

GUIDELINES & TOOLKIT

SECTION **1** 

INTRODUCTION

The background of Digital transformation

A NUMBER OF ECONOMIC AND SOCIAL FORCES ARE DRIVING THE NEED TO BECOME DIGITAL

New technologies have the power to steer human agency and enlarge boundaries reshaping behaviours and reinventing social relationships. That is why Schwab refers to this ongoing digital transformation not only as of the Fourth Industrial Revolution but also as a much broader “*transformation of humankind*” (Schwab, 2016).

Still, many organizations are just embarking on complex digital transformation journeys encompassing all aspects of their business to redefine how they operate.

To face these ongoing changes toward a more digital society, companies need to adapt to an increasingly digital market and exploit the potentialities of emerging technologies.

This adaptation process should lead organizations toward the commonly known Digital Maturity.

MIT Sloan and Deloitte define Digital Maturity as the companies’ ability and will “to systematically prepare to adapt consistently to ongoing digital change” (Kane, et al., 2017).

Digitally Mature company needs to

- i) strategically apply digital technologies to develop new business, to digitalise operations and processes
- ii) face complex challenges that require the knowledge of employees with different functions, that should work together also remotely on a collaborative digital platform
- iii) face future sustainable and social challenges, planning long term strategies to be competitive even in an uncertain future.

Achieving Digital Maturity

IT IS OBSERVED THAT THE ORGANIZATIONS THAT HAVE ALREADY UNDERTAKEN THIS MATURING PROCESS HAVE ADOPTED FIVE KEY PRACTICES

To sum up, it can be stated that digitally maturing business realities invest in new long-term digital strategies focusing on:

- attracting and training digital talents;
- designing a new cross-functional organizational structure;
- investing on providing employees with a deep digitally minded culture;
- innovation;
- the functional and strategic use of technology.

Firstly, it is proved that companies that implement systemic changes in organizing the workforce **fostering cross-functional collaboration and interdisciplinary teamwork as well as the ones that invest in empowering employees with digitally-minded culture** are likely to achieve Digital Maturity sooner than others.

Another typical feature of digitally maturing companies is the adoption of **successful digital strategies** which focus both on technology and on the business core competencies which not only enable organizational change but also improve flexibility and allow companies to adapt to ever-changing environments.

Moreover, the organizations that are moving towards Digital Maturity have shown to be more inclined to experiment and to have the possibility **to scale up their small, practice-based and iterative tests and make them become enterprise-wide initiatives** creating a bigger impact.

In addition, digitally maturing companies are not only able to **attract and retain digital talents but also to let employees improve their digital skills** and make them thrive and grow within the organization.

Finally, it is important for companies to be **willing to invest in the maturing process** which means increasing funding for their digital strategies.

SECTION 2



DIGITAL SCENARIO

Digital Maturity Enabler

TO COMPLETE THIS TRANSITION, ORGANIZATIONS NEED A GUIDE, I.E., A DIGITALLY WISE PERSON WHO IS ABLE TO BE AN INTERPRETER OF THE DIGITAL LANDSCAPE

This figure takes the name of a **Digital Maturity Enabler: a person who, owning specific creative digital skills (DCA)**, is able to extract value in a creative way from what the technological landscape offers, by responding to human needs.

A DMEnabler is a person with either a design, engineering or managerial background who is able **to consciously apply new technologies** being well aware of their potential social and environmental impacts; **share ideas and specific knowledge** within cross-functional teams; a person with a **strong future-oriented mindset** and use foresight tools and methods to create original scenarios.

Hence, the need to up-skill future generations to proactively face the ongoing radical changes and deal with such ever-emerging digital challenges to start moving towards a collective preferable future.

Digital Creativity for Digital Maturity model (DC4DM)

IN THIS REGARD, THEREFORE, INNOVATIVE EDUCATIONAL MODELS MUST BE IMPLEMENTED AND APPLIED

They have to provide upcoming generations with a radically new skill set to enhance their creative abilities enabling them to spot and exploit the viable potentialities of emerging technologies.

