

# ISED MAM

## Information Systems Engineering Discipline Maturity Awareness Model

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*IT is a very young discipline. Nonetheless, it plays a crucial role in companies. For decades, **IT continues to face the same apparently unsurmountable obstacles**. People have different views on IT. This creates conflicts between belief systems. Furthermore, IT is also very prone to influences. Nevertheless, **a tremendous potential remains untapped**. But it will only be accessible through a deeper understanding and a more belief system. By describing levels of maturity and by providing a path to a higher level of maturity, **ISED MAM** aims to contribute to the growth of the **corporate IT** discipline (professional domain).*

# What can be learned by this presentation?

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- ▶ Information is a critical and high-value resource. The challenge for a larger company or organisation is to preserve the value of its information and to fully exploit it. Therefore, it needs a strong Information Component and Information Capabilities. This component should be effective, integrated, aligned, flexible, manageable and innovative to provide a strategic advantage and to contribute to the organisation's prosperity and longevity.
- ▶ The mental picture or world view determines, among others, the work environment, roles and responsibilities, relations, objectives, missions, approaches, design decisions, norms, competencies. It is critical to recruit the right and outstanding engineers and to allow them to do their job. The way the information component is engineered is a key factor in the value creation and innovation.
- ▶ IT departments face for decades the same types of problems over and over again. Yet, they operate all this time by the idea of “developers developing software and put technologies at work to satisfy business workers and their objectives in response to an expressed need, problem, opportunity or desired solution formulated in a business demand”. Recently, the aspect of speed and continuous delivery has been added to this idea. The underlying driving world view is imperfect. And the obstacles and problems caused by one world view or belief system can only be solved by a new and more mature view and by a deeper understanding. We need another paradigm. A more holistic and mature view would be welcome. But which one and how can an organisation drive this evolution?
- ▶ ISEDMAM dissects the mental picture into aspects. It presents different views of different levels of maturity on these aspects. These views allow to evaluate the current maturity. They also show a direction for maturation. But to mature in a smoother way, we need to understand concepts like discipline, coherence, cognitive dissonance, maturity, open and closed mind. We need to understand the mechanism or process by which our view matures. Finally, some widespread misguiding beliefs about IT are challenged.
- ▶ ISEDMAM's intent is to contribute to the progress of the IT discipline towards a higher level of maturity by changing the way we view corporate IT and by offering a much deeper insight in some aspects. This is the key to professionalisation and to more prosperous organisations.

Enjoy it. If you find it worth, share it. Thank you.

# Content

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- ▶ Part 1: Introduction
- ▶ Part 2: About Professional Discipline
- ▶ Part 3: Maturity
- ▶ Part 4: Maturation Processes & Mechanisms
- ▶ Part 5: Set of Dimensions
- ▶ Part 6: Challenging a Few Beliefs
- ▶ Part 7: Conclusions

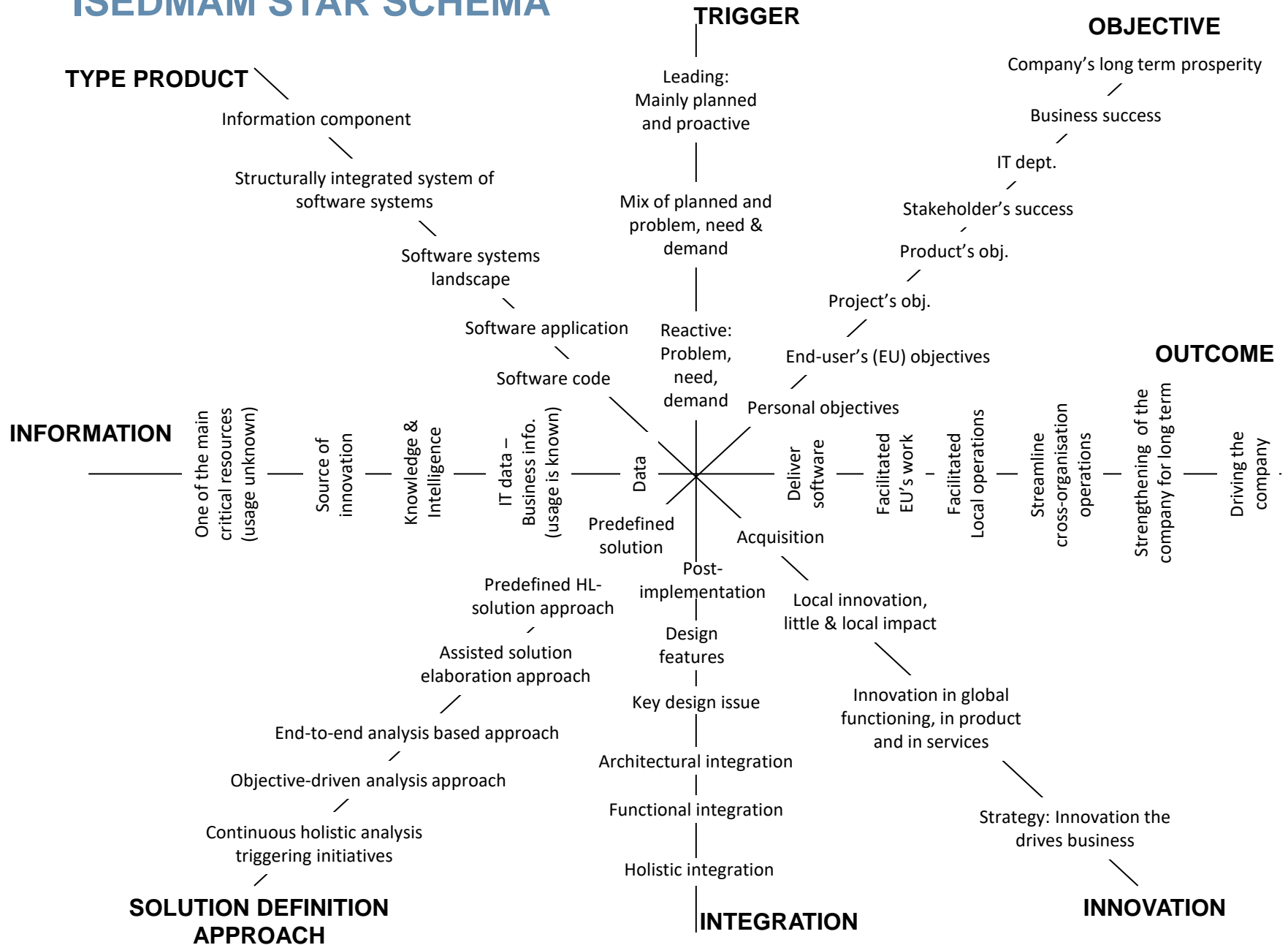


STEP BY STEP  
BUILDING OF  
ISEDMMAM

**Most recent version at:**

<http://www.taurus-ee.com/Publications/TEE - ISEDMMAM.pdf>

# ISEDAM STAR SCHEMA



# INTRODUCTION

# A Discipline Maturity Awareness Model ?

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**GOAL:** TO INCREASE THE 'AWARENESS' ABOUT DISCIPLINE MATURITY

This awareness can then drive and used as a tool for guidance of the evolution of IT

## ▶ **Domain: CORPORATE IT**

- ▶ **NOT:** consumer IT, website development, software games development, and so on  
*(these are completely different contexts)*

## ▶ **“Intellectual Maturity”**

- ▶ **‘Intellectual’:** How we perceive the discipline, how we think about the discipline, about the depth of the insight in the discipline, the drivers and intentions of practitioners, ...
- ▶ **‘Maturity’:** Progress towards a fully developed discipline, towards a correct view on the discipline, towards an increased awareness of the true potential of IT and towards the ability to maximally exploit it.
- ▶ **Transforming our belief system from obstacle into a new driving force**
- ▶ **NOT about “practical maturity”** (degree of implementation, degree of mastery)
  - ▶ Practical skills (doing): knowing standards, better applying a framework, following principles and “best practices”, improved organisation, more formalised processes and increased management, improvement loops, mastering methods, ...

# Maturity: A Positive Evolution

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MATURATION = **PROGRESS**

**POSITIVE** Evolution

TOWARDS



Harmony  
Balance  
Wisdom  
In-depth understanding  
Awareness  
Holism  
Independence  
Strength  
Sustainability  
Fulfilment  
Respect  
Well-being  
Integration  
Elegance

...

# Maturity Theory of Chris Argyris

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<b>IMMATURITY</b>	<b>MATURITY</b>
Passive	Active
Dependence	Independence
Behave in few ways	Capable of behaving in many ways
Erratic shallow interest	Deep and strong interest
Short term perspective	Long term perspective (past + future)
Subordinate position	Equal or superior position
Lack of awareness of self	Awareness and control of self

Note: This theory is about organisational behaviour. However, it gives a direction to the thinking about maturity in IT.

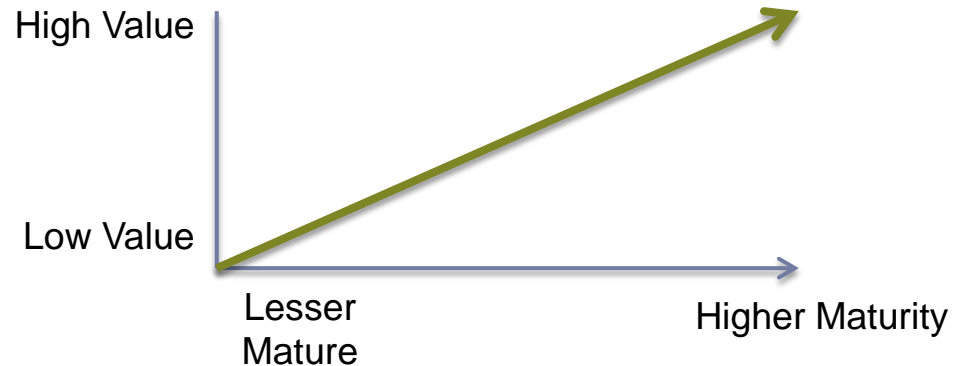
For now, they are an interested basic set of criteria to evaluate how, we, IT-people, function today.



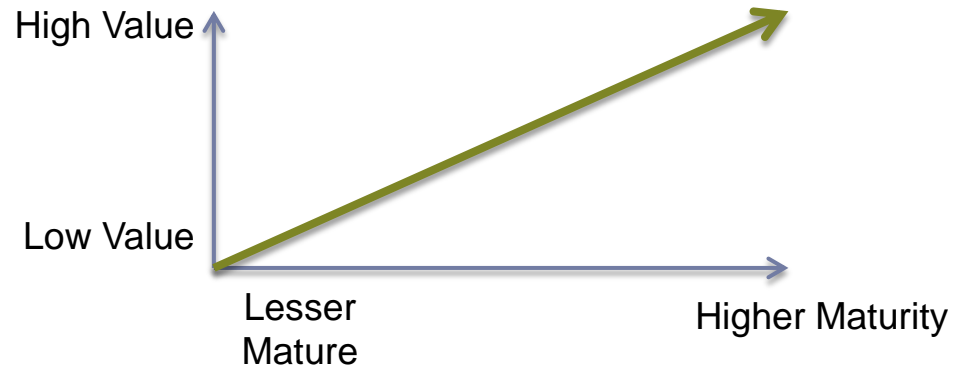
# Maturation Increases the Capability to Create Value

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**Potential of VALUE  
creation for the  
company**



**Personal VALUE  
as ISE Expert**



# Maturity of the IT Discipline

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## How mature is the IT discipline?

- ▶ Young discipline (  $\pm$  half a century old )
- ▶ Vocabulary: Missing of a unique, common, clear, established, unambiguous set of definitions; vague, confusing, changing, multiple definitions for a same term differing a lot from each other, ...
- ▶ Still many fundamental and simple questions are posed about the discipline
- ▶ Very prone to external influences (from outside the IT community)
- ▶ IT is seeking itself. A lot of huge changes (waterfall, iterative, incremental, Agile, Business-IT fusion, ...)
- ▶ Highly sensible to hype: MIS, OO, Reuse, ERP, SOA, EAI, PAAS/SAAS/..., BI, Web-isation, Virtualisation, UML, Agile, Cloud, BYOD, Big Data, ...
- ▶ Superficial insight. Many “professionals” lack of deeper insight
  - Knowledge is often limited to standards, methodologies, methods, technologies, tools
- ▶ Today's Corporate IT is extremely dependent of the business community; responding to the business demand; satisfying business stakeholders; being told what is wanted and what to do; dependent on business stakeholder's funding and timeline, ...
- ▶ IT projects have often a low-level objective and a very narrow mission.
- ▶ “Professionals” are labelled “senior” already after only a few years of experience.
- ▶ For decades we struggle with the same type of difficulties
  - technology changed, but not our thinking
- ▶ Still no solid, common and established foundation
- ▶ ...

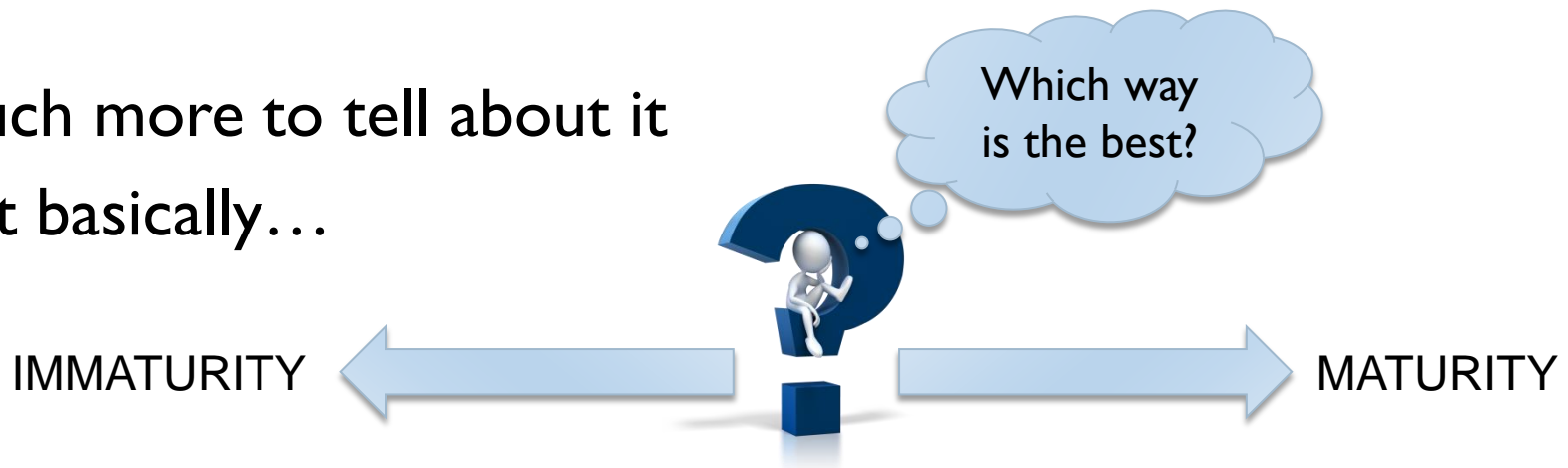
# Immaturity

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“Immaturity is the incapacity to use one's intelligence without the guidance of another.” - Immanuel Kant

- ▶ Immaturity (and the need for guidance) doesn't fit with the labels like “expert” or “professional”, neither with the job of ISE Expert as a “thinker”, “problem solver”, ....

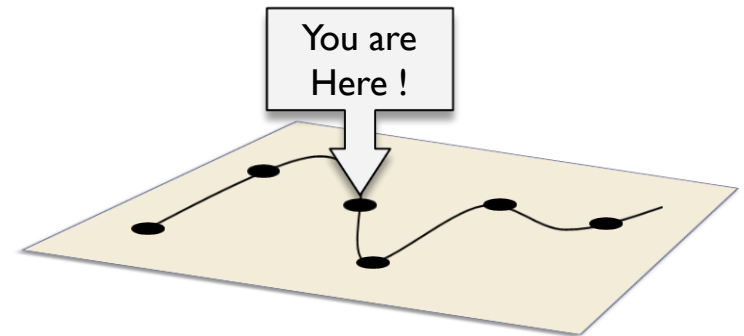
Much more to tell about it  
But basically...



# Why do we need a Maturity Model ?

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- ▶ Journey: Evolution & professionalisation of the discipline
- ▶ For those who genuinely seek to progress, to professionalise
- ▶ Maturity Models are maps showing a (most likely) path
  - ▶ Identifying where you are, where your organisation is
  - ▶ Showing what's ahead and guiding
- ▶ Encourages deeper reflection about IT
- ▶ Helps to increase awareness
- ▶ Triggers and motivates to progress → Speed up the process
- ▶ Awareness and dealing with lower levels of maturity or environments with people of different levels of maturity



# Discipline Maturity Awareness Model

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- ▶ Questioning our belief system, our assumptions, our perception of the discipline, .... is not easy.
  - ▶ Not easy to consider this with open mind and to investigate it in depth
  - ▶ Not always easy to accept
- ▶ **Lame Arguments**
  - ▶ “Yet another maturity model”
  - ▶ “This is not aligned with what I know, with my vision, so it isn’t true.”
  - ▶ “Everybody knows that ...” (Gauss-curve: largest amount is around the average)
  - ▶ “It is not how it is done / how we do it”
  - ▶ “This is about semantics”
  - ▶ “This is just a theory”; “It’s different in the field”;
  - ▶ “We have already done it this way”
  - ▶ “It’s obvious that ...” (the obvious is not always so obvious)
  - ▶ “Accordingly to the standards ...”
  - ▶ “Nobody wrote about it”, “The literature says something else”, ...

....And thus not worth questioning → all thinking is halted → no progress !!

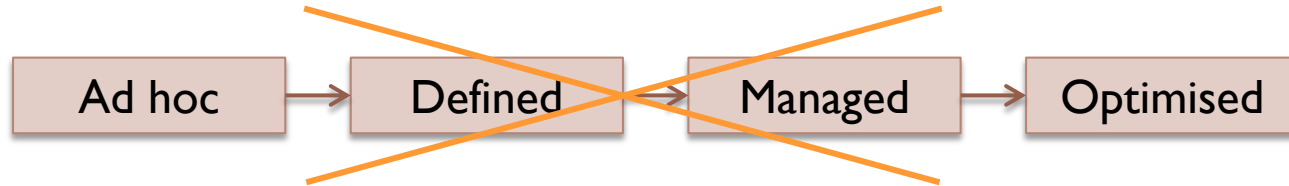
Assumption: “What we ‘know’ is true and definitive”

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# Practical Maturity Model

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Concept of traditional Maturity Models :



This model is **UNUSABLE** for Discipline Maturity / Discipline Awareness Maturity

Don't expect a model like this one

We need another model

&

a more in depth understanding

# ISEDMMAM – Some Terminology

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## ‘ISE’ = Information Systems Engineering

- ▶ ISE is used *HERE* as a generic term covering all engineering activities related to the analysis, conception, building and organising of that part of the company that deals with information and the information itself (which includes software development) within **CORPORATE IT !**
- ▶ ISE is a **PROFESSIONAL DISCIPLINE**
  - ▶ much more than knowing a few standards and applying some techniques
  - ▶ much more than performing activities within a role or function in a professional context

## ISE EXPERT

- ▶ “**ISE Expert**” is used (here) for any engineering function (like architect, analyst, engineer, modeller, ...) within **ISE** (as defined above).
- ▶ In this context, it is used as a broad and generic term because
  - ▶ An ISE Expert may evolve through different functions (career evolution)
  - ▶ Roles & functions evolve themselves over time as well

## Engineering

- ▶ Engineering is, roughly spoken, about following a methodical approach to conceive a system by applying science. It also requires the way of thinking of an engineer (combination of thinking in terms of systems, mechanisms, problem solving and methodical approach)
- ▶ Possible to build a software application, even large ones, w/o engineering it. Not all ‘designing’ and ‘programming’ of a software application is worth the term “engineering”.

# Some Questions Revealing the Maturity

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- ▶ What do we know about the ISE discipline?
- ▶ How do we define and perceive the ISE discipline?
- ▶ What role does the ISE discipline play in an organisation?
- ▶ How do we position the discipline towards other disciplines?
- ▶ How do we allow different disciplines to collaborate?
- ▶ How do objectives of ISE initiatives look like?
- ▶ How do we perceive the role of ISE experts?
- ▶ How do we define 'customers' and collaborate with them?
- ▶ How do we create added value?
- ▶ How do we innovate?



# Story Line of the Presentation

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1. **Overall picture of the IT-context:** talking about information in the company, the company, information systems and where requirements shaping the systems come from.
2. What is a **discipline**: its role, difference between activity and discipline, the internal organisation, the characteristics, how a discipline develops and related risks.
3. Discussion about the **mental picture** (world view), the aspects within the discipline and how our view on these aspects form this mental picture, how these views evolve (dimensions), the preservation of coherence within a mental picture (cognitive dissonance).
4. Discussing **maturity**, maturity path, characteristics of maturity and immaturity
5. The **maturation process** and **maturation mechanism** are discussed followed by some reflections about maturation in an organisation, knowledge gap, alignment, knowledge vs understanding, maturity plateaus, maturity mix.
6. The model is based on dimensions formed by evolving views on aspects. Some **aspects and views of different levels of maturity** are presented
7. **A few key beliefs are challenged**

An extensive explanation is provided

- ▶ to understand ISEDMAM more in depth and allowing a more meaningful application;
- ▶ to create awareness of some risks and barriers in the maturation process and help avoiding them;
- ▶ to better appreciate whether a view is rather immature or more mature;
- ▶ to open the mind and to adopt a more flexible position
- ▶ and to help learning the discipline more in depth.

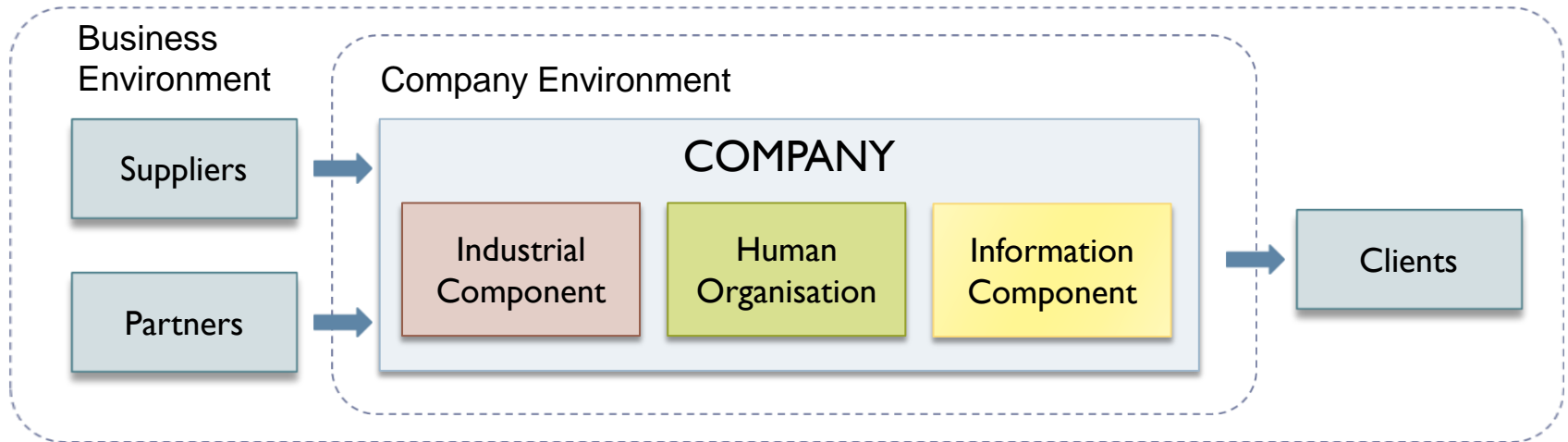
# Context – Information in a Company

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- ▶ Information is used in an organisation / company:
  - ▶ **in operations**
  - ▶ **to manage and to guide the company**
  - ▶ **to drive the business**
  - ▶ **to innovate**
- ▶ Information is a **critical resource**
  - ▶ Short term: without information, the company's activities are halted immediately
  - ▶ Long term: death, survival and prosperity of the company depends of information
- ▶ Information can also be a **product** or being delivered as a **service**
- ▶ Information has **value (variable in time, different per person), lifecycle, ...**
- ▶ Lack of information, information chaos, information glut, high unreliability of information, information loss, ... can destroy a company

**The company needs the capabilities  
to capture, store, manage and to exploit information.**

# Context – Company's Major Components



A company (or organisation) is a human-made socio-technical SYSTEM. It's also an open system, a viable system, a living system and a complex adaptive system.

Companies have three main components executing work, each of a different nature. These components are intertwined and overlap. They are geared on to each other and work in harmony. They interact and collaborate and they work towards a same goal. (ideally)

The Industrial Component contains the industrial equipment and performs industrial processes.

The '**Information Component**' (IC) implements the **information capabilities** and allows the company to capture, store, manage and exploit its information.

- The industrial component can be absent in administrative organisations.
- The information component can be archaic, simple, informal and / or ad hoc.
- In highly automated companies, the human organisation can be very reduced or even absent.

# Context – Information Component

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## WHAT DOES THE INFORMATION COMPONENT CONTAINS?

The '**Information Component**' (IC) is the system defined by the whole arrangement of people, processes, systems and all other means dealing with information within a company or organisation.

### Information

#### Processes

- Information and IT plans
- Information Policies
- Information Guidelines
- Information Procedures
- Information Processes

#### Infrastructures

- IT infrastructure
- Communication Infrastructure

### People

#### Systems

##### Information Systems

- Software systems
- Software components
- Software tools
- Computers & computer devices
- Data storage systems

#### Information / IT / Communication Tools

- printers, fax, telephones, camera's, copiers, sensors, scanners, file cabinets, book binding machines, paper shredders, all kinds of boards, information carriers, diaries, ...

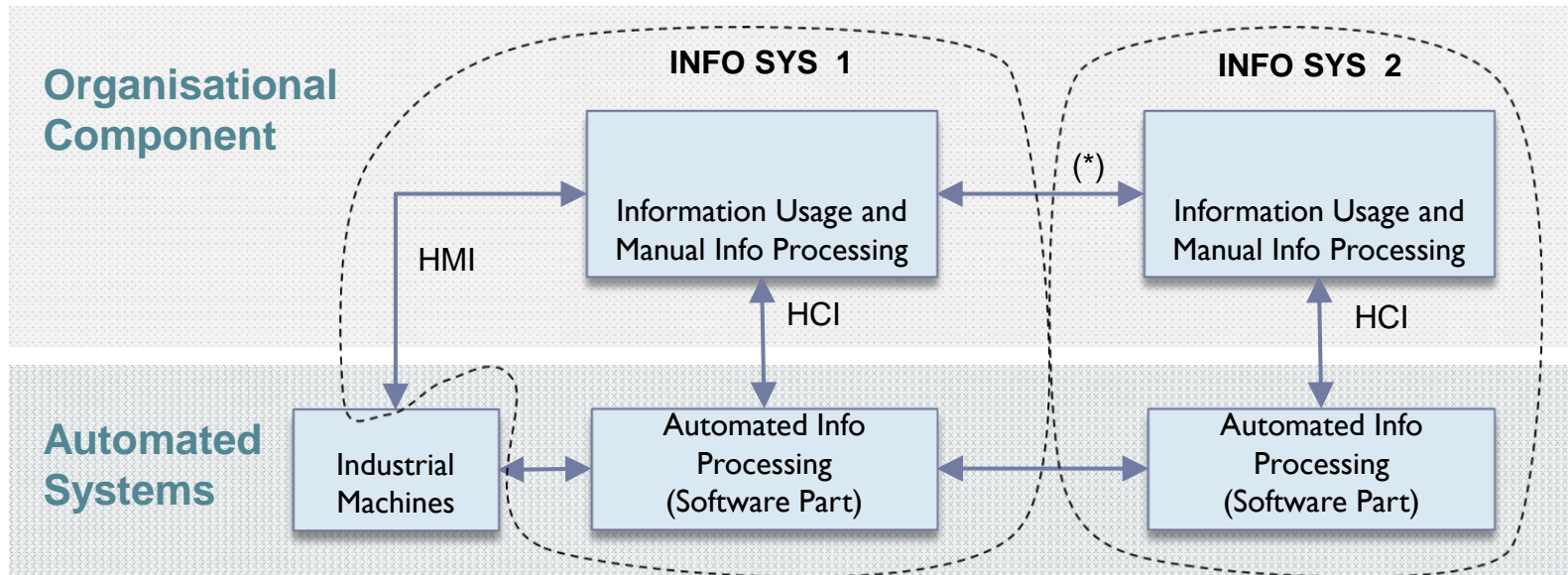


Axel Vanhooren



# Context - Information Systems

HCI: Human Computer Interaction  
HMI: Human-Machine Interaction (HMI)



This diagram clarifies that IS are more than software applications and organises also the human layer (work environment with people and information tools) dealing with information. It includes software systems, people, manual information handling and exchange as well.

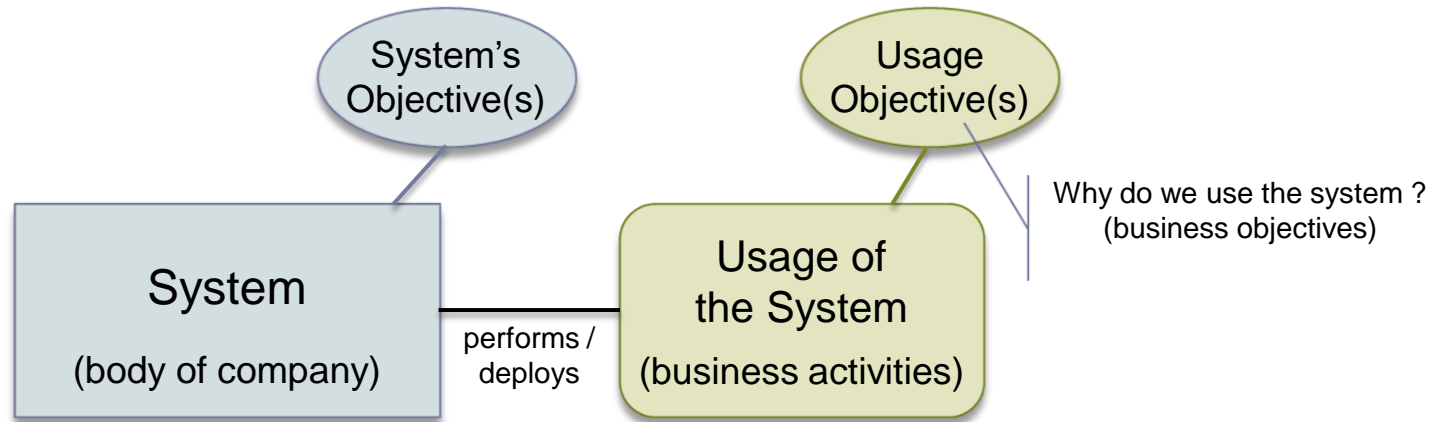
Engineering an IS  $\neq$  Engineering Software

# Context - Information Systems

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- ▶ An IS is a man-made, open system (implications!)
- ▶ “Information” is the core subject - information is the resource
- ▶ Implements and define (partly) information capabilities
- ▶ Solves (only) information needs – allows the organisation to function – allows the exploitation of information
- ▶ Defines, implements, execute or support information processes (wholly or partially)
- ▶ Engineered, designed, formalised
- ▶ Structurally integrated in the organisation, integrated in the way the organisation functions and aligned with its goals
- ▶ A system is a perspective: Borders are defined by people (usually) and are primarily based on functional or logical grounds.
- ▶ May contain parts of or entire organisational units (cross-border) (n-m relation)
- ▶ May spread beyond the company’s borders
- ▶ Borders of two IS’s may cross (overlap of two IS’s)
- ▶ May contain one or several software applications, even partially
- ▶ IS’s may share resources, software applications, computers, infrastructure, ...
- ▶ A software application and its users (+ HCI) can be defined as an IS, but this is still a very very very limited perspective of an IS.

# Context - Systems



## Company's Objectives

(System-oriented objectives)

- surviving, growing, prospering
- being able to function in its environment
- maintaining a good shape
- being effective and efficient
- reliability and sustainability in the functioning
- being able to respond to demand in capacity and in capabilities, ...
- being adaptable, scalable, manageable, ...
- ...

+

## Business Objectives

(Activities & result-oriented/related objectives)

- market dominance, position, market share
- sales volumes
- production targets
- profit targets
- ...

