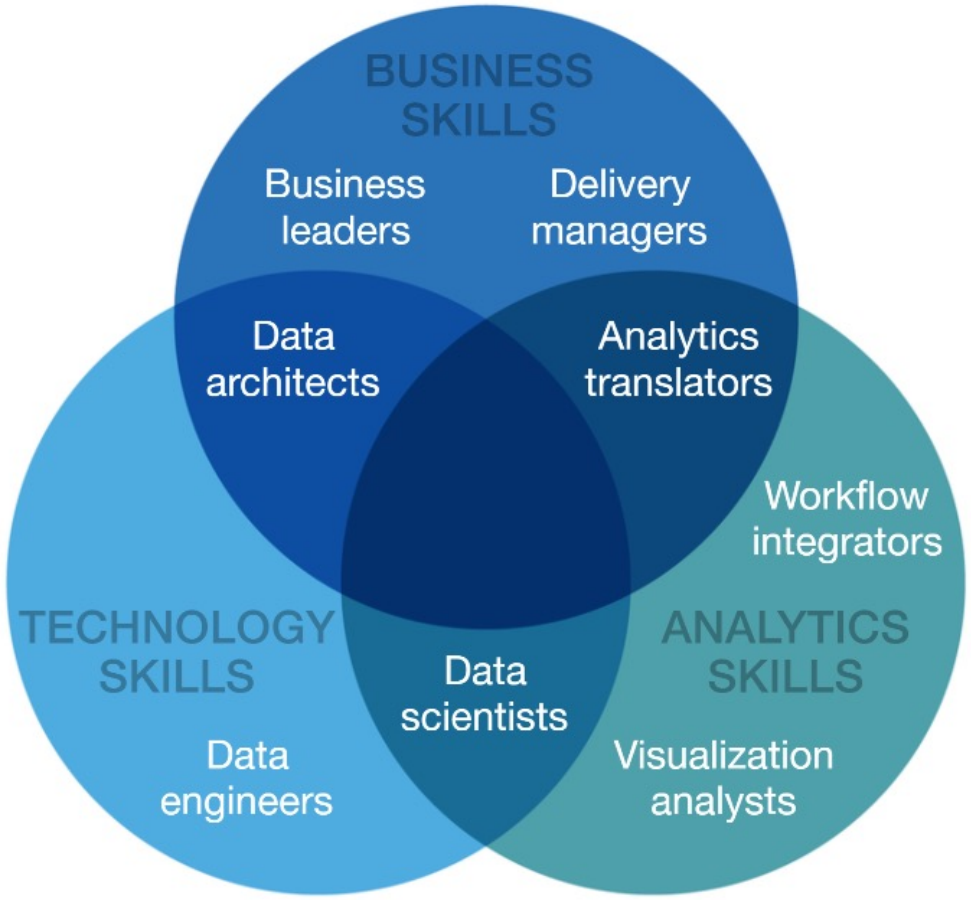
The Analytics Translator

Executive Summaries

Frank Kienle

The analytics translator is a new emerging role, its terminoly was originally coined by McKinsey



McKinsey&Company

"". **Analytics translators** perform some of the most essential functions for integrating **analytics c**apabilities in a company. They define business problems that **analytics** can help solve, guide technical teams in the creation of **analytics**-driven solutions to these problems, and embed solutions into business operations …""

Source:

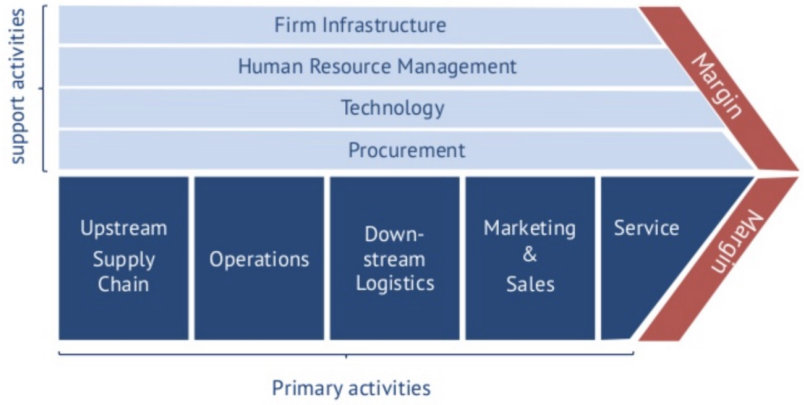
McKinsey Article, Analytics translator: The new must-have role February 1, 2018

In practice the analytics translator role is very complex and not well defined and comes with two big knowledge clusters

Business Domain practices to ensure embedding

General skills to drive executions

e.g. value chain of life-science sector



Michael Porter's value chain — lecture slide @TU Kaiserslautern, Germany

Topic of this lecture

It is relevant to have a T-shape profile, it is good to be an export in one domain

Why should you care about: Skill Domains

The role of analytics translator is not well defined, yet, an exciting, challenging, and emerging role for a future job profile.

One definition of analytics translator (McKinsey) is:

"'Analytics translators perform some of the most essential functions for integrating analytics capabilities in a company. They define business problems that analytics can help solve, guide technical teams in creating analytics-driven solutions to these problems, and embed solutions into business operations.""

One key topic especially to watch out

The job role is currently defined as the master of all subjects across the domain: business, analytics, and IT realization.

You can not learn all at once, nor is it possible to be an expert in each domain.

The focus should be a T-shape profile, where you need a solid basis of one domain and understand and evolve in other fields.

General topics to learn / tasks to perform

Topics overview to judge better on your analytics translator learning journey

Lecture Topics	Key statement executive summary	Case example to clarify one topic
Goal	Empathy, Collaboration, Resilience are key for performing the role of an analytics translator	
Skill Domains	It is relevant to have a T-shape profile, it is good to be an export in one domain	
Management	The purpose of business is to create a customer (Peter Drucker)	Writing a narrative
Problem Solving	Analytical problem solving is the art of identifying and prioritize data-driven solution paths	Miro board topic breakdown
Sales Framework	Always listen to your internal or external customer, their pains, their needs	Delivering the MVP for better overview
Product Management	Data beats opinions - listen to measurable feedback	Feedback interview: prioritization what is in and out ,
Data	Data should be findable, accessible, interoperable, and reusable	Apply open data policy, delivery of excel list
Software Design	Software design in these days is all about agile delivery.	Wiki data access for topic research
Proof-of-Value	Proving the value of data within a business context has to be key priority for every data scientist / analyst	Example of the Udemy Covid-19 analytics lecture
Project Management	Plans are only good intentions unless they immediately degenerate into hard work (Peter Drucker)	Collaborative tools like Trello, high level plan
Team Building	Best performing project teams have diverse skills and are passionate about the goal.	Spider diagram on skill sets
Analytics	Asking the wrong questions is the biggest pitfall in analytics	Kaggle survey review on job tasks and profiles
Enterprise Architecture	Foundation is important for execution	Overview operating model, tools, delivering model
Process Modeling	Everything is a process and everything is connected	Lecture process flow
Decision Making	Decision science considers data as a tool to make decisions and solve business problems	Hiring a new team member
Artificial Intelligence	Never pretend that you understand artificial intelligence	Translation service example
Causality	Knowing “what causes what” makes a big difference in how we act (J. Pearl)	Interpretation of the wheel, only causality matters

Speaking title: The slide template always shows an executive summary for each domain

Why should you care about: <domain of this exec>

What is this domain all about?

