TECHNICAL REPORT ON CYBER ATTACK BREACHES

1. OBJECTIVE

This report is intended to support possible senior management decision making regarding breaches caused by cyber attacks.

2. METHOD

To provide input for decision making, 10,000 breaches registred caused by cyber attacks corresponding to the period 2011 to 2020 were analyzed. Thus, the follwing variables were considered: sector, number of breaches, number of data records involved in the breachs and dollar cost of the breachs.
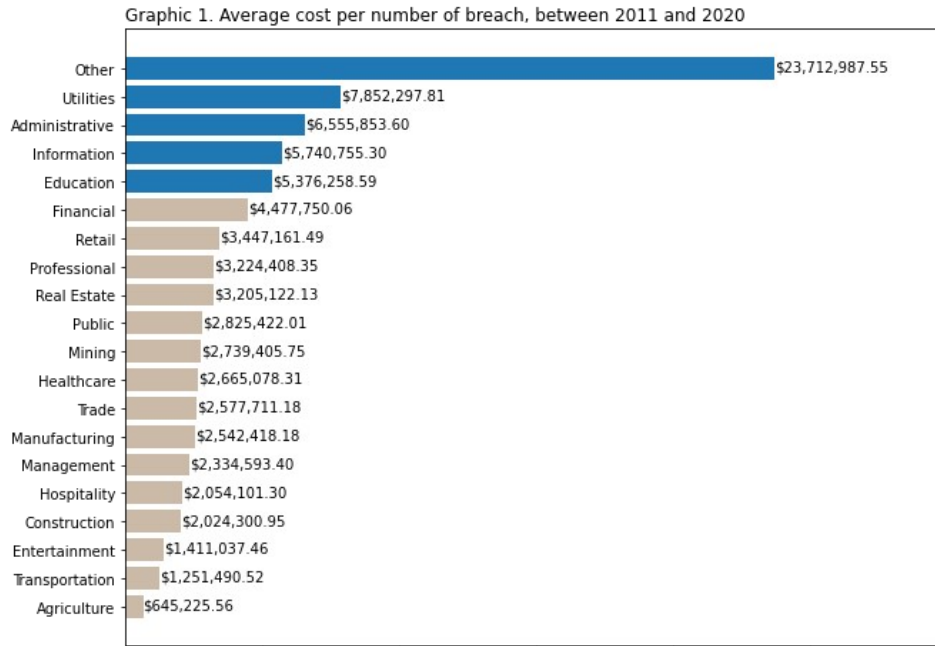
3. ANALYSIS

Initially, it should be noted that, from 10,000 records analyzed, only 9,224 were complete, which is about 92.24% of the total number of records. Of this total, 1,258 (12.75%) corresponded to the "Financial" sector; 1,232 (12.49%) corresponded to the "Professional" sector; 1,158 (11.74%) corresponded to the "Healthcare" sector; 1,089 (11.04%) corresponded to the "Administrative" sector; and 719 (7.29%) corresponded to the "Education" sector (Table 1). These sectors together represent about 48.02% of the total number of breach.

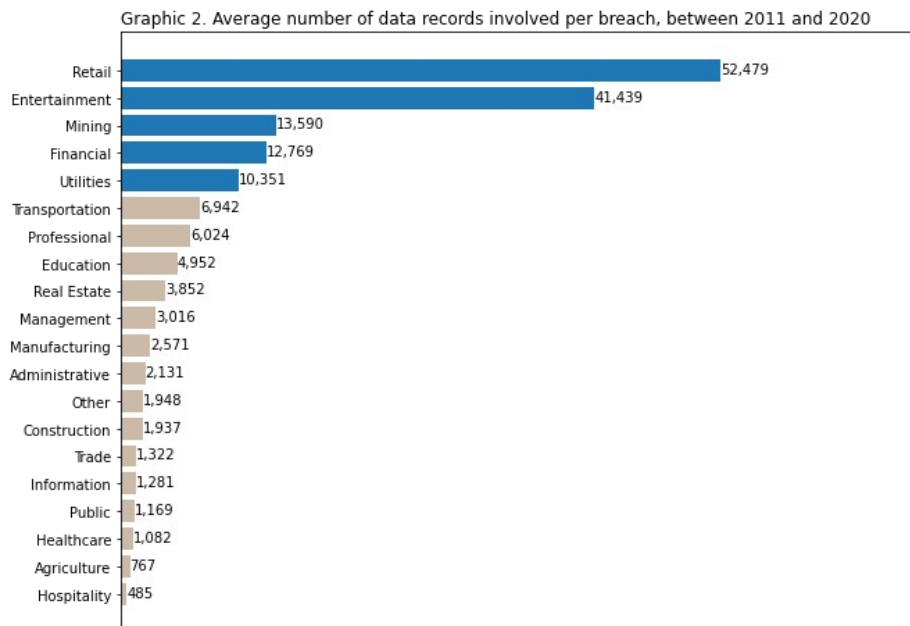Table 1. Distribution of the number of breachs per sector, between 2011 and 2020