### Examples

#### System's Objective

strengths of the army  
being healthy and physically fit

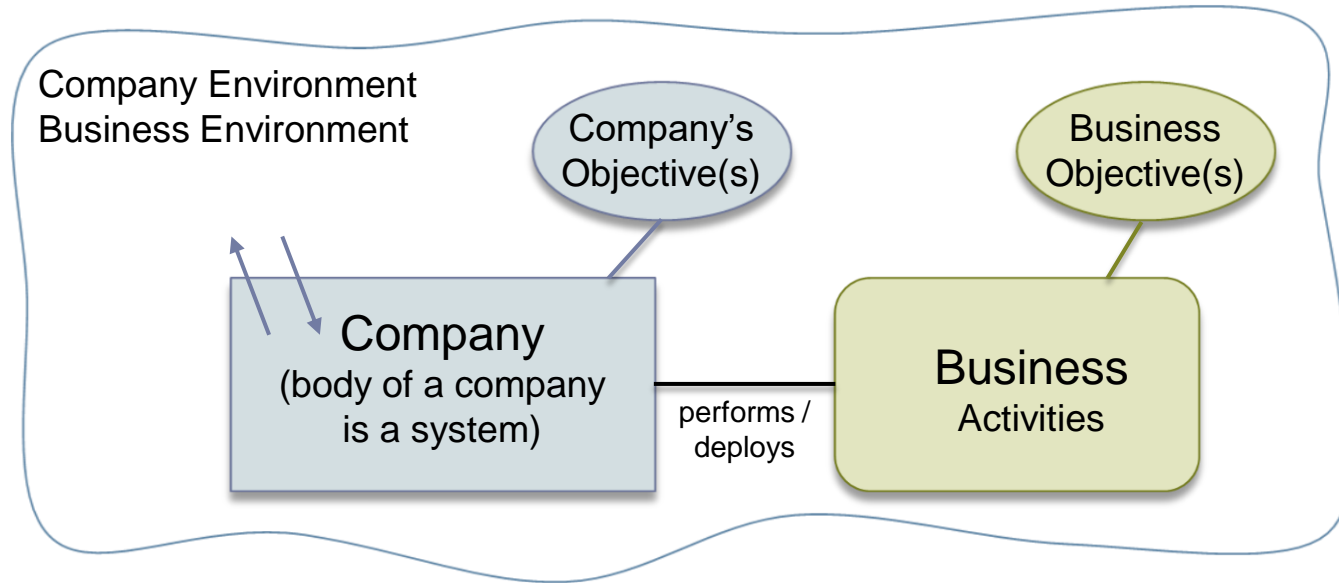


#### Activity Objective

number of battles won  
running race: ranking position and time



# Context - Systems

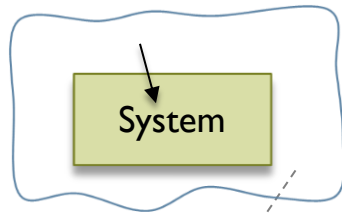


↕ The company exists in an environment. It also deploys activities in an environment.

The environment provides inputs of many kinds like infrastructure, knowledge, labour force, resources and finances. An environment poses obligations upon the company, upon its activities and upon its output.

The company has multiple influences on the environment, for example by using resources and by delivering its products and services. Even the simple fact of existing in the environment influences the environment.

# Context - Systems



System's environment

Every, abstract or concrete, system or component has an environment. The system's environment, the context, the situation (often dynamic, evolving) necessitate the system to have some characteristics, capabilities, a certain behaviour. (similar for components)

These aspects imposed by the environment and situation are way more dominant than opinions, guesses, assumptions, beliefs, desires, preferences, interpretations and demands!

Some characteristics, capabilities and behaviours are beneficial, even if they are not imposed by the situation or environment.

Often we deal with a kind of hierarchy of embedded systems and components. They are often also interconnected forming a network of systems. Systems are views defined by people and can therefore be defined in many ways. Systems may overlap, share parts. There are no strict principles for defining the boundaries. Systems and their components may differ in nature.

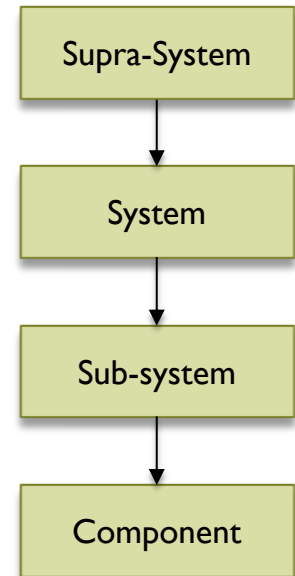
If a supra-system needs to possess a characteristic or a capability or if it needs to have a certain way of functioning, then underlying systems and components have to respect this necessity. The necessity ripples down and may become more precise. It doesn't necessarily apply to all the sub-components or doesn't apply to each in the exact same way.

Example: if a system needs to be secure, then this will affect some of the internal (sub-)systems and components one way or another and maybe also influence the overall architecture.

Basically, the implemented sub-systems and components, their interaction and their architecture, together, they implements the characteristics, capabilities and behaviour of the supra-system.

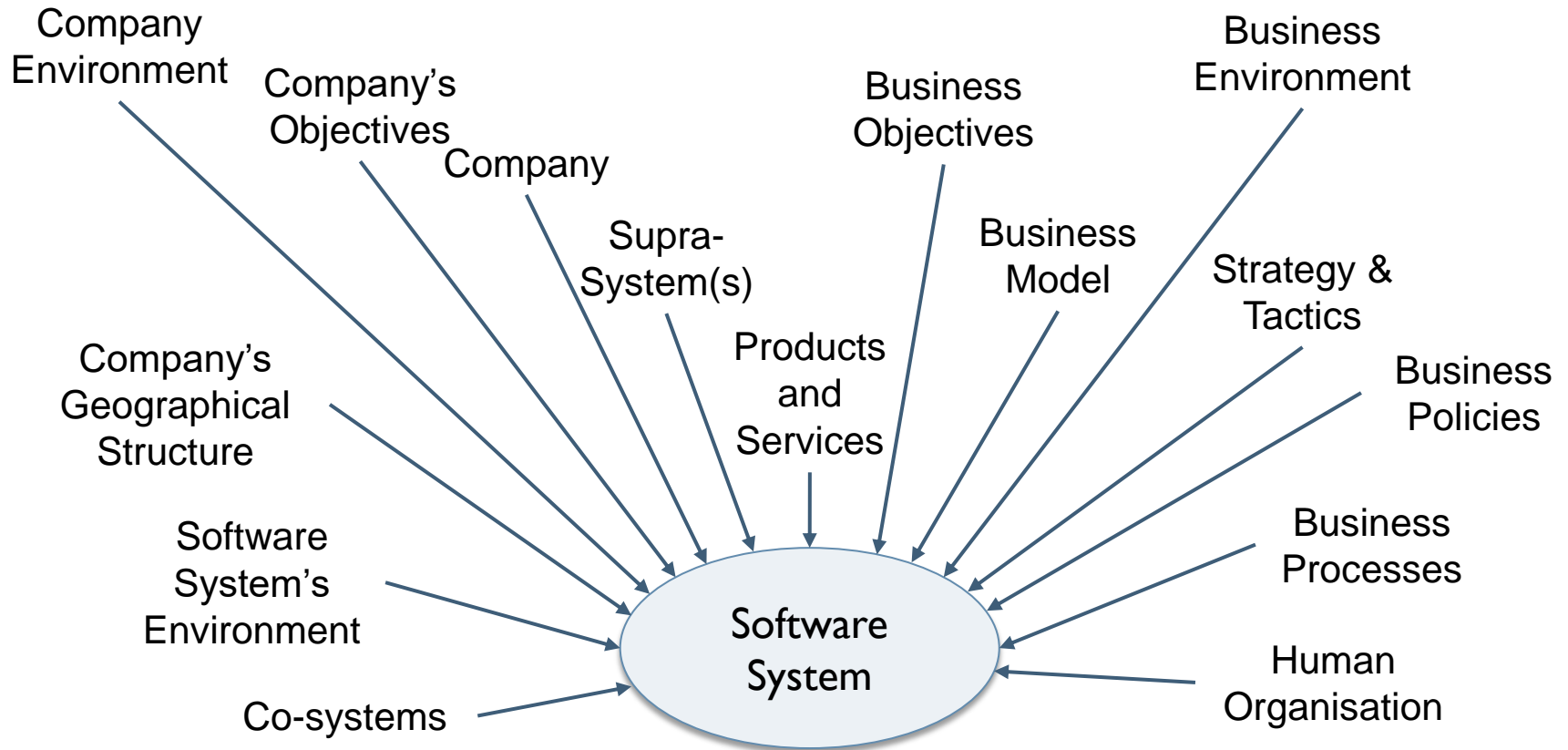
A top-down approach is the fastest way to define a decent architecture. This organisation of the internal of a (supra-/sub-)system increases, among others, clarity, control, adaptability and reduces risks.

This succinct explanation of engineering systems explains the necessity of knowing the environment, the higher layers and the supra-system(s).

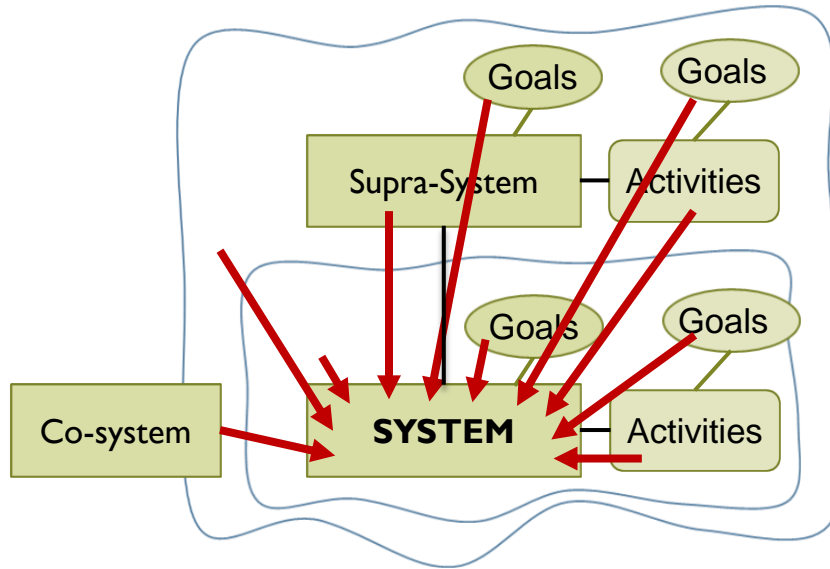


# Context - Systems

Environments, systems and other elements imposing capabilities, characteristics, structures and behaviours on a company's sub-system (here "Software System")



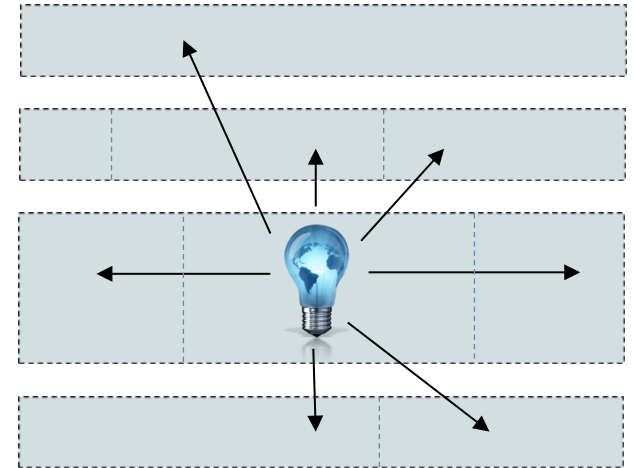
# Context - Systems



The necessity of characteristics, capabilities and behaviours are determined by the environment of the system and that of the supra-system, by the activities (usages of the system) and goals of the supra-system and of the system.

This rippling down of necessary characteristics, qualities and behaviours goes on further in a similar way to the sub-systems and other lower components.

Explains, among others, why analysing 'upwards', looking at broader picture, to know what to conceive and develop.  
Similar in EA frameworks / approaches

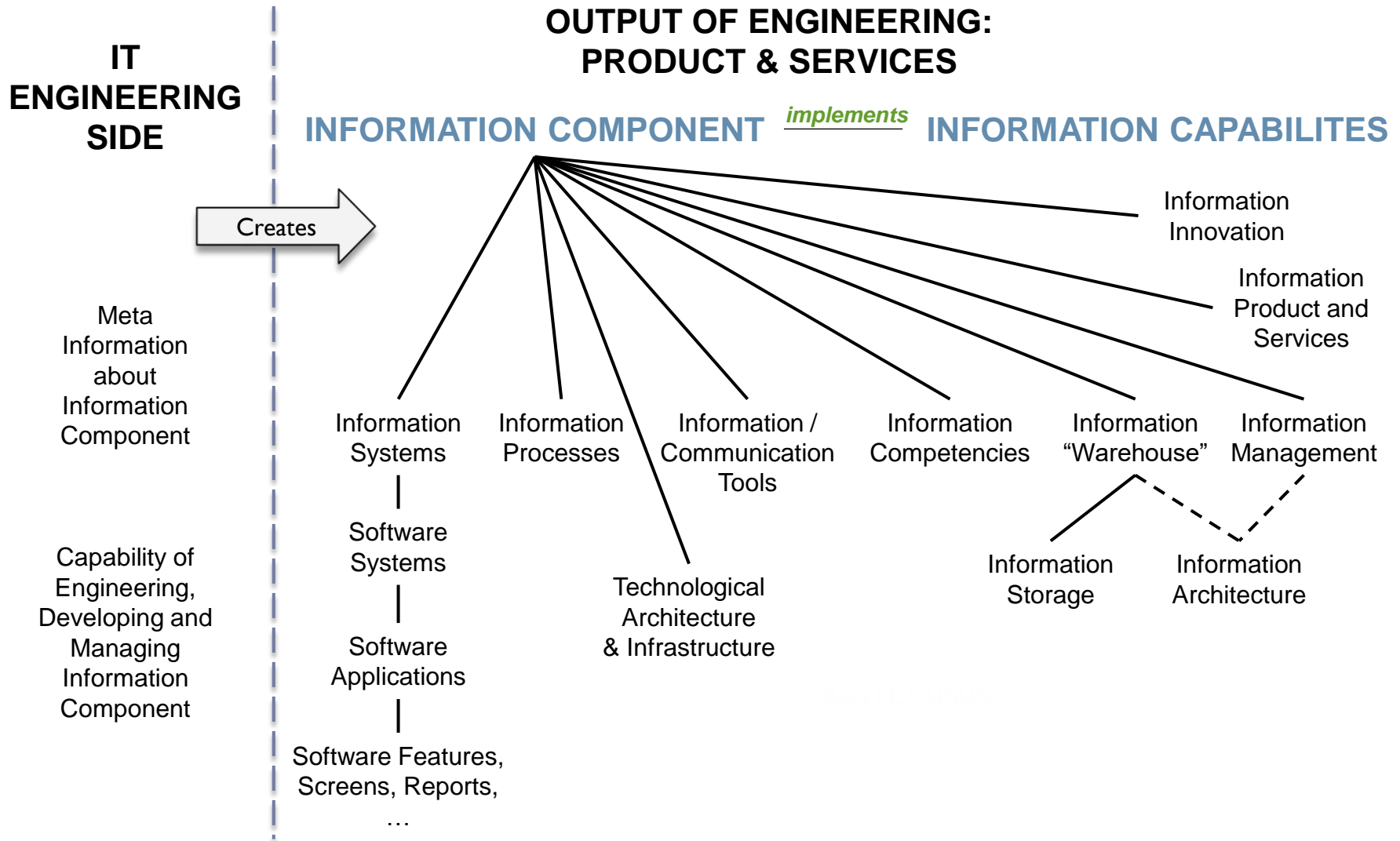


**INNOVATION**, on the other hand, may happen in any 'layer' (same for ideas).

An innovative concept or product may have effects in all directions: in upper and lower layers, in various function and impacting different disciplines.

*Additional directions are / must be possible and allowed*

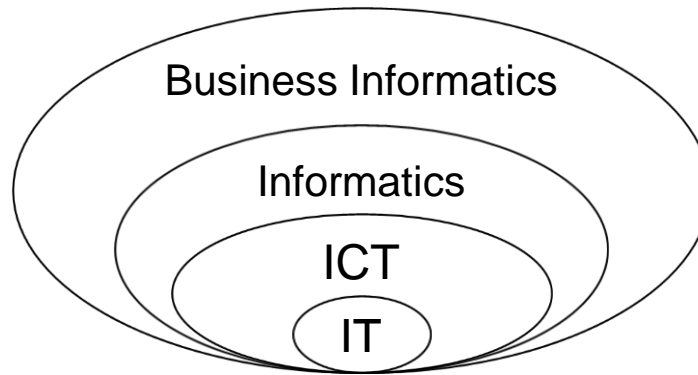
# Context – Engineered Information Component



# Context – The “IT” Discipline

IT is a discipline that conceives and builds solutions that deals with **INFORMATION**

IT / Informatics conceives and produces (a part of) the ‘*information component*’.



I(C)T is a sub-discipline  
of  
Informatics

*Business Informatics is actually the aggregation of Informatics, Organisation Development and Management.*

IT / Informatics

- conceives **information solutions**
- deals with **information**
- conceives **systems**

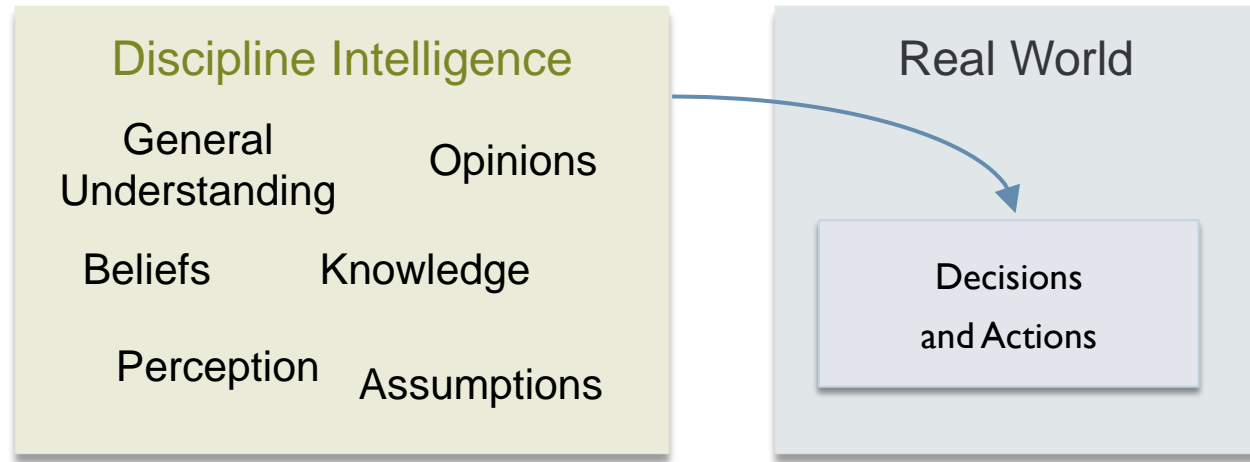
‘IT’ / Informatics  
*developed especially  
these competencies*

*Note that today IT departments function accordingly to a “Business-IT”-model.*

# ABOUT PROFESSIONAL DISCIPLINE

# Starting Point

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We use Discipline Intelligence to take decisions, to make choices and to act

- It is with what we know, what and how we think, how we perceive and consider things that we create the reality.
- Our knowledge and thoughts impact the real world, who we are, what role we play, what we do and what we contribute



# Is What We Know Today Right?



*Discipline evolves over time*

- Discipline evolves. Paradigms changes. It matures. Previous view wasn't really right. Is the present view right or will it also further evolve?
- What does a more evolved knowledge mean to the company? Competition? Benefits?
- What are the consequences for our company/organisation if our thoughts are significantly imperfect, incomplete or even wrong on some aspects?
- Do we want to follow the evolution (passive) or do we want to drive it?
- Why and how does our view evolve?
- Can we predict or envision how this will or may evolve?
- How does such a maturation process looks like? What can we do with it?

*Will be discussed in  
this presentation*

# Discipline

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## ▶ **Definition of Discipline**

- ▶ A certain branch of knowledge, an area of study, the methods, tools and abilities to apply it.
- ▶ ISEDMAM is about a **professional** discipline
- ▶ Ability to perform an Activity  $\neq$  Mastery of a Discipline !!!
  - ▶ Set of activity  $\neq$  Discipline
  - ▶ Different levels, different skills
  - ▶ Teenager fight vs martial art combat (Both are fights. They aren't comparable)

## ▶ **A Discipline has a lifecycle – It is dynamic**

- ▶ Period when it didn't exist yet
- ▶ Birth, Growth, Changes
- ▶ A discipline is in constant evolution

# A Discipline?

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## Activity

- ▶ Basic knowledge: Knowing how-to
  - ▶ Prescribing guides, procedures, ...
- ▶ Some (average) skills mostly obtained by experience
- ▶ Aiming for average to good results
- ▶ Can be learned from colleagues, who learned it from their colleagues, who ...
- ▶ May use a set of tools and techniques
- ▶ For anyone

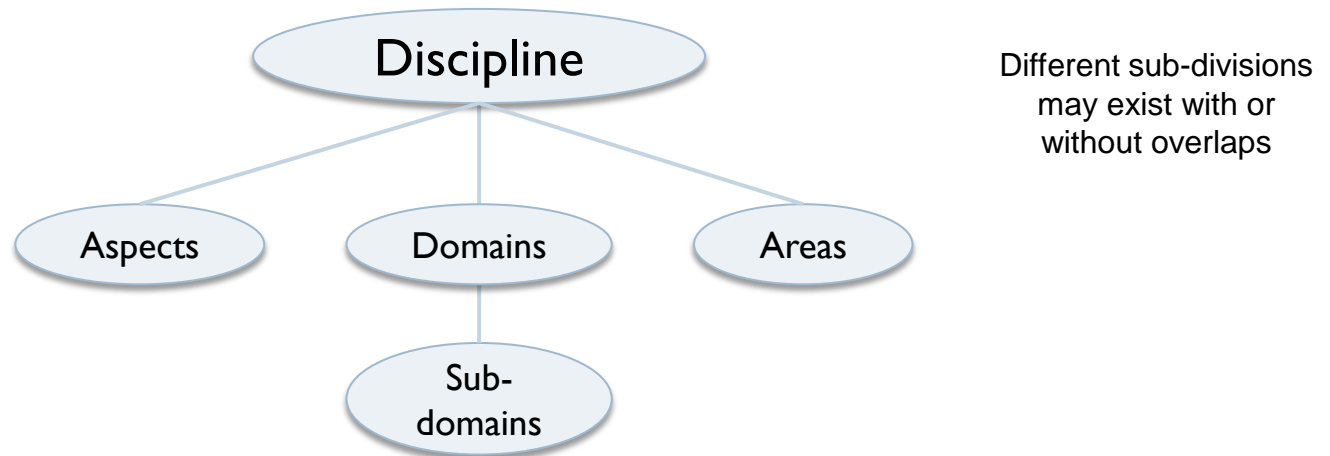
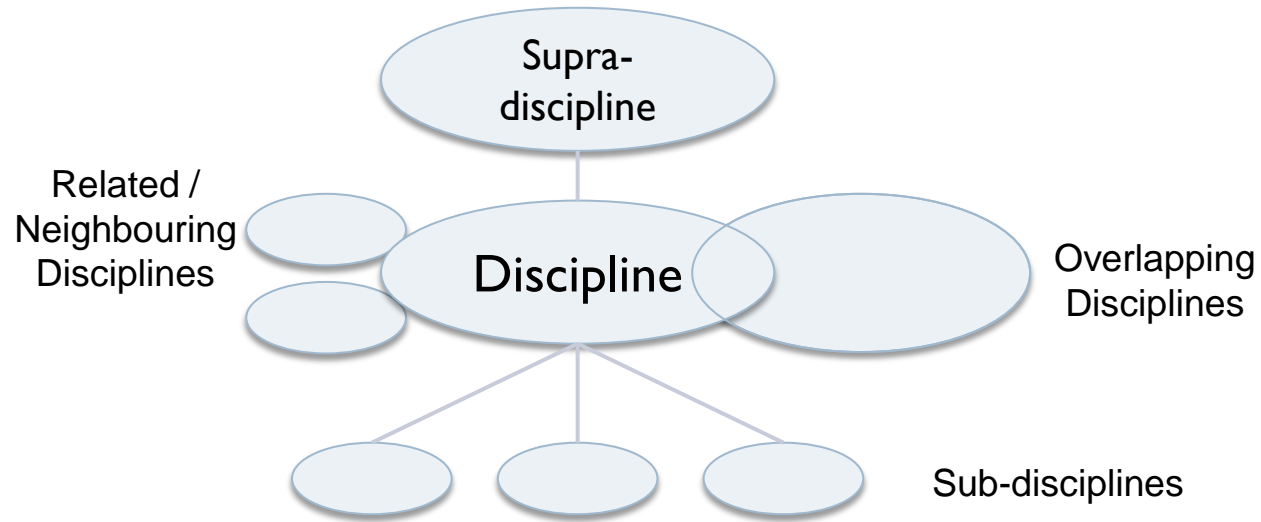
## Discipline

- ▶ Theories + deeper insight
- ▶ Methods, Techniques, Tools (knowing + understanding + skills)
- ▶ Requiring specific skills way above average
- ▶ Aiming for the best results
- ▶ Way of thinking (?)
- ▶ Attitude (?)
- ▶ Training, Experience
- ▶ Continuous learning and progress, Continuous improvement of the discipline
- ▶ For experts, masters, professionals

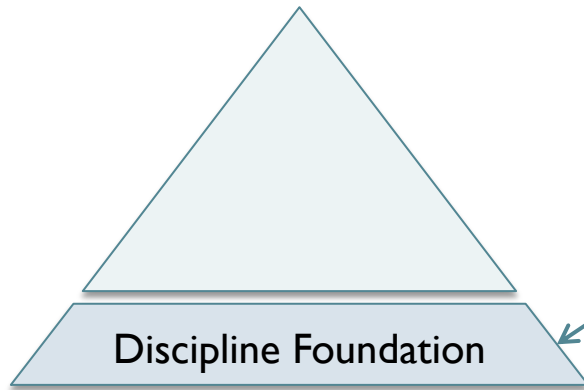
A professional discipline can't be treated as if it was just a set of activities, a set of techniques and tools and the ability to know how to follow the "how-to's" and to apply the techniques.

# Organisation of Discipline

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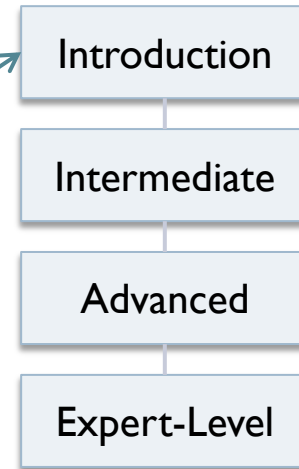


# Organisation of Discipline

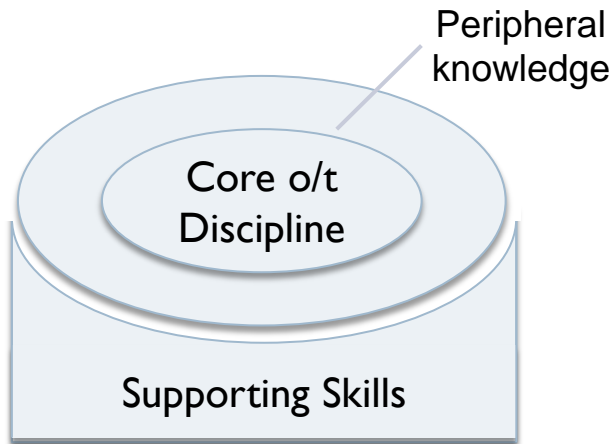


*'Foundation' is fundament.  
Other knowledge is built upon – on top of it.*

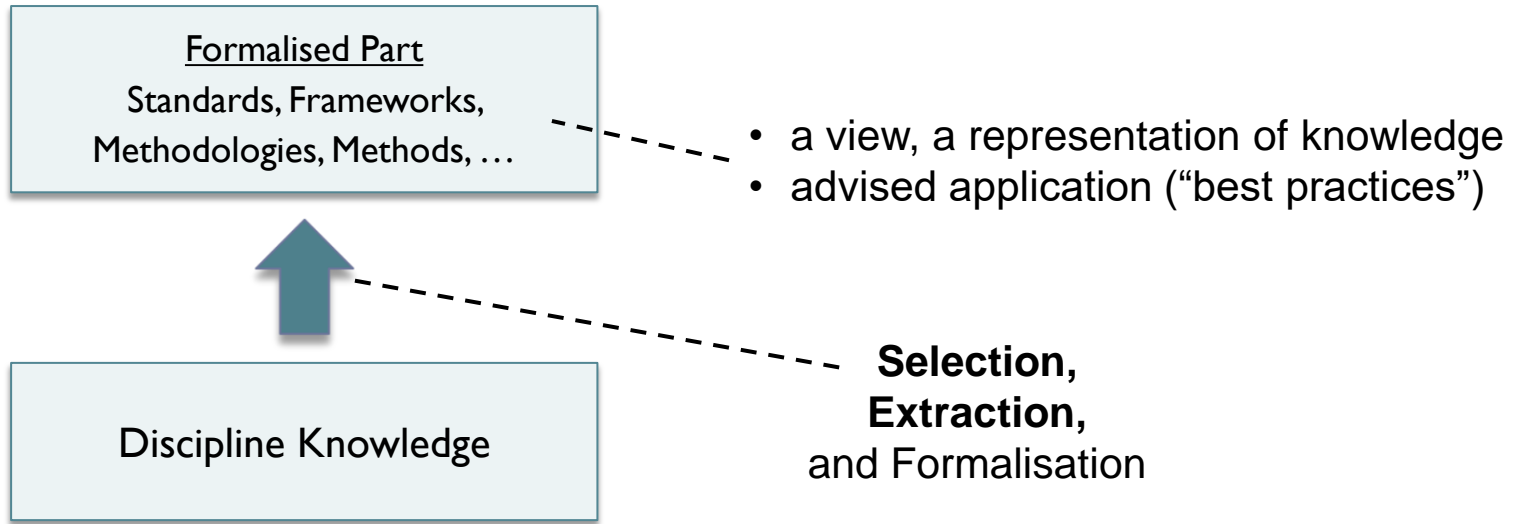
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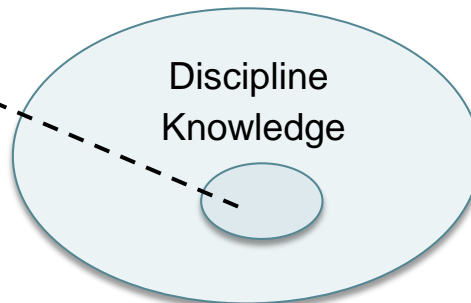
*Training's perspective – difficulty levels  
Sequence of learning; level  
'Introduction' is starting point, begin, easy stuff*



# Organisation of Discipline – Formalised Part



*Formalised part  
of the discipline*



*Standards contain some discipline knowledge. However, a discipline is much broader than any standards or even than the ensemble of standards.*

*Standards, frameworks, methodologies, methods, may, but not necessarily do pertain, to the core of the discipline.*

# Discipline – Attributes, Content & Application

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## Discipline

### **Discipline Attributes**

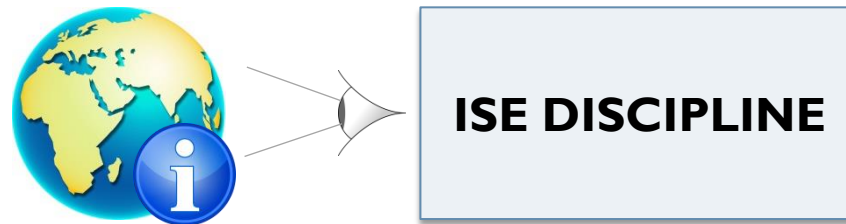
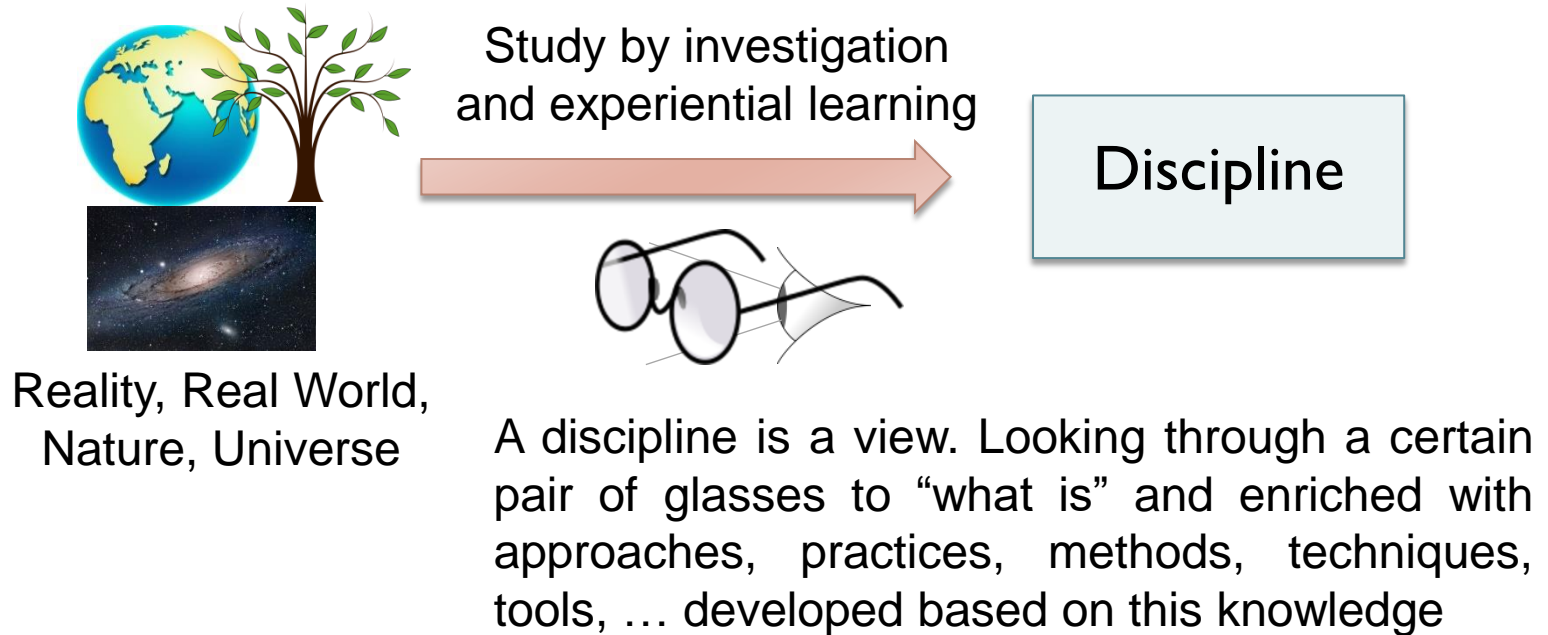
- ▶ Objective
- ▶ Purpose
- ▶ Potential
- ▶ Delineation
- ▶ Foundation  
small variable base or large and stable base
- ▶ Completeness  
gaps inside the 'discipline' or between discipline and its surroundings
- ▶ Correspondence with reality, nature of things, real world, universe
- ▶ Vocabulary and Definitions  
Well-defined, unambiguous, unique, widely spread, ...
- ▶ Frequency of change, nature of change, impact of change in the discipline
- ▶ ...