Why should you care about this domain as an analytics translator?

One key topic especially to watch out

As an analytics translator, you can not know everything.

Here is one particular topic to watch out.

This domain is especially good for learning this part.

General topics to learn / tasks to perform

Each domain is a challenge or even a full job profile by its own.

Here you will find a high level list of topics or tasks to perform.

The mentioned topics /tasks here are currated to prevent duplications and to ensure a link to other domains.

Good source to follow and revisite

One (personal) reference as starting point

Empathy, Collaboration, Resilience are key for performing the role of an analytics translator

Why should you care about: Goal

The content should illuminate the vast learning possibilities within the job role of analytics translator.

The goal is to drive your personalized curriculum of the learning journey by a better understanding of the connected terminology between other subjects.

Mission: judge better on your analytics translator learning journey

One key topic especially to watch out

A MOOC like this can mostly teach facts. However, for the translator role, one has typically gone through different positions and situations in practice with constant feedback:

Each learning path is different.

Thus, watch out for your personalized curriculum of the learning journey by identifying your interest and strength, respectively.

General topics to learn / tasks to perform

Skill Domains

Since every translator will have to moderate and translate between people, it requires multiple soft skills; these three seem to be most crucial (not only for this role):

empathy: to understand the needs, pains of all stakeholders, the clients, the different skill levels and personal circumstances

resilience: you will experience many situations that might be frustrating since, during the translation and mandatory change processes, you will experience a lot of resistance

collaboration mindset: it is all about teamwork and engaging with many stakeholders

All three soft-factors are mentioned as well in, e.g., the future AI compass framework for education (Bernard Golstein).

Good source to follow and revisite

DUALITY: Prepare Yourselves and Your Children for the Age of Artificial Intelligence, Bernard Golstein

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General topics to learn / tasks to perform

Business Literacy

It is all about value for the customer.

Analytics Literacy

It is all about using data to make better business decisions.

IT Literacy

It is all about automating a company's core capabilities.

Good source to follow and revisite

I was not able to find a comprehensive overview. Thus I designed this lecture.

The purpose of business is to create a customer (Peter Drucker)

Why should you care about: Management

Management characterizes the process of leading and directing an organization towards a goal through the allocation of resources (human, financial, material, tasks....).

As an analytics translator, you should continuously develop your management skills.

Always operate and manage in the broader context of your values (integrity), and these should be coherent to the organizational values, respectively.

One key topic especially to watch out

Either you are already an analytics translator, you are new in this role, or you are on your way to becoming a translator.

You should regularly revisit the 5 important questions by Peter Drucker.

A business narrative explains why and how a product, a service, an entire company should operate. A well-written narrative can inspire teams to work together or can articulate the purpose for yourself.

General topics to learn / tasks to perform

Mission

What is our mission? A mission statement is a short statement of why an organization exists and what is its overall goal.

Customers

Who is our customer? A customer might be an external or an internal person; consider everybody as a customer.

Value

What does the customer value? Value is the benefit you provide to fulfill a specif need.

Measure Results

What are your results? Results should be measurable by data!

Plan

What is our plan? The plan has to summarizes the actions you suggest.

Good source to follow and revisite

The Five Most Important Questions You Will Ever Ask About Your Organization by Peter F. Drucker and Frances Hesselbein

Analytical problem solving is the art of identifying and prioritize data-driven solution paths

Why should you care about: Problem Solving

Part of your job and one key competence you have to develop is the art of problem-solving.

Problems are everywhere which need to be solved, and the path from framing a problem to solving it can be complicated. Note that most problems can not be solved alone. As-a an analytics translator, you should internalize best practices on delivering results for a given situation.

Problem-solving skills are supposed to be one of the top future skill sets according to the future jobs report world economic forum.

One key topic especially to watch out

As a starting point for each problem-solving technique is the exact definition of the problem. Not that problem descriptions are often hypothesis; the precise definition might be iteratively re-phrased.

You should especially take care of the disassemble process to decompose the problem into parts. Often this is related to tree-visualization or tree decomposition techniques.

General topics to learn / tasks to perform

Problem Definition

Define context, boundaries, and the key stakeholder for the problem.

Problem Breakdown

Every problem needs to be broken down into its fundamental topics and dependencies (maybe a tree decomposition).

Focus and Prioritize

Which idea, sub-topic should be prioritized and address first, and what is the effort behind it.

Short-term Workplan

Allocated team members to fulfill the task with an accurate output description and deadline.

Analyse and Reasoning

Derive conclusions from synthesized information/data.

Convince and Sell

Storytelling and address your stakeholder needs.

Good source to follow and revisite

Bulletproof Problem Solving: The One Skill That Changes Everything, Charles Conn und Robert McLean

Always listen to your internal or external customer, their pains, their needs

Why should you care about: Sales Framework

Selling a product or service to an external customer or pushing a value case inside an organization often follows the same logical sequence.

Peter Drucker: 'The purpose of a business is to create a customer.'

The purpose of an analytics translater is to create believers.

The sales process is more than the pitch itself. It is rigorous thinking and the process of closing a deal.

One key topic especially to watch out

One of the most straightforward questions to qualify an opportunity to answer are about budget, authority, need, and timeline (BANT).

For a successful push of an analytics project within or outside your organization, first, you have to answer these questions:

- Who is the budget owner, and where does the money come from?
- Who has the authority or who is your champion to help you push?
- How valuable is the current need? What is the return on investment?
- What is the timeline? It is all about urgency, priority, and feasibility.

General topics to learn / tasks to perform

Prospecting

Identify who is your potential customer, which customer group will benefit most from your solution or product.

Qualify Opportunity

Evaluate the potential size of the business and focus on your core competencies. Qualify around budget, authority, need, and timeline (BANT).

Customer Needs

Listen to customer needs, pains, desires, business objectives, and constraints.

Customer Value

Identify benefits offering that matches prospect's needs.

Writing proposal

Put together offering with measurable benefits.

Negotiation

Present, explain the proposal and seek a mutual agreement.

Good source to follow and revisite

The New Strategic Selling: The Unique Sales System Proven Successful by the World's Best Companies, Robert B. Miller , Stephen E. Heiman , et al., ASIN : B00HG5UPUM

Data beats opinions - listen to measurable feedback

Why should you care about: Product Management

Product Management has the goal to create products/services customers love. Many questions to be answered within PM are tailored towards the (market) environment questions, the unique selling point, and prioritization.

