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The purpose of the Journal is to disseminate knowledge, experience, and best practice in engineering & manufacturing.
The articles are written by practicing professionals in the Engineering City (EC) in Yerevan. They cover issues relevant to their projects, operations, and organizations.
The articles address the challenges of the time. As such, the Journal is also a chronicle of the evolution of the EC, its companies, and its individuals.
It is the aim of the Journal to advance the engineering & manufacturing practice, to enrich the engineering & manufacturing community, and to contribute to the worldwide discourse in engineering & manufacturing.

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Organizational Management

. The Cynefin Framework for Situational Management

by Rama, Engineering Association

. What is it

The Cynefin Framework is a framework that characterizes a situation, a problem, a context into four different domains. The idea is that each domain requires a different response, a different approach, a different decision making process, a different solution. By identifying what domain the current situation belongs to, we are able to choose the correct approach. But if we fail in identifying the correct domain of the current situation and apply the wrong approach of a different domain, then we will fail. The situations are, of course, not static; they move with time from one domain to another. So, as they move, we should also change our approach. These are the main claims of the Cynefin Framework.

The four domains are - simple, complicated, complex, and chaotic.

The basis of this characterization is the nature of the cause-and-effect relationship in the given situation.

In the **Simple Domain**, the rules are clear, the cause-&-effect relationship are straight forward. There are already Best Practices that could be just applied here. The needed actions are usually embedded in clear instructions and look-up tables.

In the **Complicated Domain**, the relationships are not obvious, they need an expert's analysis. This is the domain of experts and knowledge. If you have the knowledge you can dissect the right conclusions and the right solutions.

Engineering problems fits this domain. There are cause-&-effect relationships but to see them you need expertise. We go to university to operate in this domain.

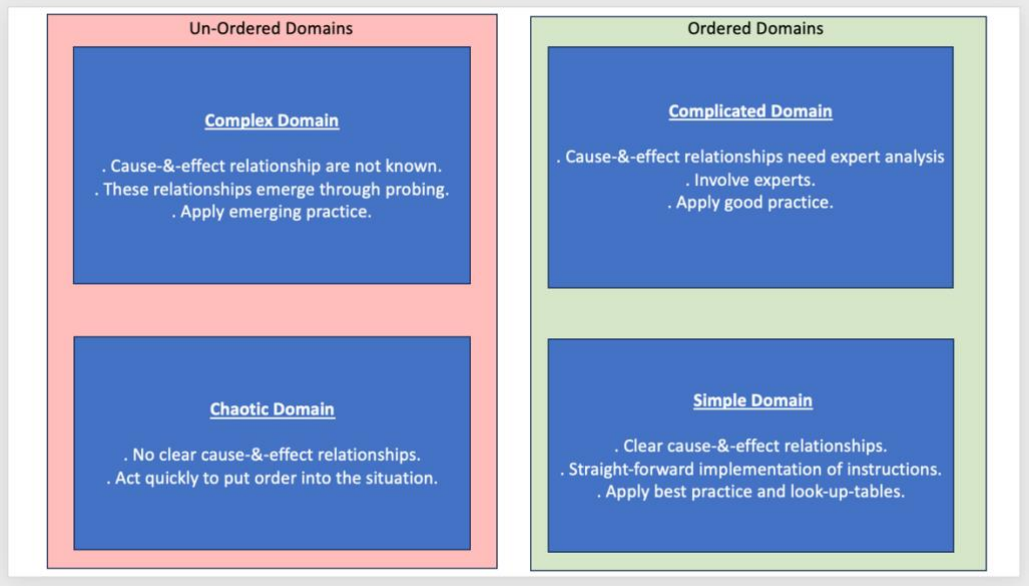
In the **Complex Domain**, the cause-&-effect relationships are not apparent even to the experts. These relationships could be arrived to only through probing, experimenting, and trials. Here the relationships emerge through patterns and evolving regularities. This is the domain of research.

In the **Chaotic Domain**, there are no cause-&-effect relationships. The situation is unstable and turbulent. Things are random, not repeateble, not predictable, and unkowable. We need to get out of this situation as quickly as possible by putting some order and some constraints and get to any other state. This is where crisis management must be applied.



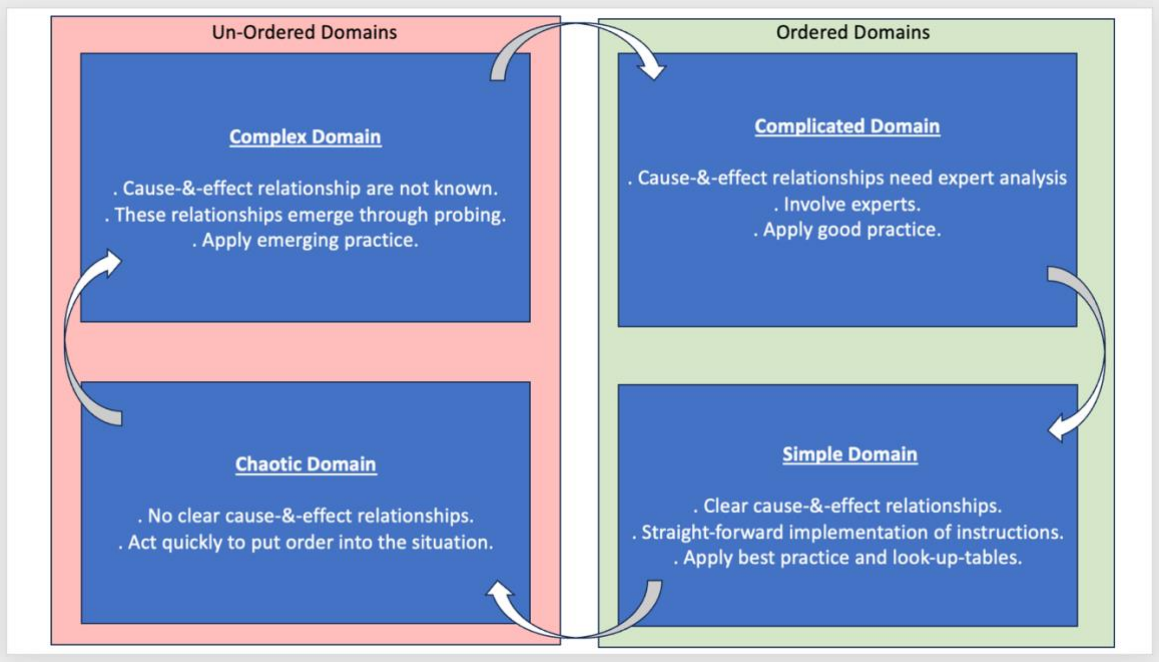
Pic. The four domains of the Cynefin Framework

The Chaotic and Complex domains are considered "un-ordered" domains, whereas the Complicated and Simple are considered "ordered" domains.



Pic. The Unorderd Domains (in red) and the Ordered Domains (in green).

The situations are not static. As we operate in the different domains we actually move the situation from one domain to another. The movement is usually from chaotic to complex to complicated to simple. And then back to chaotic.



Pic. The Movements between the Domains.

Below are some examples of applying the Cynefin Framework.

. Cynefin applied to the S-Curves

The movement between the domains can be also mapped onto the S-curves, where the chaotic situation is analogous to the pre-curve segment, the complex situation is analogous to the beginning of the curve, the complicated is analogous to the rapid growth segment, and the clear is analogous to the maturity & stagnation part of the curve.

The S-curve has four main segments:

1. The Emerging Segment
2. The Rapid Growth Segment
3. The Maturity Segment
4. The Stagnation & Decline Segment

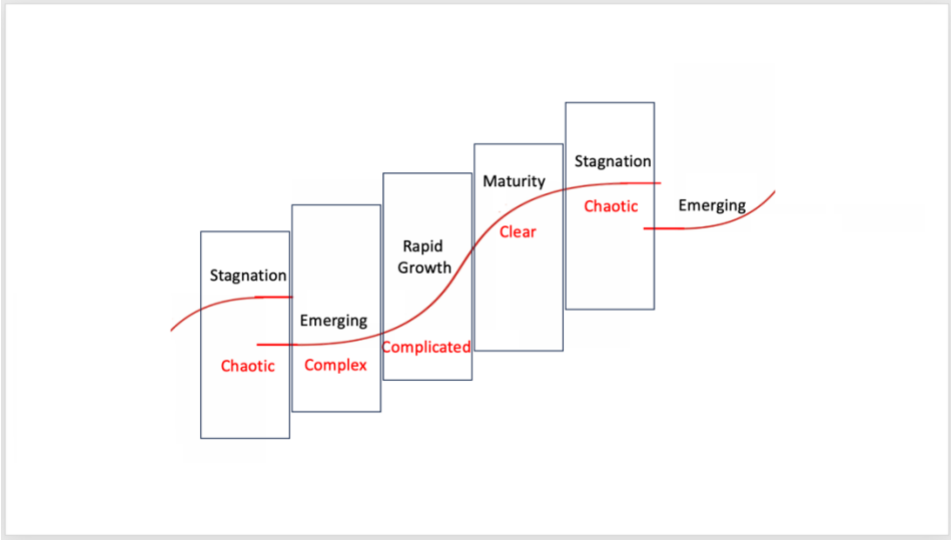
In the **Emerging segment**, the curve is still new. It is the segment where inventions happens, where new concepts are tried out. Inventions and new concepts happen through probing, experimenting, and trials. In the Cynefin Framework this is analogous to the **Complex domain**.

On the S-curve, the invetion moves into innovation and if it is successful in the market place we experience a rapid growth. This is the **Rapid Growth segment** on the S-curve. In Cynefin, this is analogous to the **Complicated domain**. This is because the complicated domain is the domain of experts. Here the invention or concept gets engineered into a product through design and development, and the products get promoted and sold through marketing and sales experts.

Then the S-curve moves into the **Mature segment**. This is when scaling takes place. This is analogous to the **Simple (or Clear) domain** in Cynefin. Here the product is already being mass-produced and efficiency has been achieved. Meaning that the production of the product is just a matter of following instructions and look-up tables.

