



Aalto University
School of Business

Business Intelligence

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Key information

1. No on-site lecture on March 20 (Wednesday). Please watch the tutorial video about Weka.
2. Peer assessment of the Power BI assignment starts today.
Deadline: March 27

Agenda: Manage a BI Department

- 1. BI leaders' Responsibility**
- 2. BI Maturity Model**
- 3. BI Team working method**
- 4. Resistance**
- 5. Data Literacy**
- 6. BI Success Factors (if we have time)**

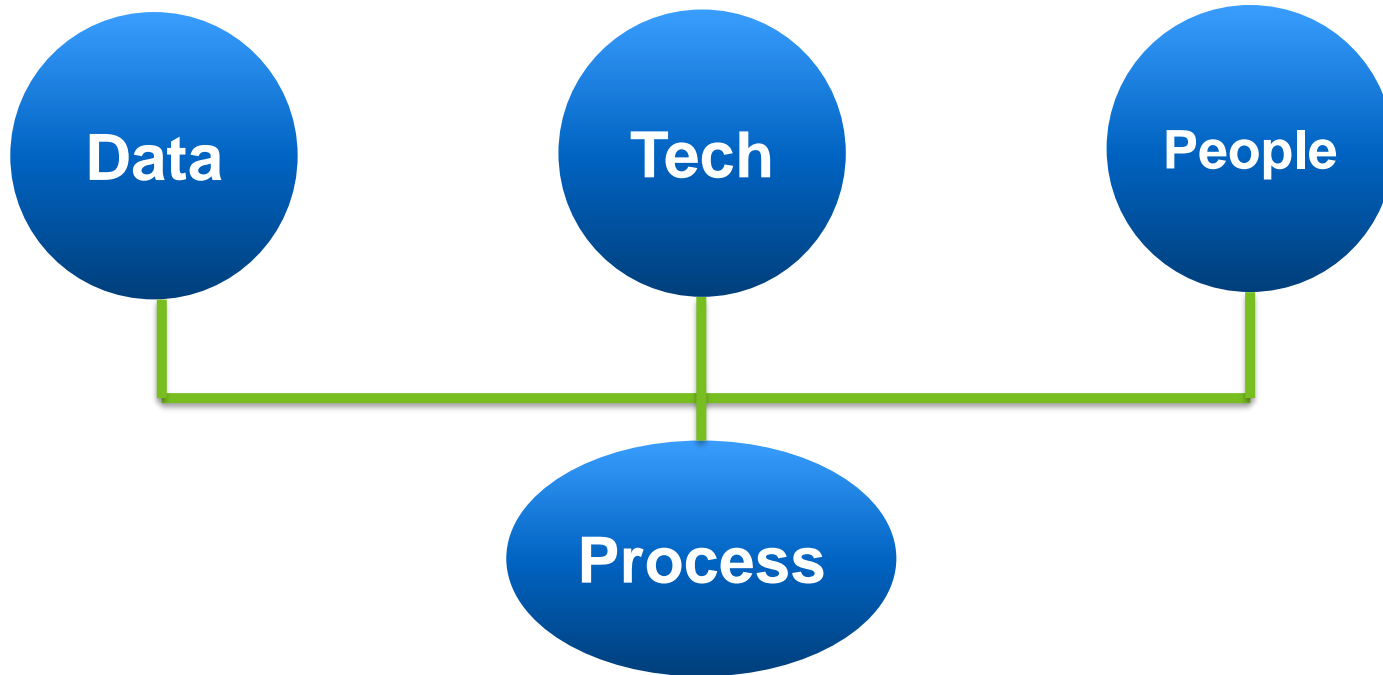
To be benefited from today's lecture

**Put you in the shoes of a
new BI department
header!**

Section 1: BI leaders' Responsibility



The Key Elements of BI Management



<https://www.domo.com/learn/article/the-4-elements-of-a-successful-business-intelligence-environment>

