

Information and Communications Security WS 24/25

Exercise GL1

Information Security

19th November 2024, Frankfurt

Guest Lecture GL1: 19.11.2024, 10:15-11:45, HZ7
Exercise GL1: 19.11.2024, 16:15-17:45, HZ7

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- Since 2023 Senior Manager Cyber Security Regulations @Lufthansa Group
- Deputy CISO @Hubert Burda Media Holding KG (2012-2023)
- Since 2017 PhD student @m-chair
- University Lecturer & Scientific Reviewer
- > 15 years experience in the field of IT / Information Security
- Areas of focus: ISMS, IT Compliance & Governance and Risk Management, Regulations
- Active participation in (inter)national committees: IATA, ICAO, A-ISAC, A4E, BDL, UPKRITIS, ISACA, GI, CAST



- I. Recap Information Security
- II. Use case Information Security Measurement
- III. Use case Information Security Management
- IV. Literature

I. Recap Information Security

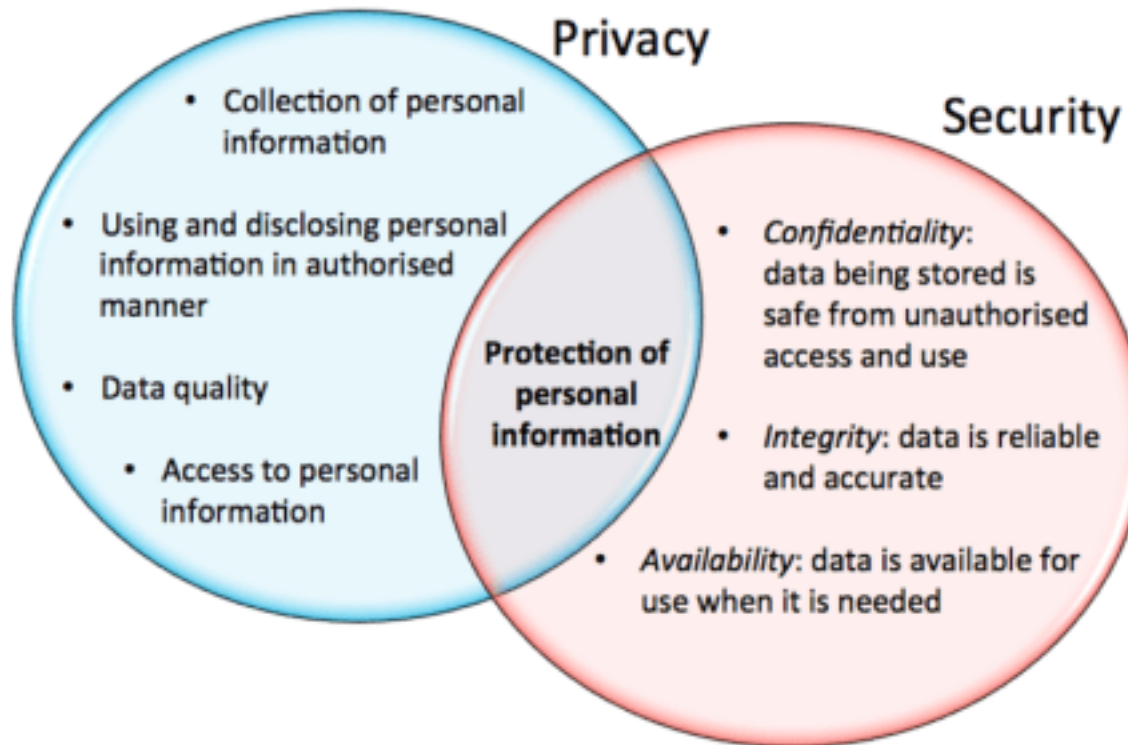
II. Use case Information Security Measurement