### **Discipline Content**

Principles, standards, frameworks, methodologies, methods, ideas, beliefs, mechanisms, arguments, logic, reasons, ...

### **Discipline Context & Application**

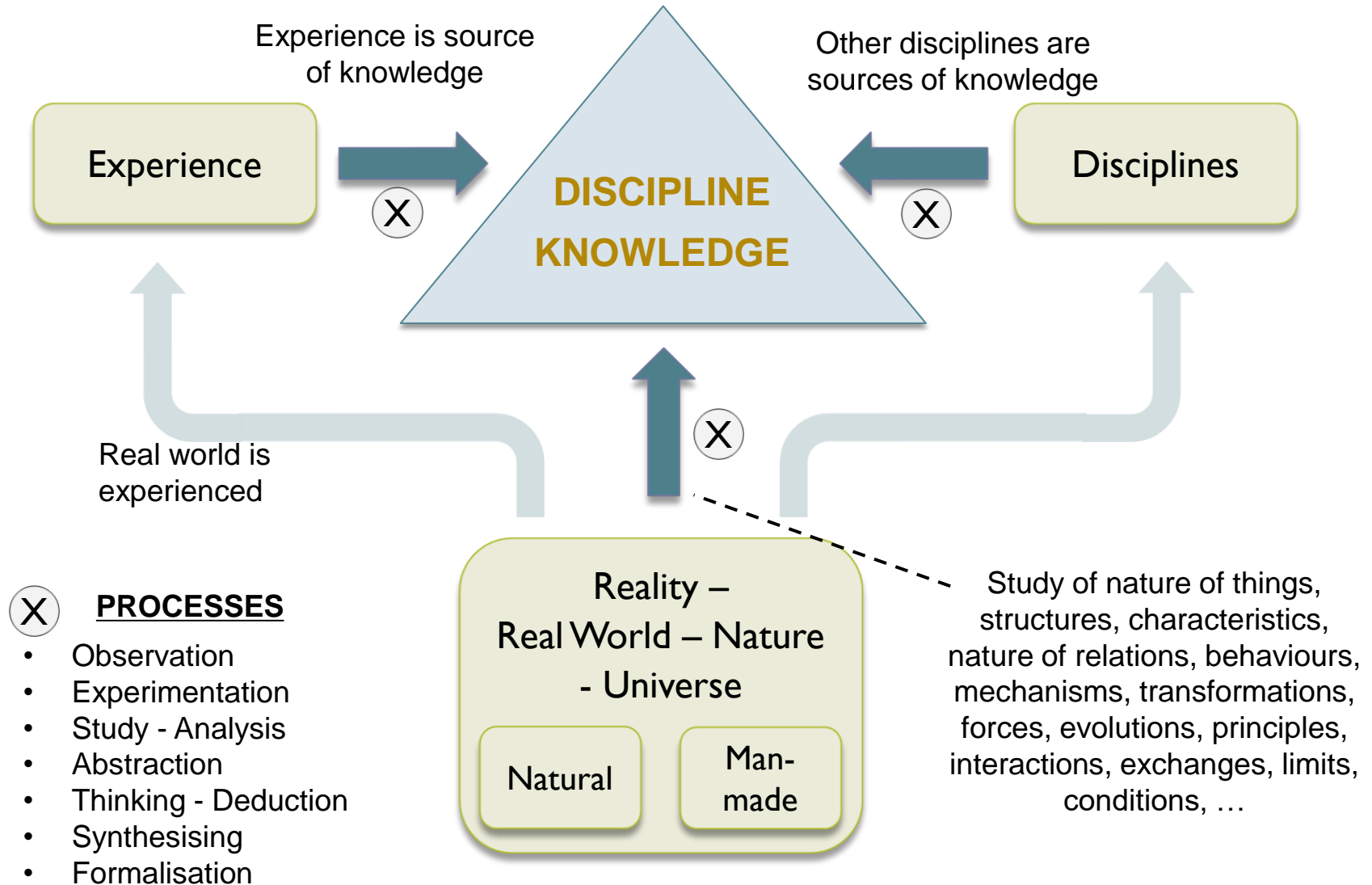
# Discipline Development - Origin of Knowledge



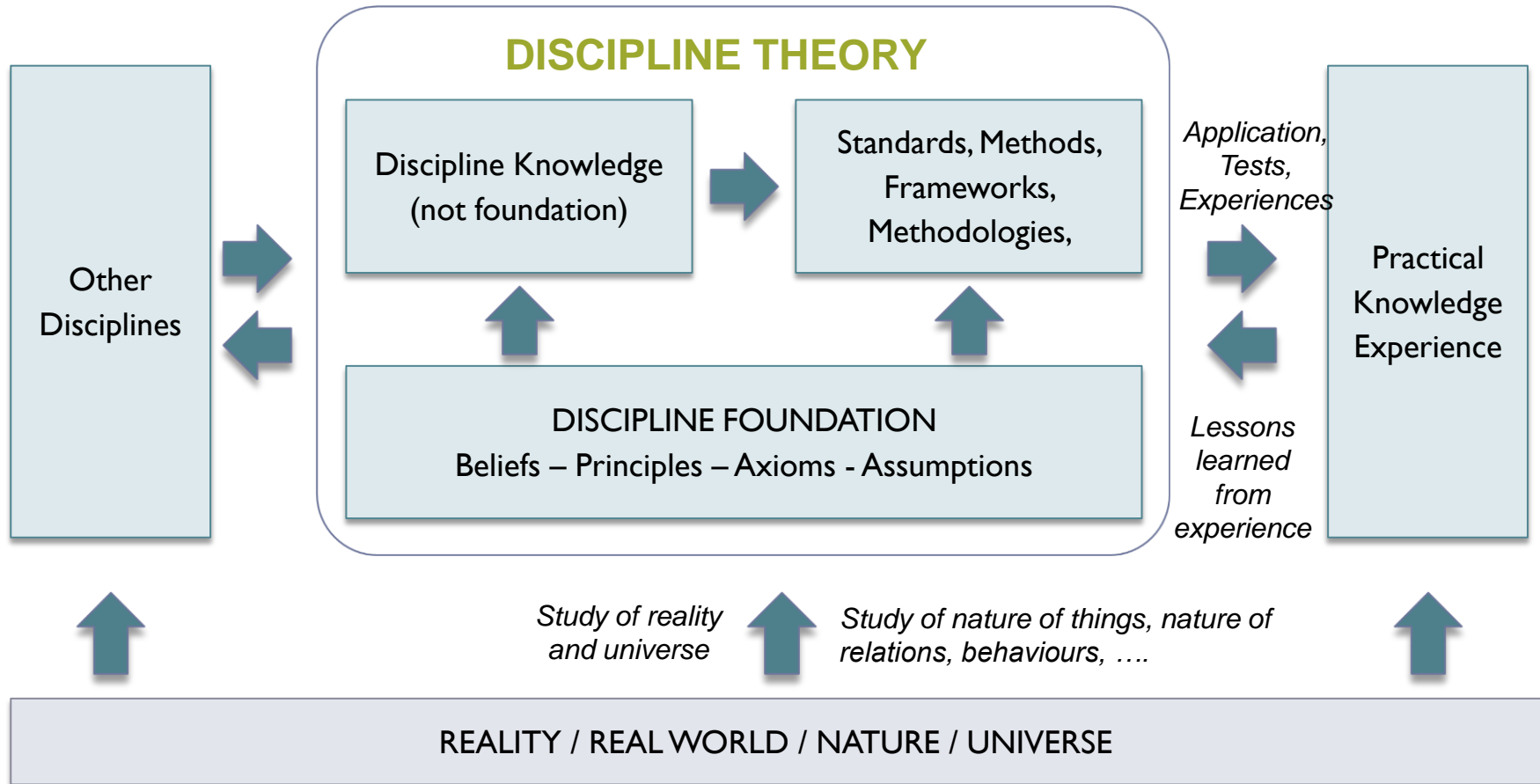
A perspective, a view, on world of information, information systems and other systems, organisations, information customers



# Discipline Development - Origin of Knowledge



# Discipline Development - Process

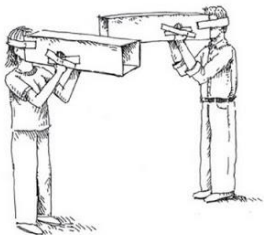


# Discipline Development - Risks & Opportunities



## RISKS

- confusion
- filtering, selection, cherry picking
- vagueness
- ambiguity
- distortion, interpretations
- incomplete information
- incorrect lessons & conclusions
- tunnel vision
- incomplete comprehension
- wrong assumptions, beliefs and ideas
- ...



Experience



DISCIPLINE  
KNOWLEDGE



Other  
Disciplines

### External influence

Market  
Media  
Society  
Community of laypersons  
...



Reality,  
Real World,  
Universe



Standards, Methodology, Methods, ...



A discipline or  
standard is not  
100% true

# Discipline Development - Reflections

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Is discipline knowledge 100% correct, complete and definitive?

- ▶ The process from the study of the reality on to the formalised knowledge is not 100% reliable.
- ▶ We seek to increase our insight in the reality. Research allows a discipline to evolve.
- ▶ Gap between reality (what is still to be discovered, understood, learned) and what we know and understand.
- ▶ Discipline (knowledge) is a view, an interpretation of the reality – an interpretation can be lesser objective or lesser right.
- ▶ Learning a discipline is continuous learning (it never ends)

**Remain Critical - Keep on Learning and Thinking**

# Discipline Development - Process

---

Discipline knowledge/understanding is a **perception** of reality / real world. This perception is imperfect and incomplete.

## A DISCIPLINE IS UNFINISHED

### DISCIPLINE DEVELOPMENT PROCESS IS ...

- ▶ about **improving**: correcting, clarifying, ...  
(cfr slide “Risks & Opportunities”)
- ▶ about **deepening**
- ▶ about **expanding**
- ▶ **Continuous**
- ▶ **Never ending**
- ▶ **Absolutely normal**

# Mental Picture

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As we learn about the discipline, we create a **MENTAL PICTURE** about the discipline, its application and the work environment of the practitioners.

This mental picture includes the broader context of the discipline, like the environment in which it is applied.

The **MENTAL PICTURE** of the discipline in our mind is a global view, a vision, an understanding, an image, a mental representation, a mental model, a perception, an interpretation, a '**World View**' that **represents the discipline** and that defines **how we consider the discipline** and **how we use it**.

This mental picture is constituted of

- ▶ 'Pure' discipline knowledge
- ▶ Contextual knowledge
- ▶ Intuitive knowledge
- ▶ Ad hoc knowledge filling the gaps in our knowledge
- ▶ Interpretations, ideas, opinions about hard knowledge and about the application of the discipline, beliefs, assumptions, axioms, guesses, experiences, habits, ...
- ▶ ...

# Mental Picture

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- ▶ Based on and aligned with our belief system
- ▶ Not about details of the discipline
- ▶ A lot of knowledge isn't strict, formal and precise
- ▶ This picture is **variable**. It may be **adjusted** and **expanded** as we learn. However, the core of the mental picture is often hard to change.
- ▶ Easier to chose for the simplest, easiest, fastest or cheapest, instead of the rightest.
- ▶ Influenced by our own preferences and dislikes → easy to ignore or avoid the disliked elements
- ▶ It is **influenced** by the IT and non-IT community, by the market, by clients, by the media, ...
- ▶ This picture is **IMPERFECT**. It can be imprecise, simplistic, wrong, distorted, confusing or incomplete.

This mental picture is a determining factor in our decisions, norms and priorities and consequently also in our actions.

## Usage

- ▶ Defining the position and role of the IT department
- ▶ Identifying needs and opportunities for construction
- ▶ Dealing with information
- ▶ Defining the initiatives, their mission and goals
- ▶ Create our drivers, norms, expectations and success criteria
- ▶ Defining the amount of the contribution and the way to contribute
- ▶ Setting up an organisational setting and work environment:  
roles, authority, responsibilities, decision making processes, collaboration, ...
- ▶ Establishing the Business-IT relation
- ▶ Defining the approach and methodologies for initiatives
- ▶ Taking decisions and actions
- ▶ Conceiving solutions
- ▶ Determining the recruitment of experts
- ▶ Determining what to learn and to train
- ▶ ...

It guides anything we evaluate, decide, chose, do, ...



# Mental Picture

---

## Possible consequences of an imperfect mental picture

- ▶ inappropriate solutions
- ▶ frequent changes which could have been avoided
- ▶ more and unexpected problems
- ▶ unpredictability
- ▶ slowness
- ▶ incoherence's
- ▶ ignorance
- ▶ uncertainty
- ▶ lack of control
- ▶ increased risks
- ▶ limited exploitation of the potential of humans, of the discipline, ...
- ▶ lack of integration, flexibility, robustness, ...
- ▶ loss of opportunities
- ▶ limited value creation
- ▶ limited innovation
- ▶ difficult collaboration, distrust, confusion, frustration, disappointment, demoralisation, despair, discouragement and other human issues
- ▶ loss of competencies
- ▶ chaos

# Mental Picture – Aspects

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This mental picture is too complex to be discussed as a whole in the context of maturity. We need to break it down. The concept of ‘aspect’ does the job.

An **ASPECT** is a topic, a perspective about the discipline or about how it is practiced. It's a piece of the world view.

▶ A few examples:

- the purpose of the ISE discipline
- the delineation of the ISE discipline
- the potential of the ISE discipline, what value can be created
- the role of an ISE Expert
- the type or nature of objectives of ISE initiatives
- the drivers in an ISE initiative
- the relation and collaboration between business people and the ISE Experts in an ISE initiative (like a software development project)
- the product built and delivered by an ISE initiative

# Mental Picture - Aspects

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## View about an Aspect

We do have a view about the different aspects. A view about an **aspect** is a smaller mental image about a specific aspect. It is what we think about an aspect, how we consider it.

It may consist of (a combination of):

- a thought
- a perception
- a consideration
- a reasoning
- an idea
- a concept
- a specific mental picture
- a belief
- a guess
- an interpretation
- an axiom
- ...
- knowledge of habit and experience
- an assumption
- a theory
- a model
- an opinion
- a principle
- a priority
- a preference
- a slogan, a catchphrase
- a cliché
- a generalisation

The idea we have about aspects may evolve (sometimes somewhat).

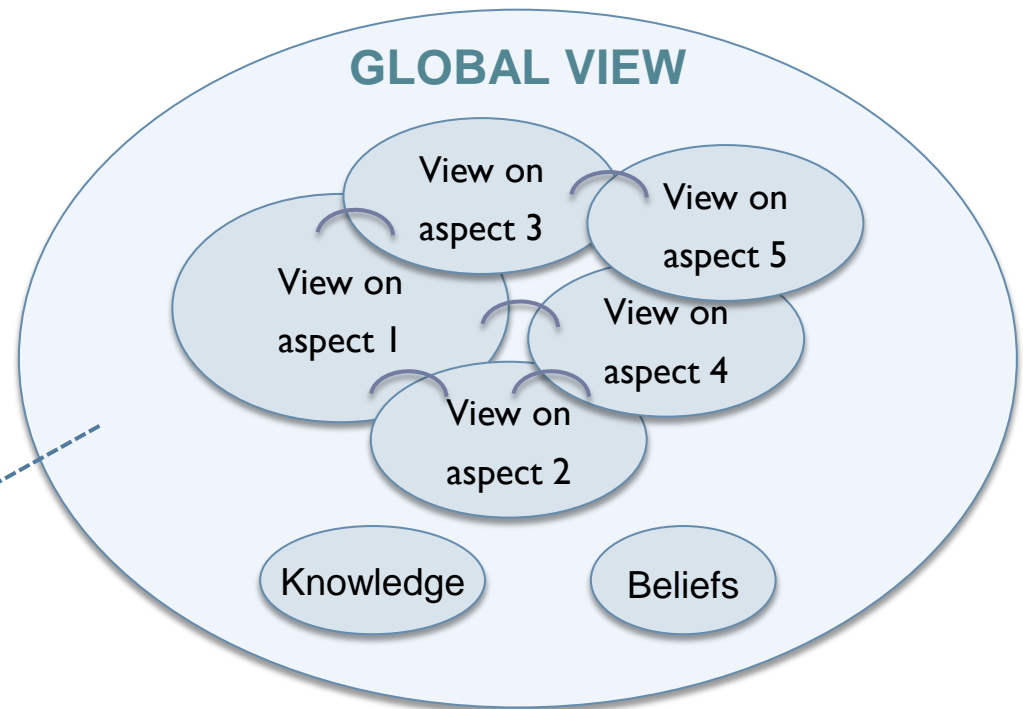
The term '**DIMENSION**' is used to indicate the ability of the view on an aspect to evolve on a path / in a certain direction.

# Mental Picture – Aspects

## Views on Aspects

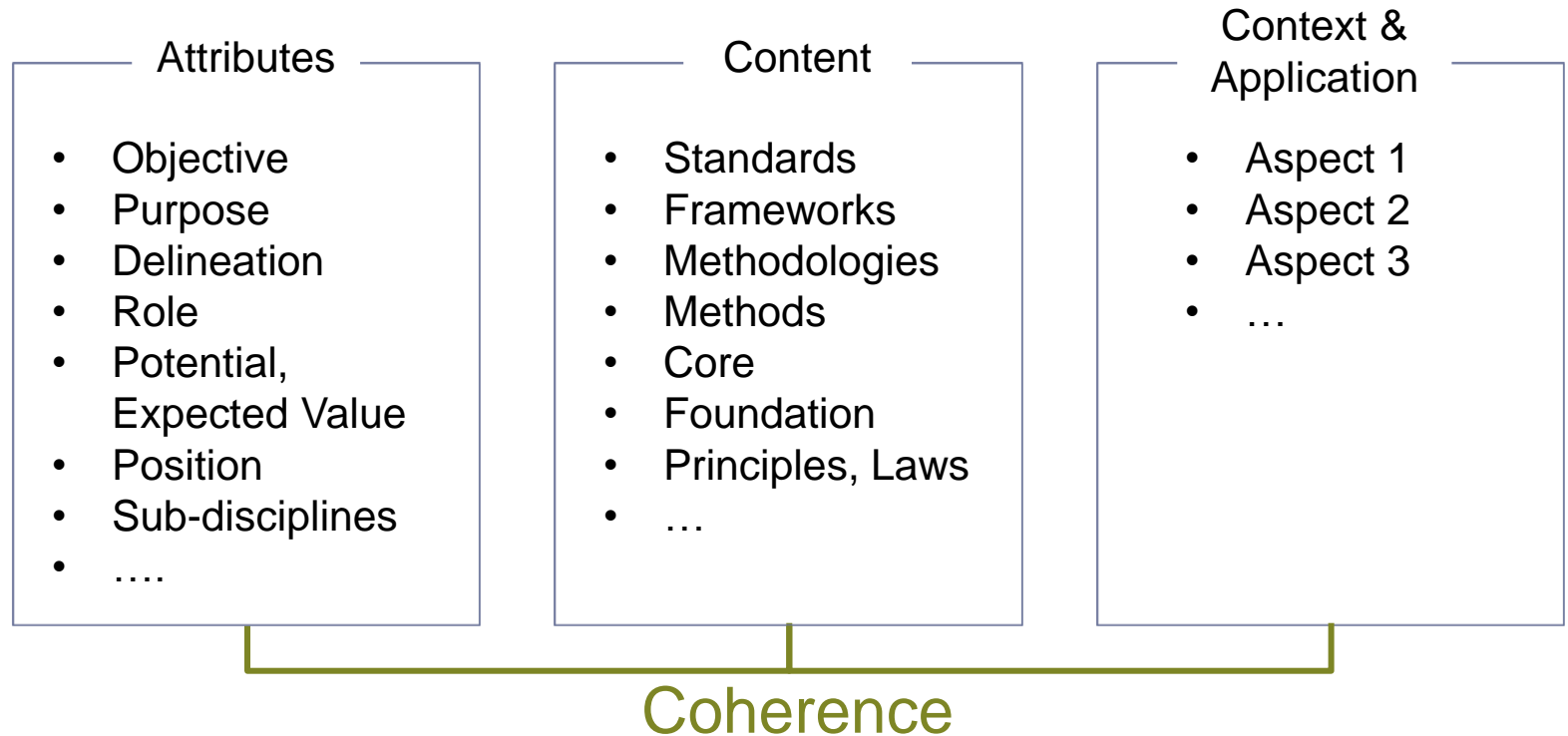
- ▶ May overlap
- ▶ May have fuzzy borders
- ▶ Are related to each other
- ▶ Are aligned (coherent)

Other knowledge,  
thoughts not related  
to the aspects



# Mental Picture – Coherence

We strive for a complete **coherent** view on the discipline



This includes coherence with the own understanding, interpretations, beliefs, assumptions, filled gaps, opinions, ...

Striving for maintaining coherence is normal. We seek to act coherently. However, it is also one of the major obstacles to maturity. New fundamental information that may lead to a new insight (new beliefs) will disturb this coherence. It may be too easily rejected in order to maintain keep the existing coherence in place. This creates stability. (Social psychology: Cognitive dissonance)

# MATURITY

# Maturity

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**Maturity** is a state

- of full development
- of full potential
- of perfect condition
- allowing the full exploitation of the greatest potential

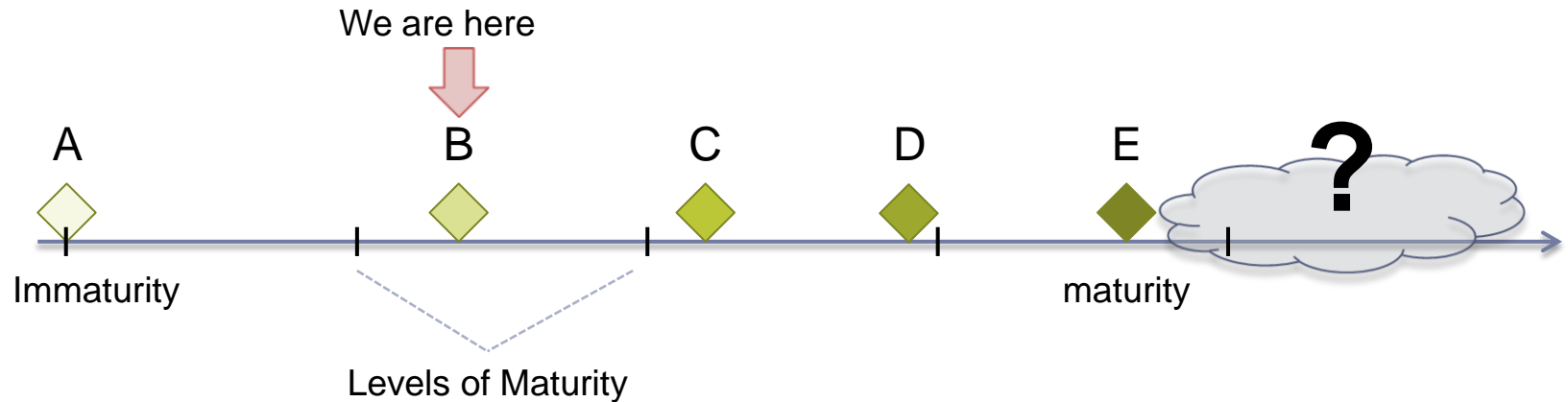
**Degree of maturity** indicates the state in the progress, on an evolutionary path, towards maturity.

## What is Maturing ?

- ▶ a **PROGRESS**, an evolution, a step TOWARDS a higher level of MATURITY
- ▶ An change (a correction, an improvement or an expansion) in the core knowledge (understanding) in the foundation and or in critical aspects which changes our belief system and our world view. It concerns essential aspects like: the purpose, role, position, goal, boundaries, the application, the context, the fit into a greater whole, deeper forces and mechanisms under the surface, ...
- ▶ The change is about increasing the **alignment** of knowledge with nature, with the real world, with reality, with the universe and with higher values.
- ▶ It is triggered by the **awareness** that new problems or a type of problem can't be solved with the present paradigm and that a new paradigm is required to get it solved
- ▶ and concerns the awareness of a greater potential and/or a significant improvement in the exploitation of the identified/estimated potential of the discipline.
- ▶ Often a **CHANGE** with great impact in the discipline that significantly changes the mental picture we have on the discipline
- ▶ In general, the more mature, the lesser (fundamental) changes occur. However, doing the same for a long time without any change, not evolving anymore, is not necessary a sign of maturity.



# Maturity



- An evolutionary path is identified (dimension)
- Our present situation is in point B. We know our past from A to B. Others may already evolved until C or D.
- Tendencies in the evolution from A to D may appear.
- This information allows us to form a vision of a future maturity state 'E' (through extrapolation). We may also look to other domains, disciplines, ...
- There is and will always be some uncertainty.
- We may not know what is beyond 'E'.

# Maturity - Path

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## How to envision the mature state?

- ▶ Knowledge (study) of the past
- ▶ Study of the evolution of individual specific aspects and characteristics
- ▶ Study evolution of achievements
- ▶ Study the evolution (or lack of evolution) of obstacles / problems and known present obstacles / problems
- ▶ Study the bigger picture and the evolution of the environment
- ▶ Looking at the evolution of similar subjects or disciplines
- ▶ Study the reality, real world, nature of things, the universe
- ▶ ...
- ▶ Maturity often strive for independence, higher goals, self-awareness, and many other such characteristics. Integrate them in the vision.

It should be desirable, meaningful, coherent and founded on a reasoning, but not necessarily achievable today. (No wild imagination)

# Maturity - Characteristics

---

- ▶ Awareness of the whole and its environment
- ▶ Pursuing higher goals
- ▶ Working on long term vision, rather than reacting on short term, local ad hoc issues
- ▶ Independence / self-determination (determining own objectives, role, mission, approach, ...)
- ▶ Increased capabilities
- ▶ Intellectual depth and emotional stability
- ▶ Holistic thinking, Systemic thinking, Thinking short and long term
- ▶ Deeper insight (vs knowledge and shallow understanding)
- ▶ Consideration of 'what is'
- ▶ Focussing doing what is necessary, not on following prescribed processes and goals or on pleasing others
- ▶ Seeking to protect the whole and pursue its benefit prosperity
- ▶ Seeking to create balance and harmony
- ▶ Sustainability
- ▶ Possessing a solid and established foundation
- ▶ Withstand influences of laypersons and uninformed sources and hypes
- ▶ Changes on the foundation become rarer. They become expansions and adjustments rather than radical changes.

# Immaturity – Characteristics (1 / 2)

---

- ▶ Seeking to please (satisfying others; meeting other's expectations)
- ▶ Short term-driven actions (mission, demand, problem-solution, deadline, short term milestones,...)
- ▶ Reactive, local & ad hoc (problem-driven, need-driven, demand-driven, opportunity)
- ▶ Lack of understanding and awareness of what's actually at stake
- ▶ Requiring permanent guidance
- ▶ Easily influenced by laypersons (markets, hypes, ...)
- ▶ Unpredictability, erratic changes, fluctuations, changes in different and even opposite directions
- ▶ High-level of dependency (following others decisions, doing what is being asked or told, yes-man, following standards and methodologies, ...)
- ▶ Requiring permanent control
- ▶ Inferior role and subordinate position in relationships
- ▶ Self-centred: focus on own objectives, own work, own responsibilities, own success, ...
- ▶ Local thinking ("throw-it-over-the-wall" processes; local solutions; siloed solutions; fragmentation; little coherence little integration)
- ▶ No understanding of the broader picture, of the mechanisms and forces at play
- ▶ Uni-disciplinary thinking – Single and limited perspective
- ▶ Inability to take decisions or feeling very uncertain about own decisions
- ▶ Preferences are more important than what a situation requires. Doing what is liked. Choices based on own preferences. Avoiding what is disliked and boring.
- ▶ Accepting, guessing and assuming, lack of critical thinking

# Immaturity – Characteristics (2/2)

- ▶ Avoiding complex problems and difficult challenges (over-simplifying and adapting the problem to limit the challenge and to suit own preferences, own intellectual capabilities and own skills; innovation?)
- ▶ Mainly experience/experimental-based, learning by doing
- ▶ Lacking of solid foundation (common unambiguous vocabulary, suitable definitions, established principles, ...)
- ▶ Superficial understanding (the “why’s”, effects, implications, risks, ...) of the environment, situation, behaviours, work, results, ..
- ▶ Focussing only/mainly on the visible aspects or on obvious matters
- ▶ Copy-thinking, copy-attitude
- ▶ Lower norms (“as long as it works“-norm)
- ▶ Imbalances, sub-optimisations, inconsistencies, incoherence’s
- ▶ Creating a lot of unpredictable results particularly negative effects, damages, ...
- ▶ Either limited risk-taking or taking inconsiderate risks (especially if others bear the consequences)
- ▶ Pressure, urgencies, firefighting, drama’s
- ▶ Irresponsible (easy since dependent of a demander, of a higher authority)
- ▶ Failing to learn (the right) lessons; no idea of what’s going on, no idea on why things are the way they are, what and why things fail, ...; Repeating the same mistakes over and over again
- ▶ No awareness of own (positive) potential and of opportunities
- ▶ No ambition to expand, to grow intellectually (not the same as to do the same but better)
- ▶ Closed mind, avoidance of real changes
- ▶ ...



*Give scores on each of these points from 0 to 10 for the IT discipline, for a project, for mainstream approach, ...*

# MATURATION PROCESSES & MECHANISMS

# Maturation Process

We develop competencies, set norms, define roles, take decisions and actions, and so on all in coherence with our beliefs.



Our understanding, beliefs, world view,... are imperfect (partial, lack of nuance, incorrect, distorted, imbalanced, incoherencies, false assumptions, generalisations, ...)



Similar problems keep popping up (same type of issues), we face difficult obstacles, get same type or same level of results



Dissatisfactions → pressure builds up → creates awareness that something is wrong



Confusion about what to do (risk of engaging in symptomatic and/or false solutions)



Question our beliefs, checking our assumptions, our way of thinking; Investigation



New meaningful insight is acquired. Lesson is learned.

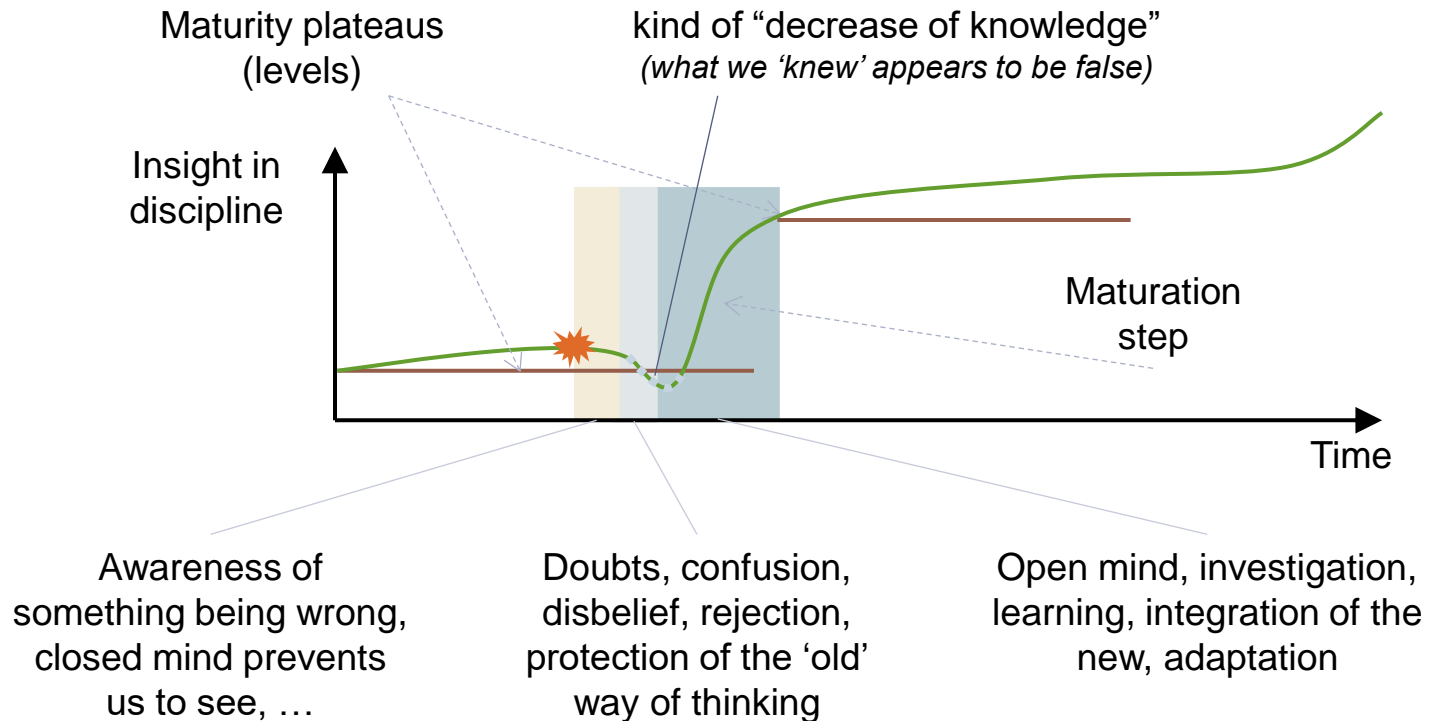


Lesson is integrated in our thinking and in our way of working



Problems similar to those that occurred before do not occur anymore. Significantly better results are obtained.

