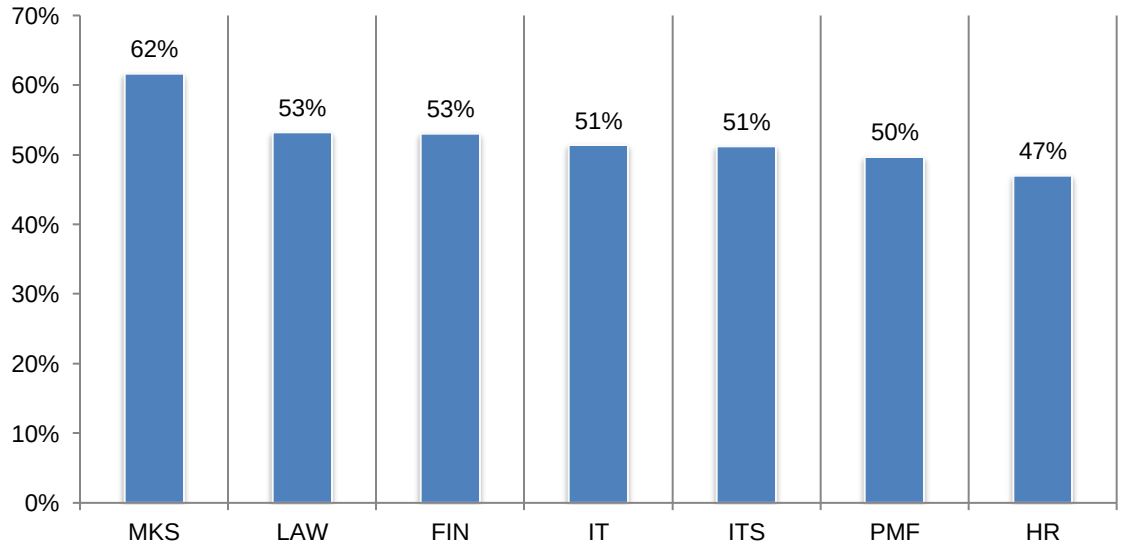
Similarly, the legal function is more positive about its ability to deal with a data breach (79 percent of respondents). The function least prepared is product and manufacturing (54 percent of respondents).

Figure 18. Is your organization prepared for a data breach?
Yes responses



Unstructured data is information that either does not have a predefined data model or is not organized in a predefined manner. Unstructured information is typically text heavy but may contain data such as dates, numbers and facts. This results in irregularities and ambiguities that make it difficult to understand using traditional programs as compared to data stored in fielded form in databases. As shown in Figure 19, the functions that have the most unstructured information are marketing and sales, legal and finance.

Figure 19. Average percentage of unstructured assets
Extrapolated values presented



Conclusion

Based on the findings, organizations are capable of estimating the true value of their information assets when provided with the specific guidelines presented in this research. Identifying the data types that would have the most negative consequences if lost or stolen should be an important part of every organization's data protection strategy.

Part 4. Methods

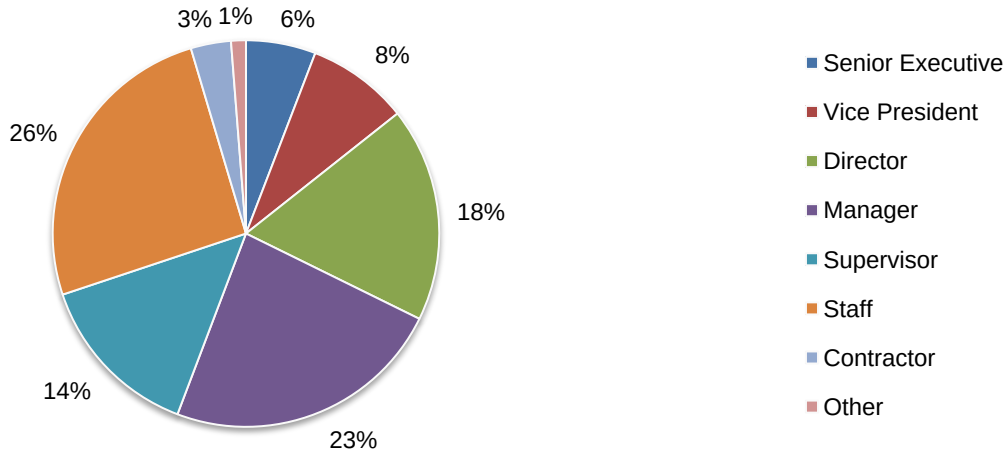
The sampling frame is composed of 70,487 professionals in the United States and United Kingdom who have a role in managing high-value information assets. As shown in Table 23, 3,232 respondents completed the survey. Screening removed 412 surveys. The final sample was 2,820 surveys (or a 4 percent response rate).