What is feasible now, what in the future, and how to test your product as early as possible (minimum viable product) to get feedback.

As a Product Management, you should have a passion for your own product, the same holds for an analytics translator and his activities, services, products.

One key topic especially to watch out

One of the hardest things in product management is about saying no.

The most dangerous phrase is often: We might need this!

By all means, you have to listen to your clients and gather every information you can get. Still, you have to prioritize, prioritize, prioritize.

The art of prioritization can only be solved when working hard on and with your product - eat your own dog food.

General topics to learn / tasks to perform

Value Proposition

Exactly what problem will this solve?

Target Market

For whom do we solve that problem? Which target market do we serve? How big is the opportunity? What is the market size behind?

Measure Success

How will we measure success? Which metrics are used, and what is the revenue strategy?

Competitors and Differentiator

What are alternatives out there now? What is the competitor's landscape? Why are we best suited to pursue this? What is our differentiator?

Strategy and Timing

How will we get this product to market? What is our go-to-market strategy? Why now? What is the market window?

Solution Requirements

What factors are critical to success? What are the requirements to build and deliver the solution?

Good source to follow and revisite

Inspired: How To Create Products Customers Love

by Marty Cagan

Data should be findable, accessible, interoperable, and reusable

Why should you care about: Data

During each discussion with stakeholders and within each phase of your analytic journey, you will collect, generate, or process data.

The art of data gathering and processing is an art.

In summary, it is all about data management, and this is relevant to all stakeholders in the digital enterprise ecosystem, from business users to IT realization.

One key topic especially to watch out

Agreeing to the importance of data is one thing, following the underlying principles one other.

One of the top-level guiding frameworks is FAIR principles. Live-it!

Gathering data and how you should prepare it, everything has to be machine-readable, which is anyhow the directive for analytics and automation.

General topics to learn / tasks to perform

Findable

The first step in using data is to find them. Metadata and data should be easy to find for both humans and computers. Machine-readable metadata is essential for the automatic discovery of datasets and services.

Accessible

Once the user finds the required data, she/he needs to know how they can be accessed, possibly including authentication and authorization.

Interoperable

The data usually need to be integrated with other data. Besides, the data need to interoperate with applications or workflows for analysis, storage, and processing.

Reusable

metadata and data should be well-described so that they can be replicated and/or combined in different process flows or business problems.

Good source to follow and revisite

https://www.go-fair.org

Software design in these days is all about agile delivery.

Why should you care about: Software Design

Software design is the process of envisioning and defining software solutions to a given problem.

As an analytics translator, it is beneficial to understand how software design is working, why does it take so long, or how to ensure fast delivery cycles.

Priority is to learn and understand agile delivery to ensure a fast market response.

One key topic especially to watch out

Look out for the art of agile software development!

Not everybody analytics translator needs knowledge in a programming language.

However, it helps to do small things alone and get a better understanding of software engineers' mindset.

Thus, one piece of advice is to learn some hacking skills, which means learning one specif programming language.

General topics to learn / tasks to perform

Teamwork

Individuals and interactions over processes and tools.
- Projects are built around motivated individuals, who should be trusted.
- Close, daily cooperation between business people and developers.

Working software

Working software over comprehensive documentation.
- Working software is the primary measure of progress

Customer Collaboration

Customer collaboration over contract negotiation.
- Customer satisfaction by early and continuous delivery of valuable software.

Change

Responding to change over following a plan.
- Welcome changing requirements, even in late development.

Good source to follow and revisite

https://agilemanifesto.org ,

Clean Code: A Handbook of Agile Software Craftsmanship, R. C. Martin

Proving the value of data within a business context has to be key priority for every data scientist

Why should you care about: Proof-of-Value

A proof-of-concept is more tailored towards the proof of a technical realization. However, in the analytics space, we often have the situation that we can not be sure that data delivers new value - or we still need convincing arguments for the next more significant step.

Proof as fast as possible the value, especially the speed, is essential with constant feedback cycles.

One key topic especially to watch out

The CRISP process is a proven method to apply the data-driven value cycle from business understanding to delivery, focusing on iterative delivery cycles.

Within the CRISP process, you will spend 70-80% of the time within the project's first phases, within the link of the business problem statement and data understanding.

It is all about the semantics and meaning of the data. The art of selecting the correct data at the beginning of the process is vital for speed. As a translator, you should focus on this part for quick and proper delivery.

General topics to learn / tasks to perform

Business Understanding

Understanding the project objectives and requirements from a business perspective.

Data Understanding

Collect and become familiar with the data, identify data quality problems, discover first insights into the data.

Data Preparation

The data preparation phase covers all activities needed to construct the final dataset.

Modeling

The mapping of the input data to a desired output by applying appropriate mathematical techniques.

Evaluation

The key objective is to determine and measure the mathematical quality and link to business requirements and especially to measurable business outcomes.

Deployment

Determine how knowledge or information will be propagated to users.

Good source to follow and revisite

CRISP-DM: https://en.wikipedia.org/wiki/Cross-industry_standard_process_for_data_mining

Plans are only good intentions unless they immediately degenerate into hard work (Peter Drucker)

Why should you care about: Project Management

You have a team and a task to be complete to reach a specific outcome, and someone has to be the bull terrier to reach it: welcome in the hard world of project management.

As an analytics translator, sooner or later, you will be in charge of managing something towards a deadline. Within all tasks described in this lecture, the duty of project management is often crystal clear.

Still often challenging and contradicting to other skills within an analytics translator journey with less room for interpretation.

One key topic especially to watch out

As a project manager, you need for sure resilience, and hopefully, you don't lose a positive attitude.

Project management is divided into phases and respective deliverables. Watch out to be very good at communicating the objectives, expectations, and often unpleasant situations.

The art of persistent claiming without burning your partner is the skill to learn from good project management practice

General topics to learn / tasks to perform

Initiation

A new project or a new phase of an existing project has to be properly initiated by obtaining authorization, budget, empowerment to start the project or phase.

Planning

The scope of the project is key for success which all about refining and breakdown of the objectives, and by defining the course of action required to attain the objectives that the project was undertaken to achieve.

Execution

Those processes performed to complete the work defined in the project management plan to satisfy the project specifications

Control

It is always required to track, review, and regulate the progress and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes.