And finally, the S-curve reaches the **Stagnation & Decline segment**. This is where the S-curve has become rigid and un-able to introduce novelties. This is the crisis of the S-curve. In Cynefin, this is when we move from Simple to **Chaotic**, only to search our way out again into the complex domain and probe and experiment with new technologies.

To summarize, we can conclude with the following analogies between the S-curve and Cynefin:



Pic. The black wording are the S-Curve segments,
the red wording are the corresponding Cynefin Framework domains.

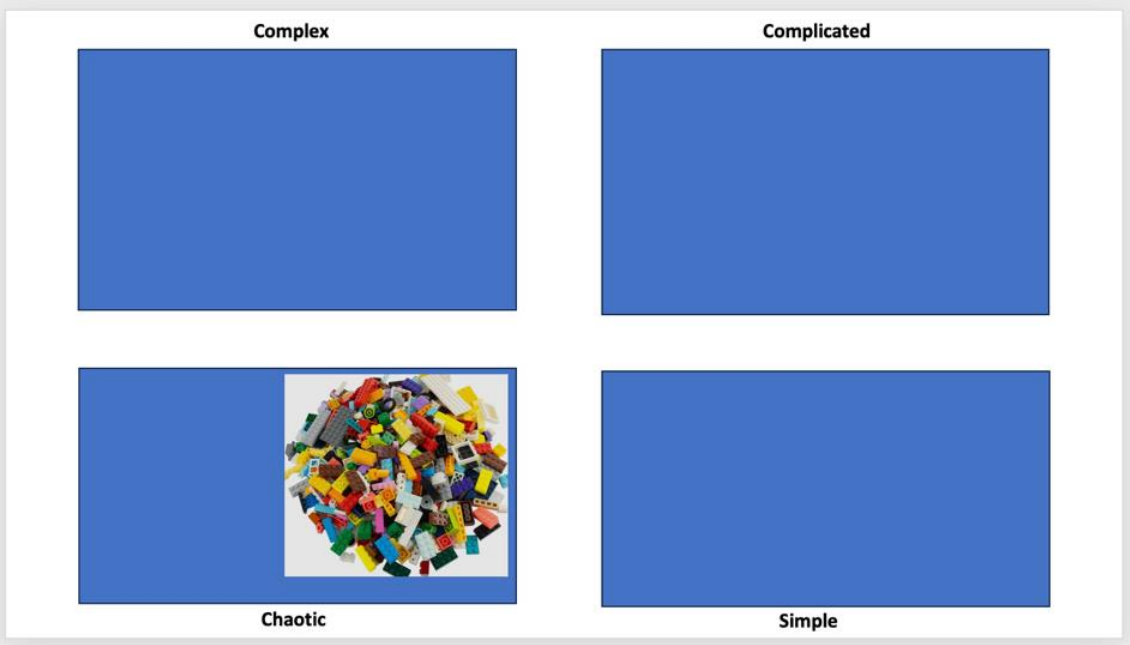
S-Curve Segments	Corresponding Cynefin Framework Domains
Emerging Segment	Complex Domain
Rapid Growth Segment	Complicated Domain
Maturity Segment	Simple Domain
Stagnation & Decline Segment	Chaotic Domain

Table. The S-curve and Cynefin Framework analogies.

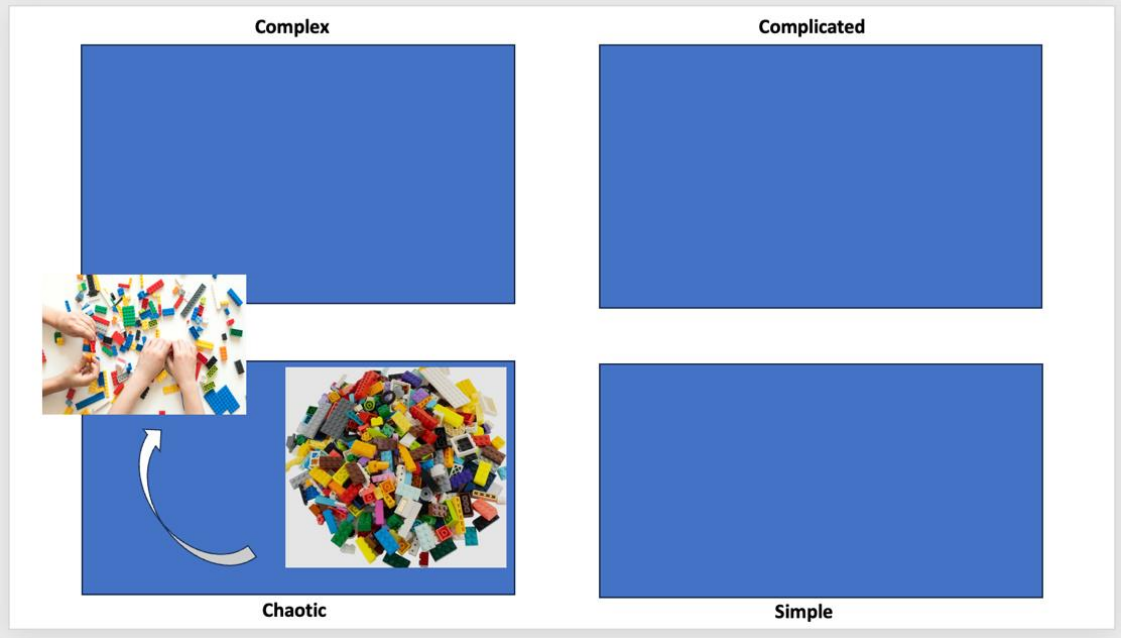
. Cynefin applied to Lego

I will now show how a Cynefin Framework could be applied to a Lego construction.

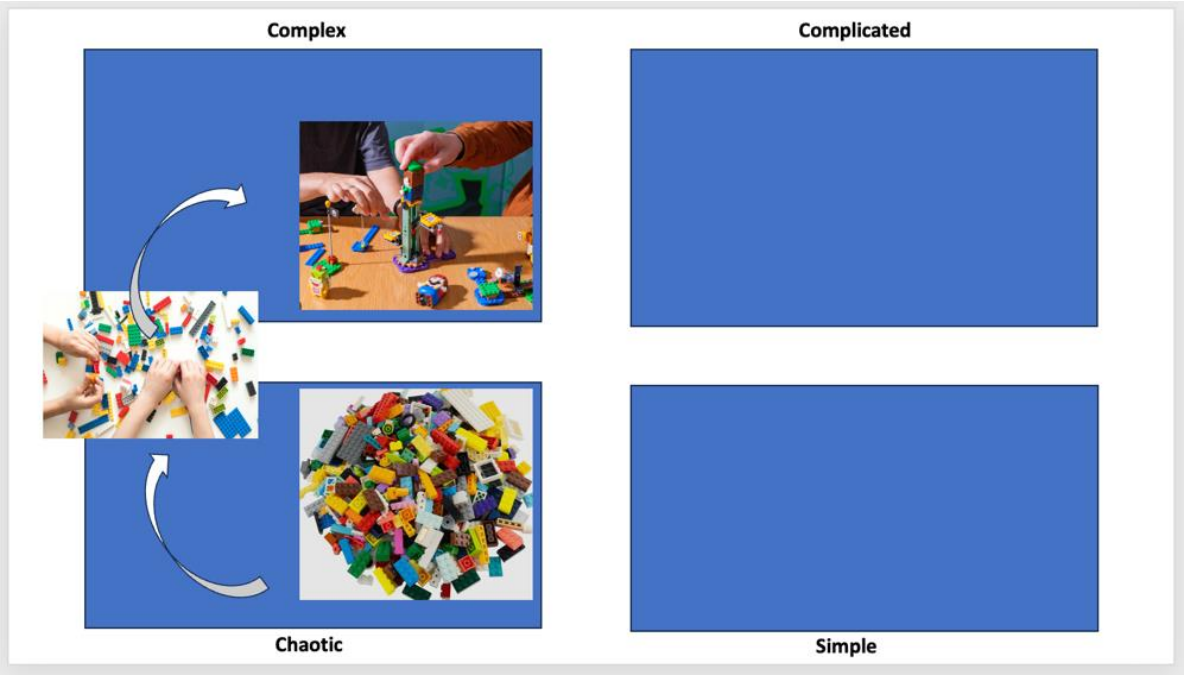
The child has just opened a box of Lego pieces and poured the pieces in front of him. This is Chaos. He does not know yet what to do with them. He has no vision yet of what he wants to build. We are clearly in the **Chaotic domain**.



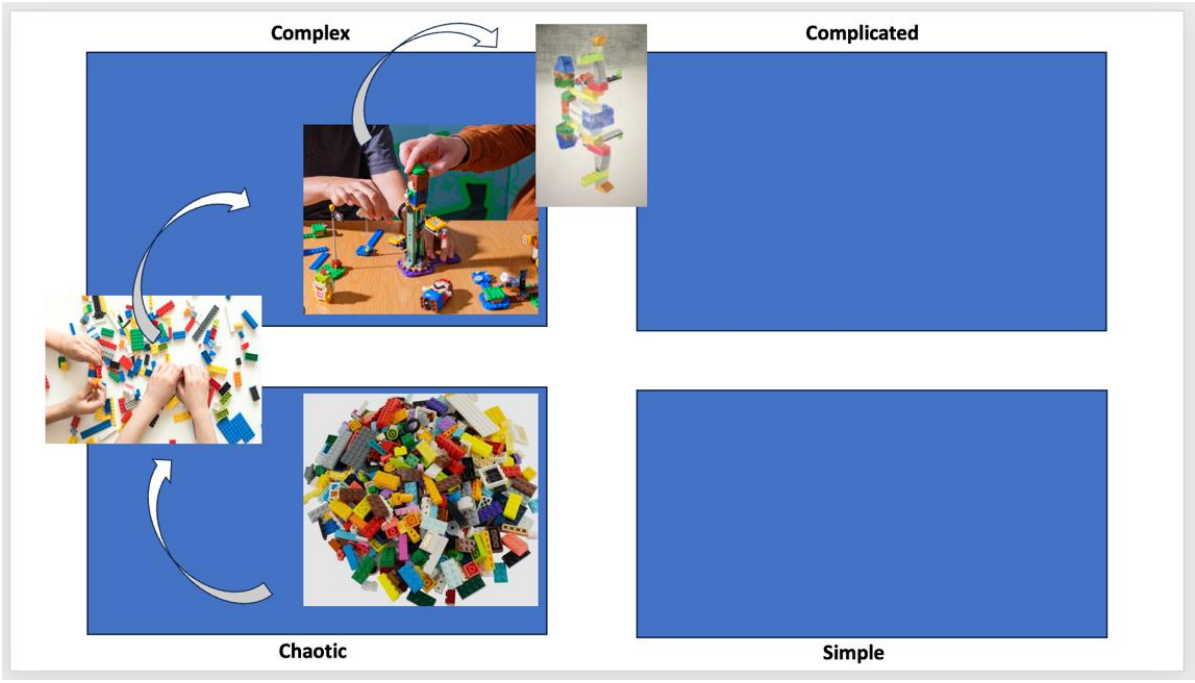
Then, he starts randomly pulling some similar parts together to make some sense of what he has in front of him. With this step he is transitioning to the **Complex domain**.