Table 23. Survey response

Functions	Total sampling frame	Total returns	Rejected surveys	Final samples
ITS	13,425	581	51	530
PMP	7,009	311	48	263
LAW	7,895	395	59	336
MKS	11,343	519	63	456
IT	10,007	530	71	459
FIN	9,813	411	60	351
HR	10,995	485	60	425
Total	70,487	3,232	412	2,820

Pie Chart 1 reports the current position or organizational level of the respondents. Sixty-nine percent of respondents reported their current position as supervisory or above. Twenty-six percent report their position as staff level.

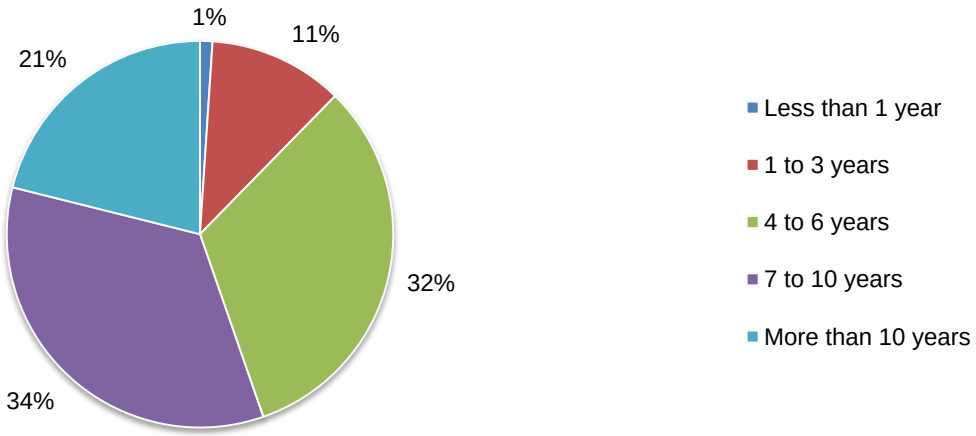
Pie Chart 1. Distribution of respondents according to position level



As shown in Pie Chart 2, 34 percent of respondents have between 7 to 10 years of experience at their current position, 32 percent of respondents have between 4 to 6 years and 21 percent of respondents have more than 10 years of experience in their current position.

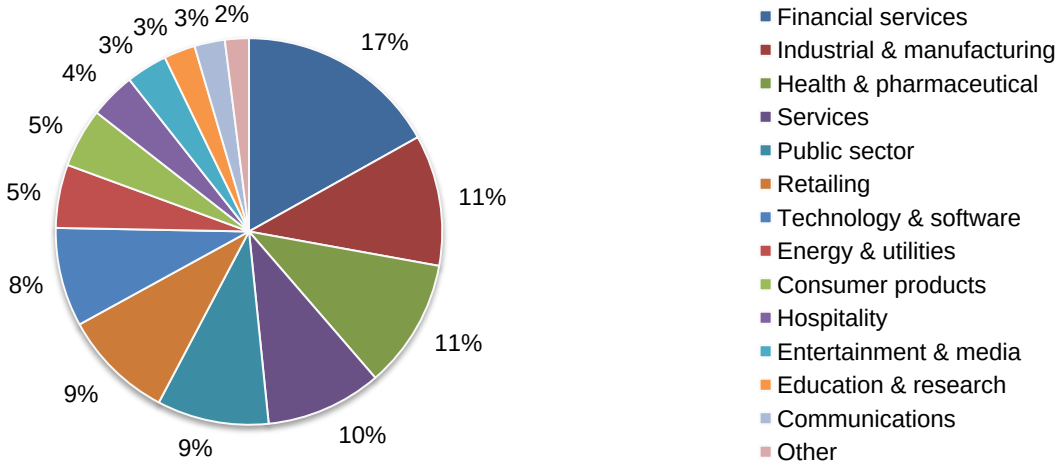
Pie Chart 2. Distribution of respondents according to years of experience in present position