III. Use case Information Security Management

IV. Literature

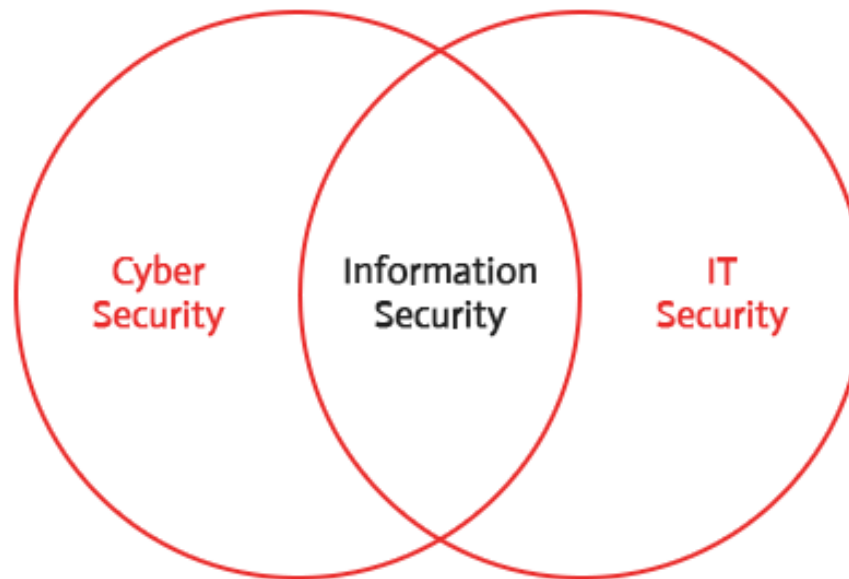
I. Recap Information Security

Privacy vs. Security



I. Recap Information Security

Cyber vs. Information vs. IT Security



I. Recap Information Security

CIA vs. Information security?



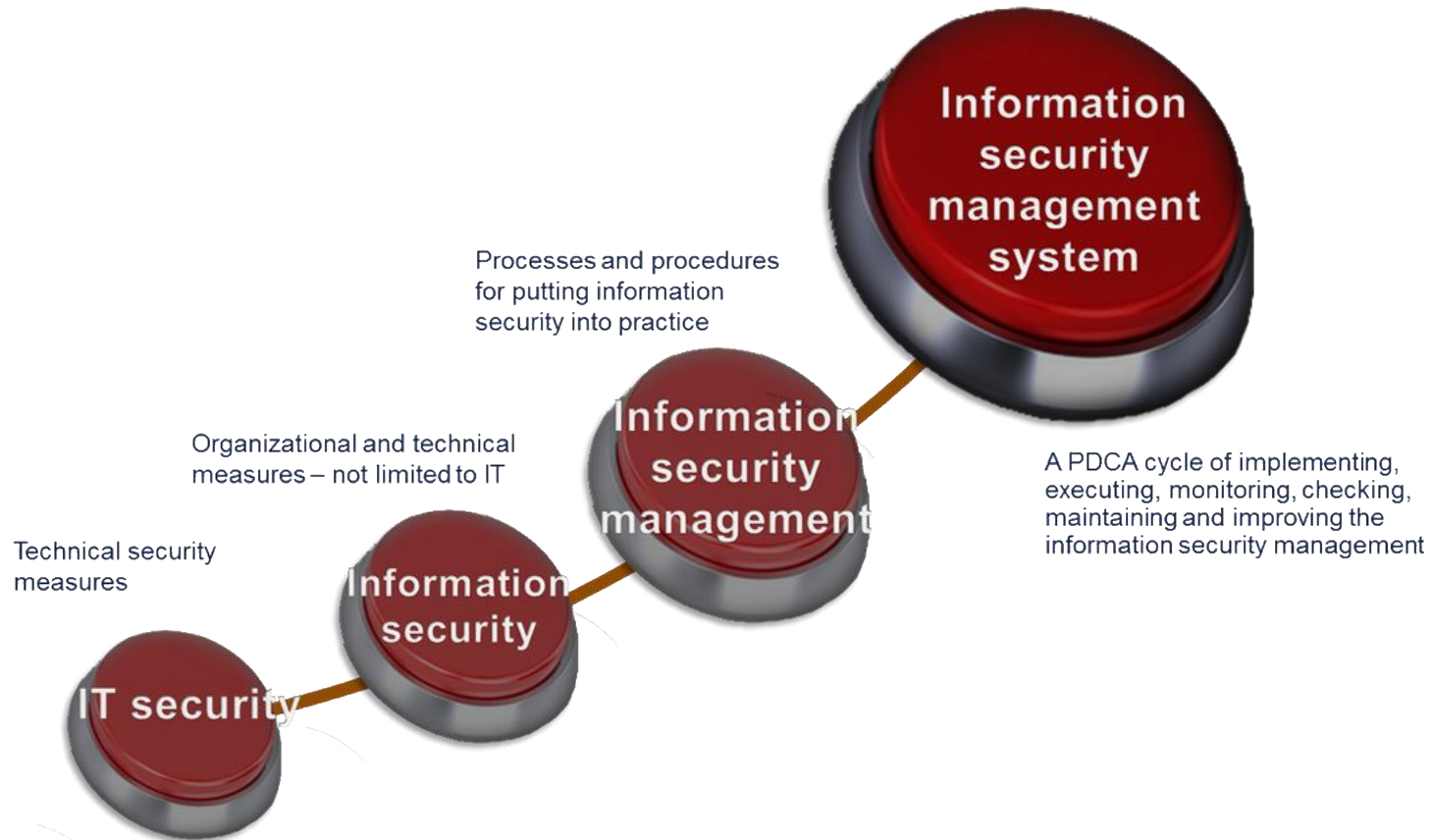
I. Recap Information Security

Governance, **R**isk management and **C**ompliance (GRC)