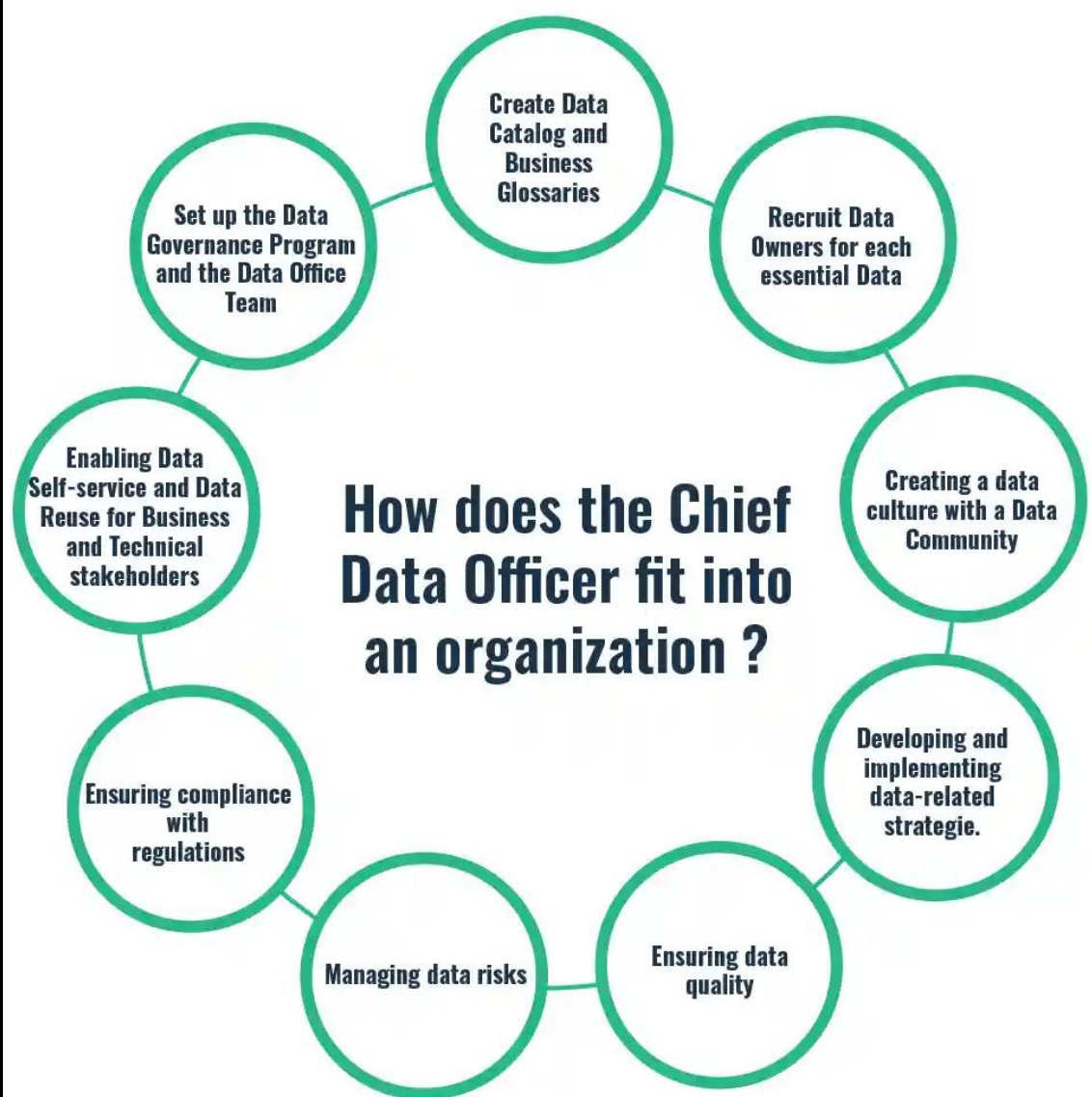
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As the CDO of the company, John is wondering what his responsibilities are and what are not.



CDO's Responsibilities

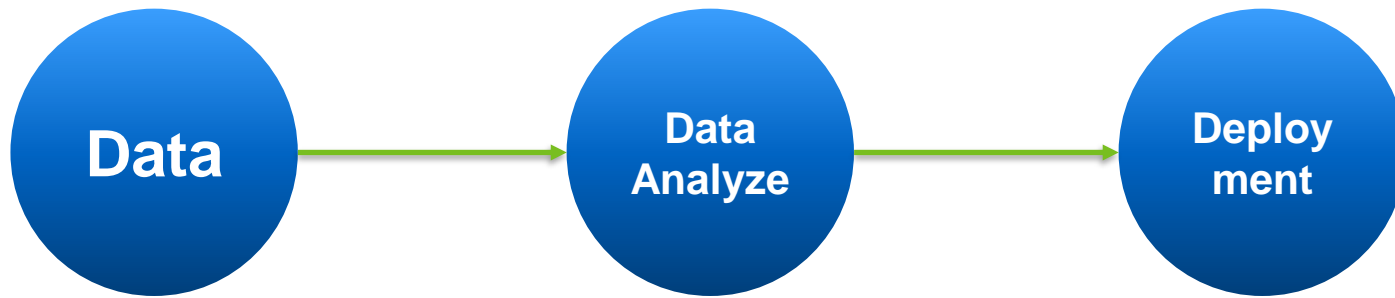
- The CDO's responsibilities also include overseeing data security measures, data privacy, and data ethics frameworks within the organization.
- CDO often works closely with the Chief Information Officer (CIO) and Chief Technology Officer (CTO).
- The main goal of the CDO is to drive business growth and deliver value through data initiatives.
- In some companies, the CDO may also oversee operational functions like creating and managing data architecture and setting up data management systems.
- The CDO's role can be highly complex and differs from one organization to another.



John is a little bit sad! This is because he has some **friction** with the company's **CIO**. Why this happens?