Extrapolated value is 7.3 years



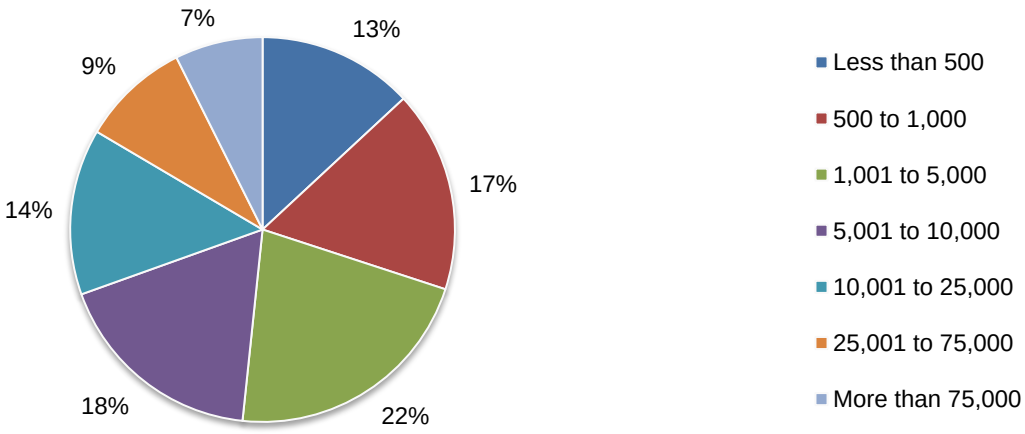
Pie Chart 3 reports the primary industry classification of respondents' organizations. This chart identifies financial services (17 percent of respondents) as the largest segment, followed by industrial and manufacturing (11 percent of respondents), health and pharmaceutical (11 percent), services sector (10 percent of respondents), public sector (9 percent of respondents) and retail sector (9 percent of respondents).

Pie chart 3. Distribution of respondents according to primary industry classification



According to Pie Chart 4, more than half of the respondents (70 percent) are from organizations with a global head count of more than 1,000 employees.

Pie Chart 4. Distribution of respondents according to the global headcount of the organization
Extrapolated value is 15,064



Part 5. Caveats

There are inherent limitations to survey research that need to be carefully considered before drawing inferences from findings. The following items are specific limitations that are germane to most web-based surveys.

Non-response bias: The current findings are based on a sample of survey returns. We sent surveys to a representative sample of individuals, resulting in a large number of usable returned responses. Despite non-response tests, it is always possible that individuals who did not participate are substantially different in terms of underlying beliefs from those who completed the instrument.

Sampling frame bias: The accuracy is based on contact information and the degree to which the list is representative of individuals who are professionals in the United States and United Kingdom who have a role in managing high-value information assets. We also acknowledge that the results may be biased by external events such as media coverage. We also acknowledge bias caused by compensating subjects to complete this research within a specified time period.

Self-reported results: The quality of survey research is based on the integrity of confidential responses received from subjects. While certain checks and balances can be incorporated into the survey process, there is always the possibility that a subject did not provide accurate responses.

Appendix: Detailed Survey Results

The following tables provide the frequency or percentage frequency of responses to all survey questions contained in this study. All survey responses were captured between August 15, 2018 and September 5, 2018.

Consolidated survey response	Total
Total sampling frame	70,487
Total returns	3,232
Rejected surveys	412
Final sample	2,820
Response rate	4%

Part 1. Screening Questions	Consolidated average
S1. What percentage of your current job is dedicated to (functional) activities?	74%
S2. What percentage of your current job is dedicated to the **management** of function-related information assets?	52%
S3. What percentage of your current job is dedicated to the **protection** of function-related information assets?	54%

Using the 10-point scale, please rate the importance of each element of information value from 1=not important to 10=essential.	Consolidated average
Intrinsic value pertains to how correct, complete and exclusive is this data.	7.35
Business value pertains to how good and relevant is this data for specific purposes.	7.19
Performance value pertains to how does this data affect key business drivers.	7.58
Cost value pertains to what would it cost the organization if the data was lost or leaked outside.	7.22
Market value pertains to what your organization earn from selling or trading this information.	6.52
Economic value pertains to how the information contributes to the organization's bottom line.	7.21

Part 3. General Questions

Are you familiar with the General Data Protection Regulation (GDPR), which went into effect on May 25, 2018?	Consolidated average
Very familiar	30%
Familiar	37%
Not familiar or no knowledge	33%
Total	100%

Is your organization compliant with the new General Data Protection Regulation (GDPR)?	Consolidated average
Yes, fully compliant	23%
Yes, partially compliant	25%
Not compliant	23%
Not applicable	6%
Unsure	23%
Total	100%

If yes, how long did it take your organization to discover all the data assets that require protection under the GDPR?	Consolidated average
Less than 1 month	4%
1 to 3 months	9%
4 to 6 months	18%
7 months to 1 year	26%
More than 1 year	27%
Unsure	16%
Total	100%
Extrapolated value (months)	6.6