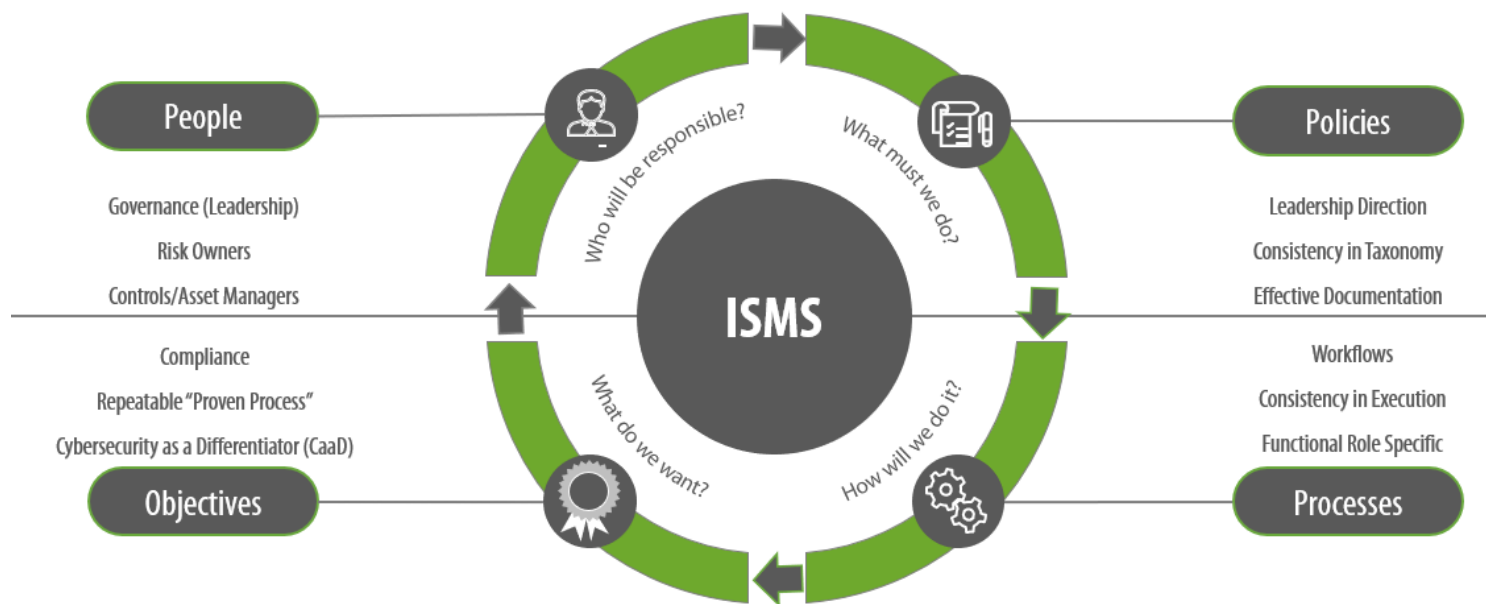
I. Recap Information Security

From IT security to an Information security management system



I. Recap Information Security

Information Security Management System (ISMS)