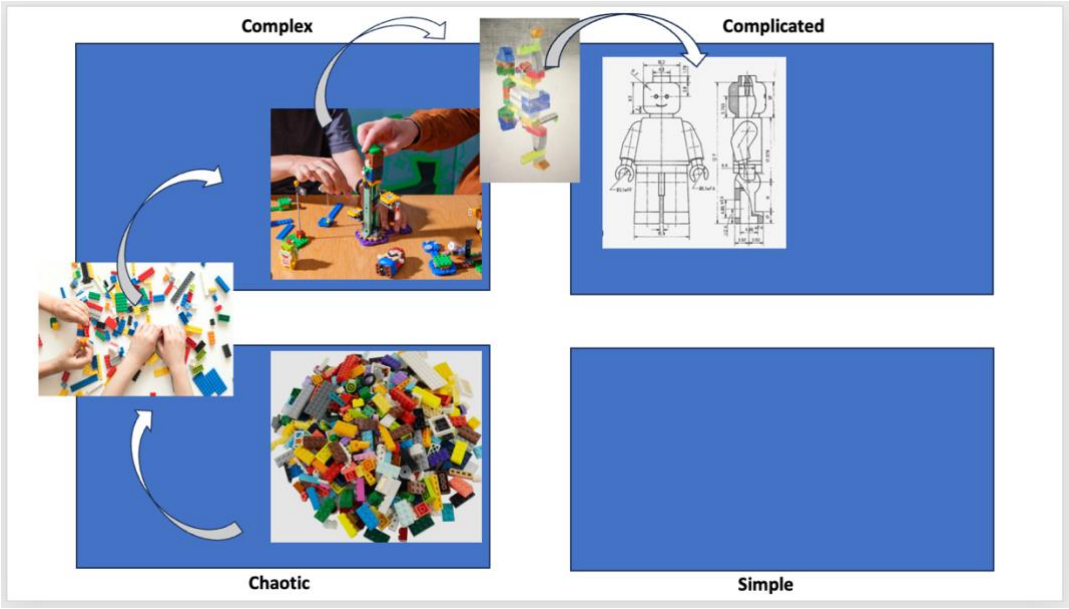
In the **Complex domain** he still does not have a vision of what he wants to build. But he starts connecting some parts together, and then some more parts here and there as a result of which a certain form emerges.



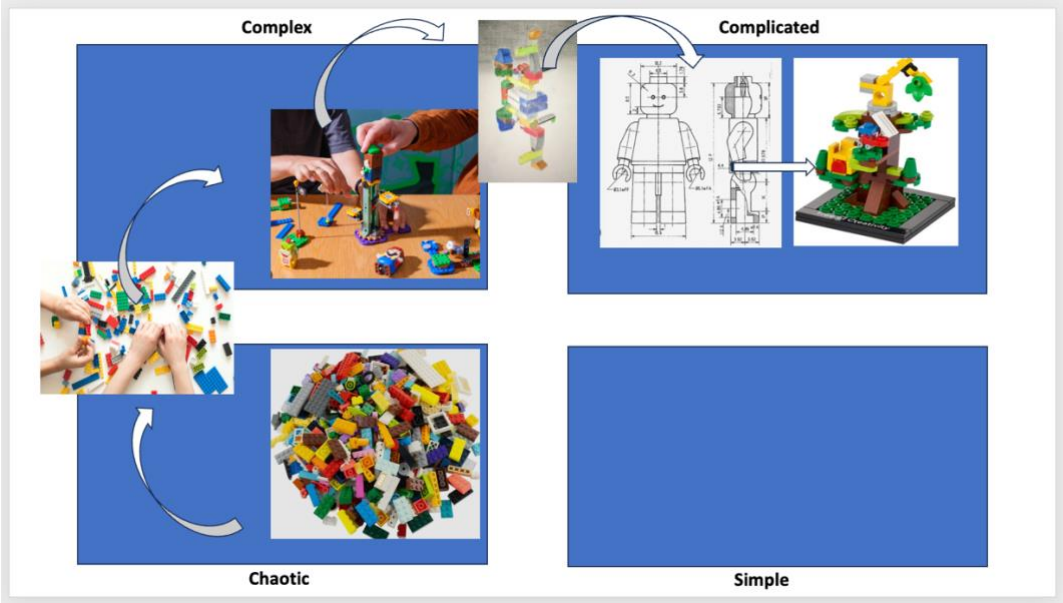
Once the picture clarifies, he moves on to create a protoype. This would be the transition to the **Complicated domain**.



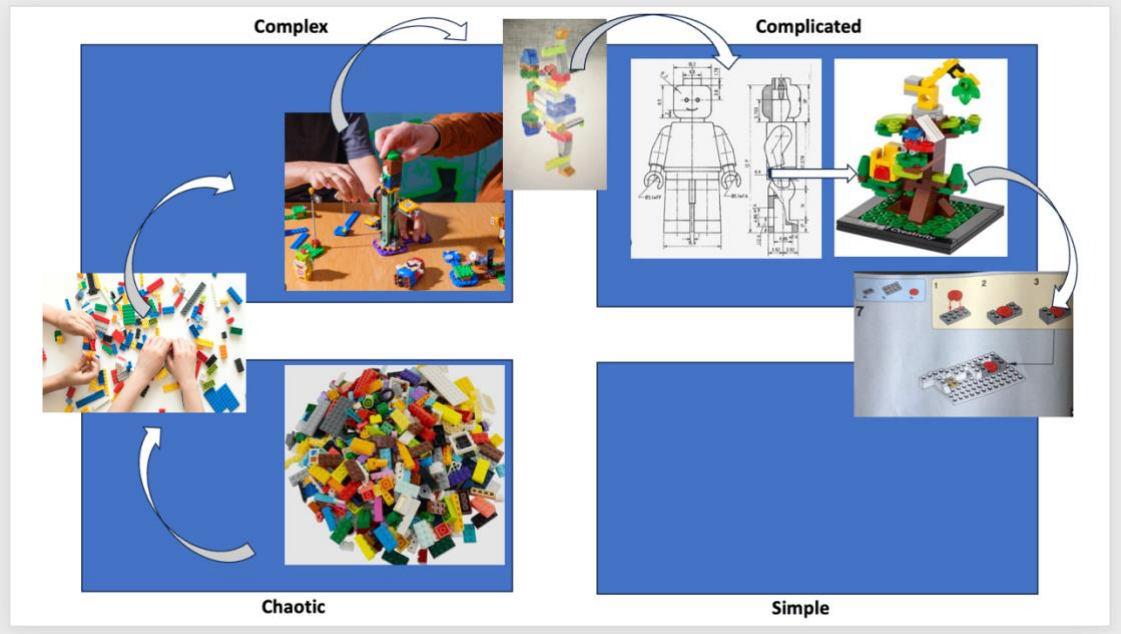
Great, now he has a prototype of what he will build, but it is still a prototype. He now drafts a clear picture on paper, and adds dimensions to what his construction be. This is similar to the technical requirement of an engineering project. This is the **Complicated domain** because here you need some expertise in drafting and read the drawings, understand ratios and measurement.



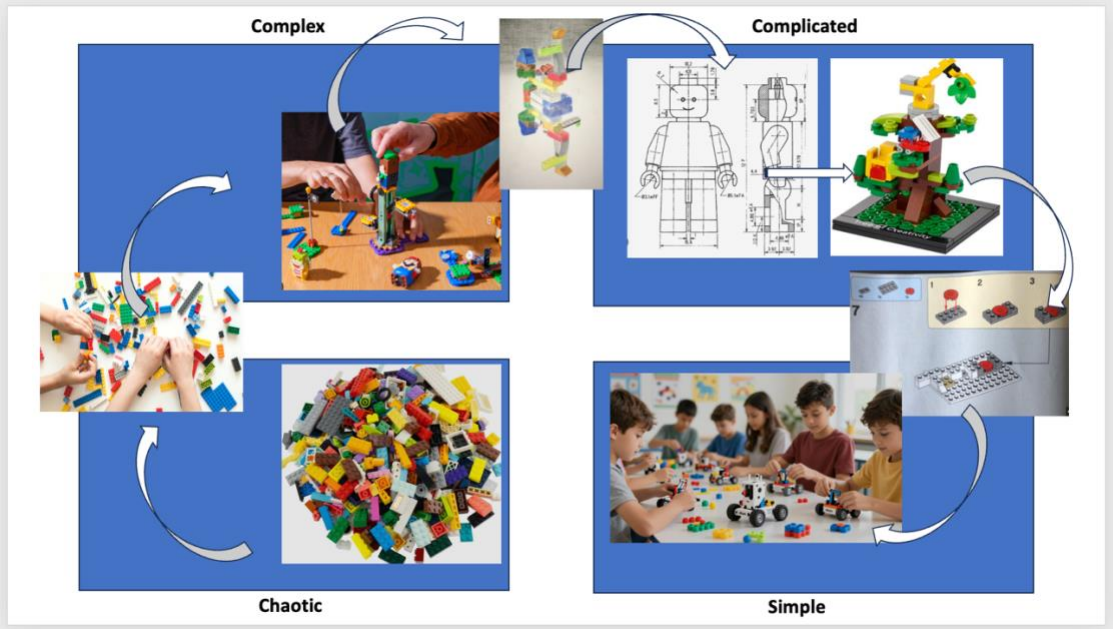
In this domain we produce the Engineering Unit.