If yes, did you have an automated tool to help undertake data discovery work?	Consolidated average
Yes	43%
No	48%
Unsure	9%
Total	100%

Approximately, what percentage of all information assets within your organization are unstructured assets?	Consolidated average
Less than 10%	5%
10 to 25%	12%
26 to 50%	30%
51 to 75%	30%
76 to 100%	23%
Total	100%
Extrapolated value	53%

Is your organization prepared for a data breach?	Consolidated average
Yes, fully prepared	31%
Yes, partially prepared	37%
Not prepared	20%
Unsure	12%
Total	100%

If had a data breach involved the loss or theft of high value information, how much would it cost the organization? Your best guess is welcome.	Consolidated average
Less than $1,000	0%
$1,000 to $10,000	4%
$10,001 to $100,000	9%
$100,001 to $1,000,000	17%
$1,000,001 to $5,000,000	28%
$5,000,001 to $10,000,000	24%
$10,000,001 to $50,000,000	13%
More than $50,000,000	4%
Total	100%
Extrapolated value (US$ millions)	$ 8.87

Part 4. Organizational Characteristics

D1. What organizational level best describes your current position?	Consolidated average
Senior Executive	6%
Vice President	8%
Director	18%
Manager	23%
Supervisor	14%
Staff	26%
Contractor	3%
Other (please specify)	1%
Total	100%

D2. What best describes your years of experience in your present position?	Consolidated average
Less than 1 year	1%
1 to 3 years	11%
4 to 6 years	32%
7 to 10 years	34%
More than 10 years	21%
Total	100%
Extrapolated value	7.3

D3. What industry best describes your organization's **primary** industry focus?	Consolidated average
Agriculture & food service	0%
Communications	3%
Consumer products	5%
Defense & aerospace	1%
Education & research	3%
Energy & utilities	5%
Entertainment & media	3%
Financial services	17%
Health & pharmaceutical	11%
Hospitality	4%
Industrial & manufacturing	11%
Public sector	9%
Retailing	9%
Services	10%
Technology & software	8%
Transportation	1%
Total	100%

D4. What best describes the global headcount (size) of your organization?	Consolidated average
Less than 500	13%
500 to 1,000	17%
1,001 to 5,000	22%
5,001 to 10,000	18%
10,001 to 25,000	14%
25,001 to 75,000	9%
More than 75,000	7%
Total	100%
Extrapolated value (headcount)	15,064

IT Security	Seven information types that are associated with IT security or other functional areas within the organization.	Average rank
	Research & design documents (manufacturing)	1.47
	Customer contact lists (marketing & sales)	1.99
	Pension data (human resources)	2.68
	Annual or quarterly financial reports (finance)	3.51
	Monthly salary lists of 1,000 employees (HR)	4.65
	Signed customer contracts (legal)	5.63
	Signed employment agreements (HR)	6.56

HR	Eight information types that are associated with the human resources function.	Average rank
	Signed employment agreements	4.09
	Draft employment agreements and offer letters	6.39
	Employee evaluations	2.61
	Discipline notes	3.05
	Hiring data - e.g. applications, interviews, CVs	2.06
	Monthly salary lists of a 1,000 employees	1.78
	Non-specific such as open positions, policies, etc.	7.55
	Pension data	1.61

Finance	Four information types that are associated with the finance function	Average rank
	Financial reports (quarterly and annual reports)	1.54
	Accounting and budgeting data	3.67
	Billing and collection information	2.89
	Banking transaction data	2.06

Products	Four information types that are associated with the product manufacturing function within your organization	Average rank
	Research and design documents	1.46
	Product manufacturing and engineering workflows	3.57
	Knowledgebases	2.13
	Computer source code	2.99

Legal	Four information types that are associated with the legal function	Average rank
	Signed customer contracts	3.50
	Signed supplier/vendor contracts	3.13
	Out-of-court settlements	2.58
	Merger and acquisition documents	1.87

IT	Four information types that are associated with the IT function	Average rank
	System and network design documents	3.61
	Configuration logs	2.87
	IT project change management documents	1.96
	Codes and scripts	1.55

Marketing	Five information types that are associated with the marketing function	Average rank
	Pricing model	1.71
	Sales quotes	3.90
	Customer contact lists	2.18
	Customer transaction history	3.56
	Marketing campaign information	4.25

Please contact research@ponemon.org or call us at 800.887.3118 if you have any questions.

Ponemon Institute
Advancing Responsible Information Management

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