# Maturation Process

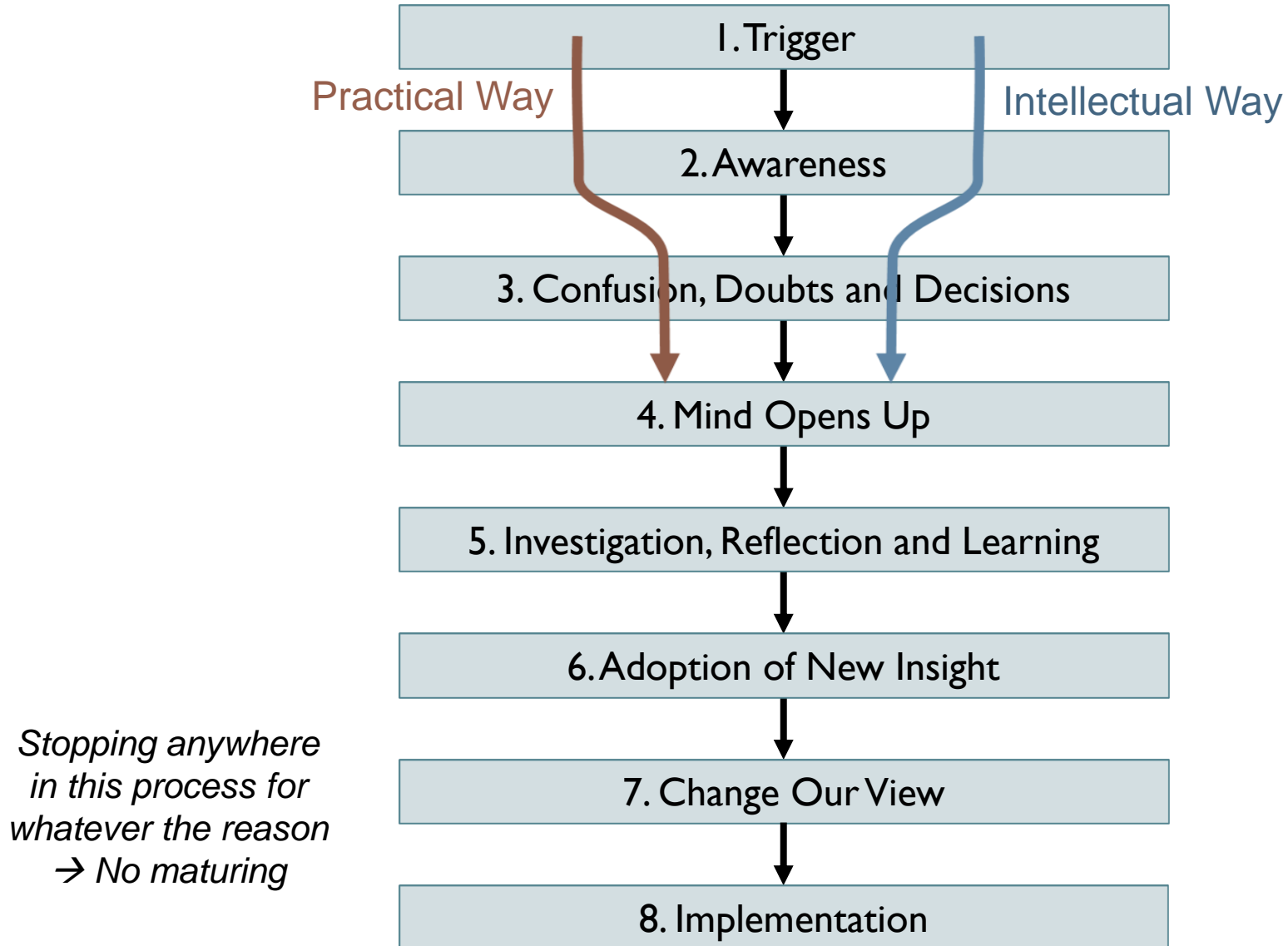


This is a typical process. However, the process may slightly differ depending on the situation. For example, it may differ when

- the mind is already open
- we learn right away what exactly is wrong or we need time to find out (longer period of doubt and confusion)
- once identified, we know immediately how to correct or we keep struggling to find the solution and to adapt
- we deny the new information and keep the mind closed
- we learned a wrong lesson and/or adapted in a wrong way



# Maturation Process - Phases



# Maturation Process – The Practical Way

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## ► Belief: „Being on the Right Track“

- Same or similar problems keep appearing



...

*Eye is blind  
Mind is closed*

- Solving the problems as they appear and go on.
- Gaining experience. Learning only a little.
- New knowledge expands the knowledge already present, but doesn't really change it (except minor corrections).
- To keep doing the same thing the same way yields similar results (basically: "more of the same")

**→ No change in maturity**

# Maturation Process – The Practical Way

## 1. Triggers

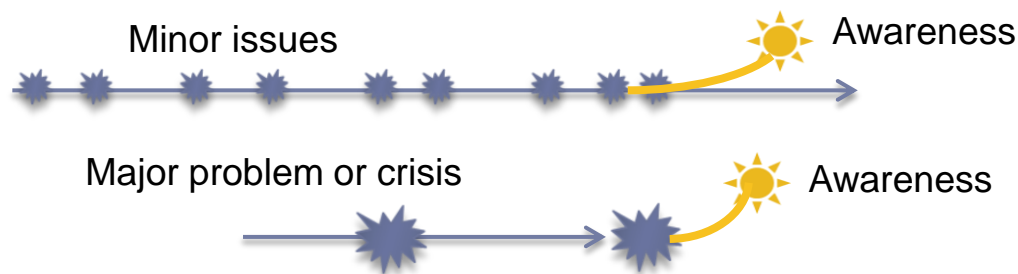
- ▶ Adverse events

One or a few major problems, crisis's or failures happened, or a series of similar issues happened, or a mix of both

Danger: starting to consider an abnormal situation (many problems, obstacles, failures) as being normal.  
Developing an insensibility for the signals that something is wrong or can be improved.

## 2. Awareness

- ▶ Awareness of the abnormality of these problems or of their occurrence
  - ▶ Problems do always happen. However, some problems shouldn't happen and facing repeatedly similar problems or obstacles should be a signal.
- ▶ Awareness that we have to deal with it.
- ▶ Awareness may appear at once, gradually, at irregular pace, with ups and downs, ....



# Maturation Process – The Practical Way

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## 3. Confusion, Doubts and Decisions

- ▶ Awareness of doing something wrong ... but what? → confusion
- ▶ Doubt about our approach, methods, people, ... (other than inside ourselves)
- ▶ Better ways, better solutions should exist, but we don't know
- ▶ Open to investigation
- ▶ Confusion about what is going wrong? Why? What do we do wrong? What are the causes? What does have to change and how to change? Will it solve the problem?
- ▶ Open to suggestions
- ▶ We may be tempted to follow the flow, hoping the world will bring 'solutions' to us (fertile ground for tendencies, market evolution, hypes, buying from the market, ...)  
Reflection: ISE engineers are the experts in their domain. They are analytical (diagnosis of causes) & problem solvers. They are the most capable of doing a right diagnosis and bring the solution to their discipline issues.
- ▶ Pressure to change builds up
- ▶ Ready to take decisions and to change

**BUT ....** the last thing we still doubt about is our own knowledge, our own belief system, our own mental picture, the standards, the core of the discipline

# Maturation Process – The Practical Way

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## DANGER ZONE



Ideal conditions for a radical change:

- ▶ awareness of the abnormality of problems
- ▶ doubts about whether we do the right things right
- ▶ convinced about having to deal with the problem + pressure
- ▶ readiness to change

However,

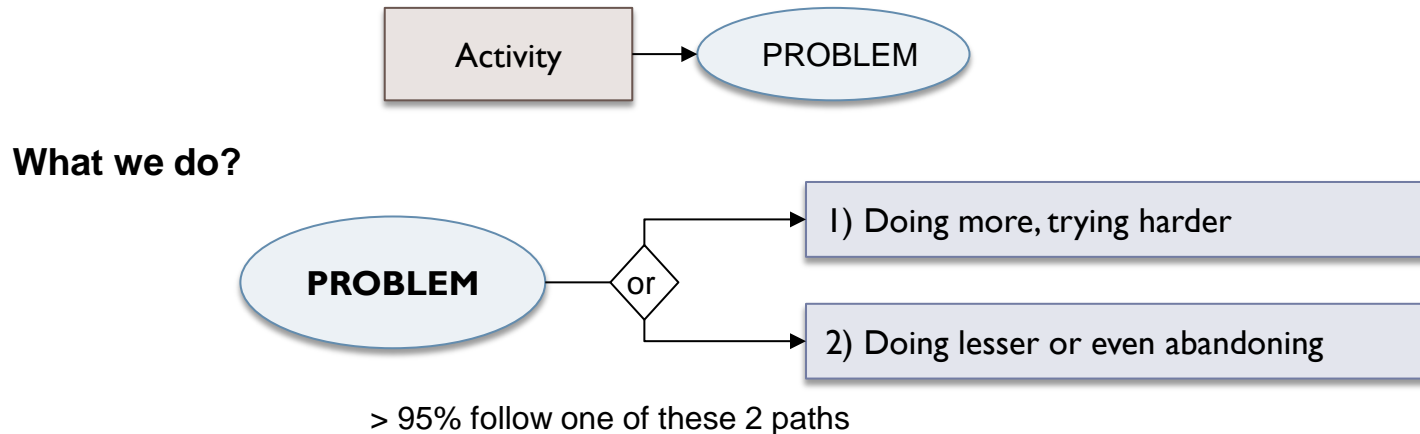
- ▶ We may have identified the problem and roughly located it. We may know the consequences and symptoms. But we may still not have identified the root cause(s) and/or understanding the problem (identifying  $\neq$  understanding; mechanism causing the unwanted consequences  $\neq$  cause).

At this point, we may be ready for a drastic change. Yet we might not be ready yet to question and to change our mind (mental picture/world view). We aren't yet aware the problem is in our thinking and in how we look at the subject. The mind is still closed ...

**Risk: we may adopt non-solutions,  
doing more harm than good and won't mature**

# Maturation Process – The Practical Way

## DANGER ZONE



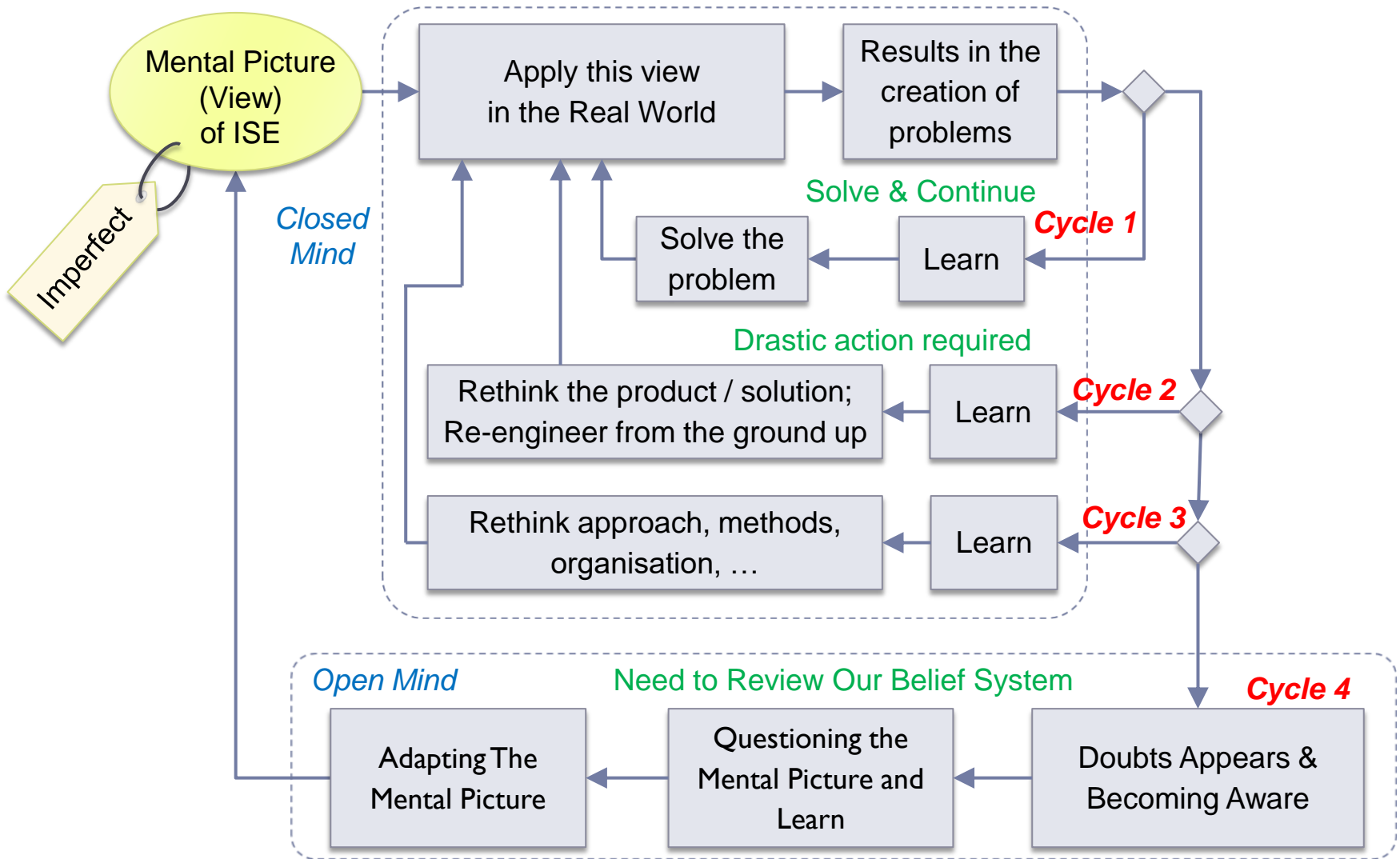
### Problems in our Activities:

- 1) It may work more or less, sometimes, or only slightly. But “Insanity: doing the same thing over and over again and expecting different results.” - Albert Einstein
- 2) “We can’t do it”; “It doesn’t work”; “It is bad”; “It is wrong”; quitting

### By abandoning engineering, solving or other activity we may look for:

- 1) **Acquisition of a solution:** Searching for an ‘existing’ solution; Buying a solution; copying a solution; following market tendencies and hypes; doing what everyone says; adopting a standard; attending courses; ...
- 2) **Externalisation of the problem:** Calling for assistance; transferring; delegating; consultancy; outsourcing; decommissioning; splitting up; privatisation; disinvestment; ...

# Maturation Process – The Practical Way



Based on Double Loop Learning Model of Chris Argyris and Donald Schön.

# Maturation Process – The Practical Way

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## ▶ Cycle 1

- ▶ The mental picture of the discipline is applied in the real world in decision making and in our actions. We created a part of this real world (organisations, business, markets, work environments, project environment or software applications). It is heavily influenced by our discipline knowledge and belief system.
- ▶ This mental picture is imperfect. Anything create based on this imperfect picture might be flawed.
- ▶ Some flaws may remain undetected (or found normal). So, even if there are reasons to complain, we may live with a flawed environment, solution or product (like an inappropriate work environment or a too optimistic project plan).
- ▶ Detected errors, like in a software application, can be corrected. This loop solves some problems.

## ▶ Cycle 2

- ▶ Issues occur when the created product doesn't suit us or doesn't fit the situation. We become aware of having to change this. We may take a drastic decision. A product or solution can be re-thought (from the ground up) and re-engineered.

## ▶ Cycle 3

- ▶ We may change the approach, the organisation, the job and the collaboration. However, if we learn the wrong lessons and if the belief system is not adapted, or wrongly adapted, then no progress in maturity has been made, despite the (apparently) “fundamental changes”.

## ▶ Cycle 4

- ▶ A major problem or repetition of problems of a same nature installs doubt. It opens the mind and creates the awareness that something in our mental picture (“world view”, “belief system”) is wrong. Our comprehension of the discipline (or the discipline itself) is questioned.
- ▶ Finding the right answer and learning the right lesson improves our comprehension and our mental picture view. When this happens, we may reach a new level of maturity.



# Maturation Process – The Closed Mind

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Maturity is about **fundamental change** in insight, in beliefs and in the way we think. But we **fear Change**. We don't like it.

Change means:

- ▶ Uncharted waters ahead - unknowns & uncertainty
- ▶ Having to (re-)think and problem solving (and most of us aren't good at it)
- ▶ Restart, undo work and do things over, ... means wasted time and effort. Waste is to avoid.
- ▶ Facing a new problems, ne obstacles, new big challenging issue
- ▶ Requires an effort, a cost, resources
- ▶ New risks
- ▶ New consequences
- ▶ Implies that we were not as good or as far as we thought. We have to admit we have been wrong (self-protection, self-esteem)
- ▶ Fear of responsibility and being blamed for the issues of the past
- ▶ Undermined position and authority ?
- ▶ Tests of our capabilities and competencies

→ **Tendency to stick to the old**

(much more present than we may think)

# Maturation Process – The Closed Mind

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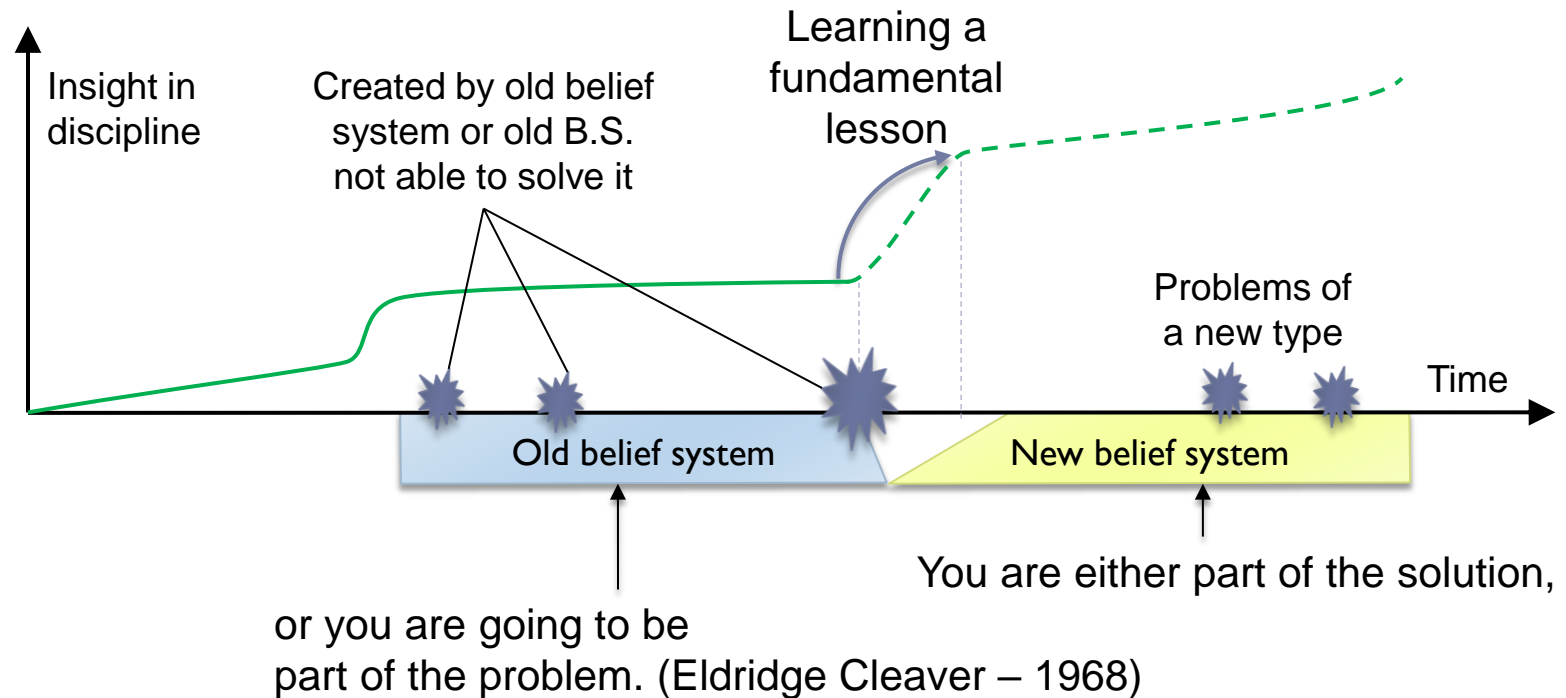
- ▶ A **‘Closed Mind’** is the lack of readiness to question, to investigate and to change our own knowledge, our own thinking and our own view.
- ▶ The mind is closed when we aren’t interested in a different answer than the answer we, and everybody else, already know or expect, when we care about being wrong.
- ▶ It is a barrier that prevents us to mature. It prevents learning and progress
- ▶ Symptoms:
  - ▶ Lack of doubts ... a lot of certainty of being right
  - ▶ No awareness
  - ▶ No curiosity
  - ▶ No time and effort spend on genuinely objective investigative thinking
  - ▶ Answering fundamental questions with readily available answers
  - ▶ Stick to what is familiar
  - ▶ Immediate and automatic rejection
  - ▶ Rejections based on mismatch with what we and everybody else know
    - ▶ BTW, Any maturity step is about adopting new knowledge that mismatches with the current knowledge
  - ▶ Defensive position protecting the present knowledge - loyalty to an idea, instead of to the truth

# Maturation Process - The Practical Way

## PROGRESS BY CRISIS'S

We meet issues that can't be solved with the same insight and belief system that created them.

A new level of maturity and increased benefits can only be reached with a new and better paradigm.



"We can't solve problems by using the same kind of thinking we used when we created them."  
Albert Einstein

# Maturation Process - The Practical Way

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## THE HARD WAY

- ▶ Because of problem, crisis, damage, loss, suffering occurs
- ▶ Closed minds need 'force', 'pressure' to be open up (painful process). If it learns, it is through the hard way
- ▶ **We have a choice:** continue to face adverse effects or improve
  - ▶ The change to mature becomes an obligation; forced to mature
- ▶ Nature (nature of things, the universe) tells us we are wrong. We will face consequences until we learn. Nature is our ruthless teacher who is always right. For people who really abhor being wrong, that's very bad news.
- ▶ People with a naturally open mind may occasionally also experience "the hard way" but probably lesser frequently and lesser painful. They may move more swiftly to a higher level of maturity. Same for true problem solvers.

# Maturation Process – The Practical Way

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## 4. Mind Opens Up

- ▶ Our mind is open when we are ready to genuinely question our knowledge, our insight, our fundamental beliefs, our world view, our assumptions, our way of thinking and the fundamental principles of the discipline  
AND ready to earnestly reflect upon any answer different from what we know so far.
- ▶ Open or Closed mind is not a binary state (gradation), can be issue-specific, may vary over time, ...
- ▶ “Being ready to change”  $\neq$  “Having an open mind”

Next phase is “Investigation, Reflection and Learning”

# Maturation Process – The Intellectual Way

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## The Gentle Way: Reflection



*Truth Seekers*

### Preconditions:

- ▶ A mind with as default state 'OPEN'  
Prior steps to open the mind aren't necessary
- ▶ Combined with a natural curiosity and advanced thinking skills

The mind goes spontaneously (or based on a light trigger, like a new idea or new information) into investigating and thinking mode. If it comes to a different conclusion, it easily adapts its former knowledge and integrates the new insight.

### Approach:

Digging deeper into the subject, questioning what we know, observation, reflection, grasping new insights, investigating, follow your curiosity, reading, learning other disciplines and comparing them, ....

- ▶ Much knowledge can be acquired by posing the right questions and reflecting about it to find answers.
- ▶ Don't accept what you read/see without first thinking about it.



Note: reading material which only reflects the mainstream knowledge will just deliver more of the same and won't help to get a ground-breaking view on the discipline. Go your own way.

# Maturation Process

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## 5. Investigation, Reflection and Learning

### DIAGNOSE CORRECTLY

Do a correct diagnosis ! Don't be too quick and superficial on that.

Any false diagnosis will result in the learning of a wrong lesson (nature doesn't care. You can't cheat with nature), resulting in a non-solution, waste and even more problems. A wrong diagnosis doesn't help maturation.

Learn the right lesson(s). Don't forget old lessons.

#### Common mistakes preventing us to solve a problem

1. Symptoms (or undesired consequences) are often identified as problems because they are visible and experienced. We found "the problem" and stopped digging deeper.
2. It's often Ok for us if we don't experience negative consequences.  
Intuitive idea: "No consequences means no problem" → isn't true
3. Identified cause is wrong
4. Insufficient understanding of the problem (too superficial, too approximate). Trying and experimenting may lead to understanding, but it doesn't replace it.

# Maturation Process

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**Recognising the presence  $\neq$  identifying the problem  $\neq$  locating it  
 $\neq$  diagnose it  $\neq$  understanding it**

## Recognising the Presence of a Problem

“there is a problem and we need to look at it” (undefined)

## Identifying, Defining the Problem

Giving the problem a vague name, a vague location linking it to a subject

We may know symptoms, consequences.

## Locating the Problem

Identifying the exact location. (Expected) location becomes more precise.

We may still ignore what exactly is happening. But we may know symptoms, consequences.

## Diagnosing

Finding out what exactly lead to the observed situation, symptoms, consequences. Pinpointing the exact cause.

Often, also understanding the mechanism leading to undesired effects.

## Understanding the Problem

Understanding of the faulty mechanism, but also risks, future implications, aspects like how it came to existence. All the consequences are identified and their impact are understood. Understanding how others and how the environment reacts to the undesired consequences. Understanding the magnitude. Understanding what can be used to solve it, what can be changed, what should be changed and what can't. and so on.



## ALWAYS FIRST DIAGNOSE CORRECTLY

**DIAGNOSE !**

diagnose  
**CORRECTLY !**

**FIRST !**, diagnose  
correctly

**ALWAYS !** (first,)  
diagnose correctly

**It's so incredibly important !!**

# Maturation Process

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## 6. Adoption of the New Insight

Acceptance of the new insight. It is accepted as true.

## 7. Change of View (Mental)

The new insight invalidates the present view / belief system. Everything has to be **reconsidered** in the light of the new insight. Some parts of our understanding and vision will have to be **adapted**. Some shifts may occur.

This adaptation is necessary to obtain a new **coherent** view.

We need to **integrate** the new insight and re-create coherence.

# Maturation Process

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## 8. Implementation (Practical)

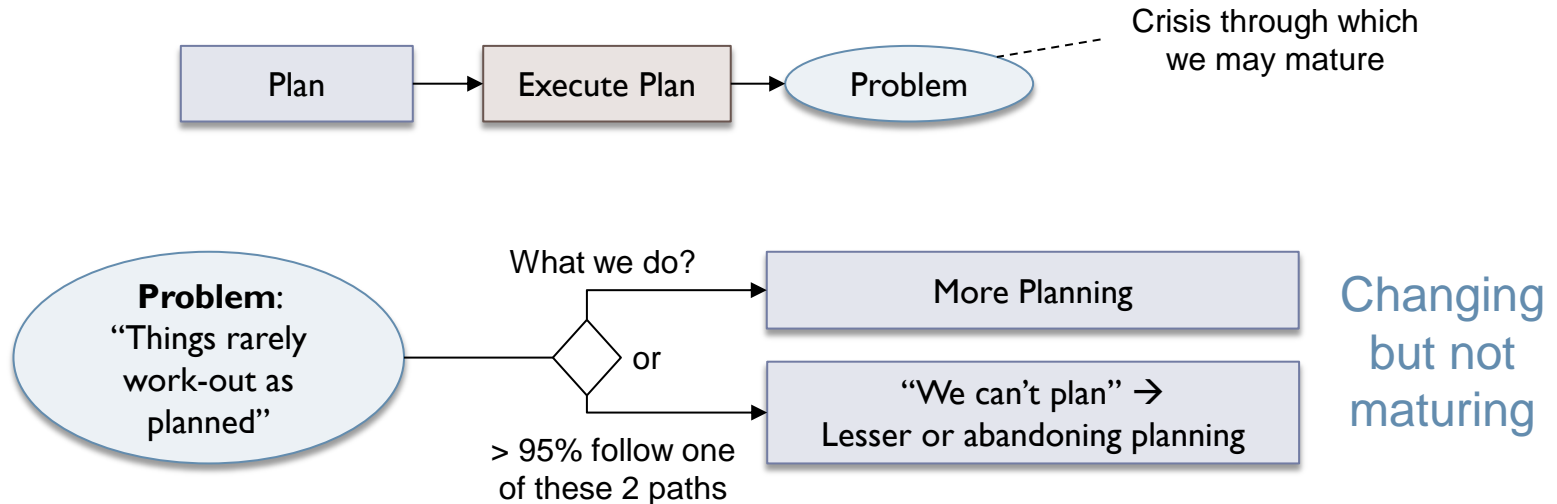
We need to consider what are the practical changes to be implemented to align what we do and how we do it with the new insight.

Some practical stuff like the organisational arrangement, the roles, the required competences, the collaboration, the methodology,... whatever will be put in place or used as tool to perform the job will need to be adapted.

# Maturation Process – Examples

## TWO EXAMPLES: PLANNING and ANALYSIS

### 1. PLANNING



**Doing More**  
More planning may work.  
But it can also be  
“more of the same”?

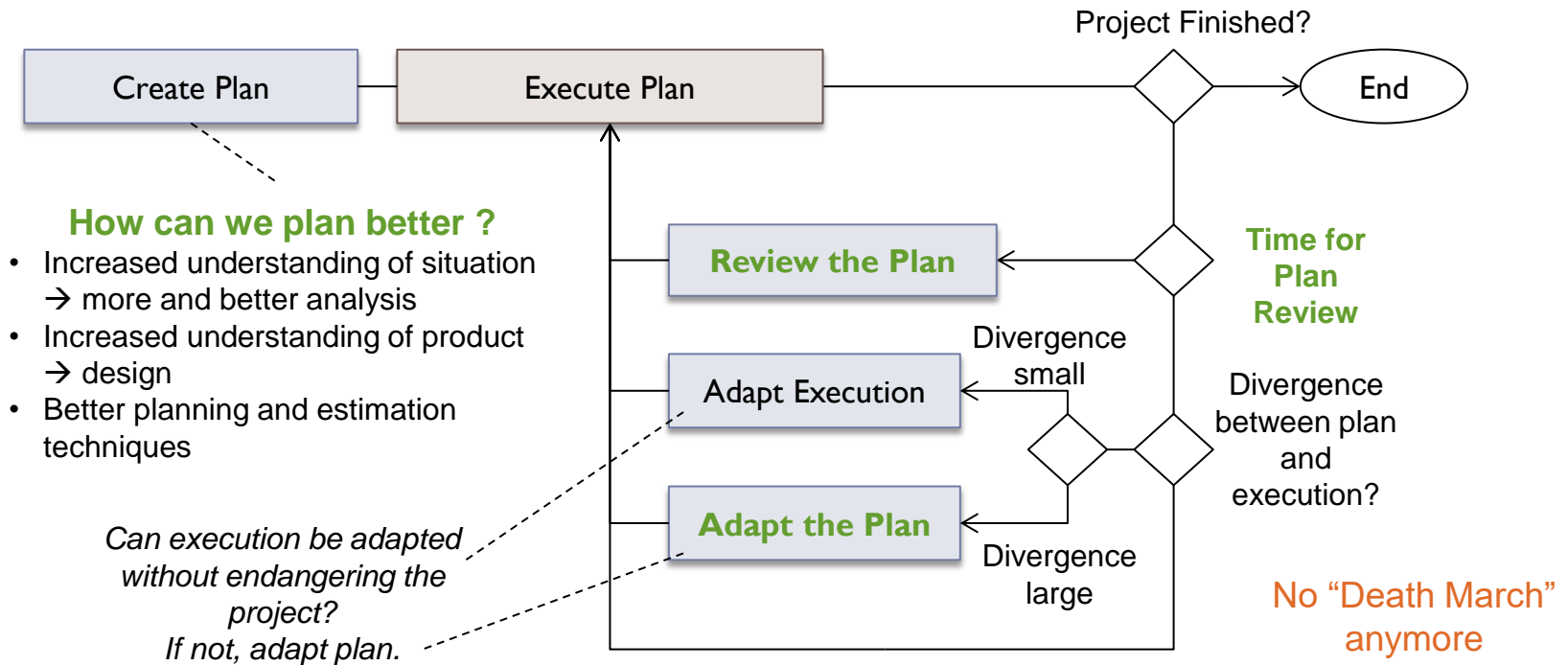
**Abandonment Planning**  
(or anything else)

- Why did we do it in the first place?
- If we abandon it, what advantages do we lose?

**None of these reactions solved the problem. The right questions aren’t posed:**  
**What is the actual problem? How can we solve it?**  
**How can we adapt and improve?**

# Maturation Process – Examples

How about **changing our VIEW** on Planning?