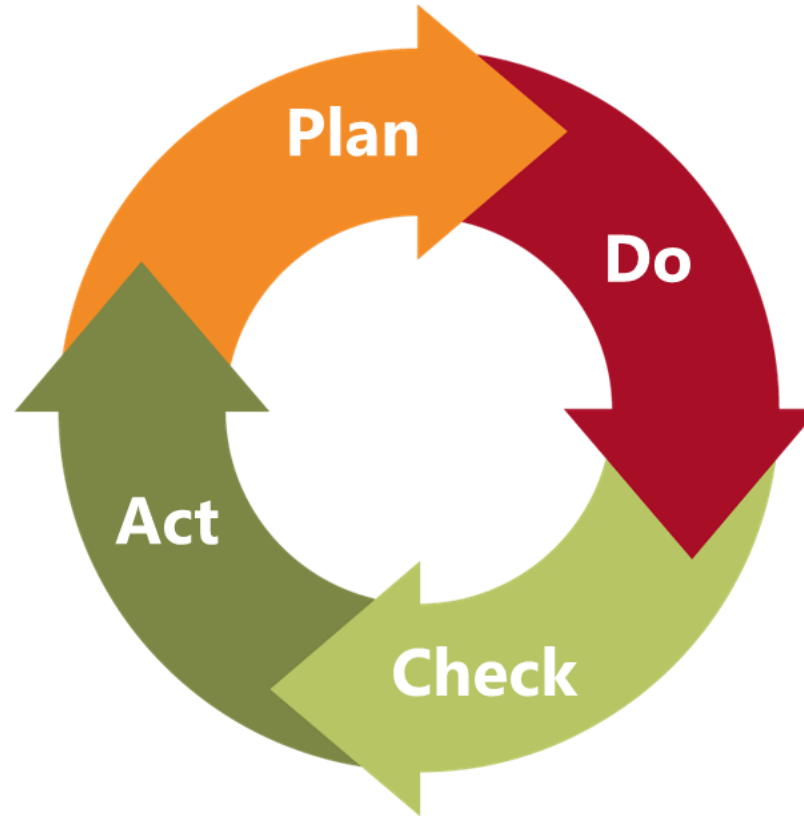
I. Recap Information Security

ISO/IEC 27001:2013 is the internationally recognised management system standard for information security.