Please submit your answer at:
<https://presemo.aalto.fi/bic/>



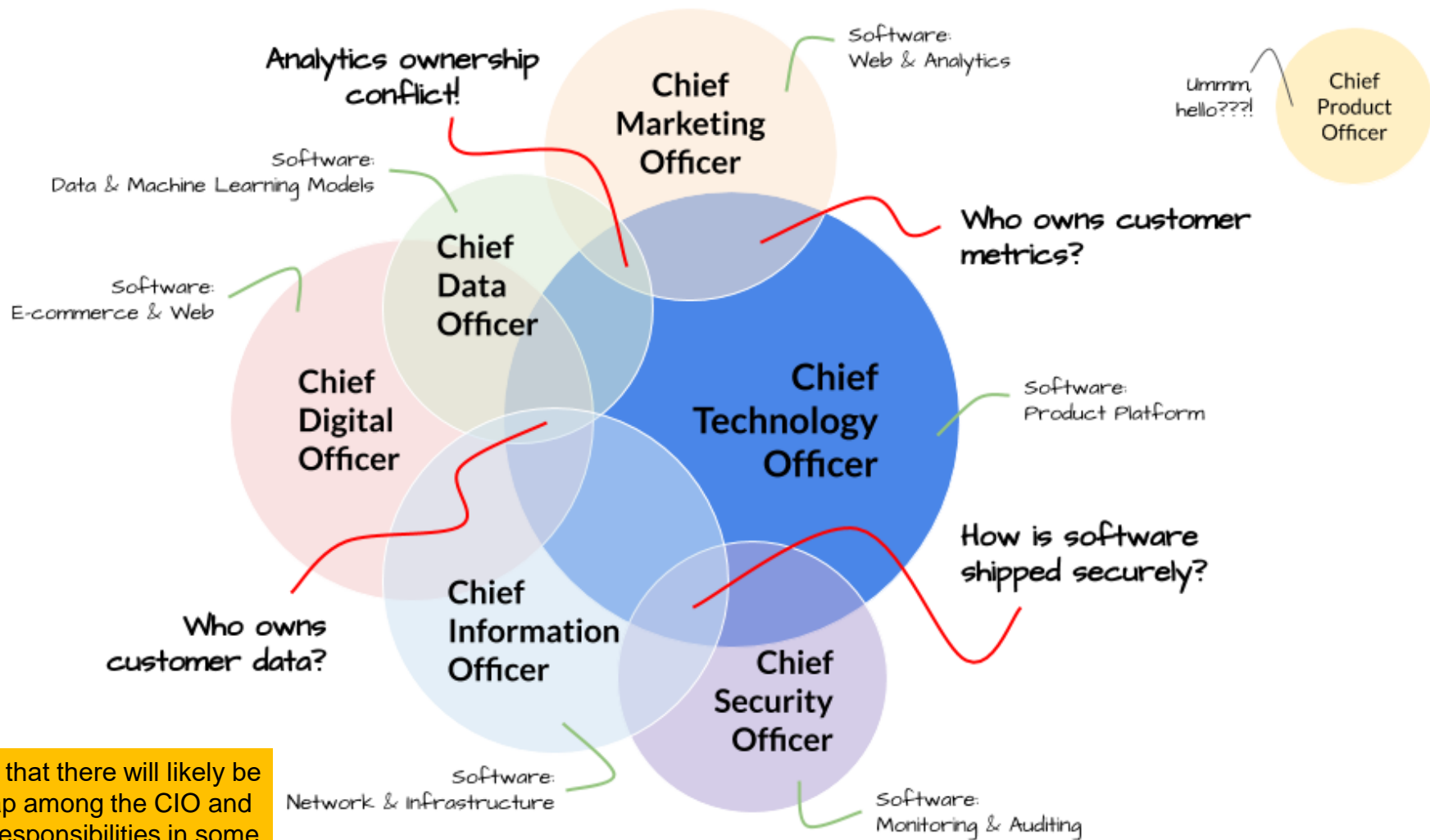
CDO: “Could you please help us with some data quality issues? We found the data at these, and these systems are in a poor quality.”

“Could you please let us access your system database?”

“Could you please let us know who is the data owner for these variables?”

CDO: “Could you please collaborate with us to deploy some analytics results or functions in your system?”

“One of the major challenges faced by CDOs is that they often don't own the systems that acquire, store or process data. These systems are the responsibility of the CIO.” -- Laurent Bride, CTO of the data integration company Talend.



“Given that there will likely be overlap among the CIO and CDO responsibilities in some areas, there’s bound to be friction.”

CIO-CDO Partnership

“The role of the CIO emerged in the mid-1980s, whereas the chief data officer is a relatively new appointment recently gaining traction in the face of increasing digitalization”.

“According to the CIO.com’s State of the CIO 2023 survey, **53% of CDOs report to the CIO or top IT executive, with 35% reporting to the CEO and 7% reporting to the CFO or top finance exec.**” **“But the CDO role is evolving”**. - Helena Schwenk, vice president and chief data and analytics officer at database software company Exasol.

“CDOs from the first generation, [who] tend to care more about managing and governing their data, report to the CIO or IT leader,” Schwenk says. “The second generation tends to be more **business-oriented**, which means they could report to a leader of the business function or the CEO. And research shows that CDOs reporting to the CEO **tend to have more success**. They have sponsorship, a clear sense of direction, etc.”

Suggestions:

- 1. Top management buying is important for creating a data-driven organization. Without top management buying, it is nearly impossible to do that.**
- 2. If top management does not buy into business analytics, it would be really difficult for BI leader to make changes to the company, such as implementing a one-truth data system.**
- 3. Is there any chance for success with very limited top management buying? Yes, we will discuss this in a future lecture.**

Section 2: BI Maturity Model



John wonders: how mature the analytic capability of the company is, and where should I focus?