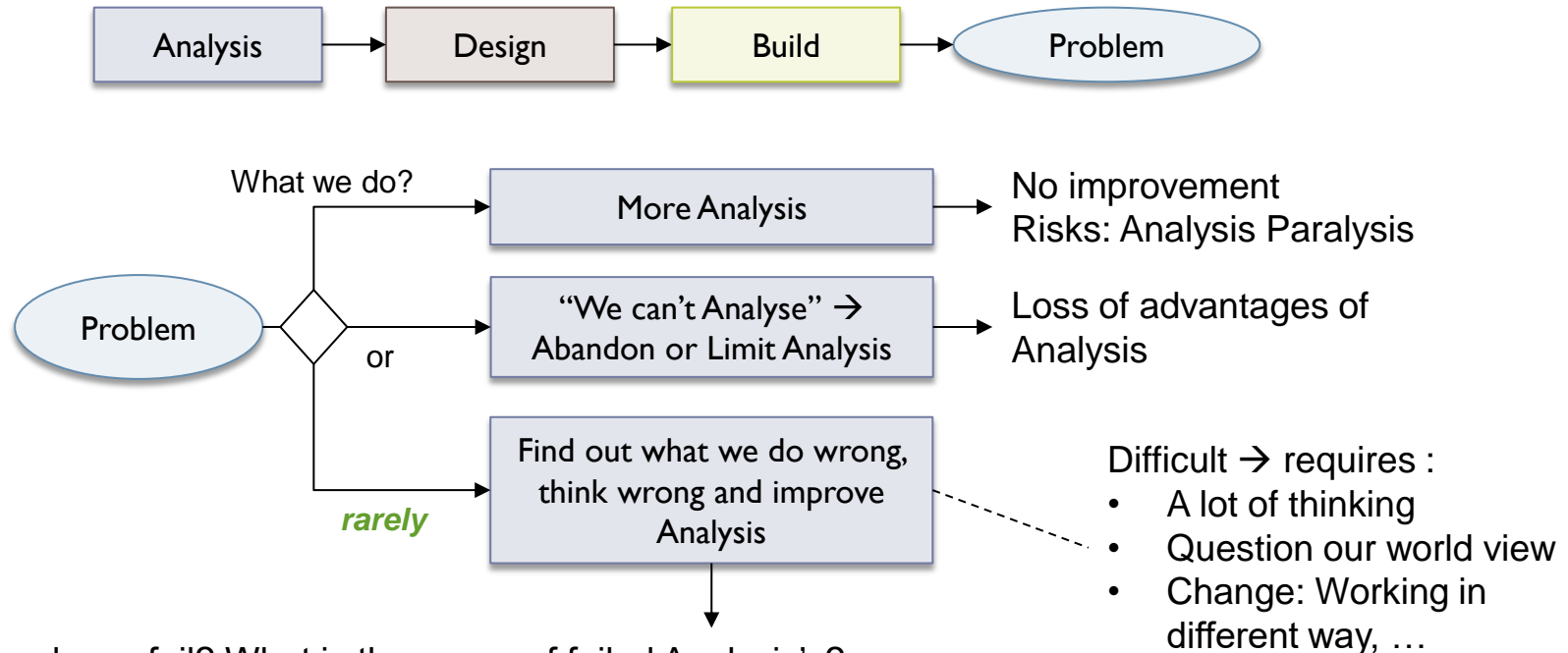
The belief of “making a planning” as a one shot activity done early in the project and then cut the plan in stone is changed into a more dynamic way of planning by which execution and plan are continuously improved and kept in sync by adapting both when necessary.

**Keep the project feasible during its execution, adapt it ... or end it (properly)**

Note: The better the product is known, the better the plan to build wit can be. The plan can only become quite reliable after the product design, provided the former activities have been done well.

# Maturation Process – Examples

## 2. ANALYSIS



Why do we fail? What is the cause of failed Analysis's?

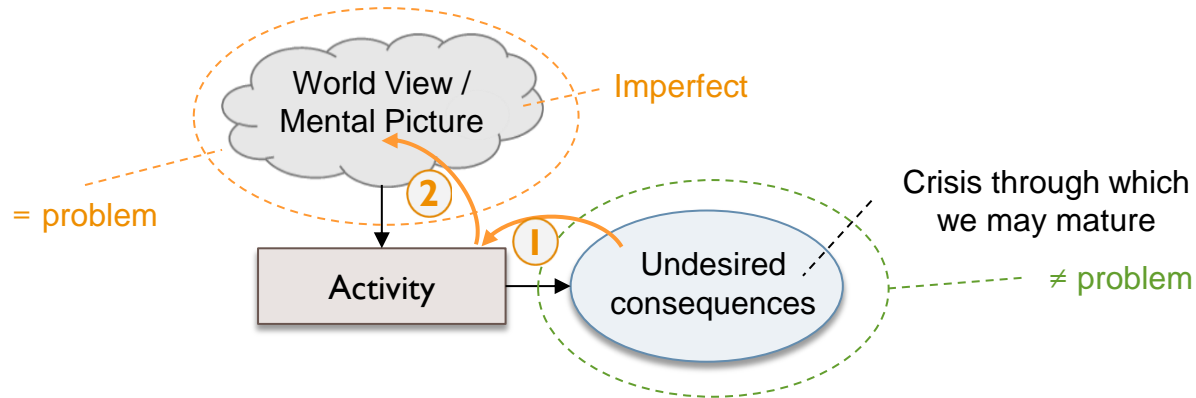
- What is the true purpose of Analysis?
- What benefits do we seek to obtain from an Analysis?
- What is a "decent Analysis"?
- What does it takes to do a decent Analysis and to obtain the benefits?
- What must be analysed to succeed?
- What knowledge and skills are required?
- ....

### 3rd easy way:

Another alternative is to expect the business community to tell what they want or need or to question them about it. This is a terrible substitute for Analysis. It gives the analyst a lame excuse for not doing a decent job and not taking responsibility.

# Maturation Process - Examples

The following approach can be used to start investigating the analysis and planning processes of the examples



## (1) We have to investigate our activities.

- What are the steps? Why ? What is their purpose?
- What elements, objects, aspects, .. are involved? What is their nature?
- What qualities are necessary to make the activity to succeed (time, stability, knowledge,...) and do we have it? How does it conform to what is required?
- How does this play out together?

## (2) Then (although not strictly sequential) we have to start investigating our beliefs, our vision, ...

- What are the assumption we make about the activity? What are the expectations?
- How do we look at it? How do we expect things to be? Is this justified? Why? Can provide further arguments about it?

# Maturation Process – Post Change Era

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## Did We Mature?

If nothing in the outcome fundamentally / significantly changed...

- ▶ Results are not improved
- ▶ More and/or worse problems are still popping up
- ▶ Same kind of obstacles are still as challenging as before
- ▶ More disharmony, imbalances, dissatisfaction, discomforts, ...

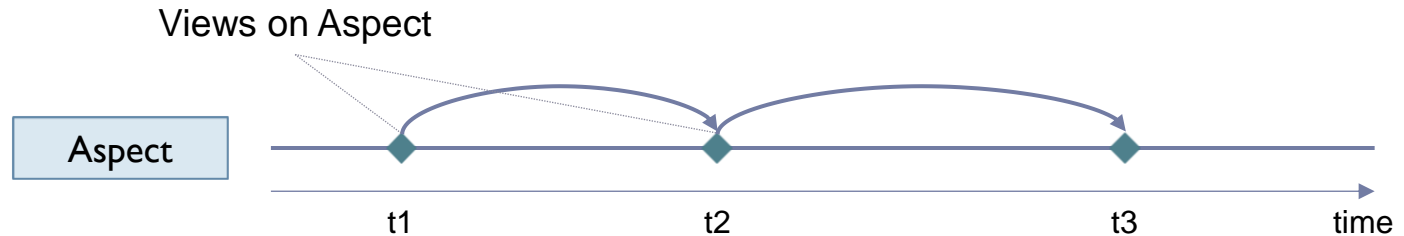
**we are probably on a wrong track**

- ▶ Check the global outcome (not local, specific, ... )
- ▶ Use the 'checklist' of immaturity to see if progress has been made



# Maturation Process – The Evolving View

## Radical progress of a view on a single aspect



The view (knowledge, opinion,..) on an aspect may evolve radically over time.

Although, we can only evolve over time, time is not important in the ISEDMAM. The different views on an aspect ordered by degree of maturity is what matters. In the representation of the 'dimension', the time aspect is dropped.

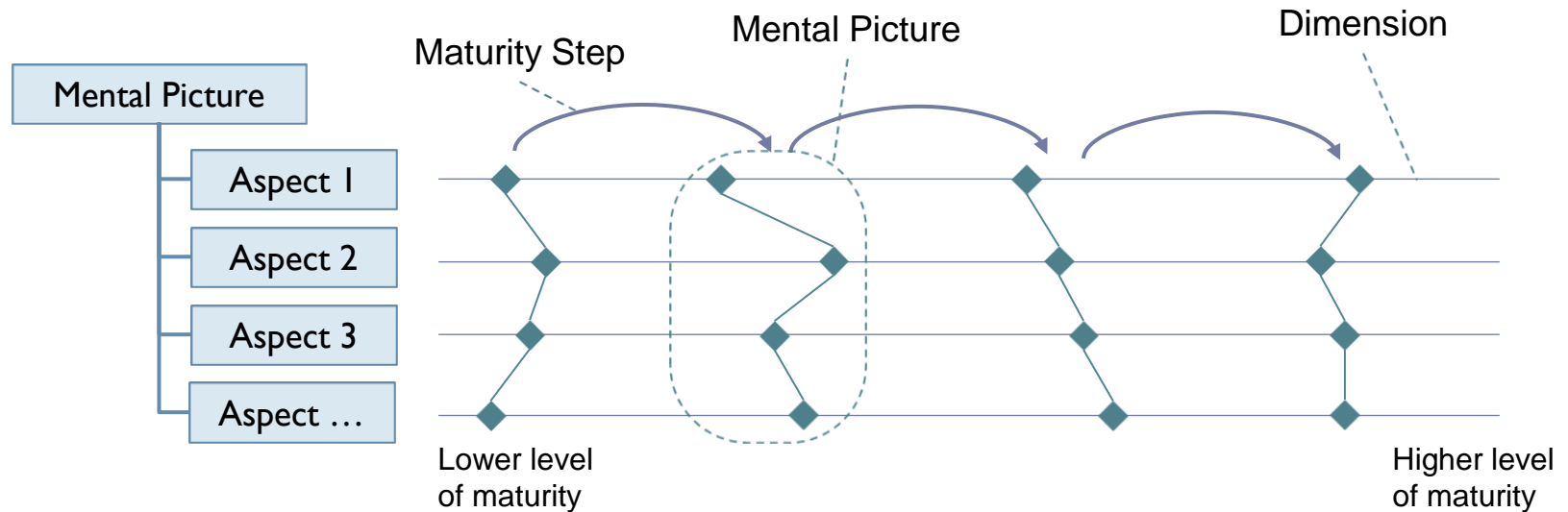


# Maturation Process – The Evolving View

## Maturation of Mental Picture - Detailed

### CORE IDEA OF ISEDMAM

An evolving (“coherent”) mental pictures at 4 different points in time

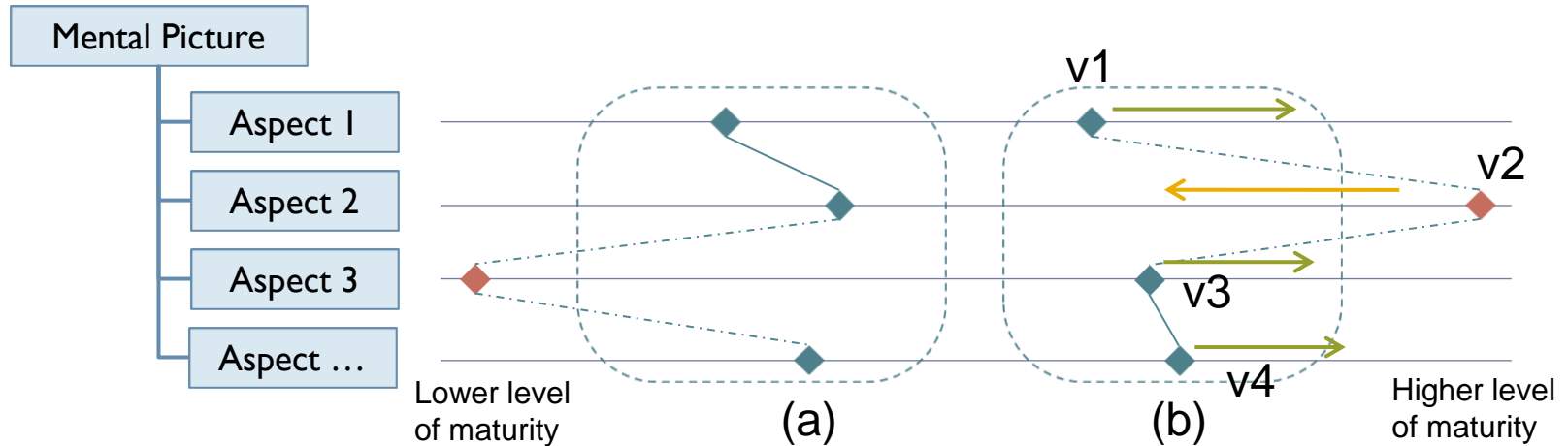


Note: The mental picture is much more than the sum of views about a set of aspects.

Somewhat further, we will select some (key) aspects  
and discuss different views ordered from lesser mature to more mature.

# Maturation Process – The Evolving View

## Incoherence



Incoherence would occur when:

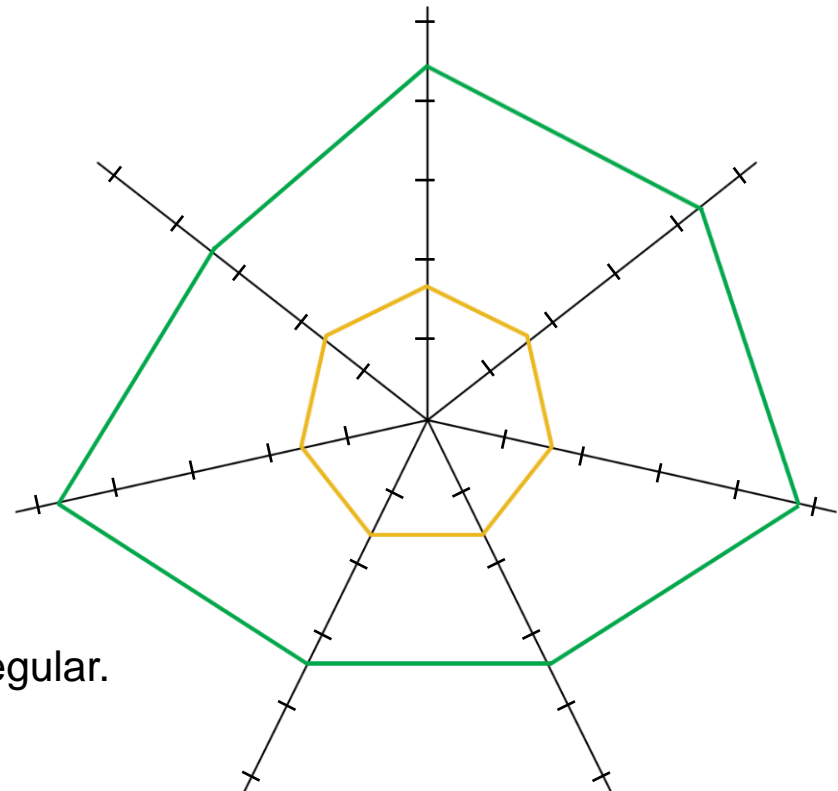
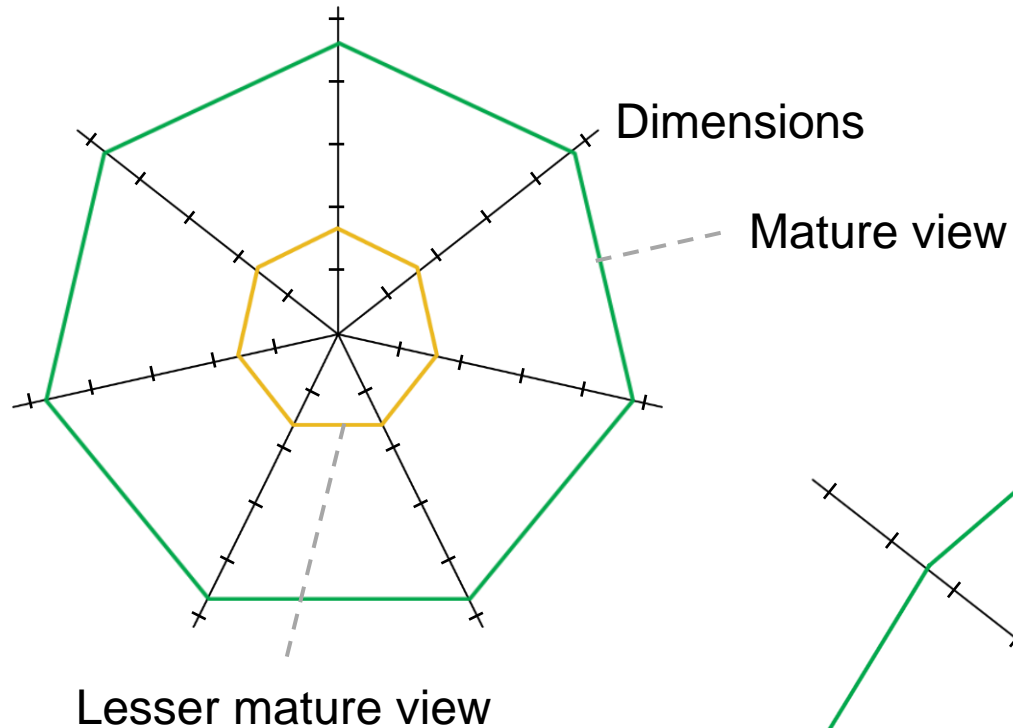
- a) Other views on aspects have evolved and one or more views on aspect(s) have not evolved
- b) Or when a view on an aspect has evolved “too much” breaking the coherence.
  - Automatic response to refute and reject the view (or new information)
  - or, if open mind, investigate, evaluate, integrate and adapt the mental picture (opportunity to mature)
    - v1, v3, v4 may pull v2 back towards them (to the left) → no progress
    - v2 may pull v1, v3, v4 towards it (to the right) → progress

# Maturation Process - Some Characteristics

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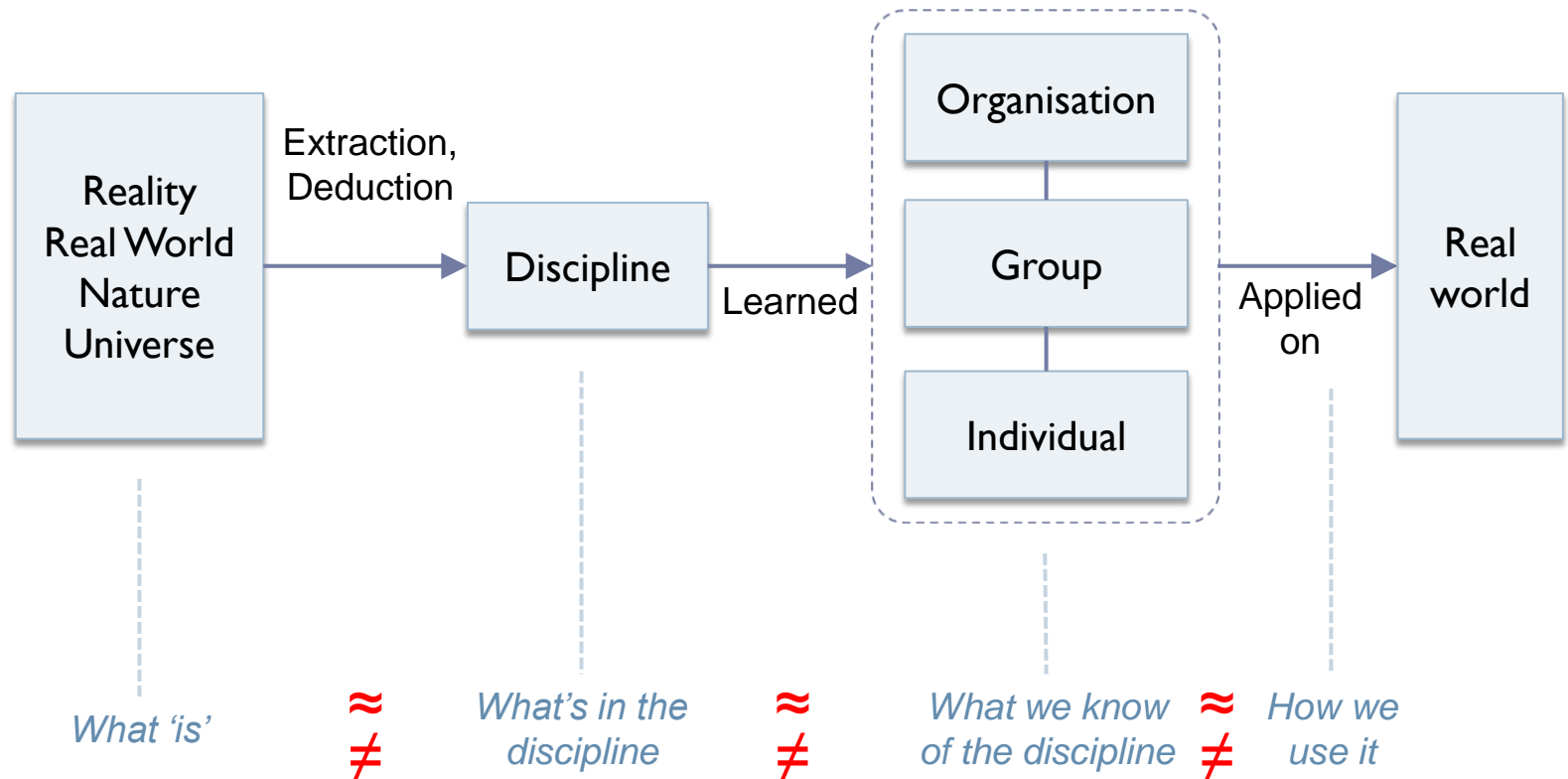
- ▶ **Multi-dimensional**
- ▶ **Gradual, progressive shift**
- ▶ **Not strictly sequential**
  - ▶ No strictly separated stages with clear well-defined gates or boundaries
- ▶ **Unidirectional**
  - ▶ Normally; should be
  - ▶ Although there is a global 'forward' direction, temporarily falling back on older maturity level is possible.
- ▶ **Irregular progress in the dimensions**
  - ▶ Different progress in the dimensions, although the whole forms a more or less coherent whole
- ▶ **Difference between individual maturity, group-level and company-level maturity (ISEDMM focusses on individual level)**
  - ▶ Differences between maturity at the different levels or among people may lead to conflicts and loss of good people
- ▶ **Complex → not for occasional practitioners**

# Maturity in a Star-diagram

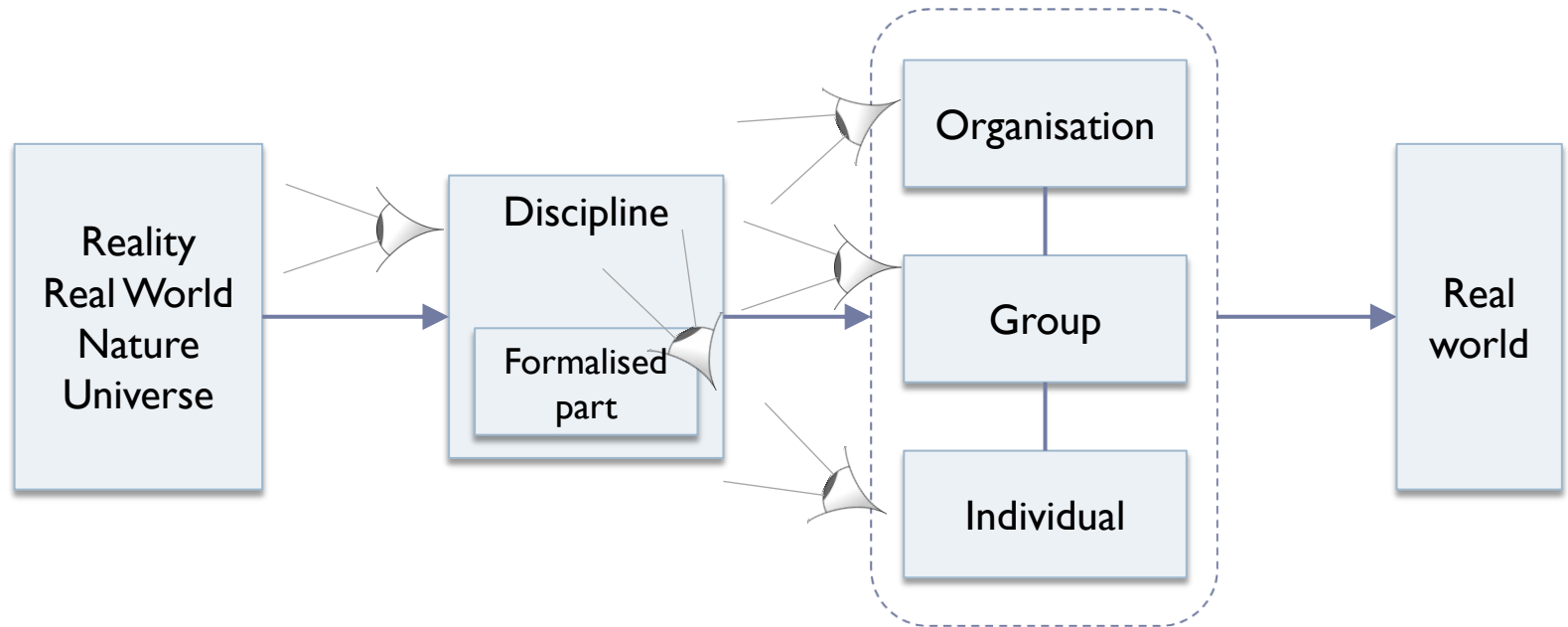


Likely, the diagram will be somewhat irregular.

# Practical Reflections – From Origin to Application

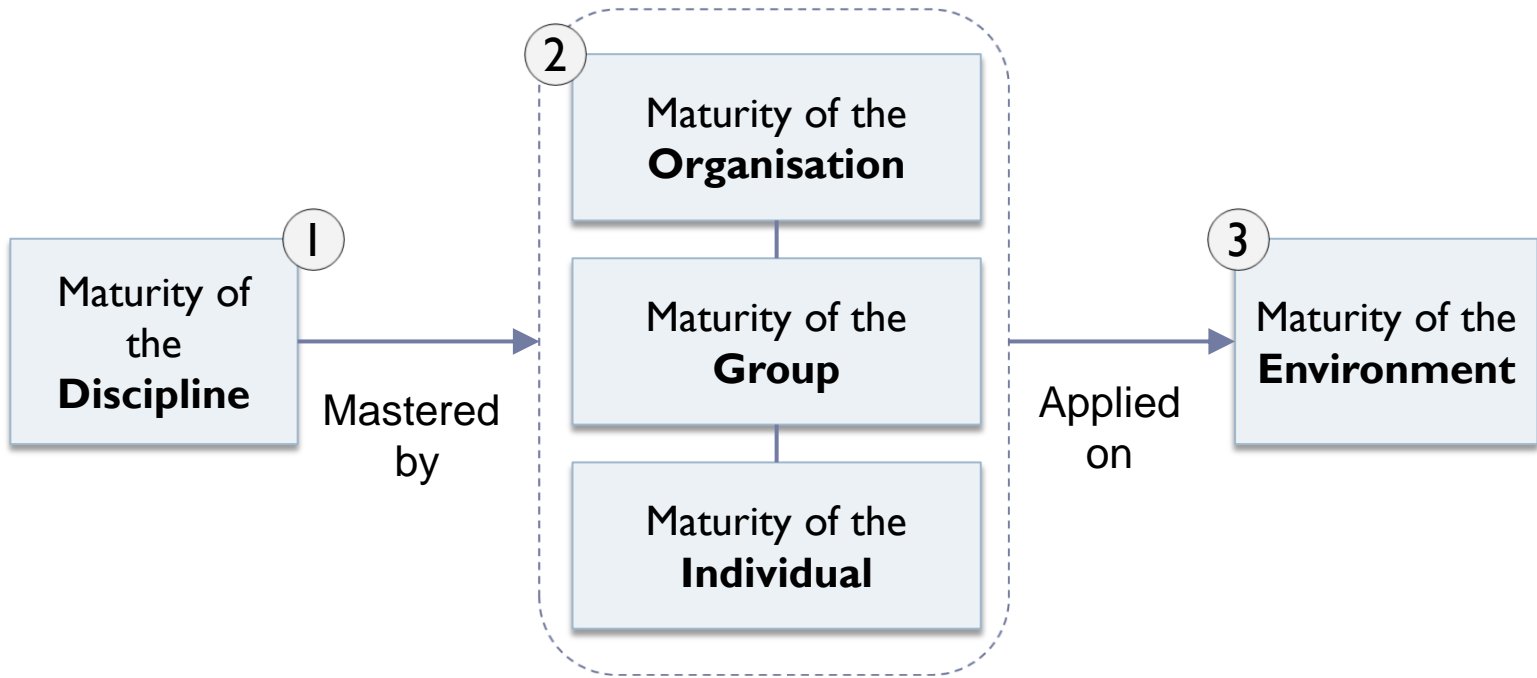


# Practical Reflection – Views



- Discipline is a view on the reality, on the real world, ...
- The formalised part of the discipline is a view / expresses a view on the discipline
- The organisation has a view (or mental picture) on the discipline. Similarly, a group and an individual has also their own views on the discipline
- An individual, a group and an organisation apply the discipline on the real world using the view they have on the discipline and their knowledge.
- **All these views are different.**  
Experts have some knowledge and understanding in common. But not one expert has the exact all the same knowledge and understanding, or same view, as another expert.

# Reflection – Maturity at Different Levels



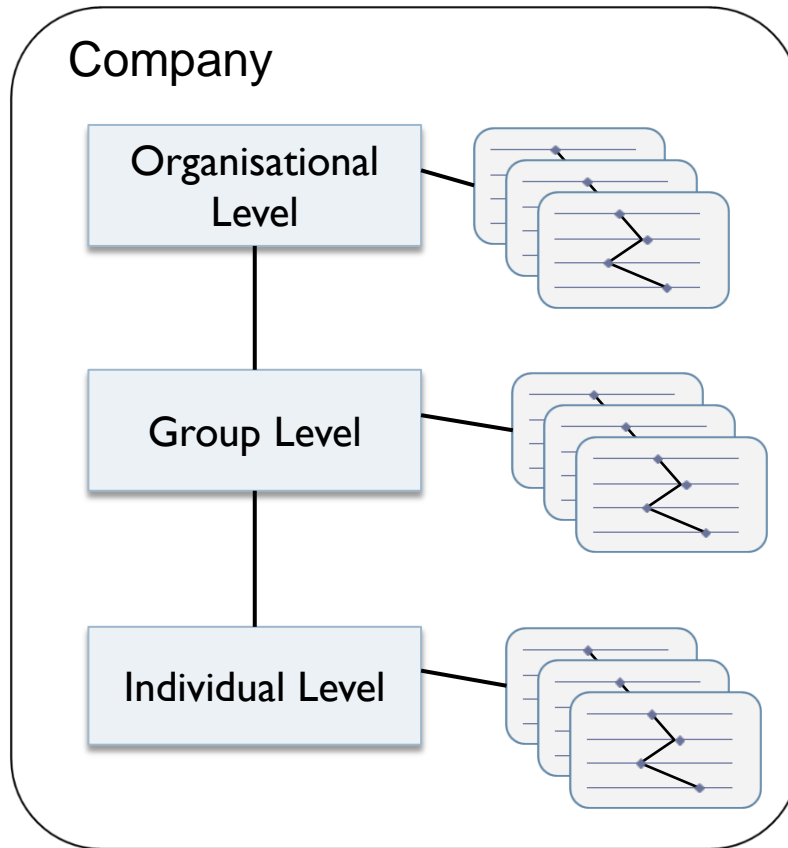
- ① Definition, purpose, delineation and content of the discipline
- ② Amount of knowledge and degree of understanding of the discipline and related domains + the ability to practice (of the individual, of the group, of the organisation)
- ③ Suitability of the environment for the application of the discipline

## Reflection:

- What happens if one of the blocks is (significantly) **more** mature than another ?
- What happens if one of the blocks is (significantly) **lesser** mature than another ?  
(Any relation with the best professionals leaving a company ? Or even inability to hire them)

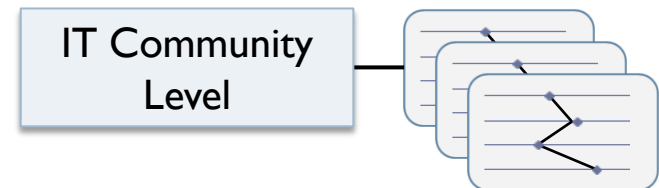


# Awareness Maturity Model in Communities

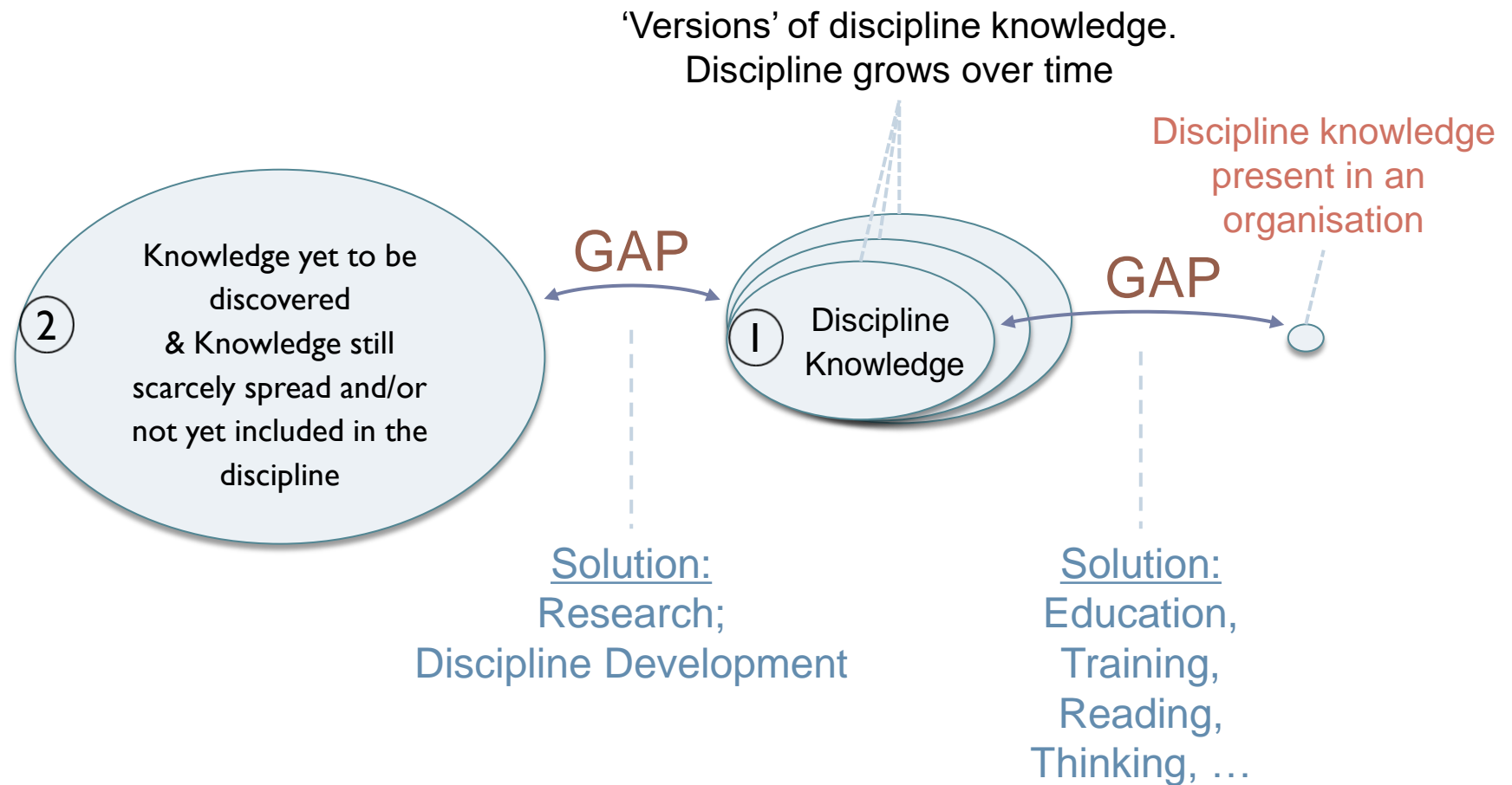


Note:  
The community of non-IT  
people has its own mental  
picture(s) of IT

- Mental picture evolves at all levels
- Different pictures may exist in groups, although usually, they are quite similar (same level of maturity)
- The IT community level (outside the company) has also its picture; a mainstream picture shared with the mass of IT people ... and other pictures.