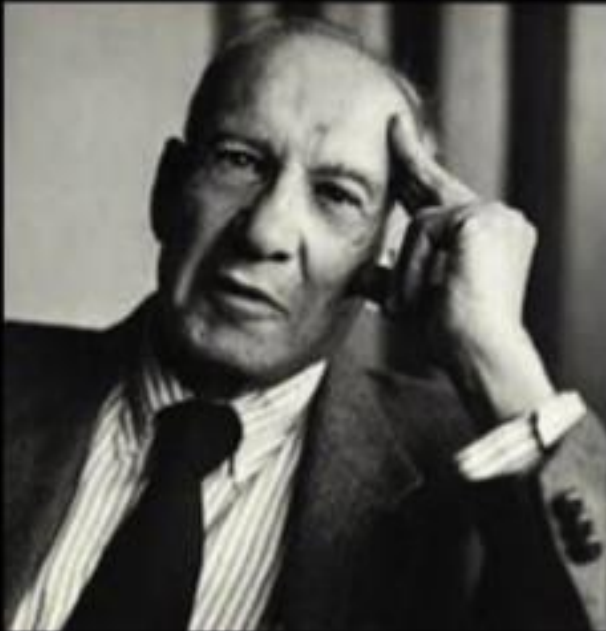
I. Recap Information Security

PDCA or Demin circle



I. Recap Information Security

Information Security Measurement

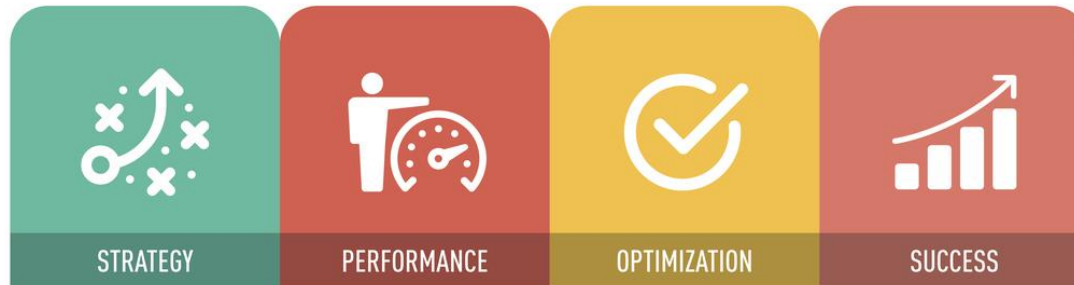


**“If you can’t
measure it,
you can’t
manage it”**

Peter Drucker

I. Recap Information Security

Key Performance Indicator



KEY PERFORMANCE INDICATOR

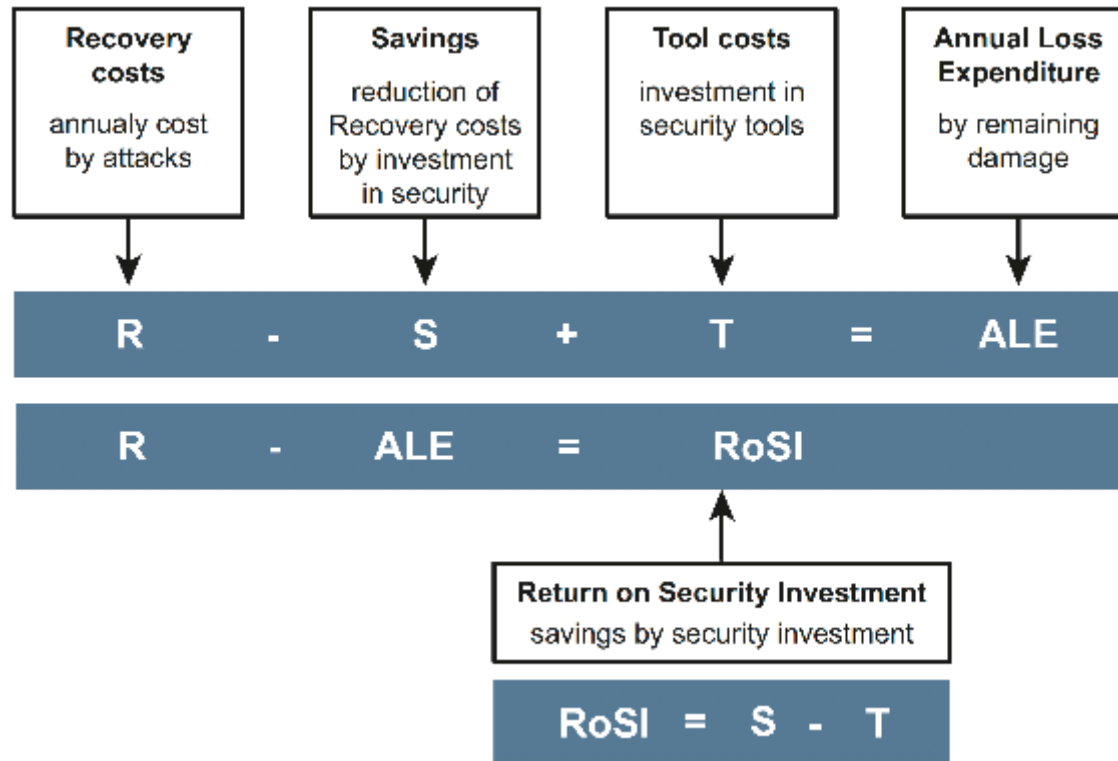


- I. Recap Information Security
- II. Use case Information Security Measurement**
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II. Use case Information Security Measurement

Return on Security Investment (RoSI)

RoSI means that by looking at all costs (including those caused by damage from an attack) it can be shown whether and when an investment in information security measures leads to a return on investment or not.



Description of the abbreviations:

Recovery Costs - R (cost of probable damage)

These costs describe all expenses that are necessary to restore the original condition after damage has occurred. They are included in the total costs of business activities. The recovery costs depend on the actual occurrence of damage, but must be estimated for the future on the basis of experience.

Savings - S (reduction of the cost of probable losses)

These are the costs saved by the introduction of cyber security mechanisms (tools) because they are very likely to successfully prevent an attack. These costs must also be estimated.

Tool Costs - T (costs for cyber security measures)

This is the total cost of ownership (TCO) of cyber security measures designed to prevent potential attacks with a high probability.

Description of the abbreviations (cont.):

Annual Loss Expenditure - ALE (remaining costs)

These are the remaining costs (damage) after an investment in cyber security measures.

Return on Security Investment - RoSI (saved costs, achieved profit)

Savings in the recovery cost (damage) achieved by investing in cyber security measures

Hint:

As long as T (Tools), the TCO of cyber security measures, are smaller than S (Savings), the reduction of costs, RoSI is positive:

formula: $R - (R - S + T) = \text{RoSI} = S - T$

Sample calculation RoSI: Notebook losses

In this example, a calculation of the Return on Security Investment (RoSI) is to be carried out based on the losses of notebooks and the investment in a suitable cyber security measure that protects the data on the notebooks.

The first thing to discuss is how likely it is that a notebook will be lost or stolen, and what resulting damage would occur:

1. What is the probability of losing a notebook?

- The various available studies on lost or stolen notebooks show that on average 6% of notebooks are stolen/lost annually (probability of occurrence).

Sample calculation RoSI: Notebook losses (cont.)

2. How high is the damage if the data stored on a notebook is misused by third parties?

- If the various studies (Computer Security Institute - Crime&Security Survey, Security Issues and Trends, ...) on the damage caused by lost notebooks are analysed, the result is that the average damage per stolen/lost notebook is over EUR 10,000.
- This is only the damage caused by misuse of the data, the loss of hardware, software and the recovery of a replacement device must be added to this should be considered (EUR 2,000 to 3,000).