The DELTA Model

The Five Stages of Analytics Maturity: Developed in 2010 by **Tom Davenport, Jeanne Harris and Bob Morison** in their book, *Analytics at Work: Smarter Decisions, Better Results*. Updated in 2017 in their book, *Competing on Analytics: The New Science of Winning* (2017).

Five foundational elements of a successful analytics program (Data, Enterprise, Leadership, Targets, and Analysts).

- Read the table on the next slide by connecting it with one company that you have worked with to estimate the analytic maturity level of the company.

Analytics Maturity Model

Success Factors	Stage 1 Analytically Impaired	Stage 2 Localized Analytics	Stage 3 Analytics Aspirations	Stage 4 Analytical companies	Stage 5 Analytics Competitors
Data	Inconsistent, poor quality and organization; difficult to do substantial analysis; no groups with strong data orientation; basic reporting tools and descriptive analytics	Much data useable, but in functional or process silos; senior executives don't discuss data management; BI and basic analytics tools.	Identifying key data domains and creating data warehouses or data lakes; expansion into unstructured NoSQL data.	Integrated, accurate, common data in the central warehouse; data still mainly an IT matter; little unique data; use of unstructured NoSQL data analysis	Relentless search for new data and metrics; organization separate from IT oversees information; data managed as strategic asset
Enterprise	No enterprise perspective on data or analytics. Poorly integrated systems	Islands of data, technology, and expertise deliver local value.	Process or business unit focus for analytics. Infrastructure for analytics is beginning to coalesce.	Key data, technology and analysts are managed from an enterprise perspective	Key analytical resources focused on enterprise priorities and differentiation.
Leadership	Little awareness of or interests in analytics	Local leaders emerge, but have little connection	Senior leaders recognizing importance of analytical capabilities.	Senior leaders developing analytical plans and building analytical capabilities.	Strong leaders behaving analytically and showing passion for analytical competition.
Targets	No targeting of opportunities	Multiple disconnected targets, typically not of strategic importance	Analytical efforts coalescing behind a small set of important targets	Analytics centered on a few key business domains with explicit and ambitious outcomes	Analytics integral to the company's distinctive capability and strategy.
Analysts	Few skills, and those are attached to specific functions	Disconnected pockets of analysts; unmanaged mix of skills	Analysts recognized as key talent and focused on important business areas	Highly capable analysts explicitly recruited, deployed and engaged.	World-class professional analysts; cultivation of analytical amateurs across the enterprise

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Recap & Suggestion

- **The DELTA Model is a very handy tool for gaining a big picture of a company's analytic capacity!**
- **Highly recommended for a company starting to look into its own data analytics issues and to plan its development.**
- **If you work as a BA at a company, albeit not as a leader, check the maturity of the BA in the company, as it affects your future.**



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Section 3: BI Team working method



John organizes the working process of the BI department using a ticket-based method.

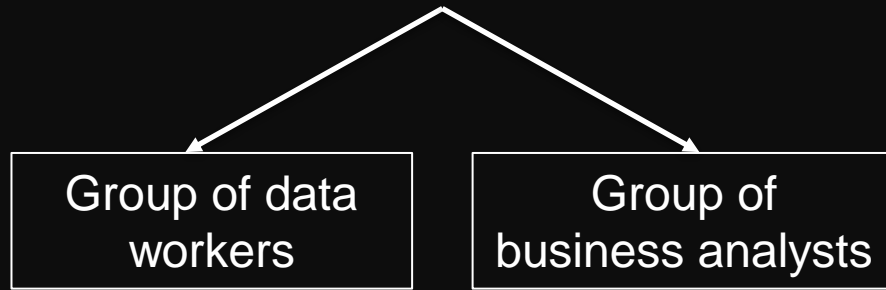


Specifically, once a service ticket is received, members of John's department will take care of both data collection and report generation and try to submit the report to the requester as soon as possible. How do you like this working approach for the BI department?

Please submit your answer at:
<https://preemo.aalto.fi/bic/>

BI department may also participate in developing new analytics application.