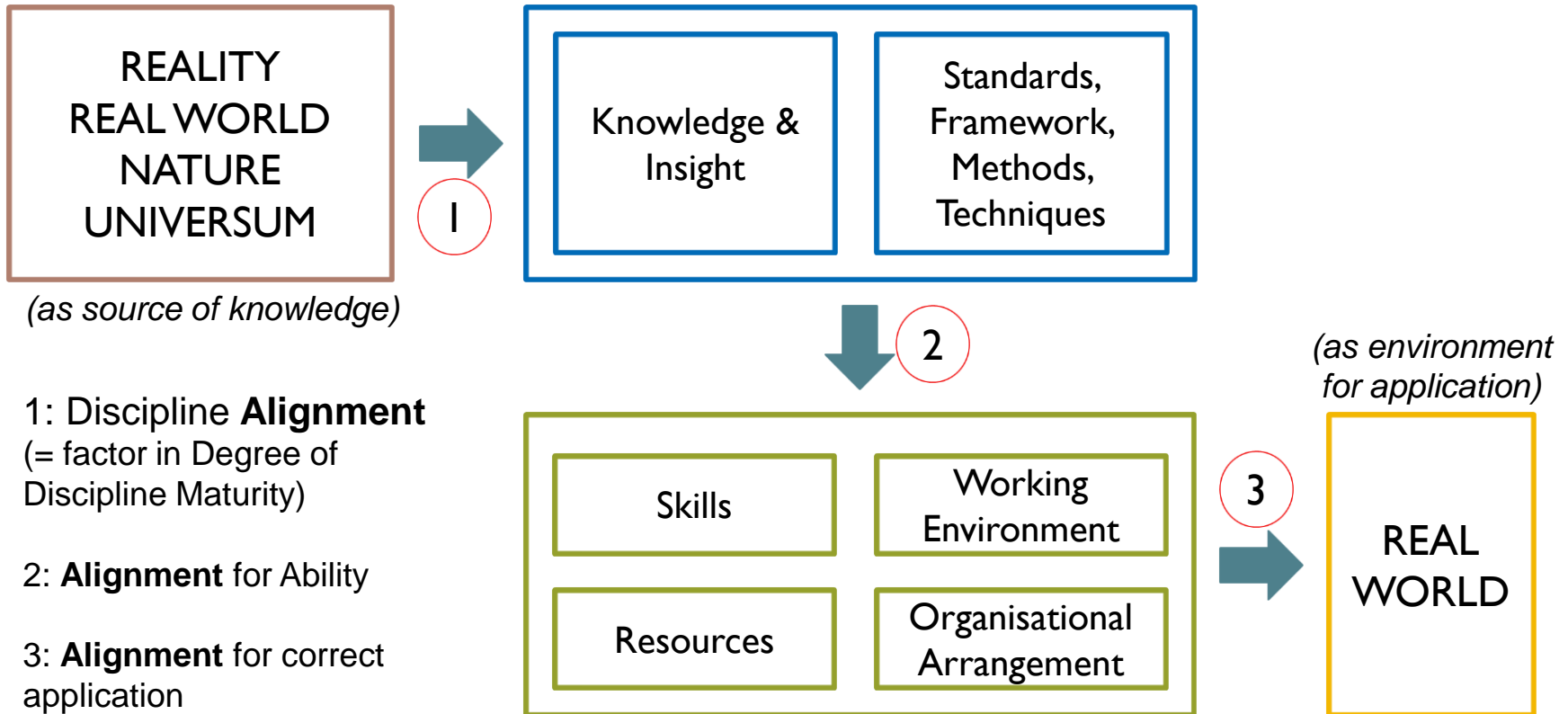


# Practical Reflection – Knowledge Gap



We should learn (1) but **ALSO** have an open mind and be curious for (2).

# Practical Reflection - Alignments



## 1: Discipline **Alignment**

(= factor in Degree of Discipline Maturity)

## 2: **Alignment** for Ability

## 3: **Alignment** for correct application

**Misalignment in 1:** Application of wrong or partial knowledge

**Misalignment in 2:** Knowledge is ok, but not the ability OR work environment, resources, skills, roles, collaboration, ... are present but knowledge is too superficial

**Misalignment in 3:** The means put in place (like a 'project') don't fit specific situation that must be dealt with and the environment in which initiative will happen and/or be deployed.

# Practical Reflection – Knowledge & Understanding

## Knowledge Layer – “HOW TO”-Layer

= “Dependency”-knowledge

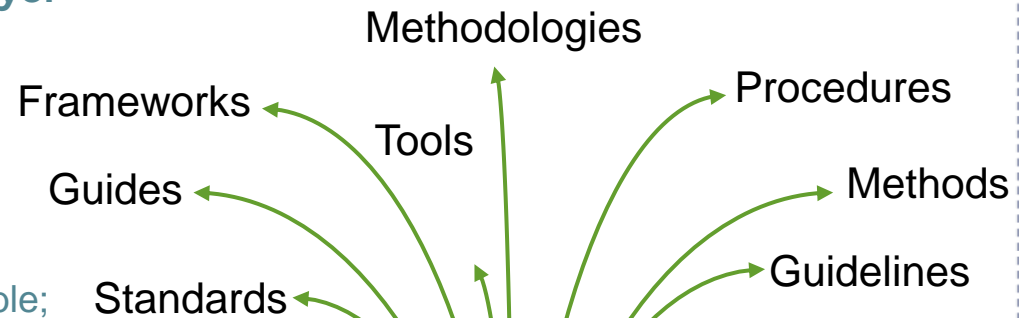
Tells how to do things:

Follow and respect standards;

Apply methods; Execute processes

Risks:

literal application; religiously following the bible;  
doing w/o understanding;

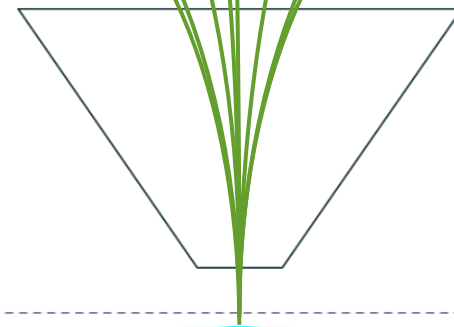


## Understanding Layer

Explains the nature of things, their relations, the forces, cause-consequence relations, mechanisms and tendencies. It allows to understand how and why things are.

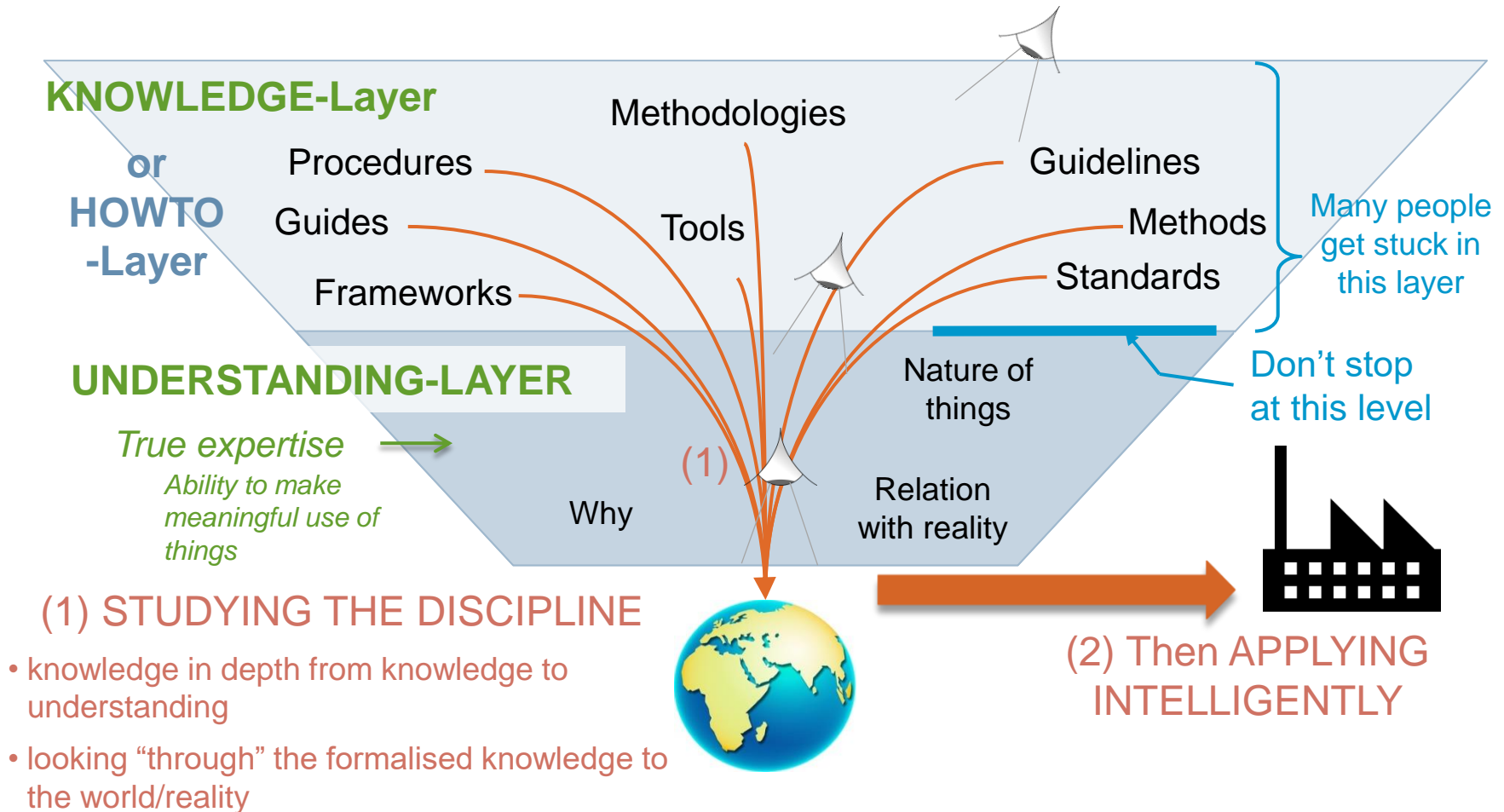
**This knowledge fosters independence**

The Howto-layer  
is deduced from  
the “understanding layer”



Reality - the World  
- True nature of things -  
Universe

# Practical Reflection – Knowledge & Understanding



Knowing (the “how-to”) w/o understanding leads to parroting and literal and indiscriminate application (= immature)

Need to understand formalised part + discipline + real world

Formalised part is an aid to understand the discipline and to understand the relation between the discipline and the real world.

# Practical Reflection – Typical questions

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## Meta-thinking / abstract thinking about ISE

**To understand the ISE discipline more in depth, these are the types of questions we should look for and study and reflect to find the right answers:**

- ▶ What are the elements; like concepts, objects, "raw materials"; and aspects we deal with? (like systems, information, people, processes, knowledge, ...)
- ▶ What is the actual purpose of these elements? Why do they exist?
- ▶ What is the true nature of these elements? (do not look to the pre-assigned labels and used terms but consider the true nature)
- ▶ How would we describe it as completely as possible in our own words? What are the differences with something very similar, but which isn't the same?
- ▶ What are the characteristics of these elements?
- ▶ How are they able to play their role? What are their obstacles, weaknesses, risks, ... ?
- ▶ How do/can we classify these elements? Does this classification have a practical value? Which? Why? (types of systems, types of processes, types of information, ...)
- ▶ How would the most complete abstract model common to all types of an element look like?
- ▶ What parts can we discern? What is the nature of these parts? What are the relations between these parts? How is this relation?
- ▶ How are these parts arranged? What is the nature of the interactions and influences between the parts?
- ▶ When looking at elements, aspects, sub-elements, ... What are the proportions? What is their relative importance?
- ▶ Does the element have a lifecycle? Do the parts have an own lifecycle? Does the supra-concepts of the element have a lifecycle?
- ▶ What is their typical lifespan? How do they evolve during their life? What events may typically happen during their lifetime?
- ▶ How are similar elements or aspects spread? Why?
- ▶ Do these elements or aspects determine and/or structure the overall concept, its characteristics and its behaviour? And how? Why?

# Practical Reflection – Typical questions

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## Meta-thinking / abstract thinking about ISE

### Some more questions

- ▶ What makes these elements strong, valuable, .. and what makes them weak or worthless?
- ▶ What are the principles? What are the mechanisms? What are the cause-consequences?
- ▶ What forces are at play? What are the tendencies? Can we discern evolutions? Which? Why? What drives them?
- ▶ Can we find new types of elements, new aspects, new characteristics in the discipline knowledge?
- ▶ Does a definition clearly describe the main aspects and single out the concept it defines?
- ▶ What are the preconditions to apply a standard, a theory; to perform an action? Do I have to adapt the situation first? Or can I adapt the theory to the specific case? Or both?
- ▶ Why do I have to perform this action? Or, why do I have it to do it this way and not in another way?
- ▶ What happens if I leave it out? Can I replace it with something else?
- ▶ What are the limitations, risks and weaknesses?
- ▶ ...

## ► 4 Directions of Growth

### 1. **Correction**

- looking for misalignments, false beliefs, assumptions, problems, inconsistencies, contradictions, ambiguities, confusions, vagueness's, ...

### 2. **Expansion** ( $\pm$ horizontal)

- Looking for gaps, missing elements, opportunities, unexplored areas, alternatives, ...

### 3. **Progress in Significance** ( $\pm$ vertical)

- Looking for higher goals, broader purpose, creation of value in higher layers

### 4. **Spiritual Growth**

- Growth in vision, role, attitude, responsibility

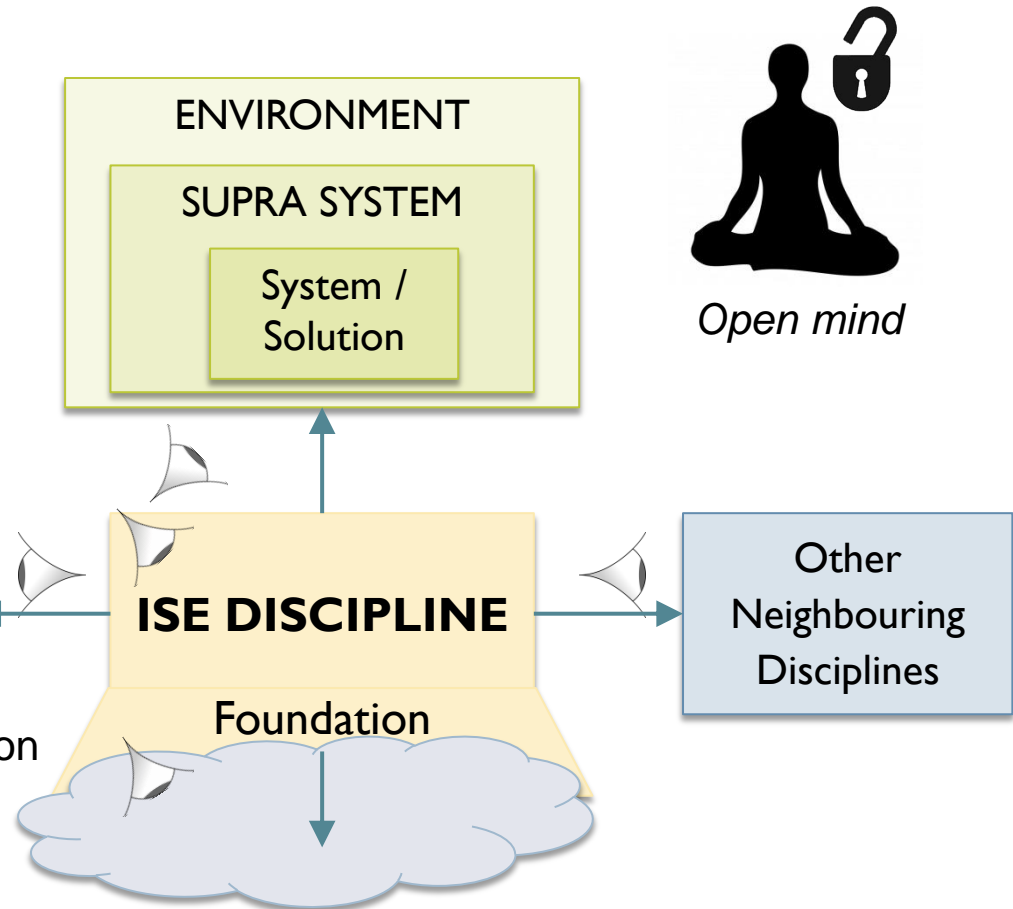


# Practical Reflection – Discipline Evolution

Other ways (than by facing problems)  
to mature:

Looking, analysing, study, reflecting  
in 5 directions

1. Look inwards in the discipline
2. Alignment with real world (Ontology)
3. Look to knowledge in neighbouring, related, similar disciplines or similarities in other disciplines
4. Dig deeper into the discipline with open mind and question the beliefs, assumptions, habits, ...
5. Look at the supra-system and the environments.



Time-dimension: Consider for each direction past, present and future (evolution, tendencies, forces, ... why and how they happen)

# Practical Reflection – Maturing Principles

---

- ▶ Improve the principles

Correction, clarity, precision, reflects true nature of things, ...

- ▶ Acquire a more complete set of principles

- ▶ Be aware of them, learn them

Worst in maturation process that may happen is to lose known principles, to forget the lessons already learned (and it happens!)

- ▶ More balanced relative importance's and priorities among the different principles

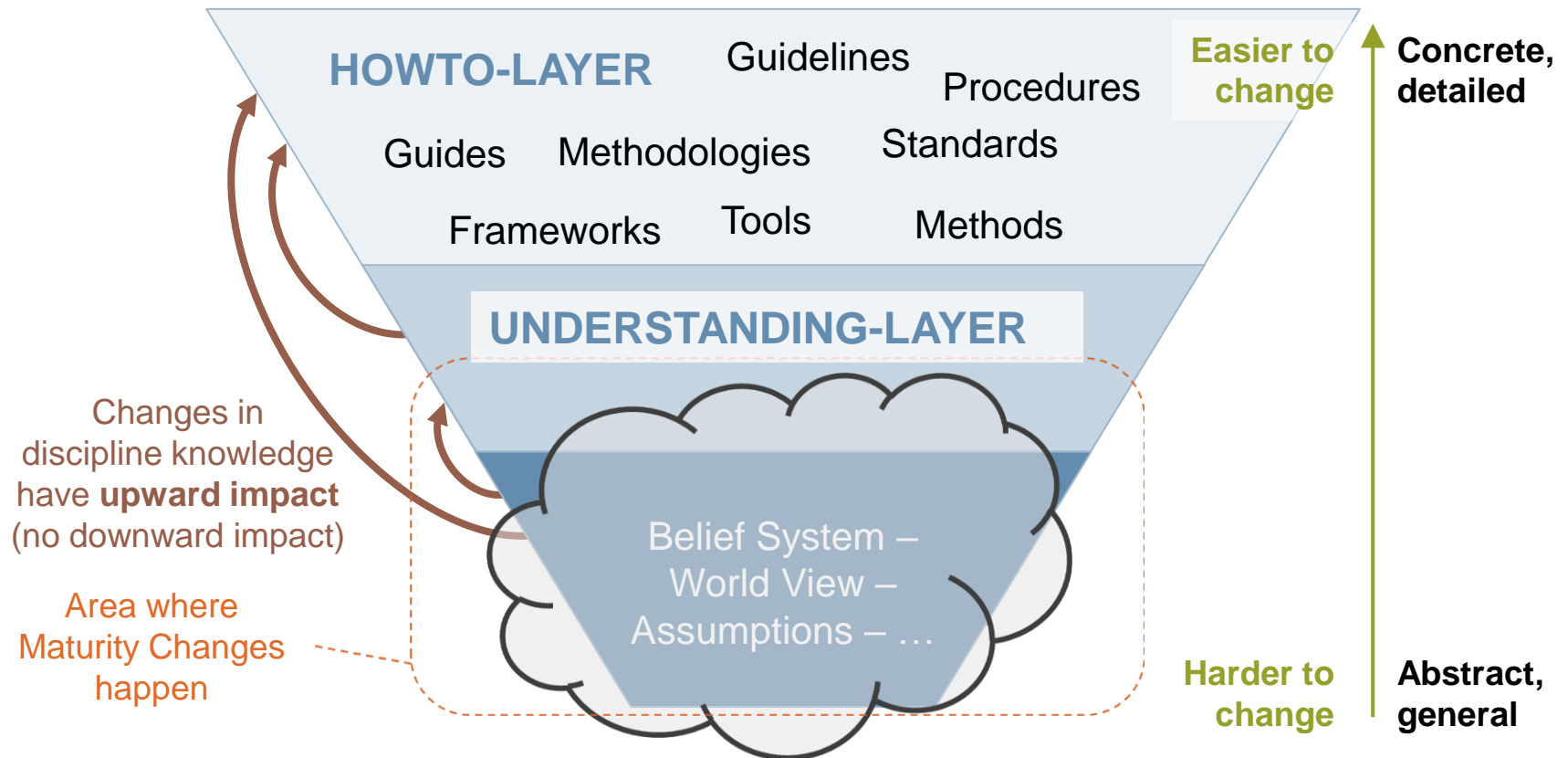
- ▶ Better understanding of the application of the principles

how to, when, when not, on what, on what not, preconditions, how to adapt, limits, .....

- ▶ Better understanding characteristics and true nature of things

- ▶ Better insight in mechanisms and forces

# Practical Reflection – “Plateaus”



- Knowledge positioned at the bottom is fundamental knowledge. Other knowledge is deduced from it. Other discipline knowledge is built on top of it.
- Some knowledge 'below' comes from the study of higher goals, supra-systems, long term, evolution over longer periods, evolutions in other domains, environments, other disciplines, .... and serve as foundation.
- The more fundamental the change, the greater the maturity step is likely to be.
- A pyramid hasn't been used in the drawing because the bottom conveys the idea of 'detailed layer' which isn't. The inverted trapezoid conveys the idea of 'depth', which is exactly what it is.

# Practical Reflection – Maturity “Plateaus”

---

## Why are there plateau's ?

1. Lower layers are lesser well known, lesser visible and lesser questioned. Issues in this layer are therefore more **difficult to identify**. Issues tend to exist for some period.
2. Hard to change because its our foundation and because a change in it is very impacting. We tend to **resist until resistance breaks**. During this period, no change in paradigm. Then, suddenly, a paradigm shift occurs.
3. **Creation of a new coherent view**  
  
The whole belief system and views needs to be re-verified and re-aligning
4. Maturity happens in fundamental knowledge.  
  
Other knowledge, **built on top of it**, must be adapted as well. Setting up new ways of working, new tools, ... takes some time
5. With the new paradigm we can solve the problems we met. We **are safe again ... for a while** until we meet a new type of problems that can't be solved because the current paradigm is still not perfect.

# Practical Reflection – Maturity Mix

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Different levels of maturity and/or different levels of expertise in a group of people or in an organisation may cause :

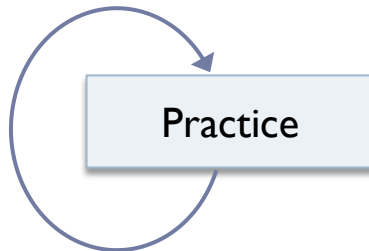
- ▶ Failures to correctly and completely understand each other
- ▶ Discomforts (like feeling of being attacked and threatened)
- ▶ Conflicts
- ▶ Loss of ideas
  - ▶ Bad ideas/solutions can be accepted and good ones rejected (simple but wrong solution, inelegant awkward solutions, ...)
- ▶ Frustration
  - ▶ Feeling of not being understood, not being appreciated
  - ▶ Noticing wasted opportunities
- ▶ Discouragement
- ▶ Departure of the more mature (and better) employees

*People with lower maturity, lower norms, lesser insight may not notice it or will less suffer of it than people with higher maturity and more knowledge*

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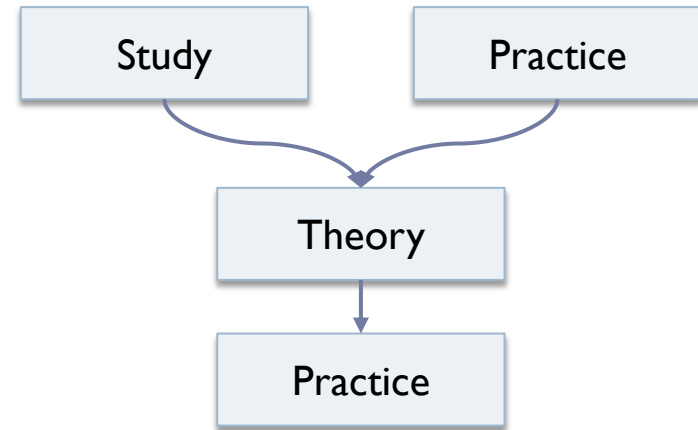
# Practical Reflections – Practice and Theory

## Activity



*No discipline involved*

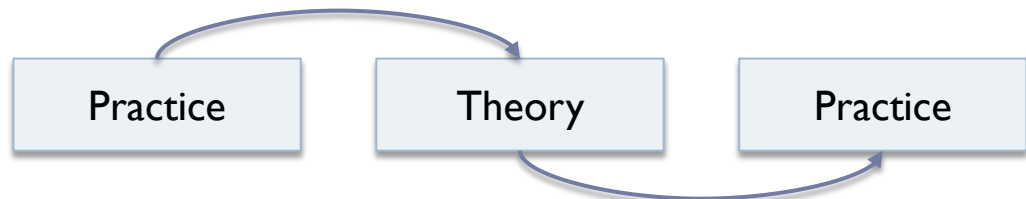
## Discipline



Applying a theory, rule or principle not knowing that it will lead to failure can be considered as ignorance or incompetency.

Applying it knowing that it will lead to failure makes no sense and is much worse.

## Forming the Theory Abstraction, synthesising



**Applying the Theory** - Translation,  
Adaptation(!) to specific case

# SET OF DIMENSIONS

# About the Dimensions

---

The *Intellectual Maturity* of a discipline can be visualised by how we perceive or think about some individual aspects.

In the following slides a set of views on aspects (dimension) are presented and suggested. They evolve towards a more mature interpretation.

The dimension represents a logical maturation path.

The different views on each aspect are ordered by their level of maturity.

The views which are lesser mature are known. Some more mature views are an expected logical extrapolation.



# About the Dimensions

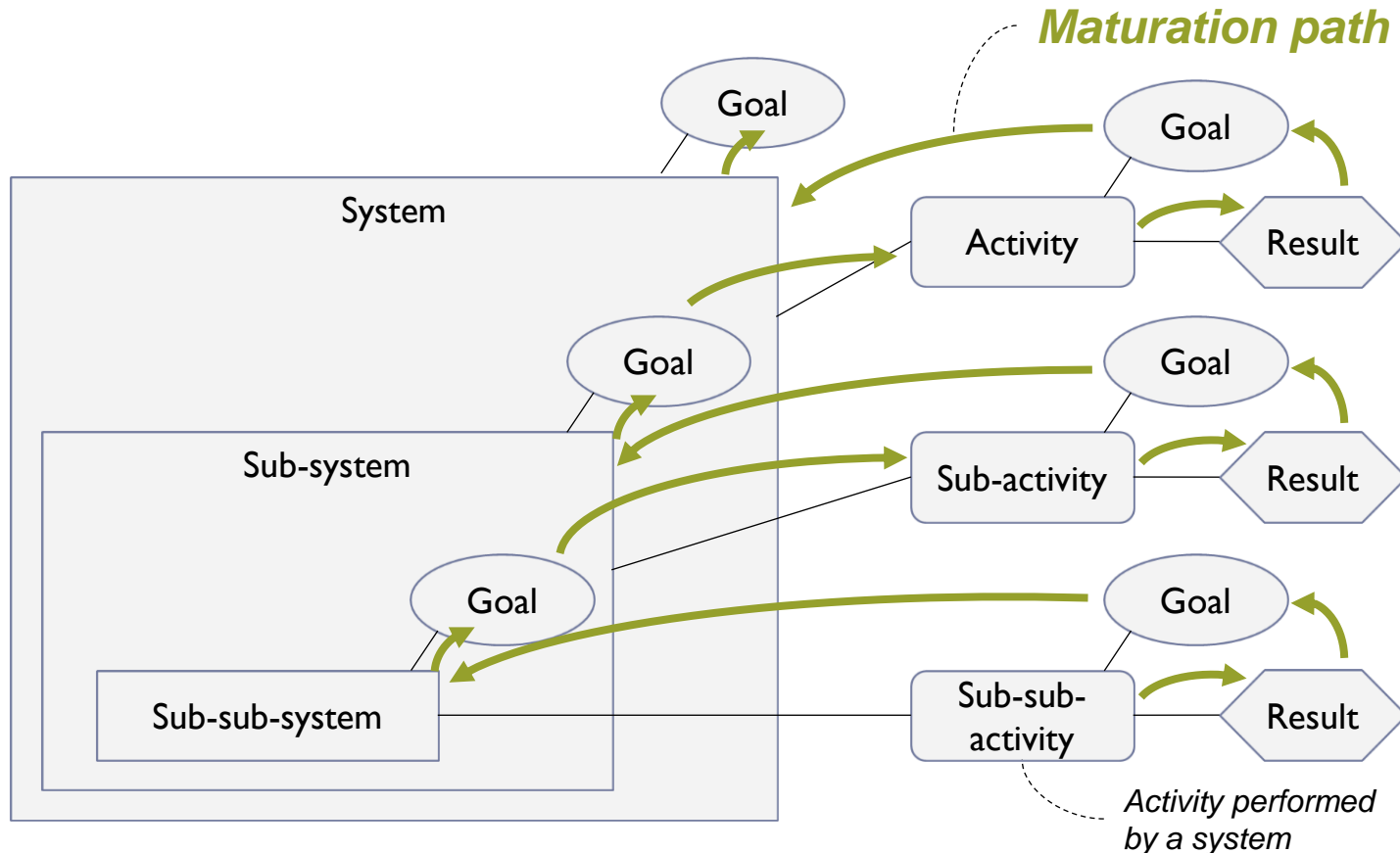
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- ▶ A set of dimensions and views are presented and suggested.
- ▶ They can be selected, improved or new dimensions can be added.
- ▶ Four criteria to chose something as an aspects / dimension
  1. Play a significant role in the grand design
  2. An evolution is detectable and a future evolution estimated
  3. Dimensions have to lead to a greater maturity
    - ▶ a greater independence
    - ▶ a broader knowledge and insight
    - ▶ a decreases dependence
    - ▶ an increase value creation
    - ▶ a more holistic and systemic consideration
    - ▶ ...
  4. A dimension must make sense, be logical, be natural, be of some value, ..

Ultimately, understanding the present maturity level and progressing towards an increased maturity level is what matters.

# A Logical Maturation Path

A logical maturation path in an environment of systems



Note:

The upwards evolution and the alternating movement between activity and system

The upwards direction is not the only direction.

*More explanation on the next slide*

# Practical Reflection – Upwards Maturity Path in Systems

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Maturing is a growing awareness of what is really important and a greater awareness of the whole.  
It's in these directions that our mind evolves.