Now, he child wants to freeze his creation so others can produce the same construction. For this purpose he needs to create the assembly instructions. The instructions is what takes us from the Complicated domain to the **Simple domain**.

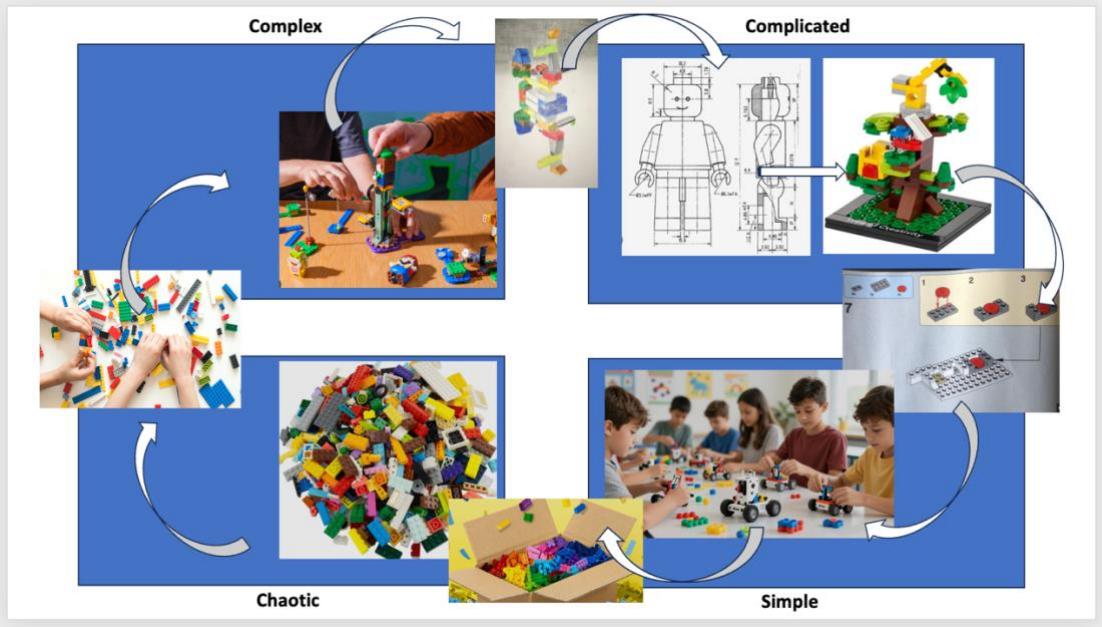


And, finally, to assemble the construction again and again all you need is following the instructions. Very simple, and very clear. You cannot go wrong here. You are in the **Simple domain**.

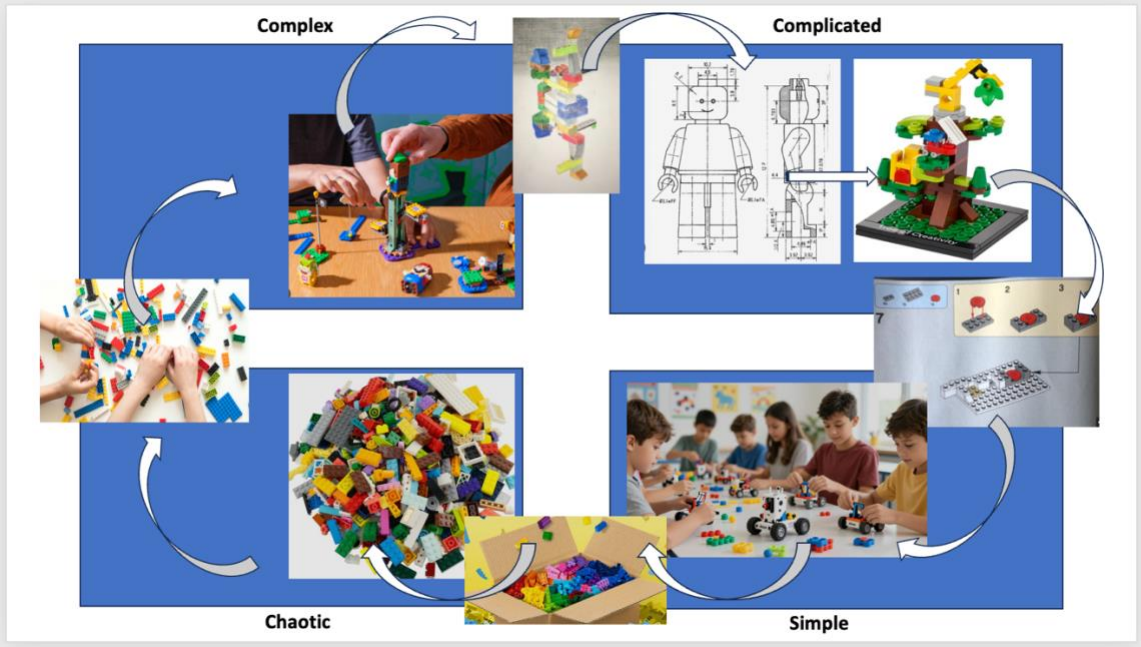


Ok, then what?

Boredom sets in, the constructions get dissmantled, and the pieces go back into the box.



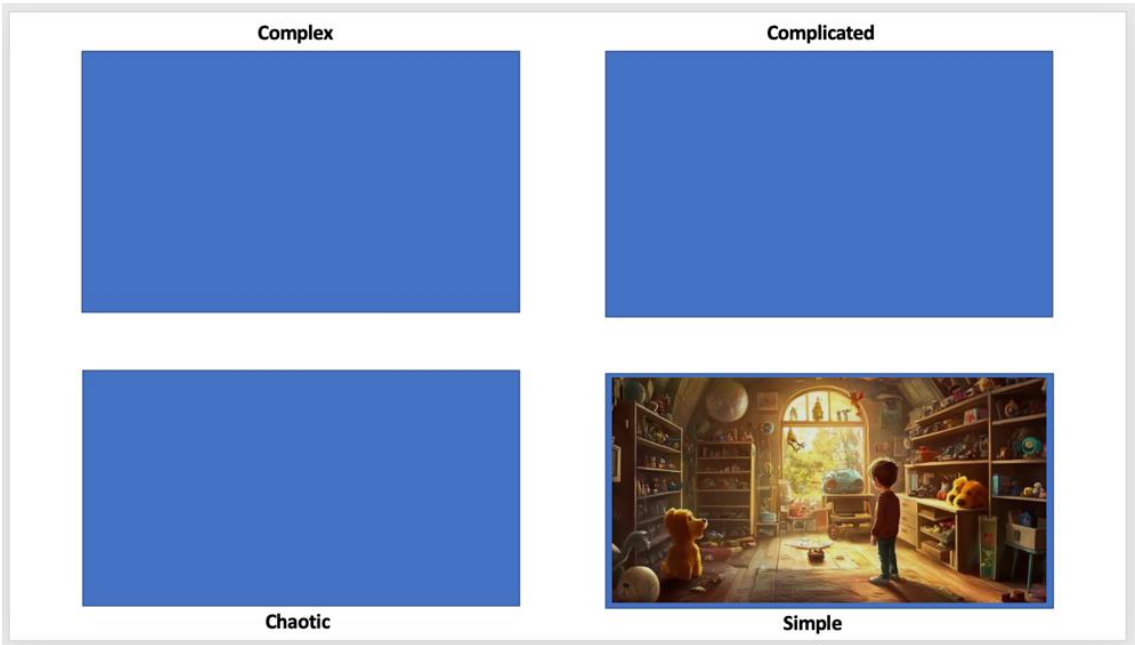
He is now ready to start all over again to build something else. We are back to the **Chaotic domain**.



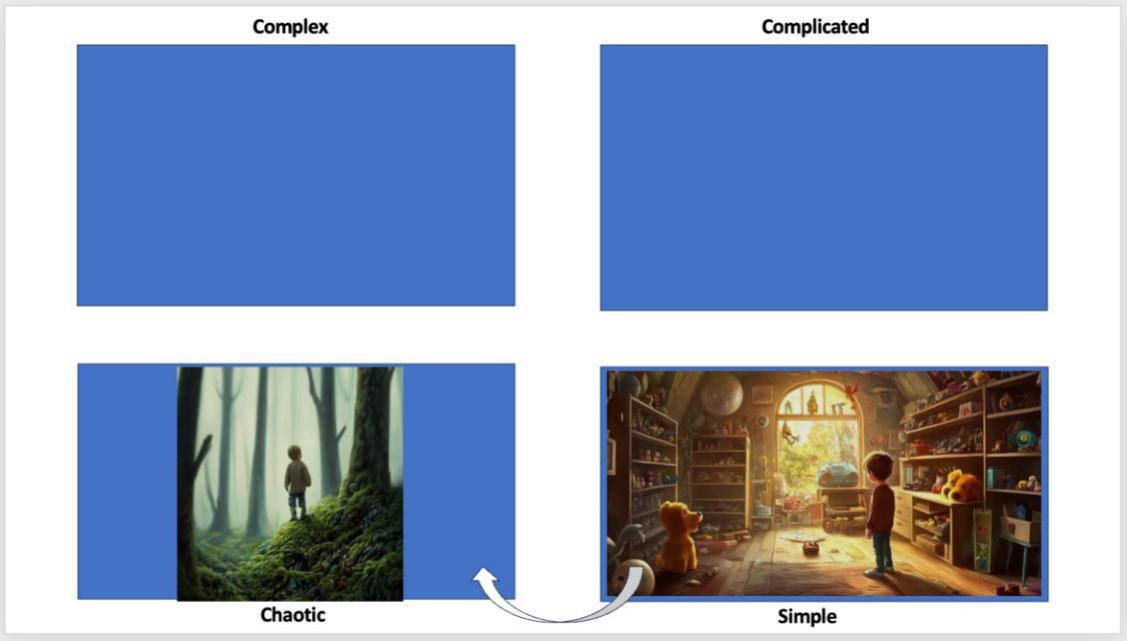
Here, we moved from chaotic, to complex, to complicated, to clear and then back to chaotic. And the game starts all over again.