Business Intelligence Department



Machine Learning Department / New Product Department

Cases of H&M, F-secure, Konecranes

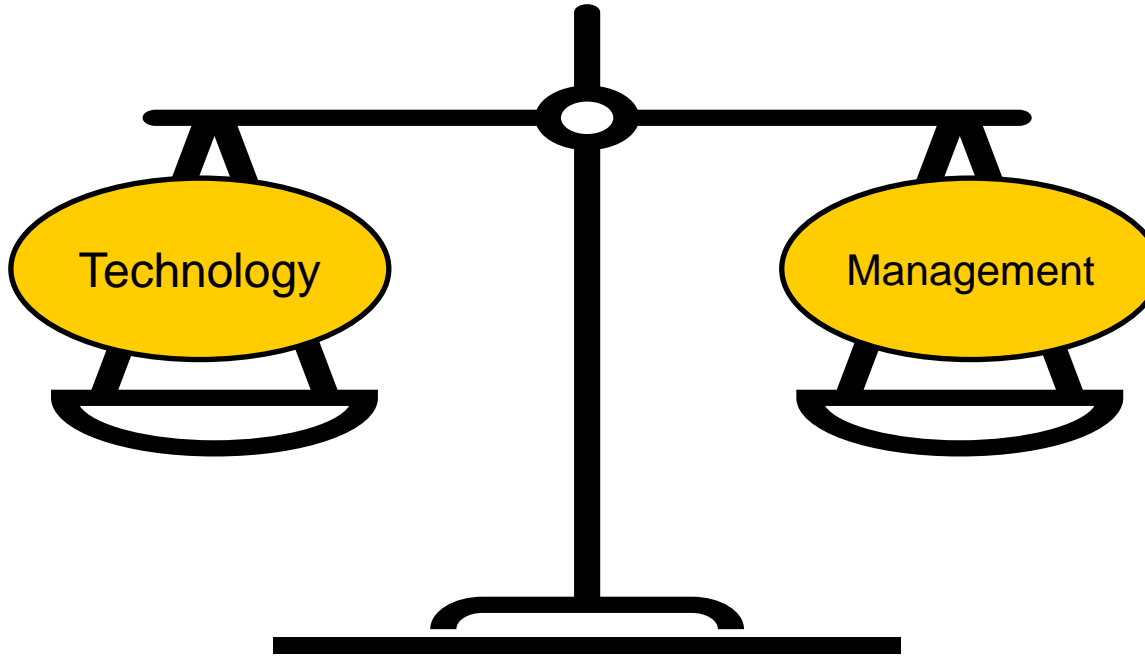
BI Department Operation Model

- **Business Intelligence as a Service!**
- **On request:** The BI department received requests from other departments or staff and generated the report in accordance with the request.
- **The most intuitive approach used by many companies.**

Do you think a company can achieve BI success by implementing good BI systems and producing a sufficient number of BI dashboards and reports to address the requests of other departments of the company?

Please submit your answer at: <https://premo.aalto.fi/bic/>

Better Analytics → Better Company?



“Like a tree falling in a forest with no one to hear it, if analysts are putting out analyses but no one takes notice, if they don’t influence decision makers’ decisions, which are still based on gut and opinion, it is not data-driven. Analytics has to inform and influence the influencers.”

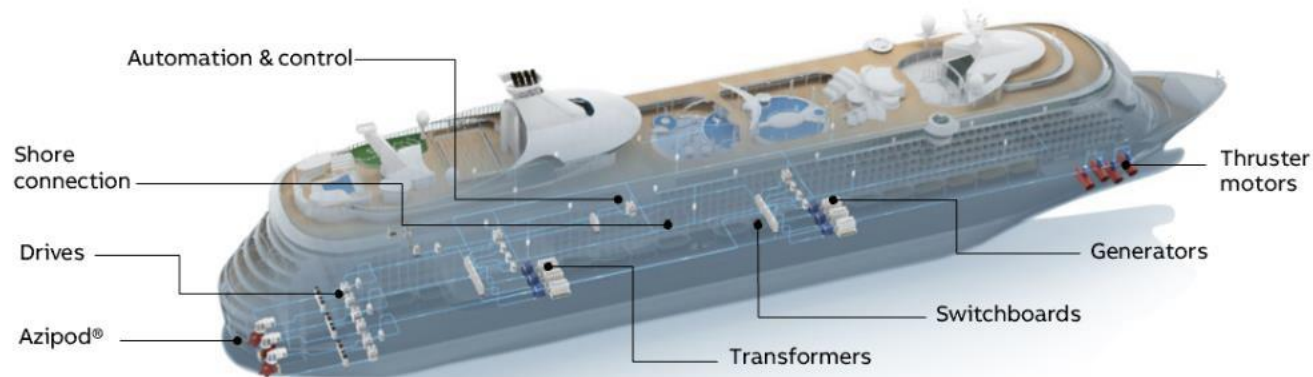
The next slides will present a master thesis findings of a BI study in a large B2B company. Please follow the case study by holding this question in mind:

As the BI department head of the company, 1) why the dashboard is created by the master thesis student, not your team? 2) How to calculate the return on investment for the BA tasks?

A case study of electronic solution group in Finland

Background: A master thesis student who worked part-time for the company for a long time and knows the essence of the team's business process.

1. The group belongs to a very large and successful B2B company.
2. The group works on designing vessels' powerplant systems. These systems include switchboards, generators, frequency-controlled drives, and transformers, to name a few.



Viljami Riekkinen, 2023,
Business Intelligence
Reporting Supporting
Business Target Execution -
A Case Company Study,
Aalto Master Thesis.

Benefits of BI tool

- “ease of accessing information from multiple different sources in one place as one of the core benefits of BI, as compared to e.g., **more traditional Excel solutions**”.
- “compare relevant project information between different projects, **making it easier to find** important but hidden insights”
- “seeing the **most relevant data in a visual format** more easily which has made it easier to make decisions on where to focus and what actions should be made.”
- “The time savings benefit is realized through **decreased amount of manual labour [for commonly used reports] e.g., from manual data exports, data manipulation, or browsing multiple files** which were more common with older solutions.

As the BI department head of the company,

1) Why the (useful) dashboard is created by the master thesis student, not your team?

Please submit your answer at: <https://presemoo.aalto.fi/bic/>

On Request

On Request: The BI department received requests from other departments or staff and generated the report with the goal of managers seeing what is happening in their domains.

How to improve? Will talk about it later

Benefits: A replacement of Excel reports with BI reports to obtain the benefits from the latest BI tools.