Sector	Number of Breach (n)	Percentage (%)
Financial	1,258	12.75
Professional	1,232	12.49
Healthcare	1,158	11.74
Administrative	1,089	11.04
Education	719	7.29
Public	655	6.64
Retail	586	5.94
Information	579	5.87
Manufacturing	556	5.64
Other	415	4.21
Hospitality	368	3.73
Trade	343	3.48
Management	195	1.98
Real Estate	191	1.94
Construction	151	1.53
Entertainment	145	1.47
Transportation	128	1.30
Utilities	53	0.54
Mining	28	0.28
Agriculture	16	0.16

Futhermore, regarding the average cost in dollars per breach, $23,712,987.55 corresponded to the the "Other" sector; $7,825,297.81 corresponded to the "Utilities" sector; $6,555,853.60 corresponded to the "Administrative" sector; $5,740,755.30 corresponded to the "Information" sector; and $5,376,258,59 corresponded to the "Education" sector (Graphic 1).

Graphic 1. Average cost per number of breach, between 2011 and 2020

Sector	Average cost
Other	$23,712,987.55
Utilities	$7,852,297.81
Administrative	$6,555,853.60
Information	$5,740,755.30
Education	$5,376,258.59
Financial	$4,477,750.06
Retail	$3,447,161.49
Professional	$3,224,408.35
Real Estate	$3,205,122.13
Public	$2,825,422.01
Mining	$2,739,405.75
Healthcare	$2,665,078.31
Trade	$2,577,711.18
Manufacturing	$2,542,418.18
Management	$2,334,593.40
Hospitality	$2,054,101.30
Construction	$2,024,300.95
Entertainment	$1,411,037.46
Transportation	$1,251,490.52
Agriculture	$645,225.56

Note that although the "Others" and "Utilities" sectors together account for about 4.75% of the total number of breaches, they are the sectors that have proportionally the greatest financial impact.

In terms of the average number of recorded data involved in the breaches, the "Retail" sector was the most compromised, with 52,479 data involved; followed by "Entertainment" sector, with 41,439 data involved; "Mining" sector, with 13,590 data involved; "Financial" sector, with 12,769 data involved; and "Utilities" sector, with 10,351 (Graphic 2).

Graphic 2. Average number of data records involved per breach, between 2011 and 2020

Sector	Average number of data records
Retail	52,479
Entertainment	41,439
Mining	13,590
Financial	12,769
Utilities	10,351
Transportation	6,942
Professional	6,024
Education	4,952
Real Estate	3,852
Management	3,016
Manufacturing	2,571
Administrative	2,131
Other	1,948
Construction	1,937
Trade	1,322
Information	1,281
Public	1,169
Healthcare	1,082
Agriculture	767
Hospitality	485

4. CONCLUSION

When looking only at the number of breaches involved between 2011 and 2020, the top five sectors are: "Financial", "Professional", "Healthcare", "Administrative" and "Education". However, when you list the average cost in dollars per breach, the top five sectors become: "Others", "Utilities" , "Administrative", "Information" and "Education". Whereas, when relating the number of recorded data involved in the breaches, the top five sectors are: "Retail", "Entertainment", "Mining", "Financial" and "Utilities".

Although no statistical analysis was performed in order to find possible correlations in the variables considered for this report, it is suggested that consideration be given not only to the sectors that the most financially, but also to those have large amounts of data record involved per breach.

This is the report.