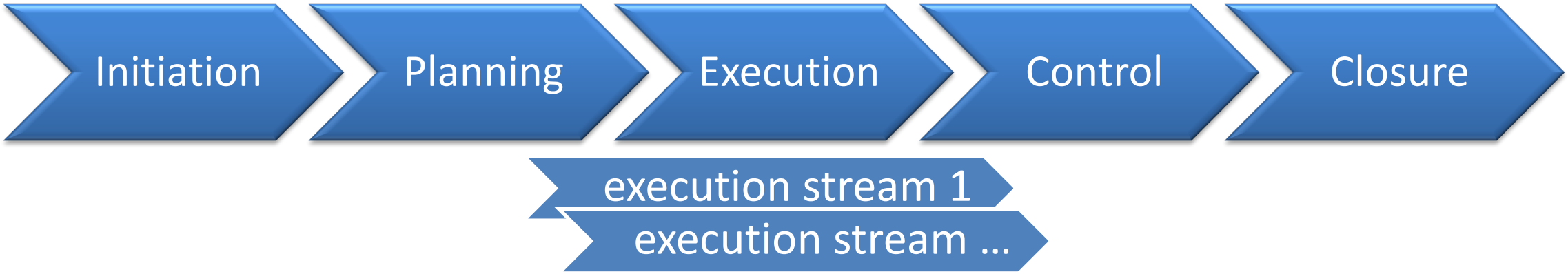
Closure

Those processes performed to finalize all activities across all Process Groups to formally close the project or phase.

Good source to follow and revisite

A Guide to the Project Management Body of Knowledge (PMBOK Guide), PMI.org

Plans are only good intentions unless they immediately degenerate into hard work (Peter Drucker)



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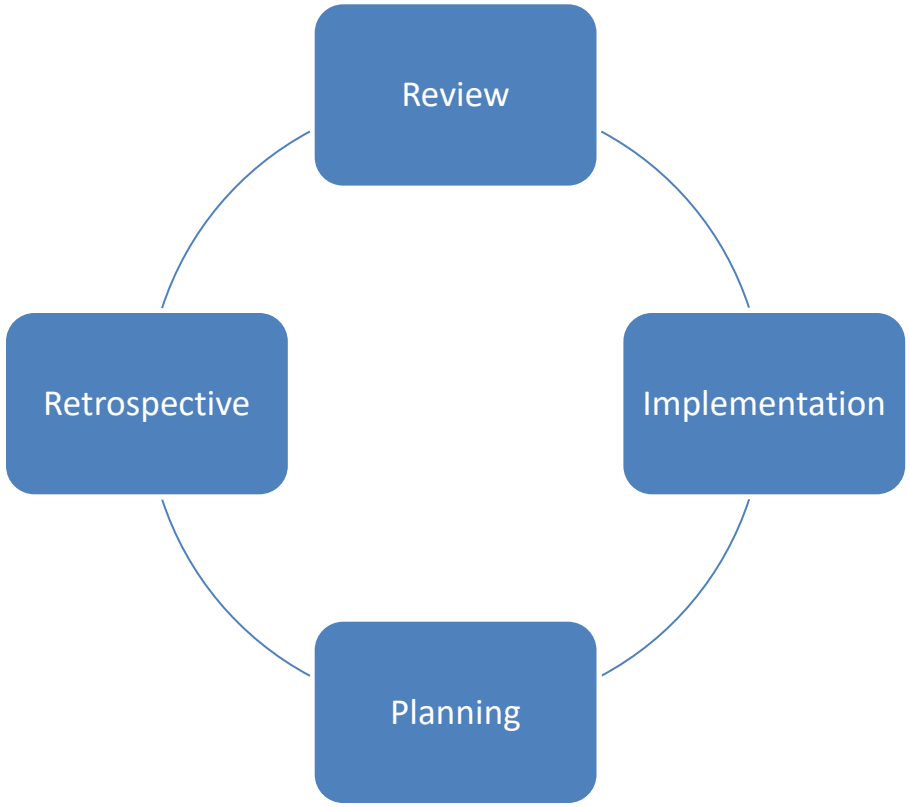
Project management practices and agile execution can be well aligned to execute towards a long term execution



Sprint Planning

Is a time boxed effort (e.g. 2 weeks), with duration and tasks agreed across stakeholders

Implementation

Dynamic implementation of agreed tasks of the sprint, typically with daily synchronization of team members to ensure balancing and support

Review

reviews the work that was completed and the planned work that was not completed

Retrospective

Continuous feedback session within each sprint to improve delivery quality and team efficiency

sprint 1 | sprint 2 | sprint 3

Project execution stream

Best performing project teams have diverse skills and are passionate about the goal.

Why should you care about: Team Building

Only with a strong team, you can deliver results; The grouping of the right skills paired with an inspiring goal is vital for success.

A golden rule in analytics is that innovation is often done when small teams work directly with the customer.

Of course, many soft factors for team building have to be developed over time like, trust, empowerment, and fun.

One key topic especially to watch out

Analytics is a team sport since you can not solve it alone. Most of the problems are too complicated to solve.

There are often some lone fighters in the business, IT, or analytics who think they can solve everything by themself. Try to balance the level of knowledge.

Take care that the team is assembled for the required skills.

Focus on diverse skills across the business, IT, and analytic know-how.

General topics to learn / tasks to perform

Attitude

People need to work and want to take an interest in it. Under the right conditions, processes, purpose, they can enjoy it.

Direction

People will direct themselves towards a target that they accept, it is strongly linked to the why of a business

Responsibility

People will seek and accept responsibility under the right conditions.

Motivation

Under the right conditions, people are motivated by the desire to realize their own potential.