Challenges:

- The requester's knowledge limits the insights offered by the report.
- Insufficient communications can be conducted online.
- Some get limited use (e.g., a 5-minute lifespan).
- Sometimes, the reports need local knowledge to produce!
- The reports get outdated/inaccurate over time.

As the BI department head of the company,

2) How to calculate the return on investment for the BA tasks?

Please submit your answer at: <https://presemoo.aalto.fi/bic/>

Measuring the ROI of Business Intelligence

- Some managers view business intelligence as a cost!

Cost of investment = Software price + implementation cost + salary cost

ROI = (Returns – Cost of investment) / Cost of investment x 100



1. Time savings from automation

To measure the net returns on time savings, ask your employees for **a conservative estimate of the hours they spend manually managing data and creating monthly reports. Multiply this number by the BI users' average hourly rate, then by how many those users use BI software. Finally, multiply this figure by 12 to get the annual time savings.**

2. Increased revenue potential

Analysts can identify new business opportunities with data modeling and visualizations, optimize marketing campaigns, and improve sales performance. To calculate the potential returns from BI-enabled strategies, estimate the percentage increase in revenue you expect from using the software. Then, multiply this by the annual revenue of the specific service, product, or process you're targeting.

For example, you could estimate a 5% increase in sales revenue for a particular service due to a better analysis of consumer behavior and buying trends. If that service accounts for \$150,000 in revenue annually, the potential return would be \$7,500. In general, you'll want to be conservative with your estimates so you don't blow the potential returns of BI software out of proportion.

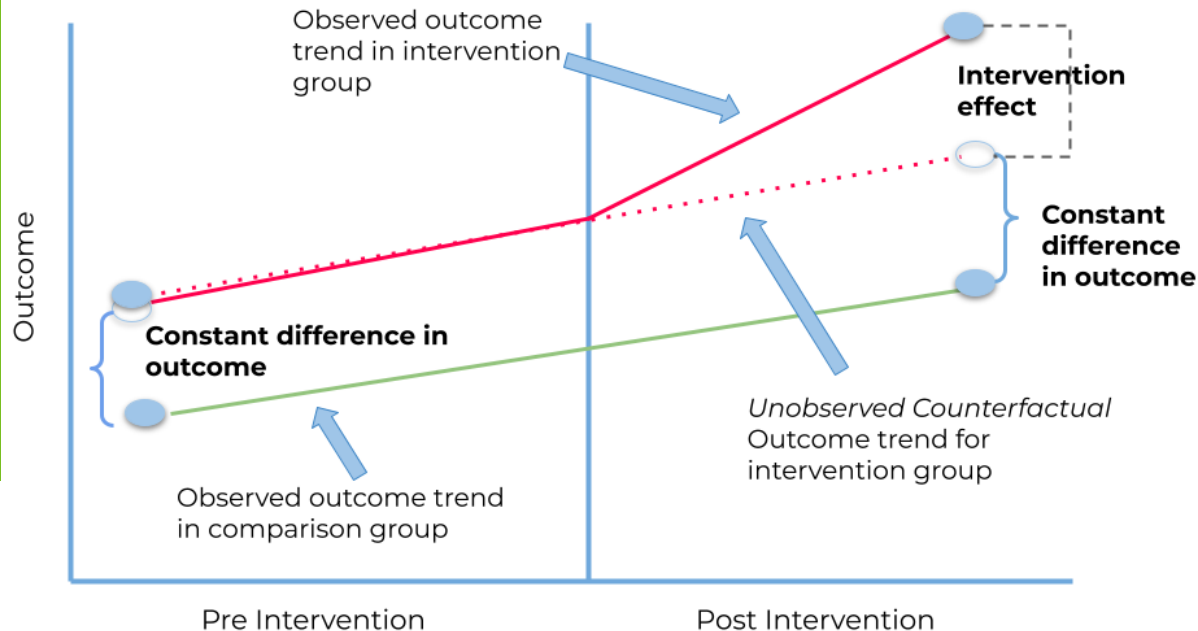
How to calculate the revenue of BA project?

The Case of a Retail Store: The BI team's analytical findings suggest that implementing discounts in conjunction with the upcoming shopping season could significantly enhance the sales of products. Based on the analytic results, a specific retail store will face a substantial shortage of these products. Consequently, the team initiated an order for the required items and requested their timely delivery to the stores.

Outcome: The BI team later noticed that the store had a small storage room, which could not accommodate the volume of the product ordered.

Difference-in-Differences Analysis

A quasi-experimental approach that compares the changes in outcomes over time between a population enrolled in a program (the treatment group) and a population that is not (the comparison group).



Recap

- **The company generally places a strong emphasis on ROI (Return on Investment), so it's important to find a reasonable and convincing way to calculate the revenue generated by your department.**
- **Failing to demonstrate the value of your department could put it at a higher risk of budget/position cuts when necessary.**

Proactive Solution?

What will happen if the BI team becomes proactive in generating many reports by working with data in their own office and offering the reports to the business users?

Please submit your answer at: <https://premo.aalto.fi/bic/>

A provision of BI reports does not mean it makes a better company



Being Proactive: Our company has established business intelligence (reporting) capability, and we work proactively.