3. Cyber security measure to protect the information stored on a notebook are stored

- To estimate the cost necessary to adequately protect a notebook, it is assumed that a hard disk encryption product is used.
- The purchase of such a cyber security measure costs about EUR 110, which is on average about 4% of the purchase price of a notebook.

II. Use case Information Security Measurement

Return on Security Investment (RoSI)

Calculation of the Return on Security Investment (RoSI)

As an example, a company is assumed where 500 employees own a notebook on which valuable data worthy of protection is stored for work.

Assumptions:

- Damage caused by the loss of stored data per stolen/lost notebook = EUR 10,000
- The number of notebooks lost/stolen each year is assumed to be 6% = 30 notebooks (probability of occurrence).
- One-time license costs EUR 110 per employee
- For the further costs of installation, rollout and administration, EUR 10,000 is assumed in the first year and EUR 5,000 in the following years.
- Here only the damage caused by the misuse of the stored data.

II. Use case Information Security Measurement

Return on Security Investment (RoSI)

Return on Security Investment RoSI – Example calculation

Calculation					In total
Time span	1 st year	2 nd year	3 rd year	4 th year	4 years
Initial costs					
Implementation/ Rollout, Admin					
Value of no losses from sec breaches					
RoSI 1 st year					
RoSI 2 nd year					
RoSI 3 rd year					
RoSI 4 th year					

II. Use case Information Security Measurement

Return on Security Investment (RoSI)

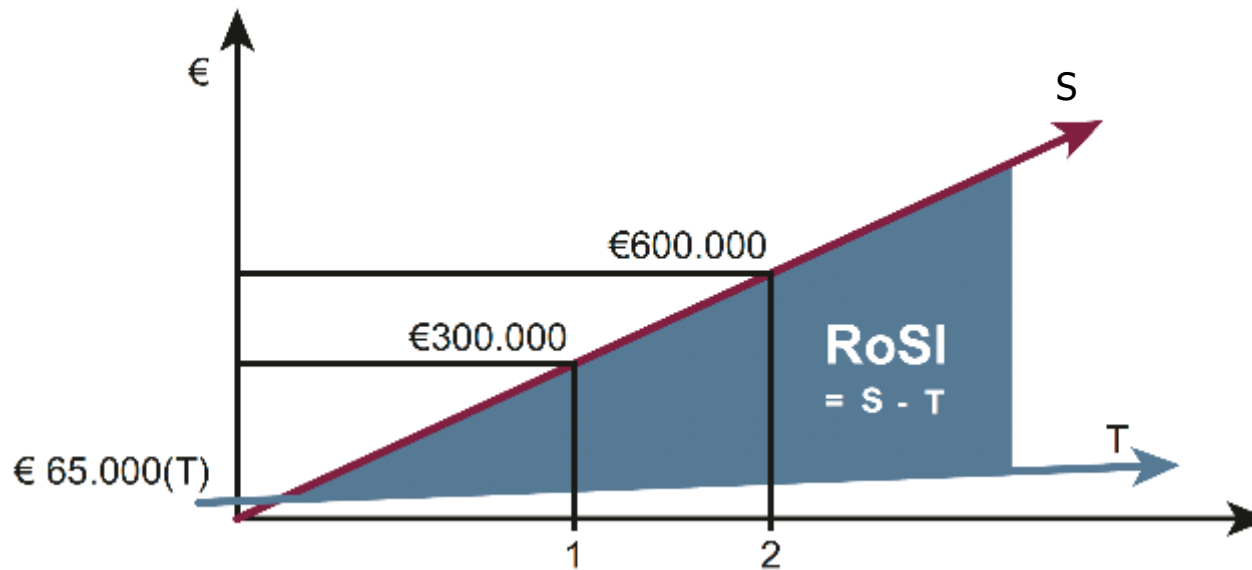
Return on Security Investment RoSI – Example calculation

Calculation					In total
Time span	1 st year	2 nd year	3 rd year	4 th year	4 years
Initial costs	EUR 55,000	-	-	-	EUR 55,000
Implementation/ Rollout, Admin	EUR 10,000	EUR 5,000	EUR 5,000	EUR 5,000	EUR 25,000
Value of no losses from sec breaches	EUR 300,000	EUR 300,000	EUR 300,000	EUR 300,000	EUR 1,200,000
RoSI 1 st year	EUR 235,000				
RoSI 2 nd year		EUR 530,000			
RoSI 3 rd year			EUR 825,000		
RoSI 4 th year				EUR 1,120,000	EUR 1,120,000

II. Use case Information Security Measurement

Return on Security Investment (RoSI)

Cyber security costs and the potential loss over four years



This shows that a RoSI of EUR 235,000 can be achieved in the first year alone. After four years the RoSI is EUR 1,120,000.