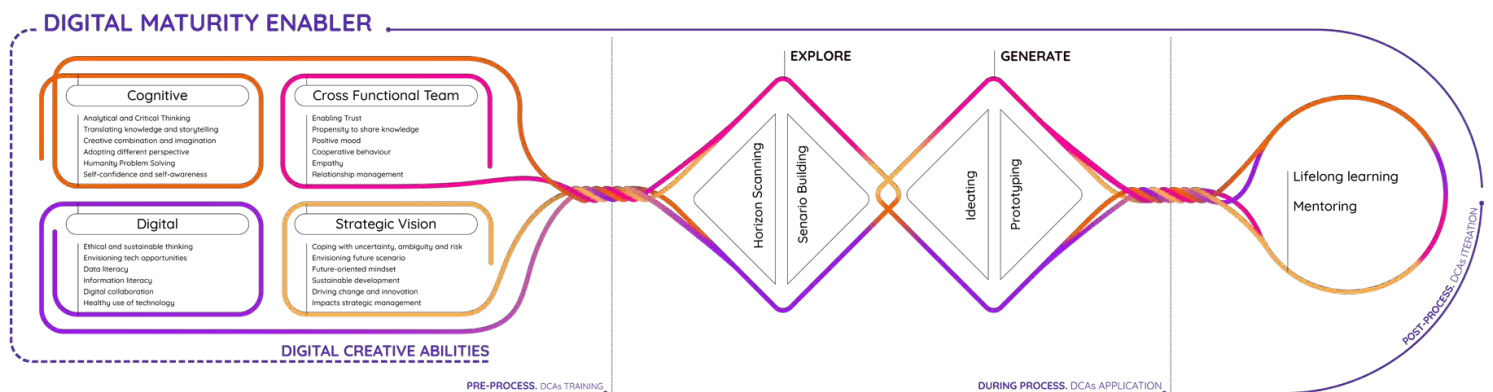
In this extremely complex contemporary scenario, human creativity is notably acknowledged as an essential ability to help people navigate successfully in this digitally enabled world and empower them to strategically unlock the multiple opportunities brought by emerging technologies (Bruno & Canina, 2019).

THIS IS, INDEED, THE GOAL OF THE DIGITAL CREATIVITY FOR DEVELOPING DIGITAL MATURITY FUTURE SKILLS (DC4DM) EUROPEAN PROJECT

The DC4DM model aims to provide the fundamental competencies needed to thrive in a continuously advancing digital landscape and reach **Digital Maturity**. Digital talents have to be prepared to face the diversity of uncertain futures, anticipate possible scenarios, and take full advantage of the innovation capacity of digital technologies.

The model has, therefore, the aim *to enable and empower learners in*

- acquiring competencies and mindset to understand the potentialities of digital technologies and apply them to design digital solutions with a human-centred approach;
- developing individual abilities of creative self-enhancement and a digitally-minded culture, as well as the team's ability to communicate and share knowledge with others with a different background;
- acquiring skills in future and anticipatory thinking, developing a mindset that can generate a long-term strategic vision and help companies face complex challenges by envisioning future scenarios.



DC4DM Model divided in three main areas

THE PROCESS DIMENSION IS CENTRAL TO THE MODEL, WHILE THE OTHER DIMENSIONS PRECEDE AND FOLLOW IT.

In this way, the model is divided into three sequential phases:

Phase 1 - Pre-process: this phase of the model includes the knowledge and skills that are propaedeutic to the process and that cross-functional teams need to go through the process.

Digital Creativity Abilities (DCAs)

Phase 2 – Process: This model phase includes the process dimensions based on a Future design thinking process. It is a divergent and convergent process deconstructed in stages, steps, activities and thinking styles, enabling a strategic application of emerging digital technologies. For each step of the design process, specific digital creative abilities intervene to improve the innovative performances of both individuals and teams during the process. These DCAs are the ones trained in the pre-process area.