Outcomes of providing BI reports:

1. Received, comprehended, and appreciated.
2. Received and ignored.
3. Received and annoyed.
4. Etc.

Case 1: District manager and BA



Angry Kaleo By TheEnderToonist

Link: <https://www.deviantart.com/theendertoontist/art/Angry-Kaleo-934549983>

Role-Playing...

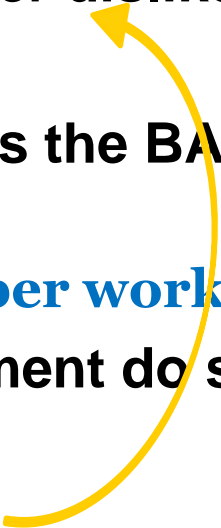
Background: A large international company with a long history.

- You are a 50+-year-old top manager in charge of the company's business in the UK area.
- The business has gone well in the past 20 years with the manager's leadership.
- You received a BA report from the BI department requesting/suggesting **something**.

Reflections

- 1. Why does the manager dislike the report?**
- 2. What would you do as the BA team leader in such a situation?**
- 3. Can the top management do something to improve the situation?**

Reflections

1. Why does the manager dislike the report?
 2. What would you do as the BA team leader in such a situation?
 - Have a team member working in the UK?
 3. Can the top management do something to improve the situation?
 - Culture building?
 - Manager replacement?
- 

Case 2: A faked 'real' dialogue

BA: Hi, we are happy to show you a dashboard that took us lots of time to develop. We believe it is relevant to your business, and it shows a tendency that the department

CFO: Sorry, the dashboard is wrong, the numbers there do not match.

BA: Oh, Sorry for that! Nonetheless, it shows a tendency that

CFO: Sorry, I cannot **trust** your dashboard because the numbers do not match.

Positive
Viewpoint



Negative
Viewpoint



Everything depends on
the way YOU see!

Case 3: BA proactive for frontline workers (not official managers) who may be unable to refuse.

The BI team's analytical findings suggest that implementing discounts in conjunction with the upcoming shopping season could significantly enhance the sales of products. Based on the analytic results, a specific retail store will face a substantial shortage of these products. Consequently, the team initiated an order for the required items and requested their timely delivery to the stores.

Outcome: The BI team later noticed that the store had a small storage room, which could not accommodate the volume of the product ordered.

Takeaway: The BA team may nicely discover a business opportunity, but this does not guarantee that the opportunity will be realized correctly. Therefore, it is crucial to see the project through to completion. This entails preparing to address unforeseen challenges that may arise.

Recap

Two possible Methods:

1. **On request:** The BI department received requests from other departments or staff and generated the report with the goal of managers seeing what is happening in their domains.
2. **Proactive provision:** The BI department actively analyzes the data and proactively provides reports to relevant departments or individuals.

Both ways can be problematic! They are insufficient.

3. **A better approach:** meet the managers, talk to them, understand their needs and generate the reports that they would like to have!



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Section 4: Resistance



Resistance to BI

- “Case 1: District manager and BA” and “Case 2: A faked ‘real’ dialogue” can be good examples of **resistance** to BA in a company.
- The optimal solution is to secure top management support and ensure that the message of the company's transition to a data-driven approach and BA personals are working on that, resonates with everyone.

Resistance to Analytic Support (Case Studies)

People are resistant to what they don't know, what they don't understand, and oftentimes, what doesn't seem important to their job or to the overall company.

1. Case Study 1:

- A retail company.
- BI report to the procurement team
- Show sales performance of products procured during the previous year
- “They don't listen”.

2. Case Study 2:

- B2B software company
- The BI department initiates cross-sale recommendations for enterprise customers.
- Resistance from the sales representative teams

To understand a resistance:

After 15 years of graduation (e.g., being 40 years old), you now become a top manager in charge of a BI department in the company, and you are a very experienced user of Python (or Power BI). Like other top managers, you are now busy with many responsibilities, you have to spend much less time interacting with data, and you decide to recruit people to work for you. You know that some other software (software XYZ) is getting more popular and more powerful than Python (or Power BI), and you are now recruiting young people to work for you.

Who will you recruit?

- Candidates who are skillful with software XYZ.
- Candidates who are skillful with Python (or Power BI).

Making the story a little bit different...

After 15 years of graduation, you become now a top manager in charge of a BI department in the company, and you are a very experienced user of **Excel**. Like other top managers, you are now busy with lots of other responsibilities, you have to spend much less time interacting with data, and you decide to recruit people working for you. You know that some other software (**MySQL or Python**) is getting more popular and likely more powerful than **Excel**, and you are now recruiting young people to work for you.

Who will you recruit?

- Candidates who are skillful with MySQL or Python.
- Candidates who are skillful with Excel.

Too Busy for Improvements?

@successpictures



People are
often reluctant
(too busy) to
change or to
learn!