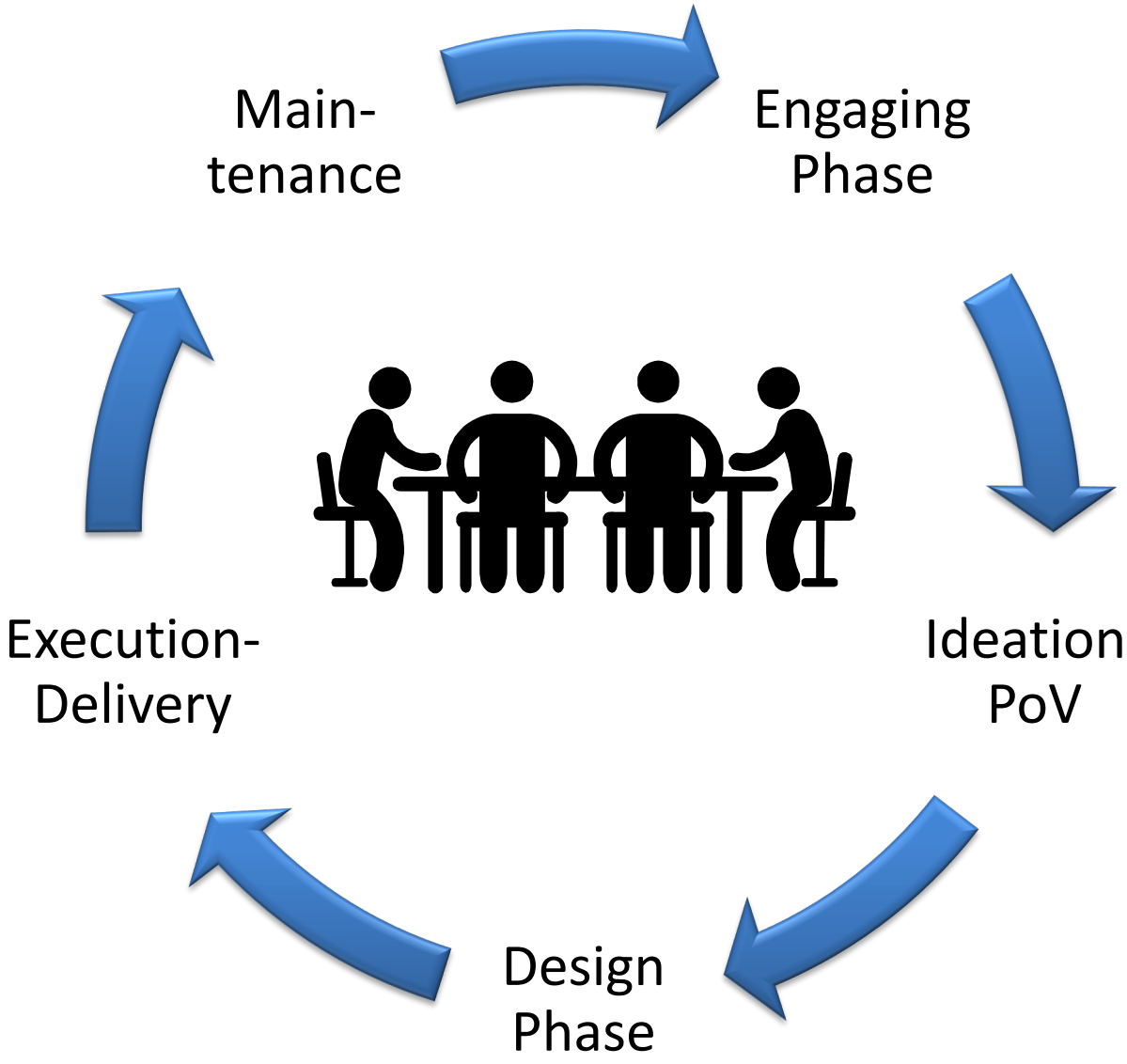
Creativity

Creativity and ingenuity are widely distributed and mostly underused. Creativity is mainly stimulated by the diversity of the team and the push outside your comfort zone.

Good source to follow and revisite

Organize for Complexity: How to Get Life Back Into Work to Build the High-Performance Organization, N. Pflaeging and P. Steinmann

Take care that the team is assembled for the required skills



The required skills changes across an application livecycle, the application type

Fokus on the skill mix!

Asking the wrong questions is the biggest pitfall in analytics

Why should you care about: Analytics

The term analytics often holds a duality in the meaning, the break down of a problem, and the hypothesis's data proof.

- An analysis is a process of breaking a topic into smaller parts to gain a better understanding. It is the art of forming a hypothesis.
- The proving or reasoning of an idea on data falls into the field of statistics.

Both skills are just essentials for an analytics translator and bridge the business to the mathematical world.

One key topic especially to watch out

Statistics are always present whenever you work with data or when pushing data applications towards business.

The art of statistics can be learned and thought precisely via fantastic books, MOOC, lectures.

Take care that you have a solid basis of statistics. Otherwise, you will end up in questions like.

Why should be your mathematics better than mine

General topics to learn / tasks to perform

Statistics

Statistics is the discipline that concerns the collection, organization, analysis, interpretation, and presentation of data.

Descriptive

Descriptive analytics is the interpretation of historical data to better understand changes that have occurred in a business.

Predictive

Predictive analytics is the art of predicting a future event's probability based on the observation of historical events.

Prescriptive

Prescriptive analytics suggests decision options on how to take advantage of a future opportunity or mitigate future risk.

Good source to follow and revisite

https://www.kaggle.com

Foundation is important for execution

Why should you care about: Enterprise Architecture

All analytics capabilities discussed in this lecture has to be embedded in the company's overall foundational execution technology setup.

"The enterprise architecture is the organizing logic for business processes and IT infrastructure, reflecting the company's operating model's integration and standardization requirements." (see book ref.)

Every adequate foundation for any analytics execution depends on tight alignment between business objectives and IT capabilities.

One key topic especially to watch out

Watch out for the underlying operating model!

Only when you know which core processes are relevant for your organization you will be able to embed analytics solutions.

Analytics and every data-driven endeavor require top-level management back-up, thus focus on topics aligned with our organization's strategic path.

General topics to learn / tasks to perform

Operating Model

The operating model is the necessary level of business process integration and standardization for delivering goods and services to customers.

Data Reference Model

Enables understanding and the meaning of the data, how to access it, and how to leverage it to support performance results. Focus is the technical realization of the FAIR principles.

Application model

Analytics application architecture to share and reuse standard solutions to benefit from economies of scale.

IT Infrastructure

Component-driven, technical framework categorizing the standards and technologies to support and enable the delivery of services.

Engagement Model

The technology foundation aligned with the people core capabilities defines the analytics engagement model. The analytics engagement model provides for alignment between the analytics capabilities and business objectives of projects.

Good source to follow and revisite

Enterprise Architecture As Strategy: Creating a Foundation for Business Execution by Jeanne W. Ross , Peter Weill

Everything is a process and everything is connected

Why should you care about: Process Modeling

Business processes are used to standardize the execution regardless of who is performing the activities. Better and new innovations in processes and their implementation can increase the market competitiveness.

It can support faster innovation cycles, a better quality of your end product, better customer service, and many other value levers of your business.

Overloaded, complex, or nonstandardized processes will slow you down in each activity.

One key topic especially to watch out

With new analytics applications, you should take special care of the future to be modeling.

Automated analytics and new human to machine interfaces will give an entirely new process flow focusing on minimum touchpoints between the user and computer/machine. The focus should always be usability and the human in the loop of an analytics application.

Note that every change in a process will affect humans' work and be directly linked to change management.

General topics to learn / tasks to perform

Identify Core Processes

Core business processes and functions are those that have the most significant impact on your company's operations.

As-is Analysis

As-is process analysis is a process management strategy that identifies and evaluates a business's current processes.

To-be Design

To-be process design is a process management strategy that defines future business processes.

Monitor execution

Process monitoring aims to track process execution and to analyze process conformance and efficiency.

Note that technical support is accelerating in this field, e.g., process mining tools to efficiently analyze and monitor processes.

Good source to follow and revisite

https://www.bpmn.org

Decision science considers data as a tool to make decisions and solve business problems

Why should you care about: Decision Making

Good decision making is an art, while we should always distinguish between decisions taken by humans and automated decisions by computers.

- We all have to make decisions continuously, mostly on incomplete information (behavior science/economics).
- Many business decisions can be fully automated, based on data (decision science).

In both cases or in hybrid cases, delivering valuable decisions with data support means making a decision under uncertainty.

One key topic especially to watch out

How does data-driven flow back in companies' decisions, how are they integrated into the business process and the overall enterprise framework?