Phase 3 – Post-process: in this third phase, the team has finally reached a shared knowledge structure related to equipment and tools, process, goals, other members' skills, expertise and abilities, and appropriate team interactions. The post-process skills will help people iterate and continue to add value to their abilities, the organisation they are part of, and the system as a whole.

The DC4DM model integrates a set of skills and attitudes identified as in line with Digitally Mature companies' needs and key practices and, therefore, relevant for training future digital talents.

THESE FUNDAMENTAL SKILLS CAN BE DEFINED AS DIGITAL CREATIVE ABILITIES (DCAs), WHICH ALLOW INDIVIDUALS TO EXPRESS THEIR FULL CREATIVE POTENTIAL.

DCAs have been identified, integrated, and transformed by analysing and comparing the 4 main competence Frameworks outlined by both companies and policymakers.

These abilities synthesise the three main objectives of the DC4DM model according to which students need to acquire competencies to:

1. ***understand technology's potentialities*** and apply them in relevant digital solutions employing a human-centred design approach;
2. ***work smoothly in a cross-functional team***, being able to communicate effectively with people coming from different fields and ***developing a digitally-minded and creative culture***,
3. ***anticipate possible future scenarios*** to define long-term strategies for identifying the opportunities and handling the risks that digital technologies might generate and tackle complexity and uncertainty.

They comprise not only a broad range of skills (cognitive, social, emotional, etc.) but also disciplinary and procedural knowledge and attitudes and values that guide how knowledge and skills are used to face challenges.

THE DCAs HAVE CLUSTERED IN 4 MAIN DIMENSIONS: COGNITIVE, DIGITAL, CROSS-FUNCTIONAL TEAM, AND STRATEGIC VISION.

COGNITIVE

Creative combination and imagination

DEFINITION
The ability to use imagination to identify opportunities and to combine ideas, concepts and knowledge to create original and valuable discovery and possibilities.

LEARNING OBJECTIVE
Learners can imagine beyond the existing reality connecting and fusing existing concepts to generate novel and original ideas, products, entities and spot opportunities for creating value.



#openess #possibilities #creativity #imagination #fuseideas

Analytical and Critical Thinking

DEFINITION
The ability to analyse and reflect on facts and situations, making critical judgements and understanding biases.

LEARNING OBJECTIVE
Learners can analyse, synthesise, and evaluate information, also recognising irrelevant, preexisting patterns that affect our thinking process.



#reflectivethinking #methodology #prioritizing #objectivity #understanding #recognizerelembienfo

Translating knowledge and storytelling

DEFINITION
The ability to easily convey a specific domain knowledge to people with diverse backgrounds to build a shared understanding.

LEARNING OBJECTIVE
Learners can communicate and share complex information and knowledge in a simple and efficient way, by using metaphor, visualisation and storytelling techniques.




#simplifymessages #visualcommunication #commonvocabulary #methodology #sharing #empathy

Adopting different perspectives

DEFINITION
The ability to observe problems and look at information from different angles, generating hypotheses and ideas from a range of diverse perspectives.

LEARNING OBJECTIVE
Learners can quickly re-adapt their thinking pattern to look differently to well-known ideas and information, with an open and curious attitude, helping new ideas to evolve.



#outofthethinking #adaptation #open-minded #nojudgement #curiosity #lateralthinking #creativity

Humanity Problem Solving

The ability to solve the complex challenges of our century with a strategic approach that consider the environment and the humans and society needs/desires.

LEARNING OBJECTIVE
Learners adopt digital technologies to serve human needs. They work iteratively, continually testing assumptions and prototypes to rapidly create an effective solution to improve and adapt to changing circumstances constantly.




#evolution #balancebetweenhumanandenvironmentneed #prioritizing #reimaging #emotionalintelligence #methodology

Self-confidence and self-awareness

DEFINITION
The ability to believe in one's personal performance and skills, characteristics and keep developing.

LEARNING OBJECTIVE
Learners are aware of their individual strengths and weaknesses, believing that their ability could influence the course of events. They reflect on personal performance and seek feedback from others to continuously improve.