The figure clearly shows that the investment T in hard disk encryption is smaller than the prevented damage S that would occur through the misuse of the stored data.

II. Use case Information Security Measurement

Return on Security Investment (RoSI)

Other examples where a RoSI calculation can usually be easily performed are

Anti-malware solutions:

- In this area, most companies themselves have available figures on the costs incurred by malware damage in recent years.

ID management, SingleSignOn (SSO) or authentication with biometric procedures:

- Here the savings effect of helpdesk costs can be very well proven (EUR 100 to 200 per year per user).

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Example

Actual situation

Conducting a GAP analysis for an SME. This SME develops and operates classic websites, mobile offers and apps.

1. Determination of the need for protection of the information assets
2. Assignment of information values to IT systems
3. Risks derived therefrom
4. Risk mitigation measures

1/4 Determination of the need for protection (regular, advanced and high) of the information assets

Cat.	Data	Confident- -iality	Integrity	Availability	Total
I	Customer/subscriber data	high	high	regular	high
II					
III					
IV					
V					
VI					
VII					
VIII					
IX					

1/4 Determination of the need for protection (regular, advanced and high) of the information assets

Cat.	Data	Confidentiality	Integrity	Availability	Total
I	Customer/subscriber data	high	high	regular	high
II	Extended customer data records (newsletter, B2B, income ...)	high	high	regular	high
III	Financial data for online business	high	high	regular	high
IV	Source code	regular	regular	regular	regular
V	Access data (to portals, web analysis systems, newsletter systems etc.)	high	advanced	advanced	high
VI	Business data (*business results, customer presentations, concepts ...)	advanced/ *high	advanced/ *high	regular/ *regular	advanced/ *high
VII	Technical concepts	high	advanced	regular	regular¹
VIII	Employee data (e.g. target agreements)	high	advanced	regular	high
IX	Web analysis data	regular	regular	regular	regular

¹Overruled by management

III. Use case Information Security Management

GAP analysis

No.	IT system	Category								
		I	II	III	IV	V	VI	VII	VIII	IX
1	Newsletter tool	x	x							
2	Deployment tool									
3	PM tool									
4	CMDB									
5	SAP									
6	File server									
7	Desktops									
8	Notebooks									
9	Mail server									
10	FTP server									
11	Cloud									

2/4 Mapping between information assets and IT system

No.	IT system	Category								
		I	II	III	IV	V	VI	VII	VIII	IX
1	Newsletter tool	x	x							
2	Deployment tool				x					
3	PM tool					x				
4	CMDB					x				
5	SAP			x			x			
6	File server	x	x	x	x	x	x	x	x	x
7	Desktops	x	x	x		x	x	x	x	x
8	Notebooks	x	x	x	x	x	x	x	x	x
9	Mail server	x	x	x	x	x	x	x	x	x
10	FTP server	x	x							
11	Cloud	x	x	x	x	x	x	x	x	x

2/4 Mapping between information assets and IT system

3/4 Risk assessment

Risk No.	Risk description	Risk category	Information asset	IT system	Impact	Probability
R1	Unauthorized use of data (e.g. shipping of advertising without opt-in)	Legal risk, reputational risk	I, II	1, 6, 7, 8, 9, 10, 11	high	Entry as good as certain
R2						
R3						