Even with the best derived analytical solution, you will fight over and over against systematic distortions towards opinions, gut-feelings, wrongly selected data sets.

The topic of bias is a challenge for human-made decisions and for machine inferred decisions, respectively.

General topics to learn / tasks to perform

Cognitive bias

A cognitive bias is a systematic pattern of deviation from the norm in judgment where people tend to replace a complicated question with one which is easy to answer

Data Storytelling

Visual Storytelling is the process of using a visual narrative to communicate data insights to your audience to explain, convince, or support decision-making.

Statistical bias

Statistical bias is a disproportionate weight in favor of or against a business hypothesis. This is mostly caused by a data set analyzed, which is not representative of the problem.

Automated Decision Making

Automated decision-making is the process of making a decision by automated means without any human involvement

Good source to follow and revisite

Thinking, Fast and Slow, D. Kahneman

Storytelling with Data: A Data Visualization Guide for Professionals, C.N. Knaflic

Never pretend that you understand artificial intelligence

Why should you care about: Artificial Intelligence

Every decision based on data will phase sooner or later a challenge of higher automation, of the need towards smarter execution.

The 'I' in every solution is towards the intelligent automation of everything.

Artificial Intelligence is doubtless one of the biggest trends these days, and new applications and ideas pop up everywhere. Ensure that you understand the direction and feasibility of the ongoing development.

One key topic especially to watch out

The analytics translator's biggest challenge is balancing hope, fears, wishes, and myth in this topic.

Watch out for the complexity of this topic, and try to embed services that can be consumed rather than develop new AI applications.

By all means, take care of the human-centric design. The user has to accept the solution and should be integrated with the highest ethical standards.

General topics to learn / tasks to perform

Reasoning

The reasoning is the process of deriving logical conclusions and making predictions from available data and modeled knowledge.

Knowledge Representation

Knowledge representation focuses on designing computer representations that capture information about the world that can solve complex problems.

Machine Learning

Machine learning algorithms build a model based on sample data to make predictions or decisions without being explicitly programmed.

Vision Recognition

Computer vision tries to gain a high-level understanding of digital images or videos to automate tasks that the human visual system can do.

Robotics

The goal of robotics is to design intelligent machines that can help and assist humans in their day-to-day lives focusing on moving objects.

Natural Language Processing

Natural language processing (NLP) focuses on the interactions between computers and human language, mainly how to program computers to process and analyze large amounts of natural language data.

Good source to follow and revisite

Life 3.0: Being Human in the Age of Artificial Intelligence, Max Tegmark

Knowing “what causes what” makes a big difference in how we act (J. Pearl)

Why should you care about: Causality

Understanding causality is the holy grail of decision making and analytics.

It describes the relationship between a cause and its effect. There are often complex dependencies between actions one can take, and the final seen result in complex environments.

As an analytics translator, you will often face the challenge of understanding the critical influencing factors of a decision; usually, there are many hidden factors and biases.

One key topic especially to watch out

Bringing things into a causal chain can not be proven on historical data.

The right balance between defining a valid hypothesis to solve a business problem and to set up and performing the initial 'test' within the complex reality is the thin line between talking vs. performing.

The causal theory is the ultimate push and call to action for doing something.

In summary, doing it and measuring it over endless planning.

General topics to learn / tasks to perform

Correlation

Correlation is any statistical association and refers, typically in a business context, to the degree to which a pair of data points are (linearly) related to each other.
Correlation does not imply causation, and developing a sense for the dependencies will lead to better decisions.

Probabilities

Probabilities in business are used to express the chance or risk of a particular observation, our prior knowledge, and how strong we trust the result. The math applied in this context is called the Bayesian theory.

Manipulation

Under these theories, x causes y only if one can change x to change y. This often means experimentation by doing an A/B test or other testing strategies.

Causal Reasoning

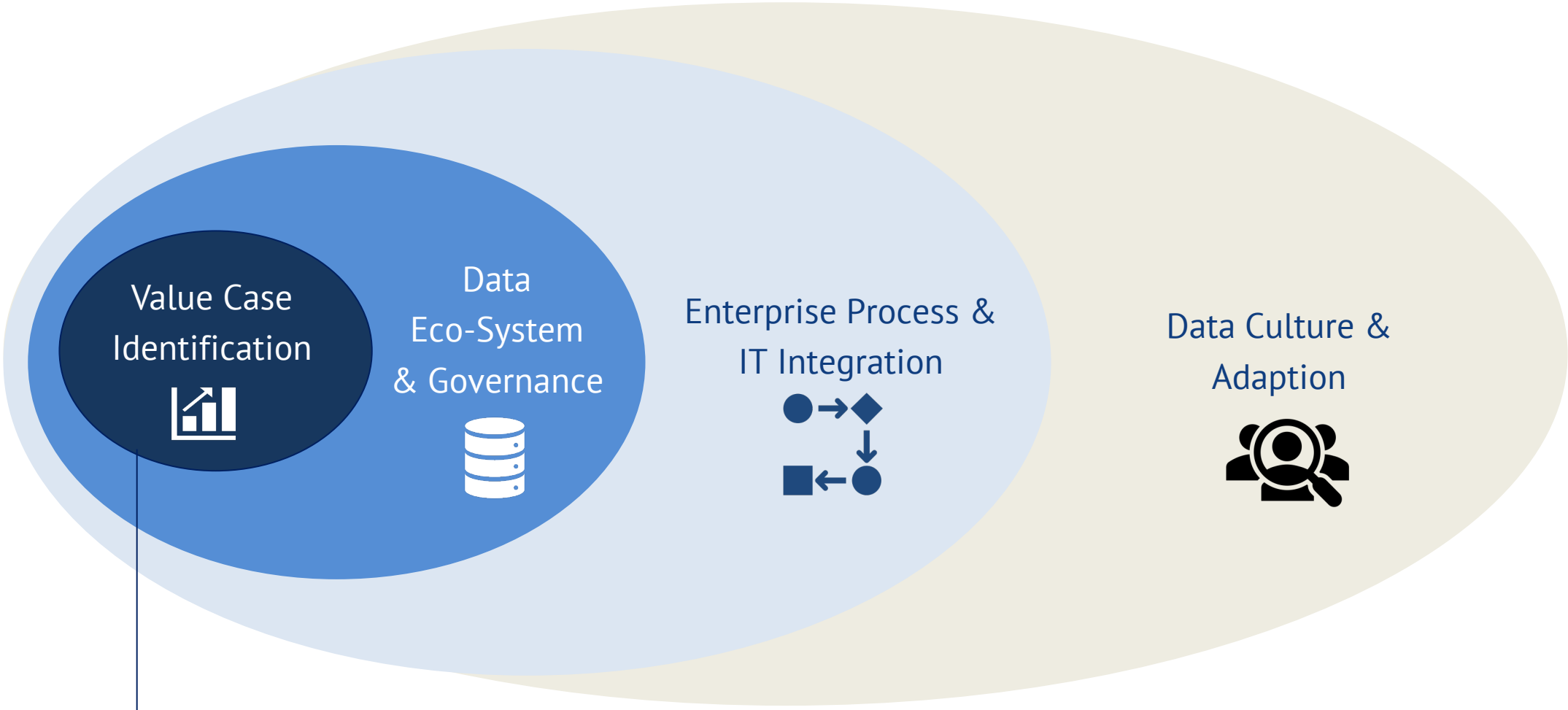
Causal structures or relationships are typically represented by process flows (arrows) between the observations, pointing from cause to effect.