Mostly, we are mainly focused towards the **activities** – the execution of the right activities. The next question coming to our mind is whether and how we can improve the **results**.

Then we become aware that we perform the activities to reach a certain **objective**. Are the processes/activities suitable to obtain the best results aligned with the **objectives/goals**? How can we reach these objectives/goals?

Activities are performed by a **system** (may include people). If the system isn't right or too weak, we are unable to execute the activities well and to reach the activity objectives. We focus on the abilities and qualities of the system and seek to improve them. The system must be strong and fit for use.

The system has been created to fulfil a **role**, to reach an **objective**. Initially, it has been designed with a **purpose** in mind. The awareness shifts towards the primary role, the true purpose and the specific objective(s) of the system. Usually, search for all the required qualities of the system to fit, to survive/prosper and to evolve.

The system plays a role in the execution of broader **activities** at a higher level. The system has to be able to allow the execution of these activities.

Then the awareness shifts towards the **goal** of these more global activities.

The system is actually a sub-system of a larger system. This evolution continues until the higher levels make less sense anymore for our role.

## Notes:

- ▶ This is one possible, likely the most probable, logical path for maturing.
- ▶ Each step (new awareness, shift in focus, increment in maturity) can be triggered by problems that can't be solved if the focus remains on the present element.
- ▶ This path concerns a maturation path, and by no means a systems development approach.
- ▶ In parallel, we may also focus on and mature in optimisation, innovation and a fit within the environment

# About the Dimensions

---

## ► Identifying the maturity-level on a dimension:

The question is not (so much) about whether we agree or disagree with a more mature view. Agreeing with them is certainly fine for further evolution.

However, it is the view that we use in practice that matters. We need to focus on the views driving and governing our attitude, our decisions, our actions and our choices. It's this maturity level that matters.

## ► Views related to roles?

The more mature views concern a more long term view and global holistic approach. Therefore, they may appear as being rather linked to higher IT positions, like information management. They seem to deal with responsibilities way above those of the role of developer. Consequently, developers may feel unconcerned by the more mature views. This is a detrimental idea. The reason is that these views influence our decisions, choices and norms, actions. A lesser mature view leads to a poor job, problems and lower quality. (see: Maturation process)

# About the Dimensions

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- ▶ **Creating a philosophy; Organising a work environment and work processes**

**V.I.TIP:** A philosophy, an organisational arrangement, an approach, a methodology, a work environment, a collaboration, and so on, they

should be based on the most mature view,

not on the least mature view(s).

*What are the consequences if they are based on the least mature view?*

*What are the implications of basing them on the most mature view? How do we do this?*

This is valid for the “IT” department, discovery of the need for a project, project portfolio management, the project ownership and funding, the information system ownership, the required competencies, project environments, the Business-”IT” relation and collaboration, the collaboration with other engineering disciplines, ...

# Discussed Aspects

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Views of different levels of maturity of the following aspects are discussed:

- Triggers of IT initiatives
- Pursued Objective / Success
- Type of Outcome
- Type of Product
- View on Information
- View on the Usage of Information
- Mission Definition
- Integration
- Innovation

It is through the different views that the level of maturity can be identified ('measured').

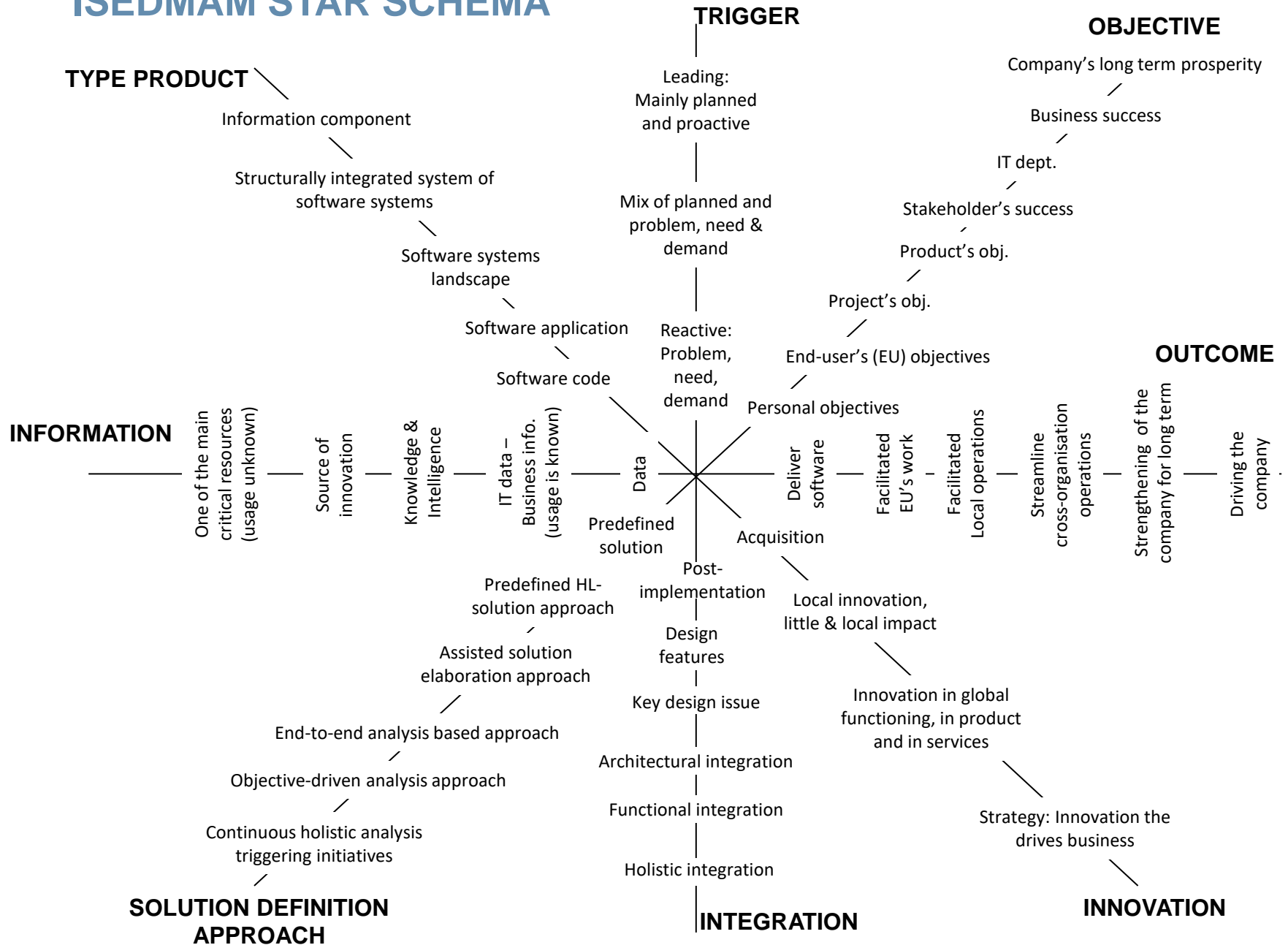
# Aspect: Trigger

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## Please Keep in Mind

- ▶ It's not about a choice, about agreeing or disagreeing. It's about what beliefs and thinking that have been used to elaborate frameworks and methodologies, to create project environments, and so on. What beliefs and thinking are really put in practice.
- ▶ Each level (except the highest?) brings about a type of problems which can't be solved by that level. They can only be solved by thinking at a higher level of maturity.
- ▶ A lower level of maturity may contribute to a higher level objective. But, a view and a thinking at a lower level of maturity creates problems. Therefore, the obtained results aren't comparable with results obtained by a more mature thinking.

# ISEDAM STAR SCHEMA





# Aspect: Trigger

## What triggers most IT initiatives / IT work ?

1	Mainly problem-, need- and/or demand-driven approach	Responding to a pre-determined demand or mission Idea “avoiding to develop what isn’t demanded, needed or necessary” (often confused with ‘proactivity’) Avoidance of taking responsibility
2	Mix of problem-, need- and/or demand-driven approach and planned-approach	High-level plans and architecture trigger and drive some initiatives
3	Planned and proactive approach	High-level plans (vision, strategy, business models, top down architecture-driven) and continuous analysis drive the evolution of the IC Some work is still problem/need-driven.

### **Note on ‘proactivity’:**

When a need, obstacle or problem exists, it costs. It has implications. The purpose of **proactivity** is to prevent these issues or to provide a solution before they occur. Some proactively solved issues may indeed never occur. But ...

The objective of proactivity is to obtain

cost avoided by proactively solved issues > cost spent to unneeded features/work

Proactivity concerns planning and decisions based on sound estimations that something is likely to be beneficial to do.

The likelihood of a need or problem, its severity, the risks and implications and the time and effort required to put measures in place have to be estimated as well as the cost, consequences and implications of not proactively solve an issue. This requires understanding of the broader system and its context. Without this understanding, no meaningful estimations are possible and the amount of developed unnecessary stuff will be too large. All the benefits of proactivity will then be lost. It is not about wild guessing or inconsiderately building features just in case it might be needed.

# Aspect: Pursued Objective / Success

What type of success is pursued ?

1	Personal objectives and success	Doing what is asked; Doing what others evaluates as a good job; Avoiding blame; Getting appreciation; Working on own success;
2	Project's objective and success	Accomplishing the project's mission; Passing the UAT successfully and deliver as expected; Devil's triangle (scope-time-budget) dominates
3	Product's success	Working on a satisfying product which truly facilitate the work and produce real value (more than a bare minimum, which is what is expected, what has been asked, simple automation).
4	Stakeholders success	Developing means which improve the functioning of the stakeholder's department and/or increase the results of its activities. These results can be in line with the stakeholder's objectives.
5	Success of the IC and IT department	The IC has to support business operations and contribute to the results. But this is unsustainable if the IC is fragmented, chaotic, undocumented, rigid, unreliable, and so on. The IT department can only fulfil its role well and in a sustainable way if the IC is well-organised, clean, flexible, manageable and adaptable.
6	Business success	The IT community seeks to make a noticeable difference in the business results. Focus is on the plans, business objectives, business activities and on business results of the global company, but also to new opportunities and innovation. It becomes a driving force. <i>This can be at the expense of the company (as a system).</i>
7	Company's long term prosperity	Considers a strong company (system) as the main factor to its prosperity. Focus is on global fit, structural integration, overall coherence, strong engineering capabilities, and so on.

# Aspect: Type of Outcome

What is the main type of outcome do we strive for ?

1	Delivered Software	Delivering a state of the art software which does what is demanded and expected
2	Facilitated work of end-users	The work of only a specific profile or limited group of end-users is improved
3	Facilitated local operations	Operations are improved inside a service or department. Scope and focus is limited to a pre-determined part of the company.
4	Streamlined and optimised operations across organisational borders	Streamline information processes, information sharing, improved metrics and control tools for management (individual systems and processes); Optimisation to reduce waste, lower costs, shortening processing time and speeding up operations The operations, processes and involved systems determine what part of the organisation is under consideration (not the other way around as in pt.3).
5	Strengthened company with long term in mind	Conceiving a well-organised, coherent, standardised, flexible, scalable, manageable and adaptable IC that is well integrated in the company's other sub-systems, aligned with the business operations, supporting the right capabilities and fitting in the broader environment. It is strengthened to be manageable, to keep control over it, to avoid risks, to make it evolvable and because it has to prosper in a competitive environment
6	Drive the company	Detecting business opportunities for increasing the business activities; Information capabilities; Engineering capabilities; Innovation with significant impact (global, large-scale, long term, significant results, ...)

# Aspect: Type of Product

How do we consider the main product the IT department works on?

1	Part of an elementary system	Software logic	Individual features, screens, buttons, menus and reports; Adaptations to these elements
2	Elementary system	Software application, Software system	Individual software applications And globally, a collection of software applications
3	System of homogeneous systems	System of software systems	Not just about changing the label “collection” to “system of systems” Homogeneous: containing only (various) information technologies
4	Structurally Integrated system of heterogeneous systems	Information Systems	Globally: a system of information systems We made the double transition of: <ul style="list-style-type: none"><li>• Software application → information system</li><li>• Collection of systems → system of systems</li></ul>
5		Integrated Information Component	IC is a main sub-system of the company. It's a system of heterogeneous systems integrated in an even more heterogeneous set of larger sub-systems and fitting in their environment forming a living system. Need to build Information Capabilities (information systems, human information skills, information engineering competencies) in/as a living system + Information Products and Information Services

# Aspect: View on Information

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How do we consider the resource processed by IT systems?

1	Data	Data that 'IT' has to capture, control, process, store, search, transport, protect, distribute, ...or facilitate these operations to satisfy the demand of the customer
2	IT Data – Business Information	Awareness that the data is 'information' driving the operations and allowing management to function.
3	Knowledge	Information is knowledge. Focus is on implementing metrics, measuring and on questioning operational data and metrics. Metrics represent operational facts.
4	Intelligence	Information is organised and exploited to create insight, by carefully choosing the metrics, by connecting information or maybe by linking it to meta-information and models, ...
5	Source of innovation	Information is used to create or improve new products and services, to strengthen or establish new forms of collaboration, new work approaches, new business models or maybe even new organisational structures.
6	Critical and precious resource	Information is considered as one of the top company's most critical and precious resources. Striving to maintain or increase its value, to exploit keep information maximally exploitable and to exploit it in all its dimensions has a high priority. It's difficult to exploit it as intelligence or as source of innovation if it is only considered as important when it's needed.

# Aspect: Information Usage

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How do we consider the use of the resource 'information' ?

(not 'information' as product or service)

1	Group of end-users	Used for a specified purpose by a group of end-users
2	Different groups of end-users	Information is shared by some groups of users across the company (organisation) who use it for different identified purposes at different moments in time.
3	Unknown	Information has an intrinsic potential value, which is variable in time, and can be used in different ways, for different purposes, by different people at different places and at different times. We may know how it is used today, but ignore how it will be used in the future. We keep the information exploitable and clean and strive to maintain or increase its value (for as long as we recognise/estimate it has value).

# Aspect: Mission Definition

How do we consider the problem solving aspect and solution conception process ?

1	<b>Predefined solution approach</b>	The IT department (or team) receives the description of the solution and has to build it. This implies that a kind of functional design has been done, even if the solution is described in business terms / normal language.
2	<b>Prescribed high-level solution approach</b>	<p>A high-level description of the requested solution is given. The description can be as high-level as a set of requirements, the nature of the product and its future location in the arrangement of systems, the boundaries and/or the main functions the system should perform.</p> <p>The IT dept. or team (usually analysts and/or developers) has to refine, produce the technical design and implement it. This implies a diagnosis and kind of design has been done (by business people?).</p>
3	<b>Assisted solution design approach</b>	The customer is assisted by IT people to align the requested solution (or system) with the identified problems or needs and with the customer's situation. IT people help the customer to find out what (he beliefs) he needs or wants. Even if assisted, IT people get the desired solution from the business stakeholders. This approach is still based on the idea of order-taking. This approach rely on a pre-determined problem (Who did the diagnosis of the information problem/need?). IT people lacking broader an deeper understanding and still very depend on how business people define and present the issue.
4	<b>End-to-end analysis based approach</b>	Development initiatives starts with the detection of gaps, misalignments, incoherencies, problems, inabilities, limitations, risks, needs, inefficiencies or any other lacks or obstacles and opportunities related to the domain of information. This is based on the analysis of the environment, the situation, data and complaints. The analysis includes the diagnosis of information issues to the post-implementation analysis to remove teething problems and allowing further improvements. Issues and opportunities and their solutions are proposed and discussed with the business stakeholders.
5	<b>Objective-driven Analysis</b>	The analysis takes the present situation and all the means into account that contributes to the business objectives and identify improvements on the IC contributing to those objectives.
6	<b>Continuous Holistic Analysis</b>	The analysis is driven by the company's objectives, the prerequisites imposed by the nature of the company (as a system) and by its environment and looks continuously how to improve the IC and the information aspect within the company to strengthen the company, driving its business activities (like innovation in the domain of information) and increase its creation of value + necessary capabilities and competencies. (all this still from the perspective of 'information' and 'information systems')

# Aspect: Integration

## When or how do we consider integration ?

1	Post-implementation integration	Integration is being addressed after the system or solution has been operational for a while. Ex. Post-project developments to implement features for information exchange, adding middleware, EAI, or other mechanisms to ensure information transfer between (existing) systems.
2	Design feature	Integration is a (set of) design feature(s). Features, like information exchange interfaces, are added during the design to ensure the integration.
3	Key design issue	Integration is fully taken into account as part of the design of the solution.
4	Architectural integration	This integration focusses on introducing a new system into an existing arrangement of systems. Information exchange must be possible, standards have to be respected, technological compatibility is an issue and technological fragmentation should be avoided. Some requirements emanating from an early (pre-design) inspection of the existing architecture have to be respected. In general, existing systems are not really adapted. Sharing information becomes possible.
5	Functional Integration	Architectural integration is not enough. Systems have also to be integrated logically. This integration needs to be addressed before the architectural integration. The information architecture fully supports sharing of information.
6	Holistic integration	See next slide



# Aspect: Integration (2)

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When or how do we consider integration ?

6	Holistic integration	Integration of processes, systems, information and capabilities and all other facets of integration are foreseen. The focus is on what is functionally, structurally and from a capability viewpoint the most suitable. For example, the necessity of a change cleanly implemented rules over the desire to limited the required changes, to impact the least possible systems, to do the least effort or to get as fast as possible a result (to get changes operational as quickly as possible).
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The idea of **“creating and adding a new component and ensuring this new component to fit in the existing architecture”** is a widespread driver.

Gradually, the idea of **“adapting the supra-system”** becomes the primary driving idea wherever possible. A similar but slightly different dominating idea is to adapt the current system, before “solving by addition”. Similarly, unneeded system functions and components are cleanly deactivated and removed. This contributes to keep systems clean and slim.

Adding components and/or logic should only be done when it is beneficial from the perspective of problem solving and from the architectural viewpoint. Components or layers shouldn't be added to solve consequences, or because it is the fastest, easiest or cheapest way.

# Aspect: Innovation

## How do we achieve innovation ?

1	Acquisition	Innovation happens by acquiring technologies, by using technological services or by technological knowledge. The market is scrutinised to detect novelties and developing tendencies and to jump as early as possible on these bandwagons in order to stay ahead in the competition.
2	Local innovative conceptual solutions	Innovation is achieved by inventing new information concepts which are implemented locally in software applications. Mainly the combination of more advanced programming skills and creativity allows to create new information concepts, data structures and algorithms.
3	Global functional innovation	The main question is how information can enhance the way the company functions. Innovative ideas improve the processing and augment and facilitate the usage of information. Typically, information is captured and made available at different locations. Or, pulling information becomes a smarter combination of pushing and pulling information. Company's operations are speed-up by more real-time changes and availability of information.
4	Innovation driving the business	This type of innovation revolve around questions like: What innovative ideas concerning information can improve the functioning of the company or even completely revolutionise it or its structure and sub-systems? What innovative idea can disclose new knowledge and new insights about the company, its activities, its clients, its products and markets? What innovative idea may turn information into new or improved products and services? What information does the company have or what can be captured or acquired and how can it be used to strengthen the company and drive the business? How can the company encourage, capture and develop (more) such innovative ideas related to information?

# CHALLENGING A FEW BELIEFS

# In this part..

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- ▶ Present beliefs, with some explanation about the belief (slide with red title). Each of this “Belief”-slide is followed by an explanation questioning the validity of the belief by offering some deeper insight in the subject.
  
- ▶ Remarks
  1. Beliefs depends of the individual. For example, business people may not necessarily be aware of the knowledge of IT people.
  2. We may know something is not true. Yet, despite this, we may not be aware that this idea is applied in our decisions, attitude, expectations or embedded into the plan, methodology, methods, ...

# Belief: IT is about “Technology”

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The term of ‘IT’ often triggers the image the idea of software technology and hardware technology. Or, it is the discipline of conceiving systems with these technologies and putting them at work.

IT people know these technologies and their role is to put these technologies at work for benefit of the business.

This idea defines the role and the business community’s expectations of the IT people.

Some mission statements of IT departments revolve around this idea. And indeed, many IT people are very technology-minded.

# Explanation to reflect upon

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## 3 DIFFERENT Definitions of IT

- ▶ Information technology (IT) is the use of any computers, storage, networking and other physical devices, infrastructure and processes to create, process, store, secure and exchange all forms of electronic data.
- ▶ the technology involving the development, maintenance, and use of computer systems, software, and networks for the processing and distribution of data (Merriam-Webster)

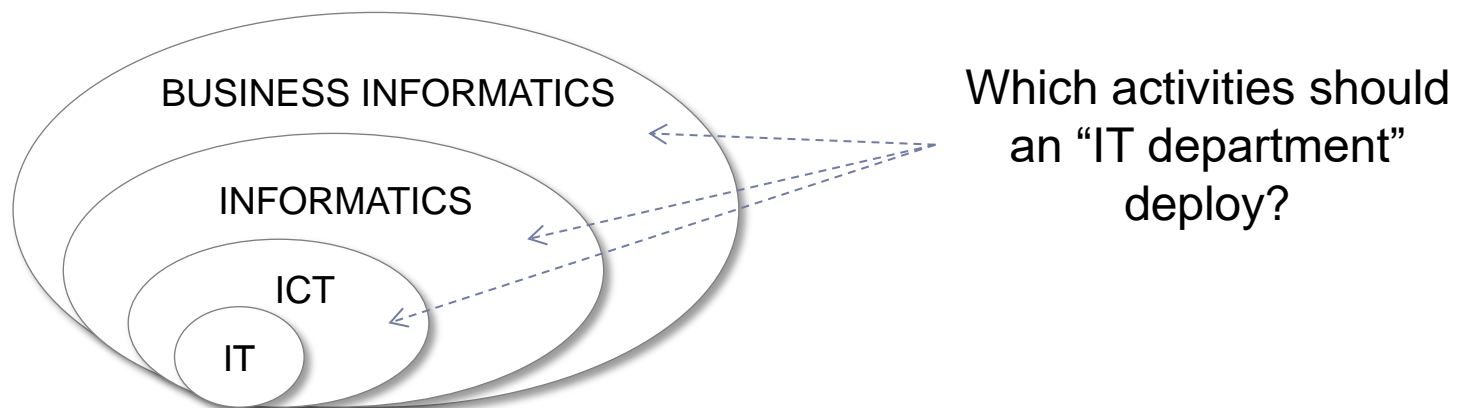
These definitions correspond to the IT as technological discipline. The next definition expands the IT discipline a bit more.

- ▶ Set of tools, processes, and methodologies (such as coding/programming, data communications, data conversion, storage and retrieval, systems analysis and design, systems control) and associated equipment employed to collect, process, and present information. In broad terms, IT also includes office automation, multimedia, and telecommunications. (Business Dictionary)

# Explanation to reflect upon

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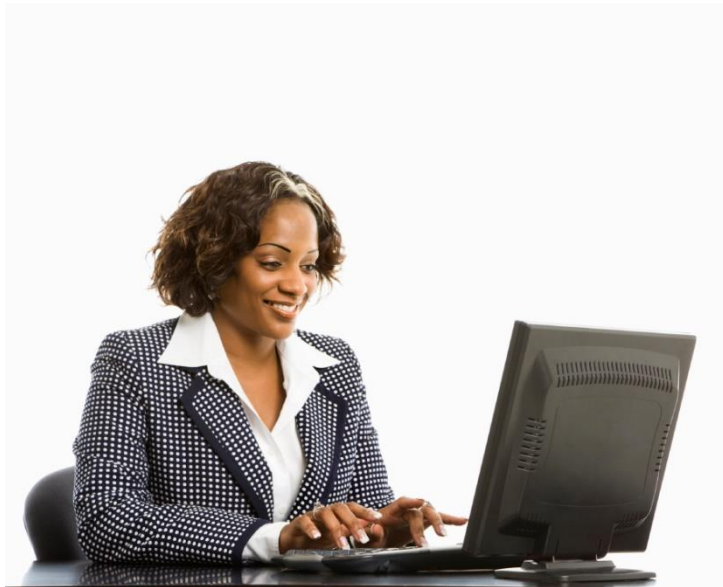
- ▶ Does it matter to the business community whether a technology A or a technology B has been used to get an information available when needed and in the right format?
- ▶ How useful are software systems which contain no information whatsoever?
- ▶ How useful is a well-designed state-of-the-art software system which “solves” the wrong problem, creates new problems or constitute an obstacle to business?
- ▶ The essence is not putting technologies at work. IT solutions are a mean to capture, process, store and distribute information where needed. It’s all about right solutions to right problems delivering the right information on time (, in the right format, ...).
- ▶ Identifying opportunities, right problems and their causes and conceiving the right solution can’t be done with technological competencies.



# Belief: Software Applications are Tools

---

End-users have business domain knowledge and job expertise. They decide manage their own work and decide how they perform a job. Software applications are just tools to help them in doing their job.



Expert +  
Knowledge



Tools



# Explanation to reflect upon

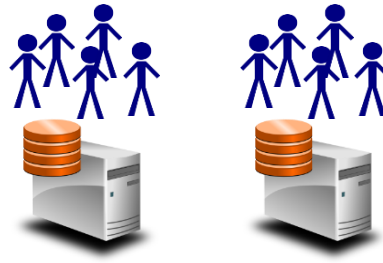
## 1) Evolution in Size

### Tool



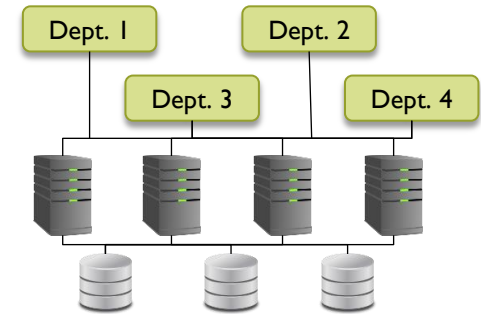
Software application are tools helping end-users to do their job.

### System



Bigger software systems serve larger and various groups of employees for different purposes. They take over a huge amount of work of the employees.

### Landscape of Systems

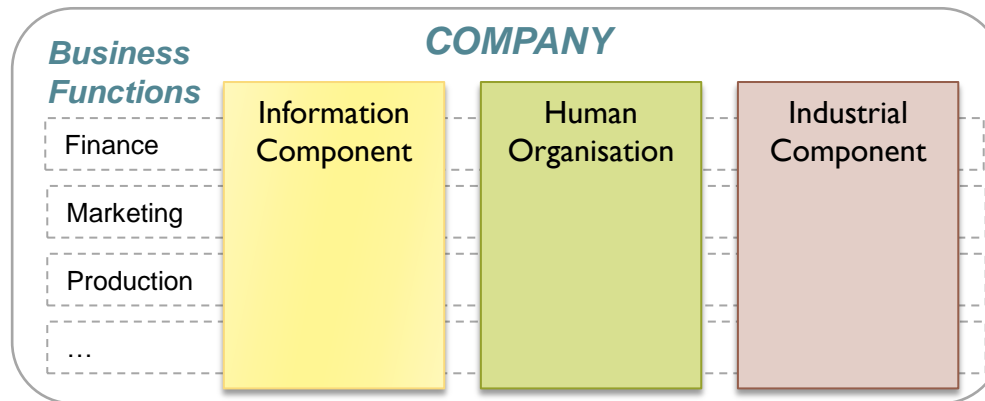


Software systems form a large collection of interconnected systems.

## System of Systems

## Component of the Company

A more mature architecture defines a fully integrated system of systems integrated in the company.



Integration - Fit

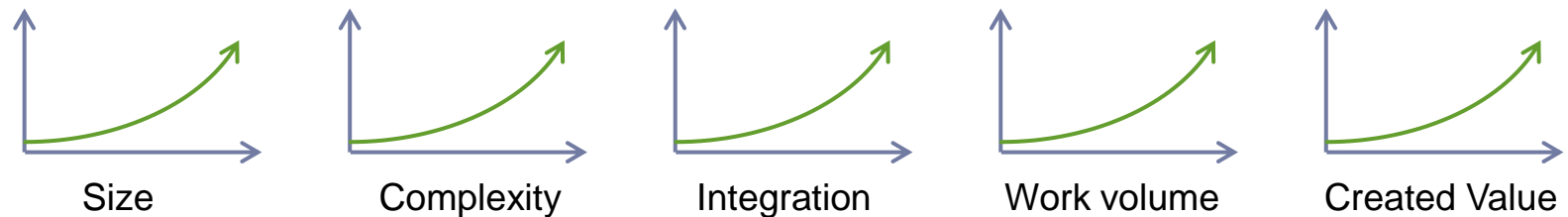
Note: A component is not necessarily used in the implementation of a business function. (ex. finance function doesn't use the industrial component)

# Explanation to reflect upon

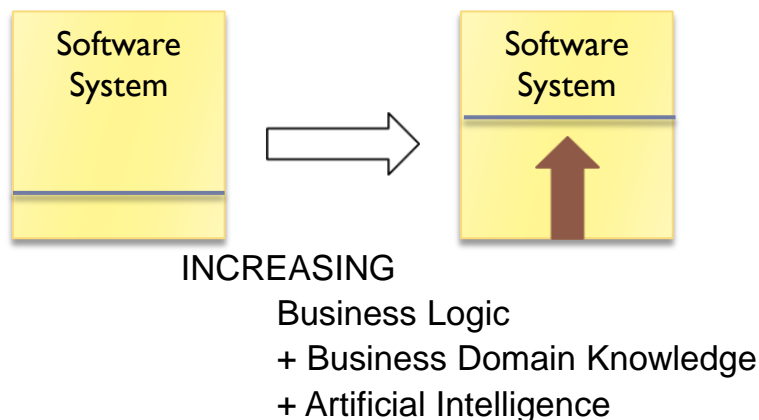
## 2) Evolution in Role

The software applications, in consumer IT, are products designed to help the users. They are indeed tools. And in corporate IT, some applications can be considered as tools as well.

However ...



Tip: Not just graphs. Imagine a system evolving from simple invoice softw. application to intelligent ERP software.



### TOWARDS **SMART** SOFTWARE SYSTEMS

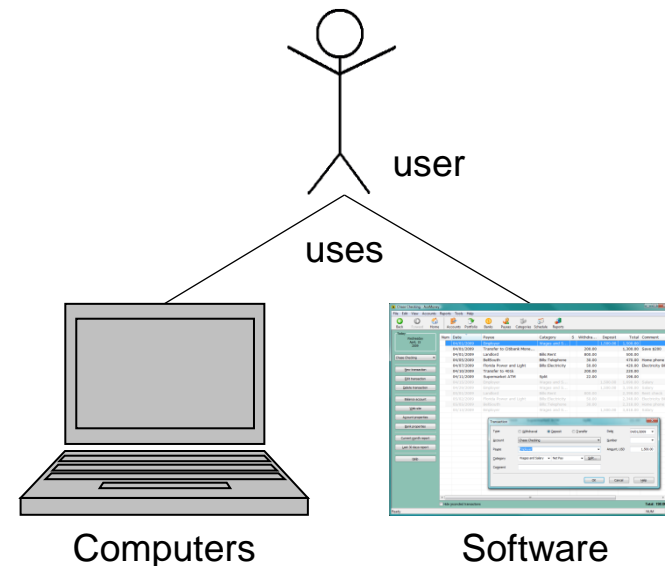
Software application will more and more identify, interpret, plan, suggest, guide, inform, take decisions, trigger actions

Systems become larger, smarter and will have higher degree of integration and independence

# Belief: Software Serves End-Users

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End-users use software applications. The applications help them to do a better job. End-users create the business value. Software applications are a mean to increase their productivity. Therefore applications must suit and facilitate their work. It has to solve their needs.



# Explanation to reflect upon

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The underlying idea of this belief is the following.

- ▶ The users' activities produce results. The personal, departmental or other business objectives and the production of value are associated to human activity.

This belief can be translated in different statements:

- ▶ Working towards business objectives
- ▶ Solving the needs of the business community
- ▶ Need-driven, problem-driven, demand-driven
- ▶ Satisfying the end-users, stakeholders or business community

# Explanation to reflect upon

Tools serve end-users → See also explanations of former belief

## 1) End-user outside vs inside a System

Integration evolves:

- Horizontally: Co-systems, other components
- Vertically: Higher-layers & supra-systems

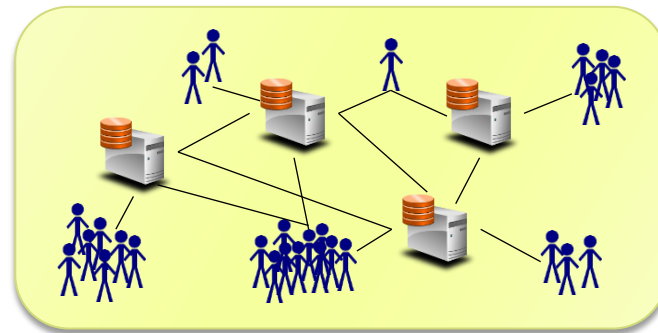
Software  
System



End-user  
using a  
system



Information System

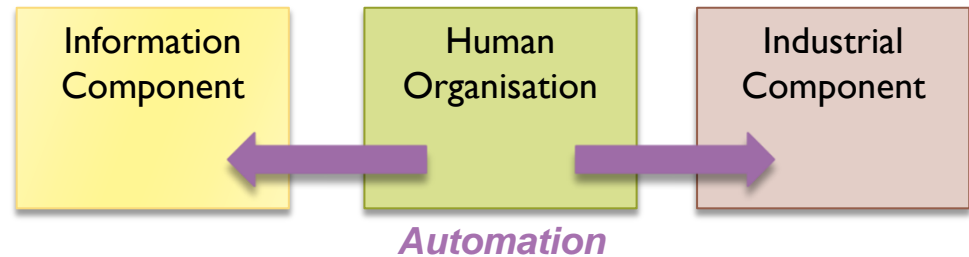


End-users are a part of  
an Information System

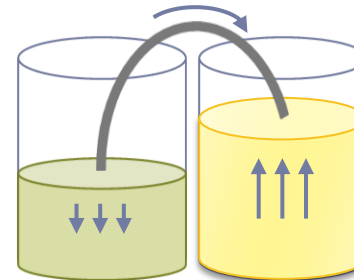
# Explanation to reflect upon

## 2) Automation and transfer of knowledge

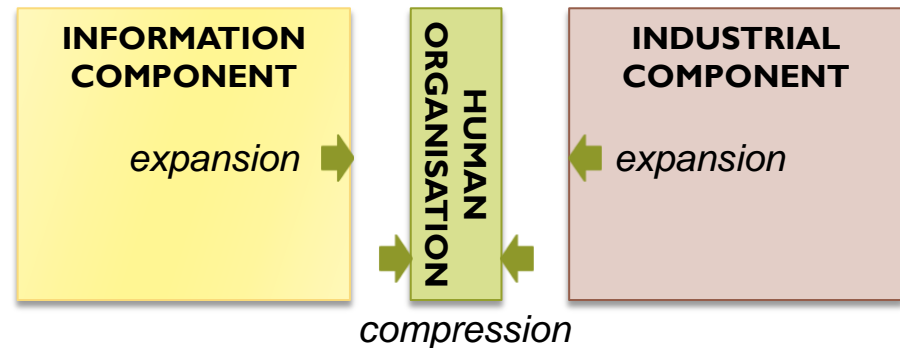
1) *Automation* is done either by the industrial component or by the information component (computers and software).