#creativeconfidence #failbutfailfast #practice #trust #motivation #beingperseverant #selfconscious

DIGITAL

Data literacy

DEFINITION
The ability to collect, generate, process, analyse a large amount of complex and interconnected data provides meaningful information to guide informed, optimised and contextually relevant decision-making processes.

LEARNING OBJECTIVE
Learners can create and/or use AI algorithms (e.g., machine learning, neural networks, deep learning) to process and recognise significant patterns that can improve decision-making and drive the formulation of new strategies informed by the capabilities of digital technologies.



#dataanalysis #ethical #humanandsocialbias #humanintheoop

Information literacy

DEFINITION
The ability to effectively transform data into usable information.

LEARNING OBJECTIVE
Learners are aware of the reliable sources from which knowledge and information can be collected and are able to identify the relevant information and facts needed to draw a conclusion.



#KISSprinciple #MAYAprinciple #datasythesis #criticalthinking

Envisioning tech opportunities

DEFINITION
The ability to observe digital technologies' application and understand their potentialities in terms of social and cultural opportunities to innovate in a sustainable digital scenario.

LEARNING OBJECTIVE
Learners are continuously updated on technological developments, identifying opportunities to deploy new technologies, building business cases, and explaining their benefits.



#anticipate #howhangingfruits #digitalcrosspollinisation #technologicalwatch

DIGITAL

Ethical and sustainable thinking

DEFINITION
The ability to understand and assess the ethical and sustainable implications of digital ideas, opportunities and projects.

LEARNING OBJECTIVE
Learners can act responsibly, being aware of emerging digital technology's positive or negative implications to develop responsible and ethical digital innovation.




#responsibility #trustworthiness #knowledgeofimpacts #transparency

DIGITAL

Digital collaboration

DEFINITION
The ability to communicate and collaborate effectively through digital channels.

LEARNING OBJECTIVE
Learners can adopt the suitable digital channels and tools to communicate, share knowledge and co-create within online environment also from distance.




#agilemethodology #remoteworking #motivation#coaching #trust#guarantee

DIGITAL

Healthy use of technology

DEFINITION
The ability to understand the benefits and harms of technology on one's mental and physical health and to use technology use while prioritizing health and well-being.

LEARNING OBJECTIVE
Learners actively self-regulate their use of technology in a healthy way and know which activities can restore them providing daily energy for their own benefit.



#mentalburnout #digitaldetox #coaching #differentperceptionsofhealthy #differenthealthimpact


CROSS-FUNCTIONAL TEAM

CROSS-FUNCTIONAL TEAM

Enabling trust

DEFINITION
The ability to understand another's behaviour, and be positively inclined to other's competencies, knowledge, skills, actions. Motivation, transparency and group dynamics are elements that regulate both the propensity and the perceived trust.

LEARNING OBJECTIVE
Learners can create a safe team environment, building psychological safety among members through reliability, honesty, and genuine concern for the needs and wishes of others. They develop a propensity to interact, engage and participate with each other improving team creative performances.




#transparency #recognizedskills #respect #honesty #sharinggoal

CROSS-FUNCTIONAL TEAM

Propensity to share knowledge

DEFINITION
The ability to share knowledge and ideas with others, fighting blocks and understanding the value and the importance of individual contributions for completing complex tasks.

LEARNING OBJECTIVE
Learners are willing, confident and active in sharing and incorporating their individual knowledge into team one's to solve problems and complete tasks for the related project. Members are aware that their individual knowledge results in collective knowledge as output.




#sharing #collective #generous #tobeopenminded

CROSS-FUNCTIONAL TEAM

Positive mood

DEFINITION
The ability to keep a positive attitude and to experience and display positive emotions, feelings, and expressions, including optimism, pride, enthusiasm, energy, and joy by pursuing a challenging goal.

LEARNING OBJECTIVE
Learners can exhibit an awareness of their own moods, identify and explain their emotions and reflect on how their feelings influence their own and other actions and decisions.



#enthusiasm #playfulness #emotionalintelligence #adaptability #curiosity

CROSS-FUNCTIONAL TEAM

Cooperative behaviour

DEFINITION
The ability to enjoy and seek working with others, both peers and experts, involving team members in decisions, listen to other ideas and looking for others' feedback, for the construction and co-creation of knowledge.