. Cynefin applied to Children Fairy Tales

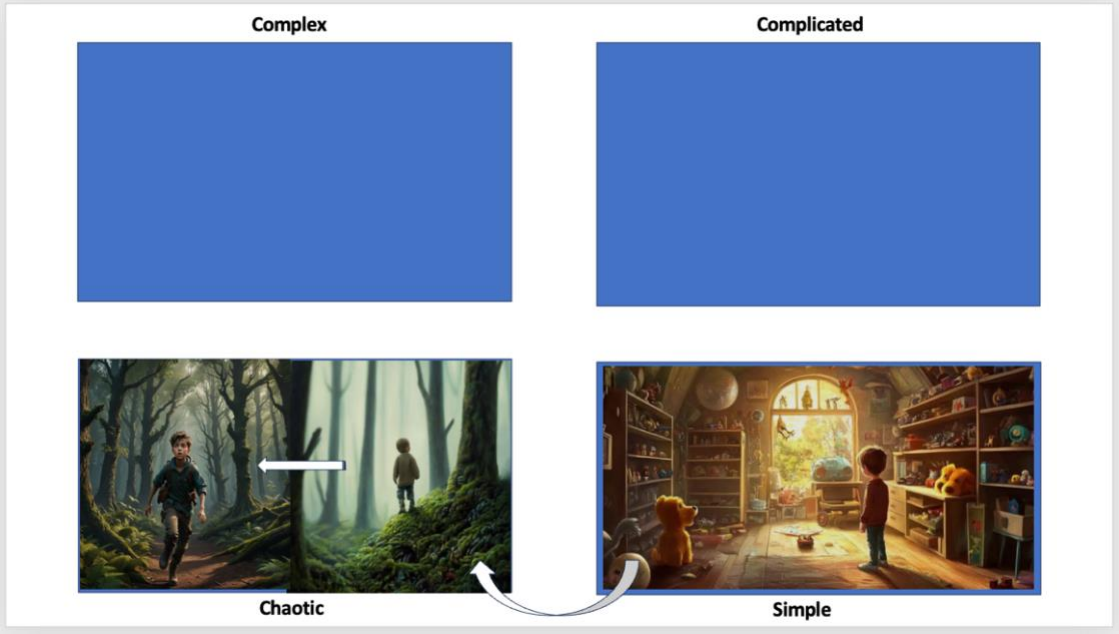
The fairy tales usually start from a given ordinary situation. For example, the boy is at home in his room. He knows every corner of his room, he know every toy in his room, and he knows the daily routines in his home. This is the **Simple domain** in the Cynefin Framework.



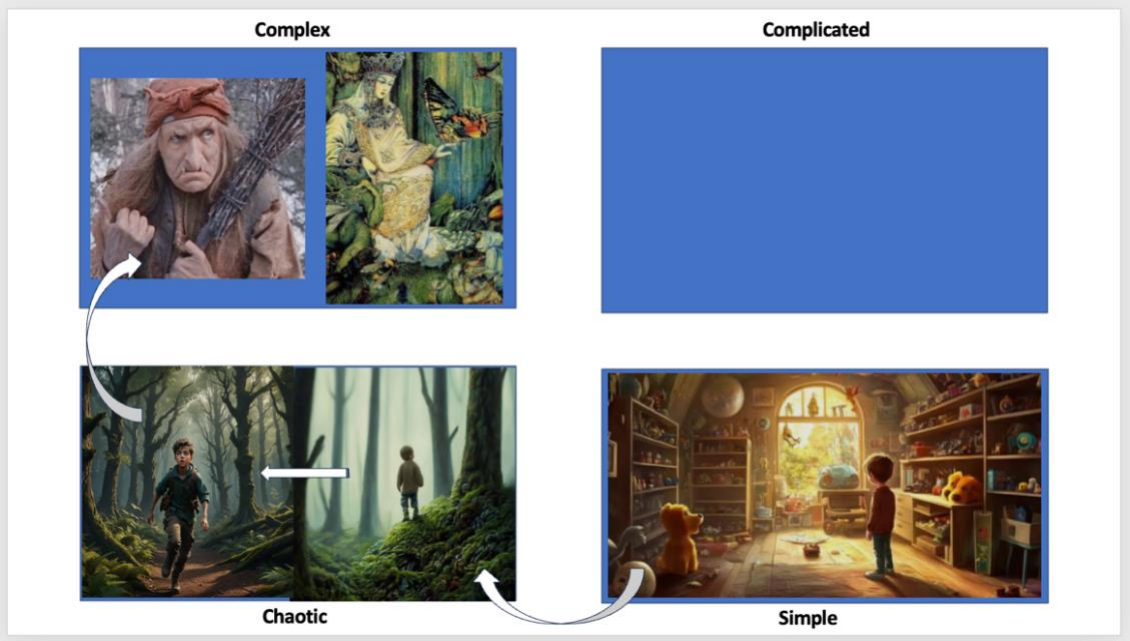
At some point, boredom sets in. To kill this boredom he must venture out of his peaceful home. He ventures out and lands in a dark forest. Noises from every corner of the forest, no regularities, no clear paths, no obvious relations. This is the **Chaotic domain** in Cynefin.



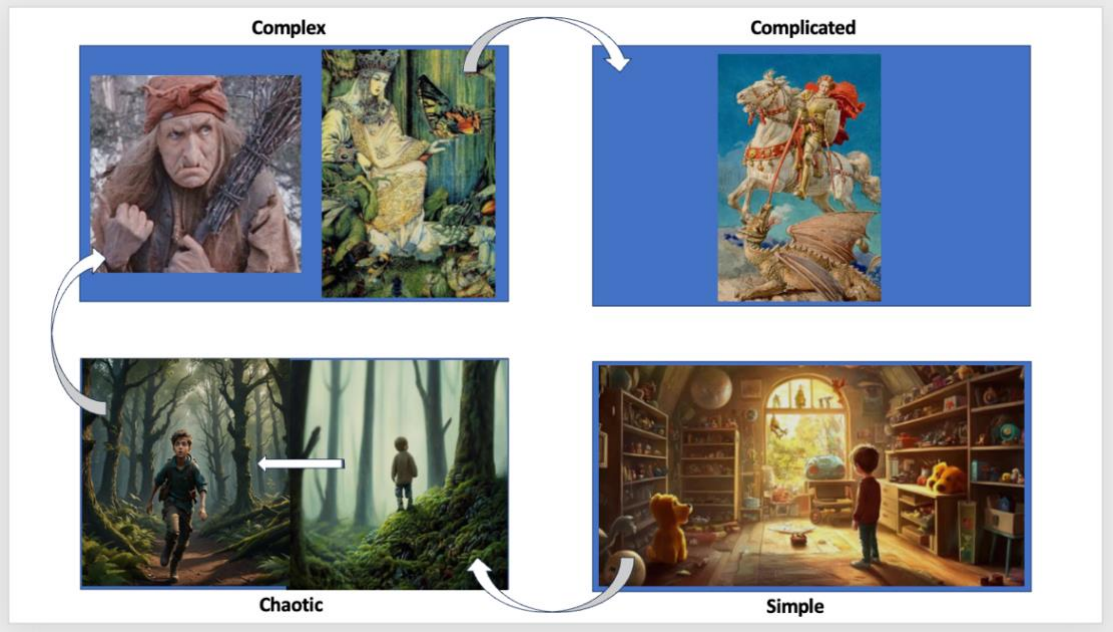
Fear sets in, he must get out of here. He starts running looking for his way out, but he is lost.



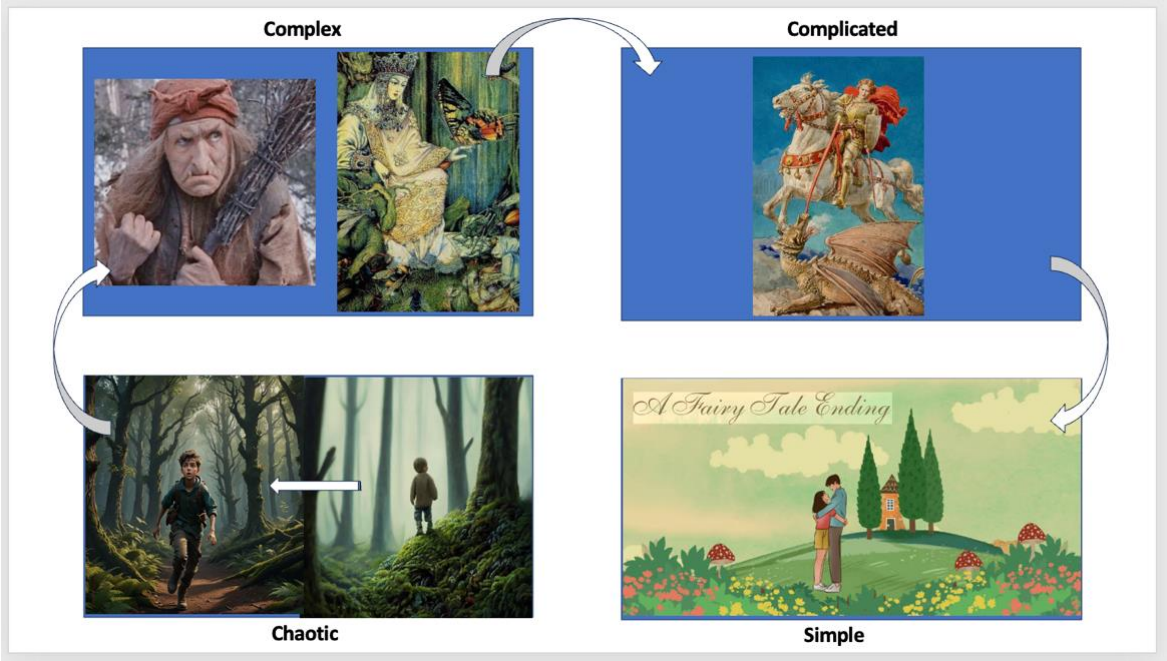
In the forest he encounters a trickster (баба-яга) who tries to confuse him and trick him further into the forest, but he also encounters a wise woman who advises him. As such, he encounters both evil and good. Putting all this together he must find his way out. He probes different paths; he tries different approaches. Finally, he finds a light at the end of the tunnel and pursues this light. This is the **Complex domain** in Cynefin.