Good source to follow and revisite

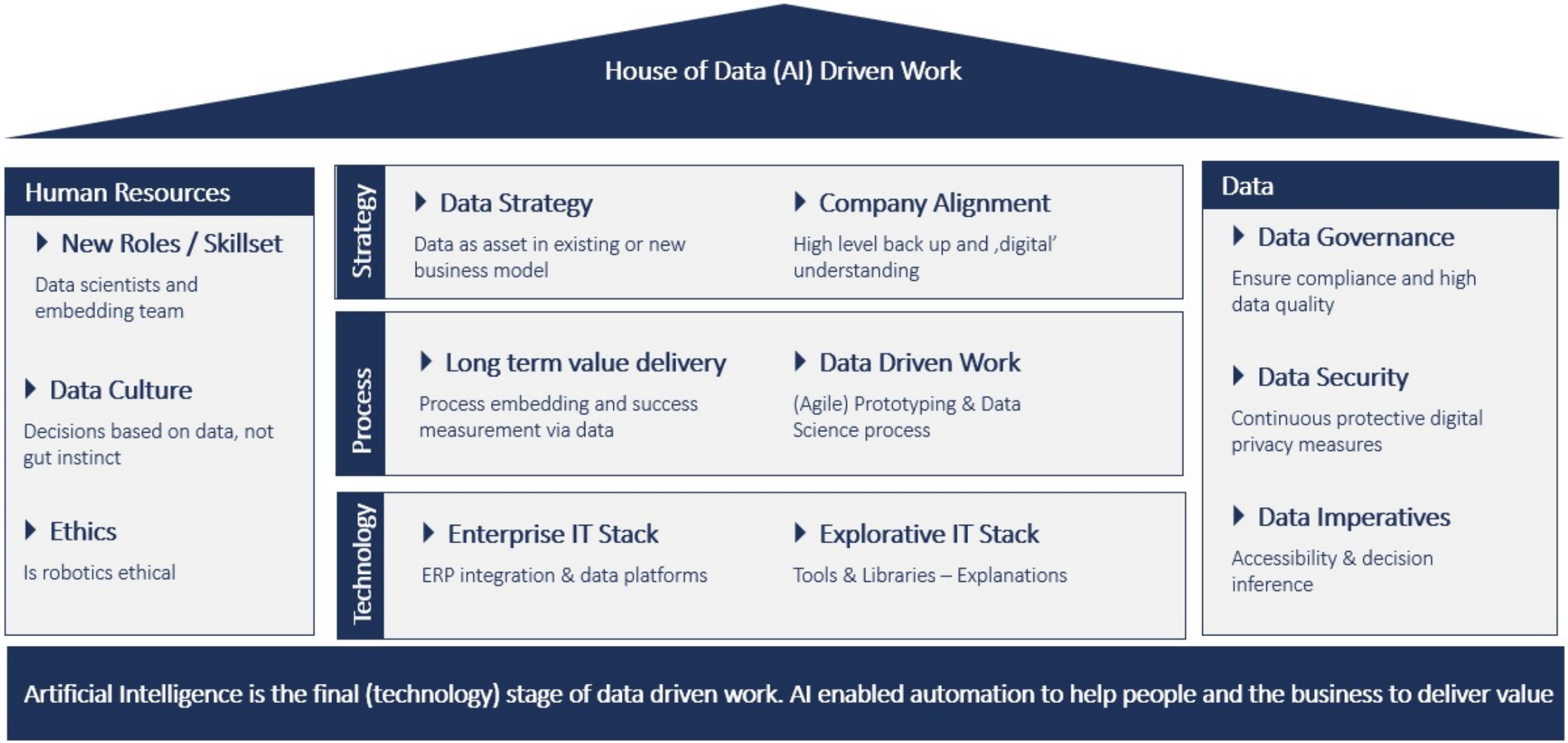
The Book of Why: The New Science of Cause and Effect
by J. Pearl and D. Mackenzie

Backup

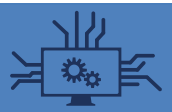
Delivering value through data in an enterprise requires the focus on many different aspects



CRISP-DM belongs to the first phase of value identification and initial value proof

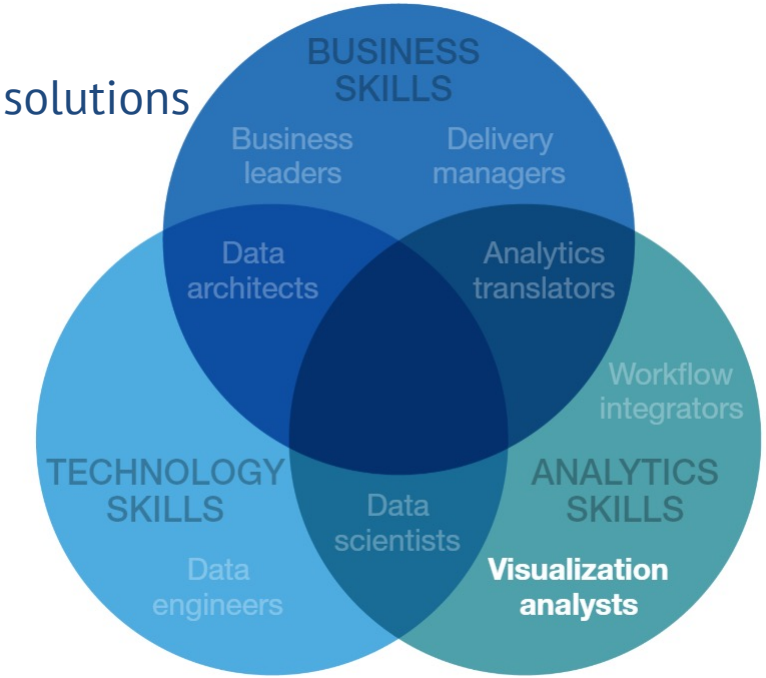

House of Data (AI) Driven Work
Human Resources
New Roles / Skillset
Data scientists and embedding team
Data Culture
Decisions based on data, not gut instinct
Ethics
Is robotics ethical
Strategy
Data Strategy
Data as asset in existing or new business model
Company Alignment
High level back up and ‚digital' understanding
Process
Long term value delivery
Process embedding and success measurement via data
Data Driven Work
(Agile) Prototyping & Data Science process
Technology
Enterprise IT Stack
ERP integration & data platforms
Explorative IT Stack
Tools & Libraries – Explanations
Data
Data Governance
Ensure compliance and high data quality
Data Security
Continuous protective digital privacy measures
Data Imperatives
Accessibility & decision inference
Artificial Intelligence is the final (technology) stage of data driven work. AI enabled automation to help people and the business to deliver value