LEARNING OBJECTIVE
Learners accept heterogeneity and cultural differences within teams, cultivating tolerance to one another and a sense of community. They build bonds and care for others' actions and ideas, acquire the awareness of interpersonal differences and commonalities, be open to others' personalities and ideas, identifying themselves as a functional unit.



#listen #trust #tolerance #coordination #respect #reciprocity

CROSS-FUNCTIONAL TEAM

Empathy

DEFINITION
The ability to be aware of, be sensitive to, and be supportive of one's own and other's feelings, needs, and concerns.

LEARNING OBJECTIVE
Learners are sensitive to and respect others' perspectives and emotions. They understand how different personalities feel and react in various circumstances and can regulate and respond accordingly to make them feel better.



#feelings #understanding #perceptiveness #context/circumstances

CROSS-FUNCTIONAL TEAM

Relationship management

DEFINITION
The ability to skillfully manage one's relationships, online and offline, through cooperation, conflict management, and persuasion, adopting behaviours that convey a sense of comfort and appreciation.

LEARNING OBJECTIVE
Learners can engage affectively, communicate and negotiate with stakeholders in intercultural and interdisciplinary dialogue. Individuals cultivate tolerance to one another and teamwork towards building and growing positive communities.




#conflictmanagement #inclusion #coordinationskills #communicate #respect

STRATEGIC VISION

Coping with uncertainty, ambiguity and risk

DEFINITION
The ability to operate effectively and make decisions dealing with uncertainty and ambiguity, taking risks in the hope of great achievement.

LEARNING OBJECTIVE
Learners can create and make decisions in situations with high uncertainty, when the information available is partial or ambiguous, and are open to change their strategy when things do not go according to plan.



#Curiosity #Managing #Attempts #Foresee #DesignForFailure #Storytelling

Future-oriented mindset

DEFINITION
The ability to orient thinking and actions on the future.

LEARNING OBJECTIVE
Learner can imagine the future and base on it, they make choices and decisions in terms of actions, strategy and resources deployment. They are well aware that today decision will have an impact on the imagined future.



#Imagine #Develop #UpdateKnowledge #Sustainability #Ethical #Plan #Challenge

Sustainable development

DEFINITION
The ability to understanding the value of digital technologies to develop sustainable long-term social, cultural and economic innovation (SDG).

LEARNING OBJECTIVE
Learners can adopt digital technologies to enable sustainable development goal, digitalizing processes, toward an inclusive, better future for all.



#Capacity #Empowerment #EnlargedPerspective #Loyalty #SustainabilityLiteracy

Driving change and innovation

DEFINITION
The ability to see opportunities and persevere for continuous improvement through innovation generates in others the willingness or desire to emulate it.

LEARNING OBJECTIVE
Learners can recognise the potential an idea has for creating value and identify suitable ways of making the most out of it, inspiring and arousing enthusiasm among team members and stakeholders.




#Leadership #Enthusiasm #Positivity #Resilience #StrategicPerspective

Impact strategic management

DEFINITION
The ability to plan design actions to guide tech application and scenario evolution.

LEARNING OBJECTIVE
Learners can analyse the future implications of digital technologies on humans and define design actions to react to their evolution path.




#OpenInnovation #Agility #Crowdsourcing #ThinkingAhead #Adaptability #StepByStepApproach #InvolvingStakeholders

Envisioning future scenario

DEFINITION
The ability to visualize, develop and bring to life a future scenario, envision new tech applications and turning a vision into action.

LEARNING OBJECTIVE
Learners can analyse driving forces using future thinking to map possible alternative future scenarios, inspiring and guiding people to realize that vision.



#Alternatives #StrategicOptions #MixingData #UnlockPossibilities #Conviction #Compromise #Observation #Archetypes

DC4DM Drivers

DRIVERS ARE THE FOUNDATIONS FOR DIGITAL MATURITY ENABLERS' TRAINING PROCESS.