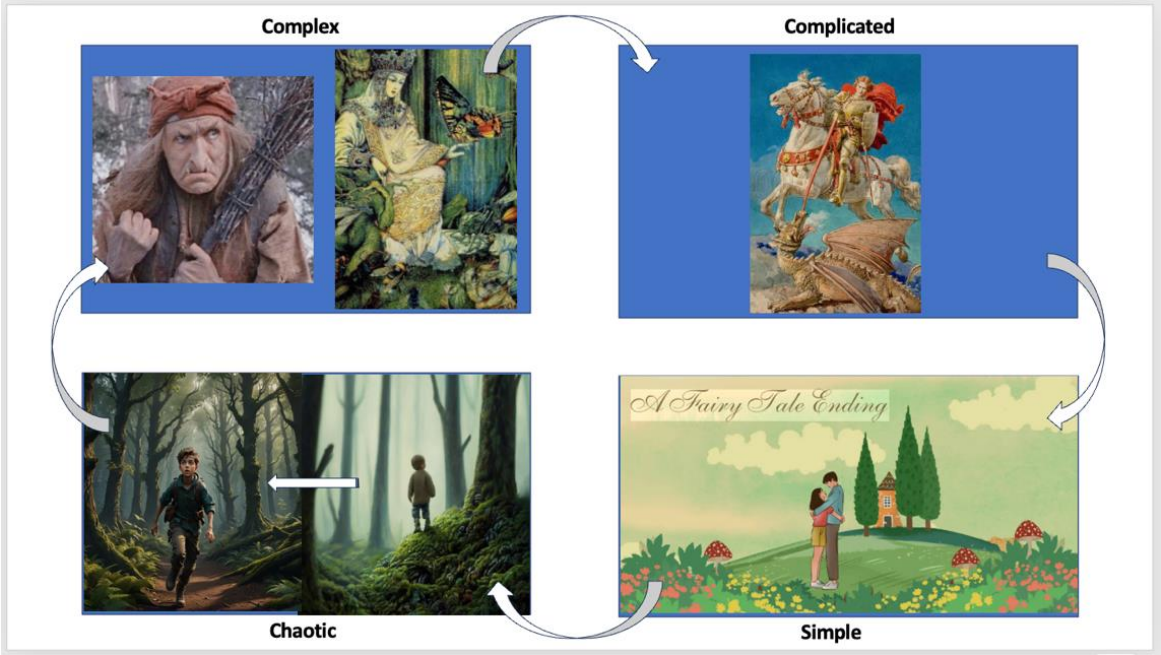
Now he sees the light (a solution) he must implement the solution. The problem is still there, but he now has the knowledge of the solution. In fairy tales, the problem is usually depicted as a villain. He must slaughter the villain (solve the problem) to be able to take the path back home. This is the **Complicated domain** in Cyenfin.



After successfully slaughtering the villain, he can now go back home. He reaches home and settles in. He is back in the **Simple domain**, but he is no longer the little boy. He has grown up with experience and knowledge in his back.



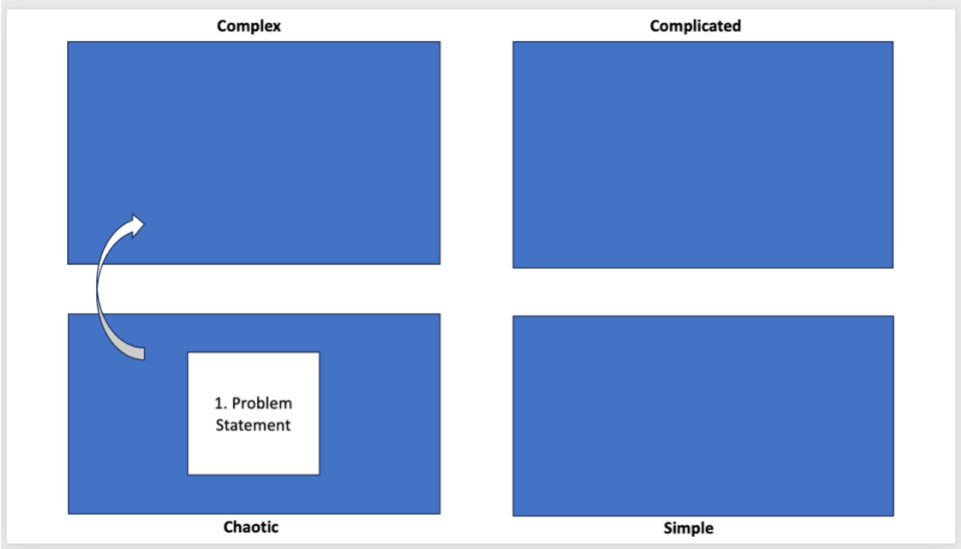
But after some time, boredom settles in again, and he must venture out again only to land in the Chaotic domain again.



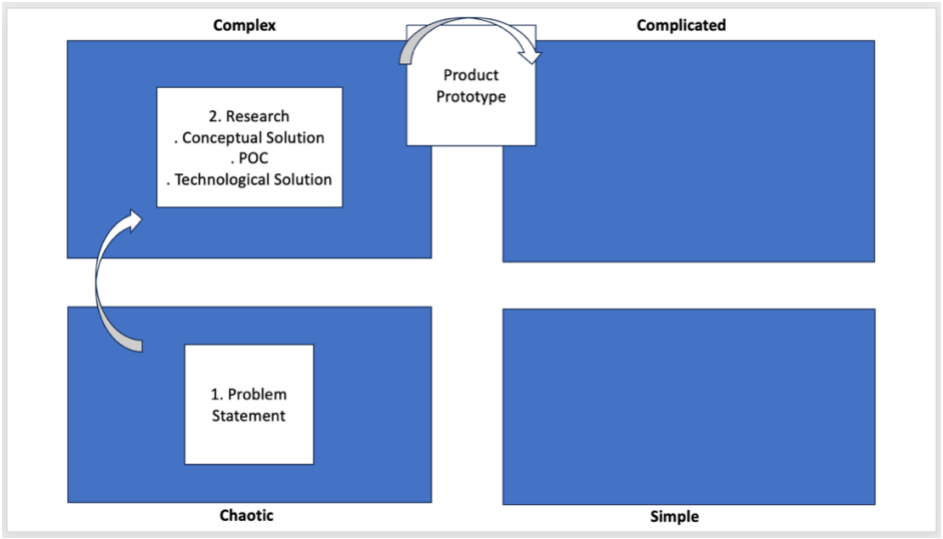
And so life goes on.

. Cynefin applied to Product Development Lifecycle

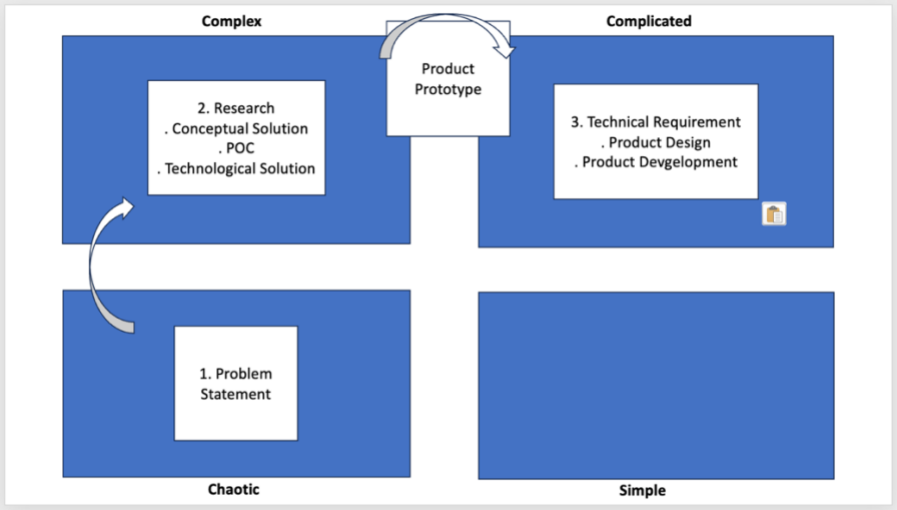
Let's try to apply the Cynefin Framework onto the Product Development Lifecycle. Here we start with the Problem Statement. We received the Problem Statement, yet we don't know how to approach it yet. The constraints are not set yet. This is the **Chaotic domain**. To get out of it, we must set some constraints and boundaries to the problem so as to guide our approach.



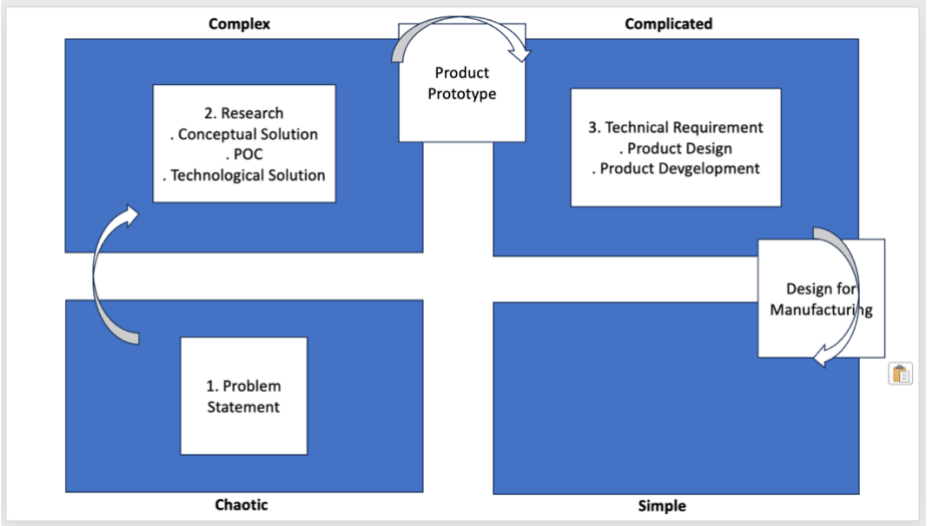
Once the boudaries and constraints have been set, the research work starts. Research is about creating models, simulating the system, probing, experimenting, and trying. We need to get to the conceptual solution. This is the **Complex domain**. Once the concept has been proven by a POC, the cause & effect relations get established. At the end of this stage we also work on the technological solution which ends with a Prototype. The Prototype is what takes us into the **Complicated domain**.