3/4 Risk assessment

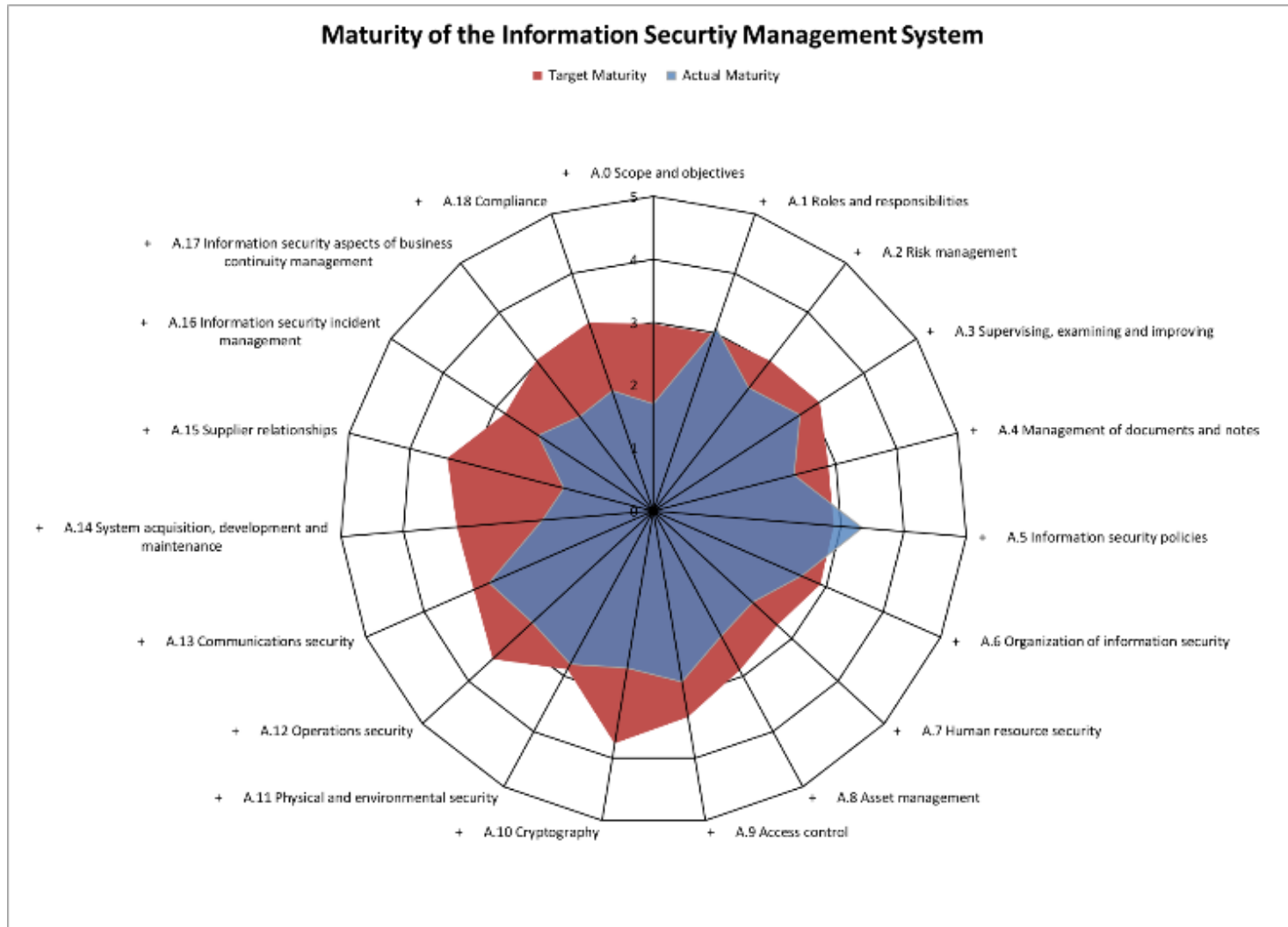
Risk No.	Risk description	Risk category	Information asset	IT system	Impact	Probability
R1	Unauthorized use of data (e.g. shipping of advertising without opt-in)	Legal risk, reputational risk	I, II	1, 6, 7, 8, 9, 10, 11	high	Entry as good as certain
R2	Theft of customer data, company or business data, employee data	Legal risk, reputational risk, business process risk	I, II, III, IV	1, 6, 7, 8, 9, 10, 11	high	Entry as good as certain
R3	Manipulation of customer data, company or business data, employee data	business process risk	I, II, III	1, 6, 7, 8, 9, 10, 11	high	Entry as good as certain

4/4 Risk mitigation measures

Measure No.	Measure	Against risk	IT system/application	Priority	Implementation
M1	Set up a central process for employee approval and access	R1	all	medium	Q1 2025
M2					
M3					
M4					
M5					
M6					

4/4 Risk mitigation measures

Measure No.	Measure	Against risk	IT system/application	Priority	Implementation
M1	Set up a central process for employee approval and access	R1	all	medium	Q1 2025
M2	Systematic withdrawal of access rights after leaving the company	R1, R2, R3	all	high	Q1 2025
M3	Defined role and user concept of the applications	R1	Newsletter tool, Deployment tool, PM tool, CMDB	medium	Q4 2024
M4	Awareness training according to target group	R1, R2, R3	all	high	Begin Q3 2023
M5	Revise rights structure of the file server	R1, R2, R3	File server	high	Q3 2024
M6	Develop specifications for data exchange (customer data)	R1, R2	Mail server, FTP server, Cloud	medium	Q4 2024



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- Guide to Disaster Recovery, M. Erbschilde
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- Real Digital Forensics: Computer Security and Incident Response, 1/e; Keith J. Jones, Richard Bejtlich, Curtis W. Rose
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