2) Software Systems contain increasingly more business logic, business domain knowledge and are combined with advanced concepts and logarithms and artificial intelligence.



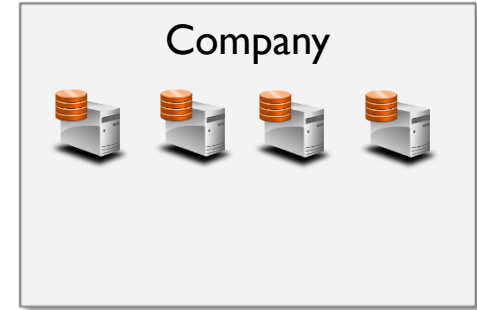
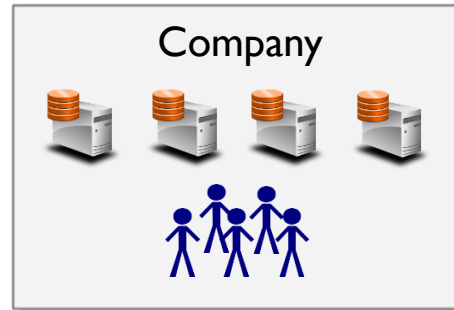
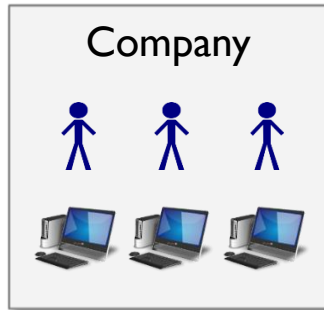
*Automation shifts work away from the organisation resulting in a tendency to reduce the human organisation.*



# Explanation to reflect upon

## Consequence:

- Changing role of information systems
- Changing role of end-users / business community



Software systems serve people

End-user using a software systems to perform business activities.

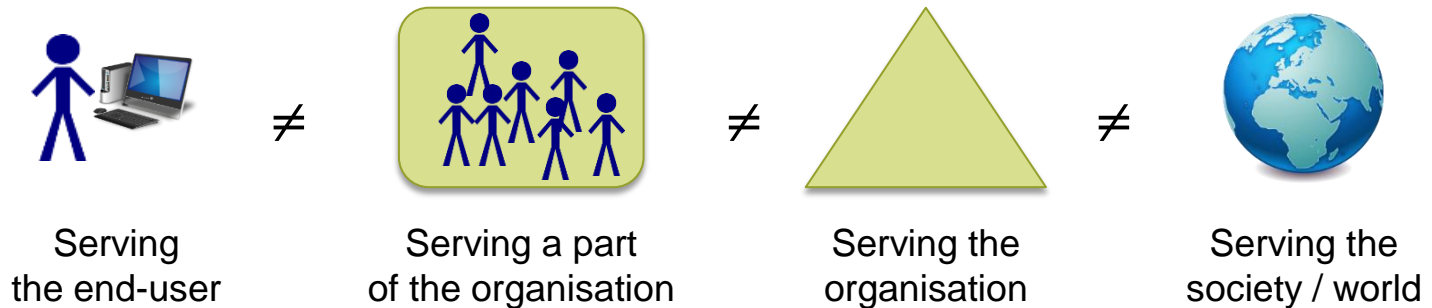
People serve software systems  
Computers perform business activities. People serve the computer systems.

“Software systems = the business”

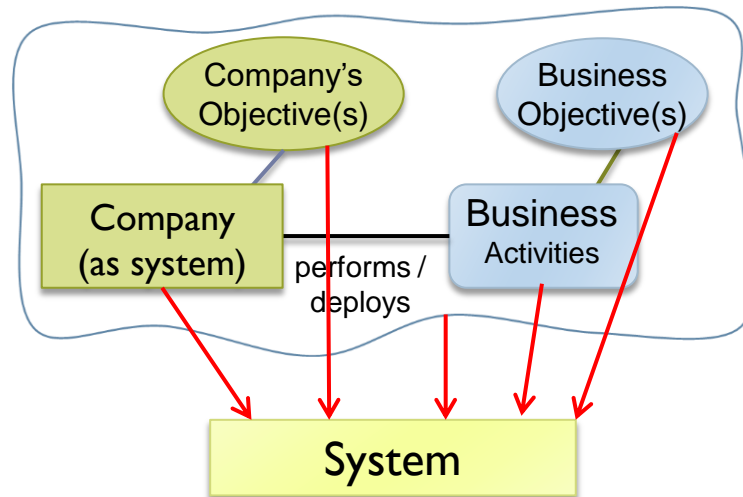
Software systems running the company  
“Userless” systems ?  
“Peopleless” company?

# Explanation to reflect upon

## 3) End-user part of larger organisation



*Each level has its own goals, specific necessities, ... (different forms of “sub-optimisation”)*



What the business (community) needs and what allows them to perform business activities in order to try to reach business objectives is different from what the company, as a system, needs to be efficient, to survive, to evolve and to prosper (to last). Engineers are, or should be, much more concerned with the qualities of the company they are engineering.

*The company is the main stakeholder.*



# Explanation to reflect upon

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- ▶ This way of thinking is very oriented towards activity and activity result. It overlooks, among others, the importance of the system that performs the activities and the system's own objectives. It also ignores the fact that, today, software systems may produce more value in operations than the end-users. This tendency of increased value creation through automation will last.
- ▶ It results in business-IT-relations, project portfolio processes, projects and software development methodologies based on the idea of solving problems, removing obstacles and facilitating the operations (activities of the business community).
- ▶ Activities have to be facilitated and optimised. But how about exploitation of information, strengthening the company, innovation by IT, IT as a driving force for business, ...?

# Belief: Software Systems Solve Business Problems

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- ▶ The Business Community performs activities in order to produce products and services and to obtain some business results.
- ▶ The Business Community meets regularly obstacles or problems hindering them in their work.
- ▶ Software applications help to overcome obstacles and can solve many of these business problems.
- ▶ The Business Community is expected to express their business problems and their business needs. 'IT' can then investigate about how to solve the problems.

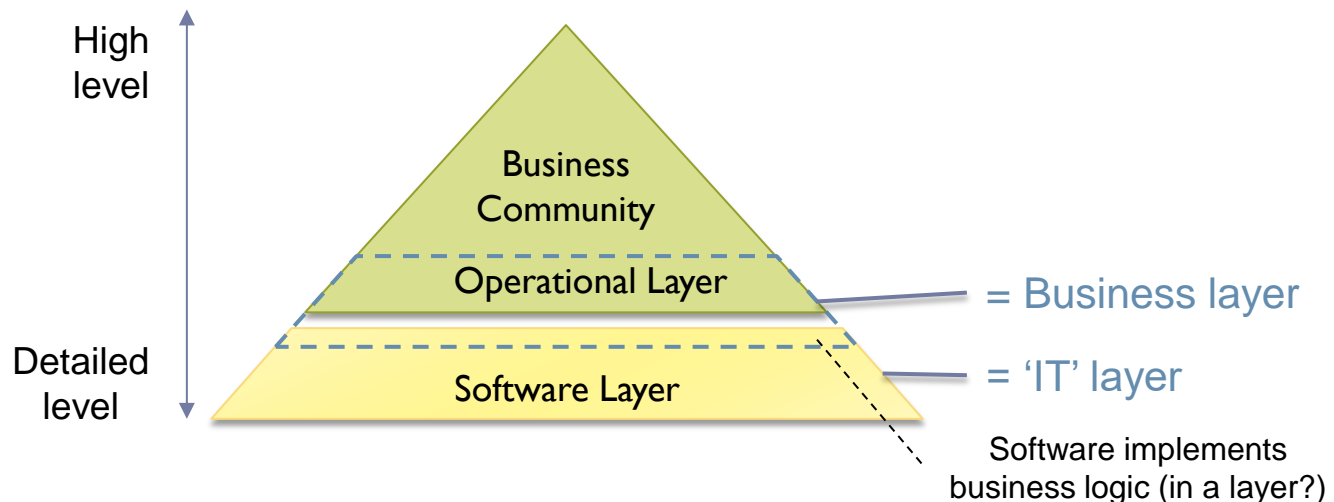
# Explanation to reflect upon

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- ▶ A problem experienced by the Business Community is a Business Problem
  - ▶ Business people may experience financial problems, computer problems, interpersonal problems, planning problems, ... and **information problems**
  - ▶ Not every problem the business community experiences is a “business problem”. Though, it may indeed be a problem for the business community.
  - ▶ Business problem/need  $\neq$  information problem/need (beware of wrong labelling!)
- ▶ IT “solves” only “information problems”
  - ▶ IT solutions capture, store, process and provide information. The information contained by IT solutions solves information problems.
    - ▶ If “information” is a product or a service, only then this information can solve a business problem.
  - ▶ Diagnosing and solving information problems require competencies in informatics.
    - **to be diagnosed and conceived requires informatics competencies**
- ▶ Grey area between business problems and information problems
  - ▶ By lowering costs and reducing delays, IT can make a business model attractive and profitable
  - ▶ Per specific issue, consider what is most determinant (business or information), look at it from both perspectives and use common sense.

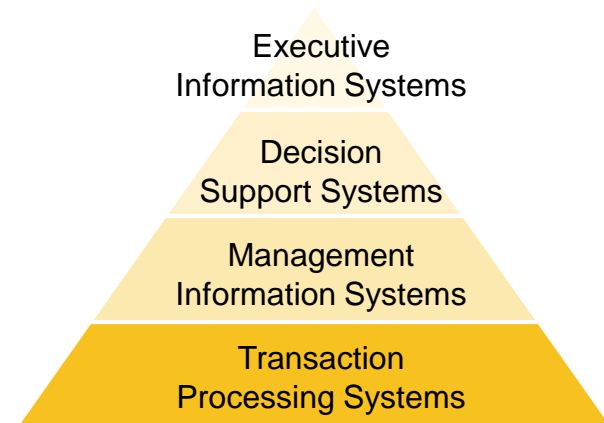
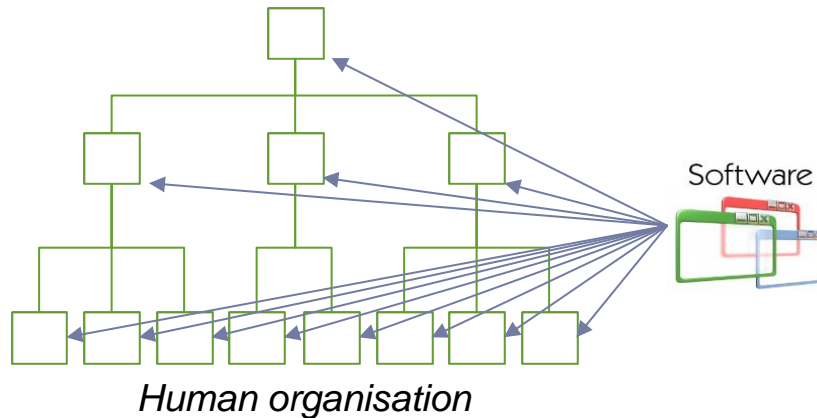
# Belief: Software Applications Deals with Details

- ▶ A software applications contains very detailed logic. Business people deal with higher logic.
- ▶ Operational logic is how business works, how the business community works. It's a business matter.
- ▶ The logic in software application is refined operational logic plus some technical logic.
- ▶ Deduction: Operational logic must be determined by business experts before “software logic” (all the logic expressed in the software application).

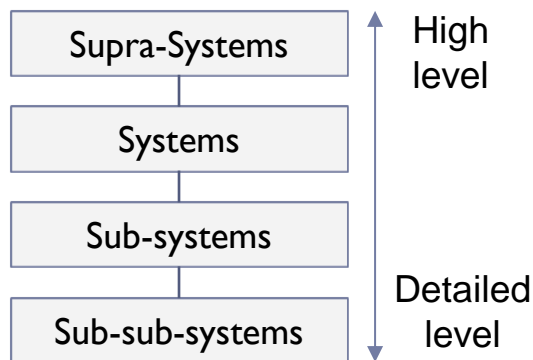


# Explanation to reflect upon

## 1) Perspective of location of software systems in human organisation



## 2) Perspective of hierarchy of systems and system of systems



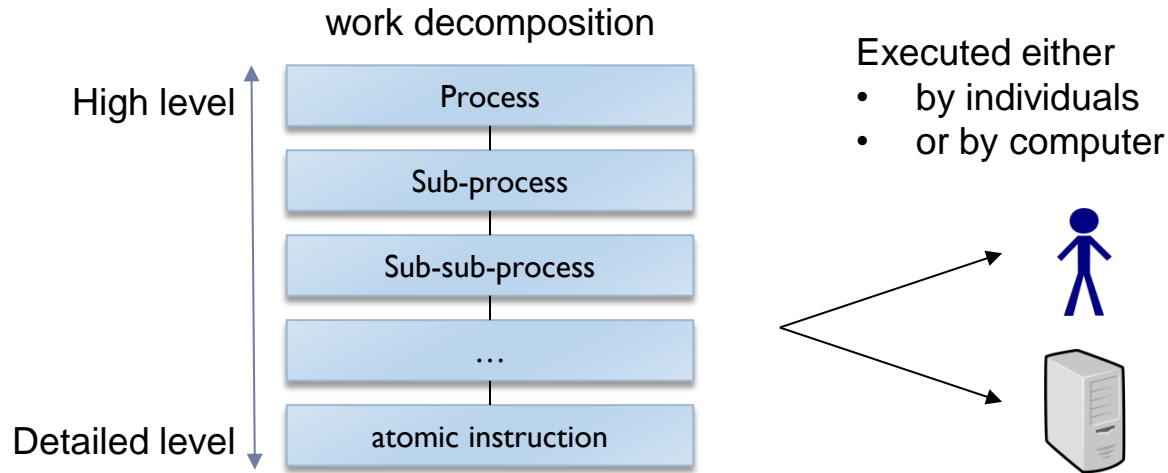
Different hierarchies of systems are possible according to hierarchy of:

- Role (purpose) & Responsibilities
- Processes
- Data

A hierarchy of systems, an organised landscape of systems or a system of systems implies a very high-level logic being implemented in the architecture and in the functional logic of the systems.

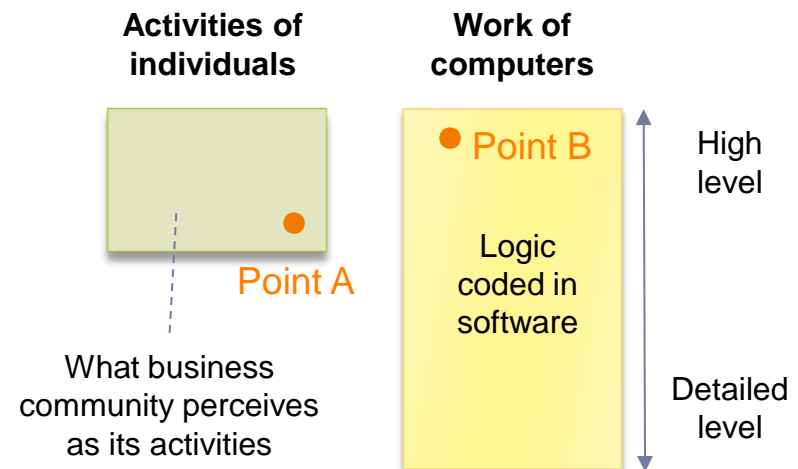
# Explanation to reflect upon

## 3) Perspective of processes



A software application implements indeed very detailed logic. However, the landscape of software applications and the individual applications implement and/or are determined and influenced by very high level logic as well.

Logic of point A in organisation is more detailed than logic in point B in the software system. Logic in point B can't be deduced from logic in A.



# Explanation to reflect upon

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## 4) Perspective of Knowledge

### 4.1) Business Logic? Business Knowledge ?

The “business matter”, the activities performed by the business community, even when we consider only the operational level, is not a uniform domain or discipline, but rather a mix of different disciplines:

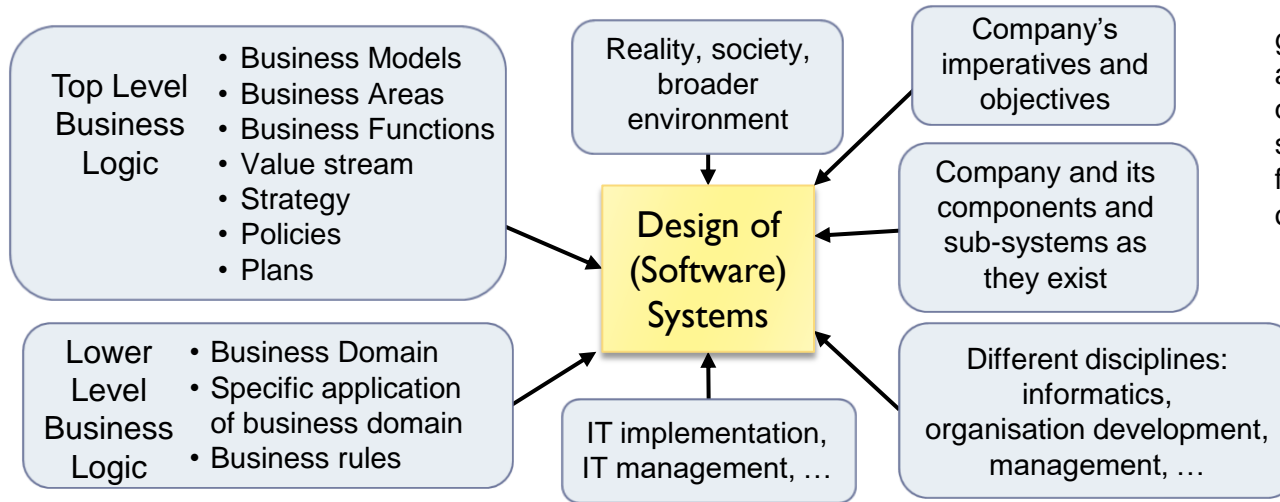
- Business Domain knowledge and expertise (like insurance, transport, banking, health care, ... )
- Management
  - Management, operations management, project management, process management, time management, ...
- Statistics
- Finance
- Informatics
- Organisational Behaviour
- Communication
- ...
- Practical matters and knowledge of society and real life

“Business matter”, “business logic” is often a patchwork of various disciplines  
(we may not be aware of it)

Information Systems are not conceived solely based on (pure) business logic.  
Experts of different domains are required.

# Explanation to reflect upon

## 4.2) Required knowledge - Sources



The input comes from a great variety of sources and is very diversified. It doesn't belong to a single stakeholder, business function, expertise area or discipline.

A solution or system isn't simply derived from the business domain knowledge/expertise. This is even more clear in SOA-solutions or in agent-based solutions.

Cause: business people think in terms of administrative concepts, UI-concepts and mechanisms presented by the UI (drag-drop, copy, ...). The world of IT and systems has a so much broader assortment of solution elements and techniques to offer.

Input for design/engineering is not an already defined high-level solution. The input are various artefacts and chunks, fragmented information items, ...

Obviously, a right identification of the cause and an in depth understanding of the problem, of the situation and of the environment are also essential.



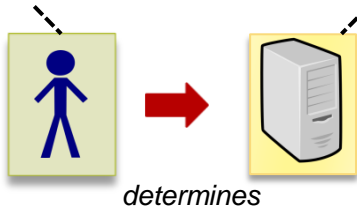


# Explanation to reflect upon

## 7) Alignment between human activity and computerised operations

Activity executed  
by individuals

Activity executed  
by computers



Idea: “How business community wants to work determines the software design”

The software logic must be adapted to the activities of the work of people.



‘IT’ (informatics) allows much more powerful solutions that business community just can’t imagine.

Innovation by technological progress creates also a stream from software to business activities. It is seriously hindered if software logic is only deduced from “business solutions”.



Activities executed by the business community and computer activities should be geared to one another (bi-directional influence and adjustment).

The main direction the logic “flows” is **top-down** and from the vision, the overall purpose backwards through the design-process

However, it is true that, since in a far past computers didn’t exist and because of progress of IT, a lot of human activities are “transferred” to software systems (automation). ( ≠ deducing logic from operational activities and business knowledge; automation ≠ engineering)

# Belief: Business Community is IT Literate

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- ▶ Most people work already for years with computers. They know office automation software and many tools. They surf regularly on the web and use their smartphone maybe daily.
- ▶ Some use more advanced tools, anti-malware programs, conversion applications, upgrade-features, WYSIWYG-software and wizards
- ▶ IT is not a dark and unknown domain anymore.

## ▶▶ “The Business Community is IT literate”

**Assumption:** This IT literacy is adequate enough to understand and to deal with larger information issues and IT Corporate issues and to take information / IT decisions.

# Explanation to reflect upon

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Is there one "IT" ?

Consumer IT  $\neq$  Corporate IT

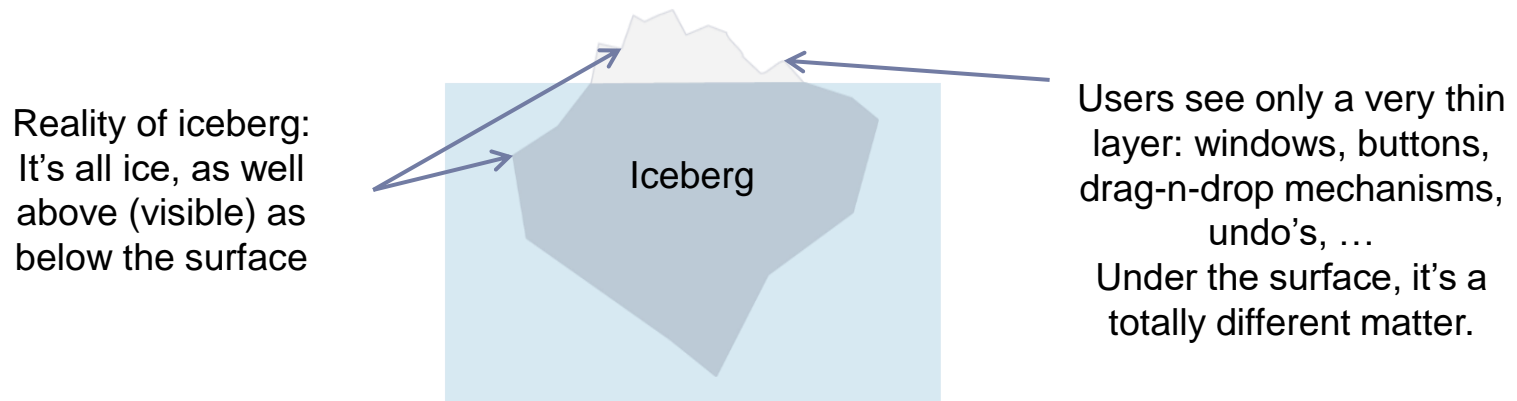
These are two different worlds. We can't treat one as the other.

There is also a great variety of types of systems and environments. The development of each type of system has its own specificities.

Development of corporate software applications will differ from website development, from BI systems, from developing scientific systems or from robotics software.

# Explanation to reflect upon

- ▶ The Business Community know the user's side of IT. They know consumer-IT and some know a bit of end-user computing. They know only that facet of IT that is shown to the users and public.
- ▶ Corporate IT  $\neq$  user-interface; multimedia; web; wizards; mechanisms like one-click, do-undo, copy, drag-n-drop, ...; consumer IT products; picture created by vendors, marketing, many magazines, movies, ... Software features are especially adapted to the computing abilities of end-users: simplified, smart and intuitive concepts. The, the internals, the true complexity is all hidden underneath.



- ▶ The nature of the part visible by users does NOT reflect the nature of the internals of software systems.
  - ▶ Above water: screen elements, user's features, reports, ...
  - ▶ Under water: abstract concepts, advanced algorithms, code, technology, structures, ...+ much more problems are solved inside (below the surface).
- ▶ Metaphor: Car: dashboard is completely different from mechanical part of car

**Users/Consumer's picture of professional IT is very misleading**

# Belief: Business Stakeholders Know What They Want

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IT dept./IT projects has/have to build  
what the business stakeholders need, want, demand

- ▶ Business stakeholders have to formulate a demand
- ▶ Business stakeholders know 'their' problem or need
- ▶ Business stakeholders have to explain
  - ▶ what their problem or need is
  - ▶ what they want; what solution they want
  - ▶ what solution will work for them, and which not; whether a solution is fine
- ▶ The underlying assumption here is that business people
  - ▶ have the knowledge, competencies and experience to detect, correctly diagnose and understand their information needs and information problems and their causes.
  - ▶ Are able to elaborate a conceptual (logical) information solution, be it high level and in business language (to design, to engineer).

## Remarks:

- ▶ Business people may know business problems well. In the present context, 'problems' means "information issues" since this is the type of issues IT helps to solve. Usually, a doctor knows the illness better than the patient, even though it is the patient's body, it's the patient who experiences it and it's the patient that pays. And a doctor can even detect illness a patient isn't even aware of yet.
- ▶ Being aware of an obstacle or knowing the uncomfortable experience of a problem's consequence is not the same as "knowing the problem" !

# Explanation to reflect upon

## ← DIFFERENT TYPE OF JOB →

### Business Expert

- ▶ *Business domain knowledge & Job expertise*  
*Related to information*
- ▶ Understands the meaning of specific information in his job and (direct) environment
- ▶ Skills to organise, use and manage this information (often/mainly for own work)
- ▶ Understanding is stronger inside the perimeter of own work, but becomes hazy in more distant areas (like usage of same information in another service or dept.) and for other domains of expertise.

*Driving skills (usage skills)  
doesn't provide skills required  
to engineer a car (engineering skills)*

### Information Solutions Engineering

- ▶ Diagnosing information needs and information problems
- ▶ Conceiving/Engineering/Designing (conceptual) information solutions
  - ▶ thinking about what solution is needed
- ▶ Organise information shared across a company and use for different purposes
- ▶ Fully exploit this resource and ensure the information remains exploitable



### Required Skills

“information” (information science, information engineering, ..), systems (theories), systems engineering, nature of software & its (im-)possibilities, software engineering, systems analysis, ...

**Completely different discipline, other set of skills, a different attitude, and even a totally different world view and way of thinking (mind set)**

# Beliefs: Analysis is about looking inwards & refinement

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- ▶ Analysis is about investigating something and looking inwards.
- ▶ Analysis verifies, refines, fill in the details and translates.
- ▶ Analysis is the obliged step of translating the business demand into artefacts developers need to build the demanded solution (bridge).
- ▶ Assumptions:
  - ▶ The Analyst must be given something to analyse.
  - ▶ Analysis is a skill everyone possess to some degree.
    - ▶ Or learn some analysis standards and techniques, like UML or Use Cases, and get some certifications suffice to become analyst.

# Explanation to reflect upon

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## Analysis vs ‘analysis’

Analysis, as recorded in a dictionary, is about the skill of “looking inside, looking at the parts to study them and their relations”. However, ‘Analysis’ as in “Systems Analysis” is a discipline, which is knowledge, a set of skills, techniques, an attitude, a way of thinking, ... Analysis can’t be done decently without strong analytical skills. However, possessing this skill is insufficient to do ‘Analysis’.

Some skills, the right attitude and way of thinking are critical and not easy to acquire.

## What is Analysis?

Analysis is the professional discipline of studying systems and environments in order to solve problems, improve and expand systems or designing new systems. In the context of corporate IT, Analysis is focusses on information (information needs, information problems, information as product or service, ...).

## Core Activities

- ▶ **Detection:** **DIAGNOSIS**
- ▶ **ENVIRONMENTAL ANALYSIS:** learning , **understanding**
- ▶ **CONCEPTION:** (problem) **solving**, conceiving, optimising, design, **engineering**
- ▶ Evaluation

Analysts must absolutely excel in them



# Explanation to reflect upon

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## Core ideas in the Analysis discipline

- ▶ Identifying problems, issues and opportunities as early/quickly and as rightly as possible
- ▶ Striving to get as quickly as possible the right improvement or solution (preferably from the first time) avoiding repeating attempts and building wrong solutions (some corrections are normal and improvements welcomed)
- ▶ Getting an **upfront insight** in order to
  - ▶ Avoid engaging in unfeasible solutions
  - ▶ Create and organise the work environment, provide resources and plan the work (planning is not a one-phase-activity, a one-shot. It's an continuing activity)
  - ▶ Reducing the uncertainty and risks
  - ▶ Avoiding working on non-solutions and avoiding changes due to lacking of understanding and bad decisions
  - ▶ Ensuring the delivered product has value (delivering 1/2 of a car, because of lack of time or resources, is worse than delivering no car at all).

It's obvious that a poor analysis or an analysis relying on wrong information will never be able to deliver any of those advantages. How can an analyst solve a problem or know he/she solved the problem if the focus is only on "what is required"? An analyst knows only what he is doing, if once the problem is understood. We need first a **problem-oriented analysis** and only then a **solution oriented-analysis** (of course, not 100% sequential).

# Explanation to reflect upon

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## Some Key Competencies

- ▶ Information, systems, management, organisation, quality,
- ▶ Engineering, problem solving, Information Systems Engineering
- ▶ Critical thinking (doubting/questioning), systemic thinking, holistic thinking, creativity, thinking like an engineer, curiosity, depth in thinking, no herd mentality, ...

## Investigating

- ▶ Root cause → ... → cause → problem → consequences → impact → ripple effect
- ▶ Goals, intentions, plans, expectations, necessities, priorities
- ▶ Upwards: Higher levels, supra-system, broader environment, co-systems
- ▶ Downwards: Lower levels
- ▶ Past, present & future
- ▶ Static & dynamics (forces, influences, tendencies, mechanisms)
- ▶ Information, processes, systems
- ▶ Coherence, reliability, flexibility, manageability, ...
- ▶ Problems, optimisations, improvements, expansions, opportunities, innovation
- ▶ Value creation
- ▶ Feasibility

# Explanation to reflect upon

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## The Analyst

It is a widespread fundamental and **colossal underestimation** how much the Analyst has to know about

- ▶ information
- ▶ systems
- ▶ how software and computers can handle information (among others algorithms and data structures)

and how much

- ▶ Critical skills, Analytical skills, Abstract thinking
- ▶ Investigation skills
- ▶ Problem solving and Engineering skills
- ▶ The attitude and way of thinking of an engineer

are required and **how critical this is** in order to conceive appropriate information solutions or software systems.

# What has been presented in this presentation?

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- ▶ Information, systems, the information component and information systems have been discussed briefly to draw the context and the challenge of Corporate IT.
- ▶ Understanding the origin of the content of a discipline, the process to come to a discipline and its organisation help to learn, to recognise the right value of what is learned. Since maturity is about augmenting the knowledge and improving the insight, some paths or directions in which to search for new, deeper and more reliable insight are provided.
- ▶ We create a mental picture or world view of the discipline. Concepts like aspects, coherence, cognitive dissonance, closed or open mind, dimensions play a role in maturation. The specific characteristics of immaturity and maturity are also worth knowing.
- ▶ The process and mechanism of maturation are explained. Some practical aspects about maturity have been provided as well.
- ▶ ISEDMAM maturity model is based on the views of different levels of maturity of individual aspects. This set of dimensions allow to evaluate a mental picture, to identify its weaknesses, to look for a more mature picture, to learn and to guide the progress.
- ▶ Views of different levels of maturity are presented per aspect. And finally, explanation about some doubtful key beliefs about corporate IT are given as a matter to reflect upon.
- ▶ Our world view defines the created value, success and failure. It paves the road to prosperity or to self-destruction. Now, it's our choice.

Hope you enjoyed it. If you find it worth, share it. Thank you.

# Other related documents

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- ▶ Analyst's Perspective on Systems Analysis The Essence of an Undervalued Discipline [Download](#)
- ▶ Map of Dynamism in Corporate Software Development Environments Eroding the IT Department and the IT Discipline [Download](#)
- ▶ Problem Solving: Concepts and Approach for Systems and Strategies [Download](#)
- ▶ Why Business Demand Driven Information Systems Development Approaches Don't Work [Download](#)
- ▶ The Waterfall - A Commonly Misapprehended Methodological Concept [Download](#)
- ▶ La collaboration " Business-IT " - Pierre angulaire et pierre d'achoppement de l'informatique d'entreprise [Download](#)
- ▶ Human Causes of IT Project Failures [Cartoons](#), [Explanation](#)

# GOOD LUCK

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