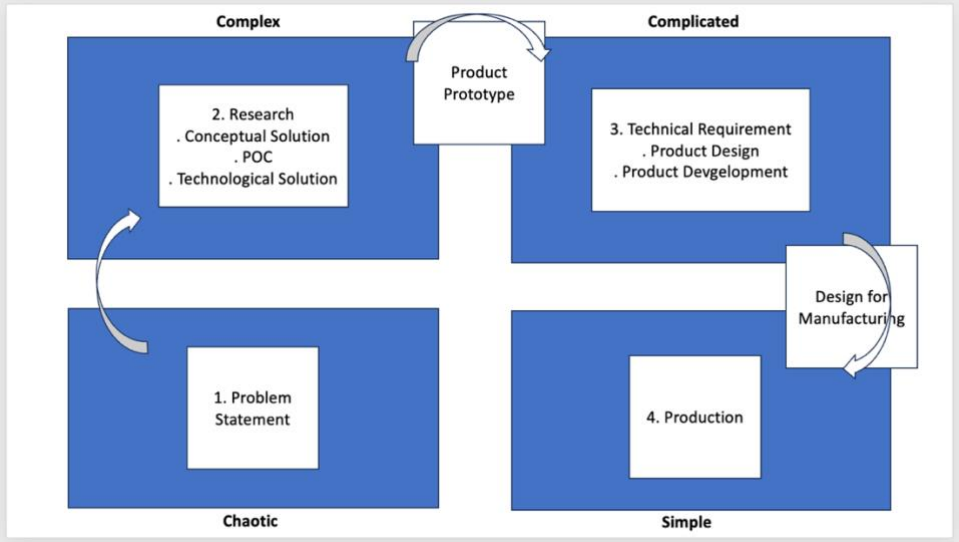
The prototype gets now transfered to the engineering team. The protoype gets translated into a technical requirement document, after which the product design and development starts. This is the domain of engineering expertise. We are now firmly in the **Complicated domain**. This stage ends with V&V tests.



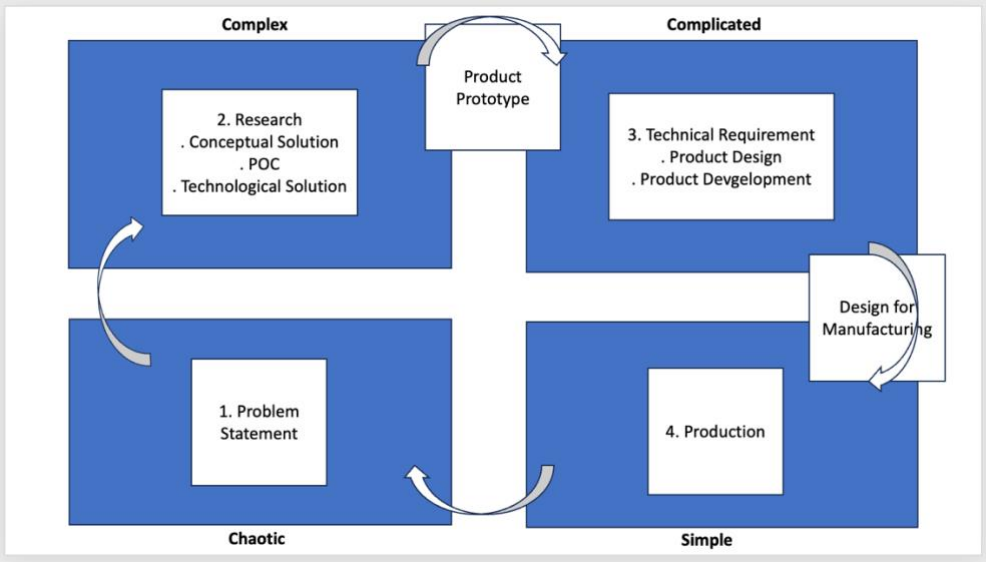
Once the V&V tests are done, the product is ready to be produced by manufacturing. This move to manufacturing happens through the Design for Manufacturing (DFM) step.



The DFM takes us right into production. We start with the process design, and then we generate the production instructions. We have arrived to the **Simple domain** as production is about following clear instructions.



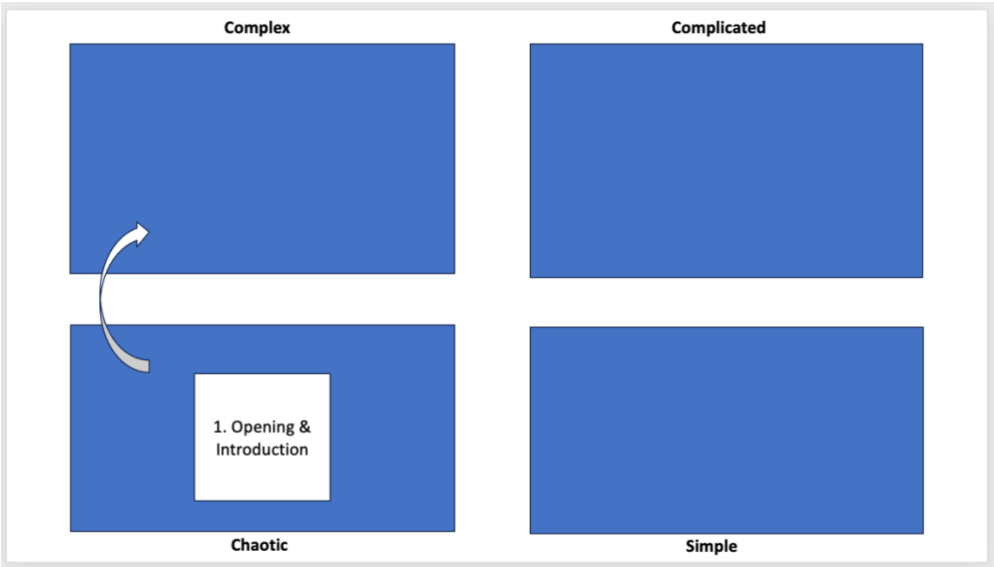
And then, we start with a new Problem Statement and a new product and the cycle gets repeated.



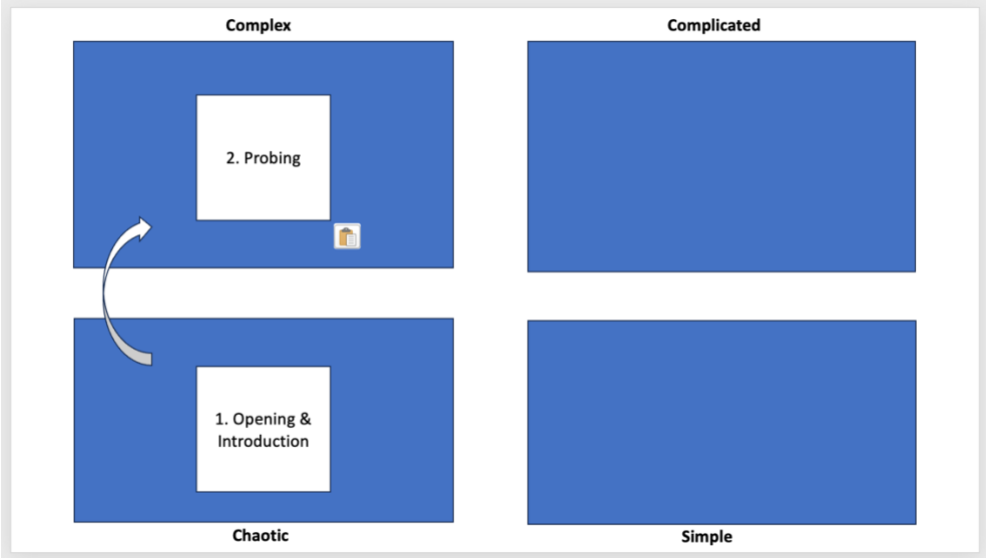
. Cynefin applied to Sales Process

We can also apply the Cynefin Framework on the classical sales process.

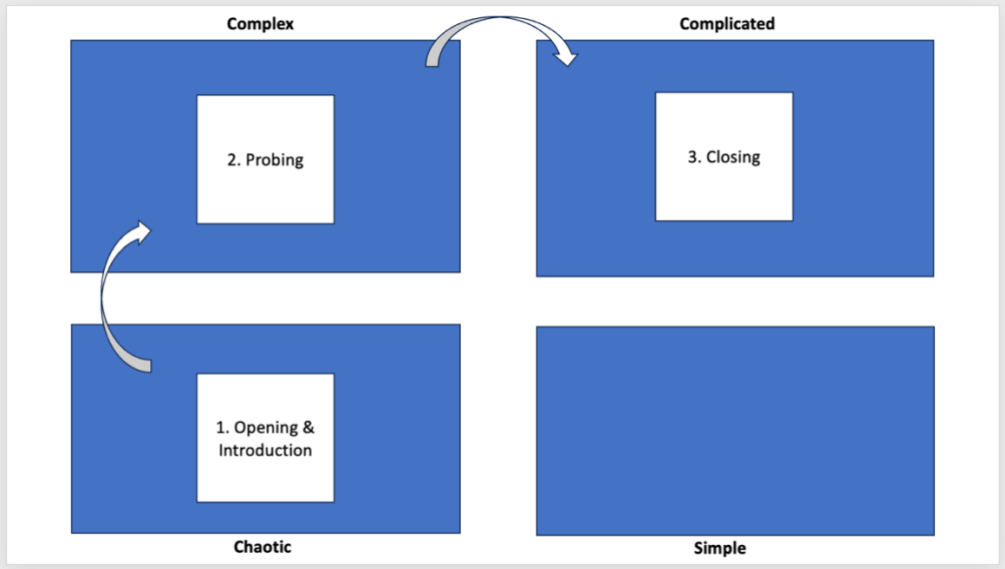
When the sales person visits a customer, the outcome of the visit is not clear in the beginning. We are here in the **Chaotic domain**. To put some structure, the sales person starts with some small talks and then an introduction to his company. He wants to get to the Complex domain as soon as possible. This is why the introductions must be as quick as possible.