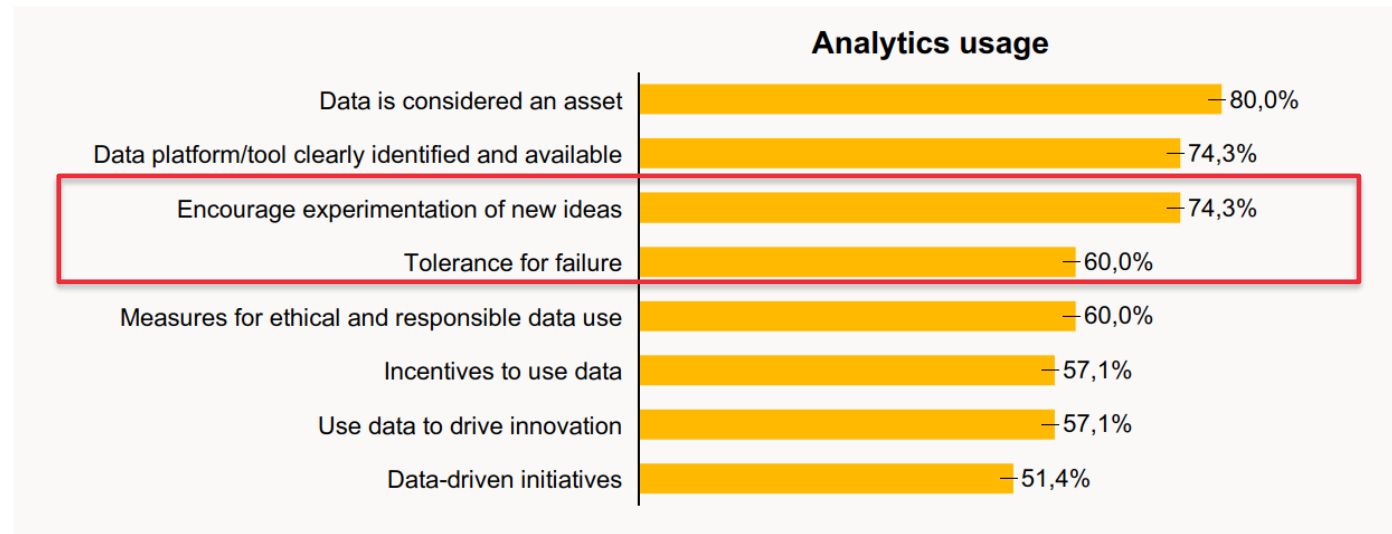
Case Study 3: Side effect or Resistance

- **A large corporation's AI project, utilizing a specific technical solution**
- **The project idea is proved not possible/good after a collaboration with a university research team on the technical solution.**
- **The team reports their findings to senior management**
- **The team is then terminated.**

Data as an Important Resource

Most Finnish companies surveyed considered data as an asset!

80% of surveyed companies recognize data as an asset, and **74.3%** have clearly identifiable and available data platforms and tools. Almost half of the surveyed companies (**51.4%**) leverage data for data-driven initiatives and to drive innovations. While **74.3%** encourage experimentation of new ideas, **60.0%** of companies have a tolerance for failure.



Section 5: Data Literacy



The CEO approaches you saying that “John, many of our staff cannot even read tables and figures. This makes it difficult for our company to be data-driven and we are far from our aim of building a data-driven culture. Can you help address this problem?”



What are you going to do to address this challenge? Please submit your answer at:
<https://presemio.aalto.fi/bic/>

What is data literacy?

- A very hot topic discussed in the recent couple of years.
- Some scholars think knowledge of Excel represents good data literacy.
- Gartner defines it as "the ability to read, write, and communicate data in context, including an understanding of data sources and constructs, analytical methods and techniques applied, and the ability to describe the use case, application, and resulting value."
- "Data Literacy Will Be the Most Critical Skill for the Workforce in 2030"

Why is data literary important?

- Some staff cannot read tables or figures. Thus, they cannot read Power BI reports.
- They don't understand the importance of data quality and may not provide reliable data for the company.
- They cannot make analytics requests to the BI department.
- They cannot use self-service BI tools.

Instrument for assessing the data literacy level of your company

1. How many people in your business can interpret straightforward statistical operations such as correlations or judge averages?
2. How many managers are able to construct a business case based on concrete, accurate and relevant numbers?
3. How many managers can explain the output of their systems or processes?
4. How many data scientists can explain the output of their machine learning algorithms?
5. How many of your customers can truly appreciate and internalize the essence of the data you share with them?

Your company staff lacks data literacy; what are you going to do?

Recruiting a consulting company to have a massive employee training event for a few days.

Develop an internal training program by the BI department and request people to participate.

Develop an internal training program by the BI department and invite people to participate freely, and offer the training regularly.

Develop online tutorial videos and make them openly available to employees.

A case company

- 1. Online tutorial videos or courses are openly available.**
- 2. Free to participate and no compulsory requirement.**
- 3. Encourage non-office workers to understand the basics of their activities.**
- 4. Have the CEO and C-level executives complete the courses and communicate this with broad company staff.**
- 5. Financially support those who are interested in advanced analytics.**

Metrics for evaluating data literacy programs and progress

1. The diversity of training courses available
2. Number of employees per course
3. Dwell time per content item
4. Number of employees passing the certification for specific D&A competencies/skills, like D&A leadership and decision making, D&A governance, information security and privacy, data science, and machine learning.
5. Employee's ability to gauge the trustworthiness of information
6. Employee's understanding of data provenance, lineage, etc.

Summary of lecture today

1. **BI leaders' Responsibility**
2. **BI Maturity Model**
3. **BI Team working method**
4. **Resistance**
5. **Data Literacy**