Analytics Machine Learning Project Typus

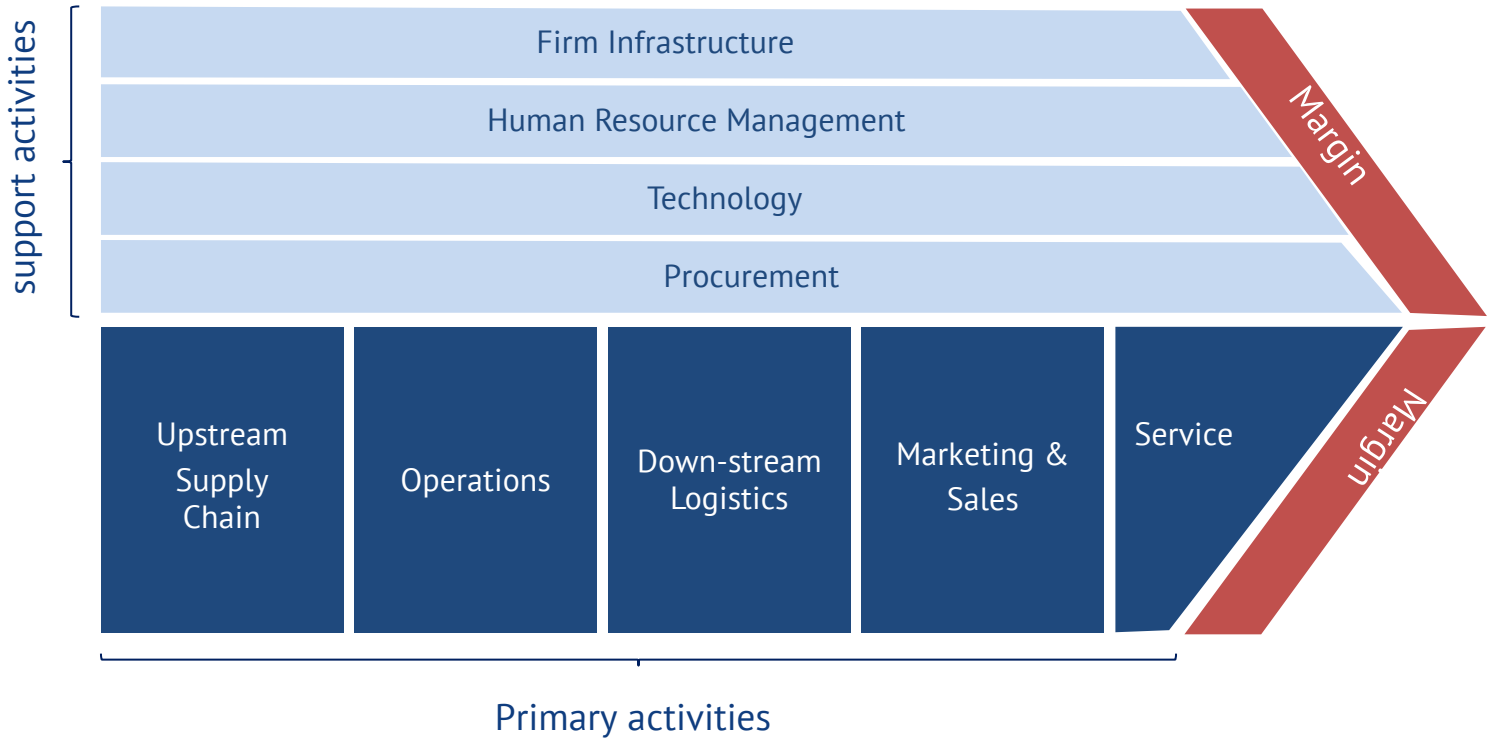
	 Data-Driven Innovation	 Explorative Analysis	 Process Integration	 Development	 Operation
Problem Solving Requirement	100%	80%	60%	20%	0%
Who	Industry Experts Data Science business translator	Data Analysts	Data Science Modeler Data Science practitioner / apply algorithms	Analytics System architect Developer	Data Science practitioner
Goal	Identify opportunities for business innovation and transformation Create prototypes Deductive approach	Explore the data Identify trends and shape Find outliers Inductive approach	Develop new solutions Offer better approach	Enhance existing solutions Model management	Identify abnormalities Fix problems Perform additional testing
How	Engage industry representatives and data scientists to find valid use cases	Invest sufficient resources (time, financing, people) for performing the explorative analysis	Get formal approval for prototype development and integration (ROI) Might include multiple versions and stages	Typically a stand-alone LoB activity	Cross-functional tactical projects
Data Volume	Little	Massive	Selective	Selective	Selective
Data Delivery	Ad-hoc	Data dump	ERP	ERP/Cloud	ERP/Cloud
Persons per project + business	2-3	2-5	5-10	5-10	2-5

There exist many additional roles within the analytics space

Delivery managers: Deliver data- and analytics-driven insights and interface with end users
Business leaders: Lead analytics transformation across organization
Analytics translators: Ensure analytics solve critical business problems.
Data architects: Ensure quality and consistency of present and future data flows
Data engineers: Collect, structure, and analyze data
Data scientists: Develop statistical models and algorithms
Workflow integrators: Build interactive decision-support tools and implement solutions
Visualization analysts: Visualize data and build reports and dashboards



Example of a value chain (Porter) which focuses on a valuable product /service rather than on departments and financial categories



Value chain analysis is the process of looking at the activities that go into changing the inputs for a product or service into an output that is valued by the customer.

Data science has to bring a value proposition to an enterprise

Data scientists should be always aware about the benefit of their work.

Does the activity contribute to topline growth of a company

→**Top line** refers to a company's revenues or gross sales

Does the activity contribute to bottom line of a company

Bottom line is a company's income after all expenses have been deducted from revenues

Both the top-line and bottom-line numbers are useful in determining the financial impact of a data science task

Top line indicates how **effective** a company is at generating sales and revenue and does not take into consideration operating efficiencies (e.g. even with negative bottom line)

→ **Data Science Projects focus on new customers, new markets, new products**

The bottom line it is all about how **efficient** a company is with its spending and managing its operating costs.

→ **Data Science Projects focus on optimization (mostly automation)!**

Decisions are the heart of any activity within the value chain

We have to make decisions over and over again, and each decision affects the future. Typically we distinguish between:

- the strategic decisions with a focus on future years,
- tactical decisions with a focus on the next months,
- operational decisions with a focus within the day or week