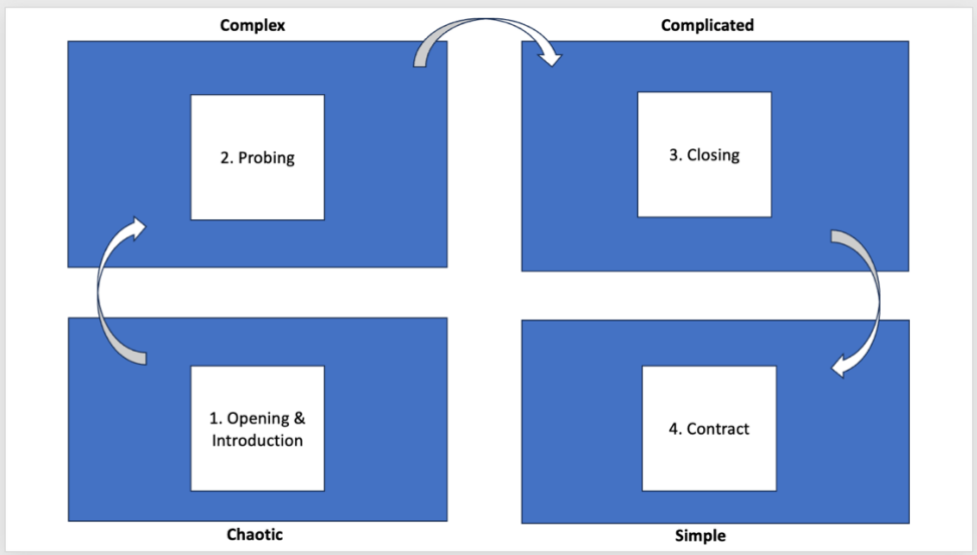
He then starts probing the customer to get a clue on his needs and challenges. Sales person ask many questions and just listens to the customer. He needs to find a pattern in the customer's challenges. We are here in the **Complex domain**. The sales person starts offering some solutions and waits for the customer's replies. In the beginning, he still does not know what he must zero in. He is still probing. At some point, the picture dawns on him, now he can move into the closing stage.



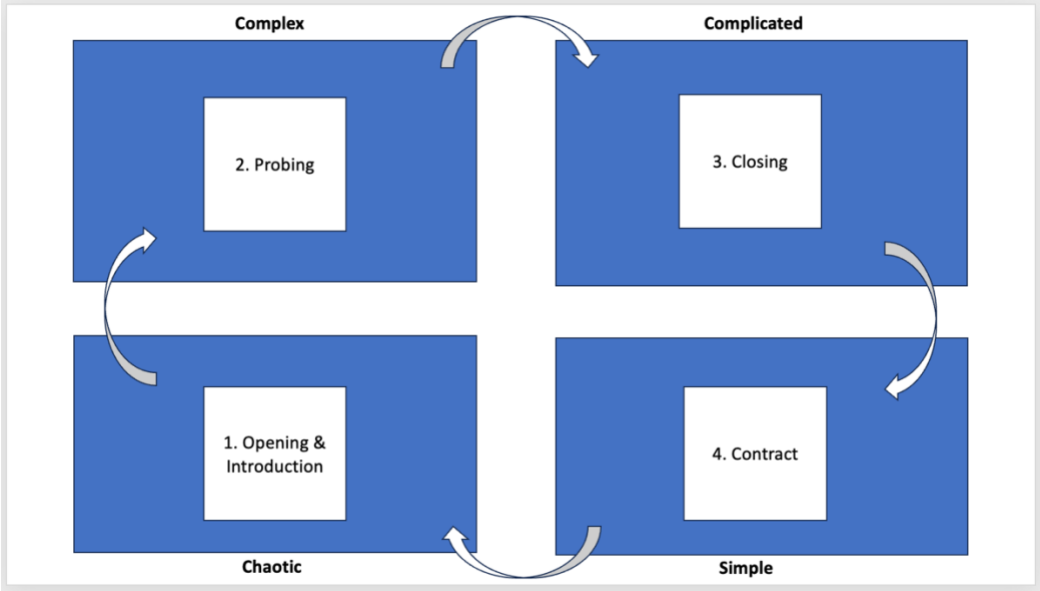
Once the needs of the customer's have been clearly identified, the sales person moves in to make his offer. Here he needs all the skills of a sales person to make the offer – both technical and commercial - and get to the close. Here we are clearly in the **Complicated domain** as this is the domain of sales expertise.



Once the agreement with the customer is reached in the complicated domain, he moves to the contract stage. This is already straight forward as the contracts are usually typical contracts where the task is just to fill in the blanks. Here we have reached the **Simple domain**.



Once the contract is signed, the sales person can move to the next customer, where he, again, starts from the Chaotic domain. And so on.



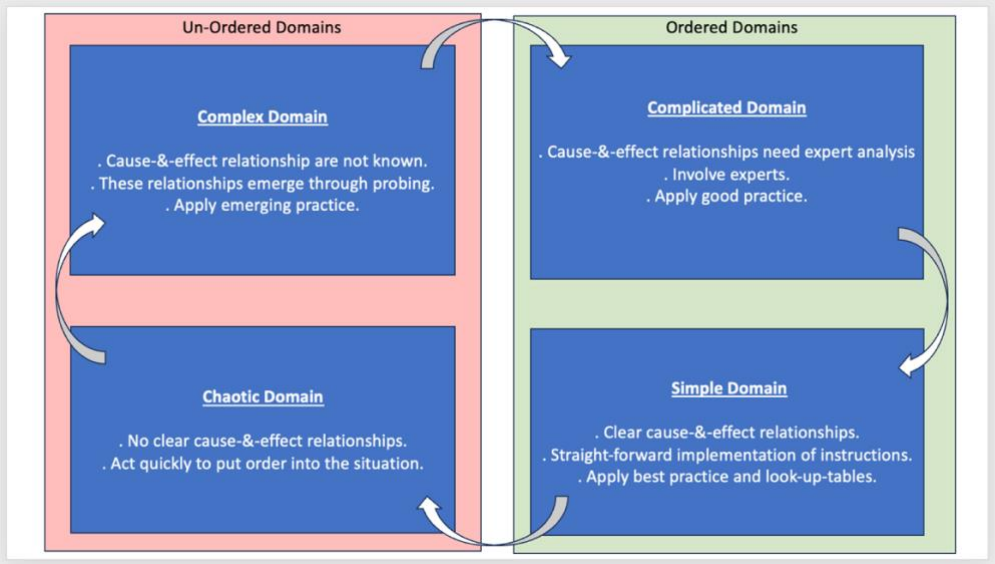
. Cynefin applied to AI

Here we come to the AI part. Actually, I got into the Cynefin Framework as I was searching for places where AI cannot perform well and where the Human Intelligence (HI) is necessary.

I found that the AI excels in the Simple domain where all the cause-&-effect relationships have already been found and the instructions are clear. I found that AI could work well to a good extend in the Complicated domain. Here the Human Intelligence is still very much needed in guiding the AI and validating the work of the AI.

AI works poourly in the Complex domain. At best it can assist in identifying patterns. But it cannot invent and it can not come up with new conceptual solutions. In other words, it cannot guide the probing and experimentation that this domain requires. And AI is completely helpless in the Chaotic domain. Getting out of the Chaotic domain is a purely human excersice.

In short, AI works in the Ordered Domains (the green section in the below picture), and works poorly in the Un-Ordered domains (the red section in the below picture).



Pic. AI works well in the Ordered Domains, and works poorly in the Un-Ordered Domains.

In conclusion, I should conclude with a final note. The risk of the examples above is that we might have tried to force the different examples onto the Cynefin Framework. In reality, it is not that not precise and the analogy do not always match. The purpose of the examples were to draw the attention of the readers to the possible applications of the Cynefin Framework.

Armenology

. Ագռաւ եւ գայլ (the Wolf & the Sheep) – in Memory of April 24

Միսիթար Գոշ (1130–1213)

Գայլը ծերանալով, գնում է ոչխարի հոտի մոտ ու ասում.

— Այժմ ապաշխարող եմ և շատ եմ ձեզ վշտացրել, ուստի ուզում եմ գալ ու ձեր տան ավլողը դառնալ, որպեսզի թողության արժանանամ, պահպանեմ ձեր մանուկներին ուրիշ գայլերից:

Եվ ուրախանալով, ոչխարները շներին ասում են.

— Այլևս մի հալածեք նրան:

Գայլը մնում է այդտեղ, համբերում մինչև մեծանում են գառները, ապա սկսում է հոշոտել և ուտել նրանց: Ի վերջո, շատերը նկատելով այդ, սատկեցնում են նրան:

Առակս այսպիսի խրատ է տալիս, շուտ չհավատալ չարագործին:



Youtube clip of Aesop's similar fable
https://www.youtube.com/watch?v=IyardeElTvM

. Museum of Science & Technology Receives New Artifacts

The following artifacts were gifted to the Museum of Science & Technology.



Pic. Some Engineering Books published in Armenia



Pic. A few editions of the Science & Technology Journal



Pic. Armenia's Product Catalog at ВДНХ, and Catalog of the Jewelry Factory.



Pic. Medals of different Factories and Institutions



Pic. Razdan Radio

. Armenian Equivalents to Foreign Words, 8

Հայոց լեզուն՝ ի տարբերություն, օրինակ, անգլերենի և ռուսերենի, հետևողական պայքար է մղում ինքնամաքրման՝ փորձելով յուրաքանչյուր օտար բառի դիմաց ստեղծել դրա համարժեք հայերեն տարբերակները։

Անի Մակինյան
Հայոց լեզվի և գրականության ամբիոնի ղեկավար
«Շիրակացու ճեմարան»

Օտար բառեր	Հայերեն համարժեքներ
թայմեր	ժամաչափ
թինեյջեր	պատանի, պարմանի
թեզ	դրույթ
լեգիտիմ/լեգալ	օրինական, օրինավոր
խալտուրա	խոտան
կաբել	մալուխ
կալկա	յուղաթուղթ
կիքս	վրիպակ, սխալ

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