The creative abilities related to ethical, sustainable and future thinking turn out to be essential to steering the ongoing digital transformation. Thus, Digital Maturity Enablers should not only be aware of the importance of such abilities but should also consider them as **actual "drivers" of change**.

From this consideration, the DC4DM model groups such DCAs into the so-called Drivers, defined as clusters of creative abilities that enable learners to gain awareness on paramount topics such as **Digital Ethics, Sustainability, and Tech Foresight also Sense-giving, Collaboration and Complexity**.

Training the DCAs included in these Drivers would enable learners to use efficiently and responsibly emerging technologies and make them fully aware professionals.

The following list presents the six DRIVERS with the respective DCAs:

Driver #1: Sustainability

Learning Objective: A Digital Maturity Enabler is able to design the future through/with digital technology aiming at improving and guaranteeing the well-being of the planet and its communities, among which the human ones, to see and think from the perspective of other organisms (beyond human), balancing resources from environmental, economic, technological, socio-cultural and political level.

DCAs: “Humanity Problem Solving”, “Impact Strategic Management”, “Ethical and sustainable thinking”, “Sustainable development”, “Healthy use of technology” and “Positive Mood”

Driver #2: Tech Foresight

Learning Objective: A Digital Maturity Enabler is able to be continuously updated on technological development, to understand the feasible and viable opportunities from different angles that they could open in the future as well as their implications, to envision new scenario of application out of them.

DCAs: “Envisioning tech opportunities”, “Envisioning future scenario”, “Impact strategic management”, “Adopting different perspectives” and “Future oriented mindset”

Driver #3: Ethics

Learning Objective: A Digital Maturity Enabler is able to identify and understand ethical challenges and implications of digital innovation, to drive digital strategy, to adopt an ethical attitude/behaviour during the design and implementation process.

DCAs: Empathy”, “Relationship management”, “Ethical and sustainable thinking”, “Future-oriented mindset” and “Healthy use of technology”

Driver #4: Sense-giving

Learning Objective: A Digital Maturity Enabler is able to create or extract knowledge from a large amount of digital contents, to select reliable sources, possibly from different domains, to process, analyse, interpret information in order to build a 360° view of the world and allow them to think outside the box to define the design objective.

DCAs: “Data Literacy”, “Information Literacy”, “Adopting different perspectives”, “Create combination and imagination” and “Analytical and critical thinking”

Driver #5: Collaboration

Learning Objective: A Digital Maturity Enabler is able to understand the dynamics of collaboration especially in a digital context, to recognize their own abilities and potentials, to develop the mindset to share knowledge (= simplify language) and build trust.

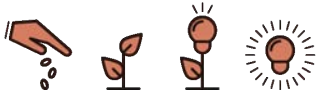
DCAs: “Self-confidence and self-awareness”, “Digital collaboration” “Cooperative behaviour”, “Propensity to share knowledge”, “Translating knowledge and storytelling” and “Enabling trust”

Driver #6: Complexity

Learning Objective: A Digital Maturity Enabler is able to cope with the complexity of digital challenges and the unexpected turn of events, to dialogue with different stakeholders despite different perspectives and cultural background, to manage the difference between the vision and digital possibilities in reality.

DCAs: “Driving change and innovation”, “Translating knowledge and storytelling”, “Coping with uncertainty, ambiguity and risk”, “Adopting different perspectives”, “Cooperative behaviour” and “Analytical and critical thinking”.

SECTION 3



PROCESS

DESIGN FUTURES PROCESS

TO TACKLE THE CONTEMPORARY EVER-EMERGING DIGITAL CHALLENGES, IT IS NECESSARY TO ENVISION NEW FUTURE SCENARIOS REFLECTING ON THE POSSIBLE APPLICATIONS OF DIGITAL TECHNOLOGIES AS WELL AS ANTICIPATING THE POTENTIAL IMPLICATIONS THEY MIGHT HAVE ON THE SOCIETAL, ENVIRONMENTAL, ECONOMIC AND POLITICAL LEVELS.

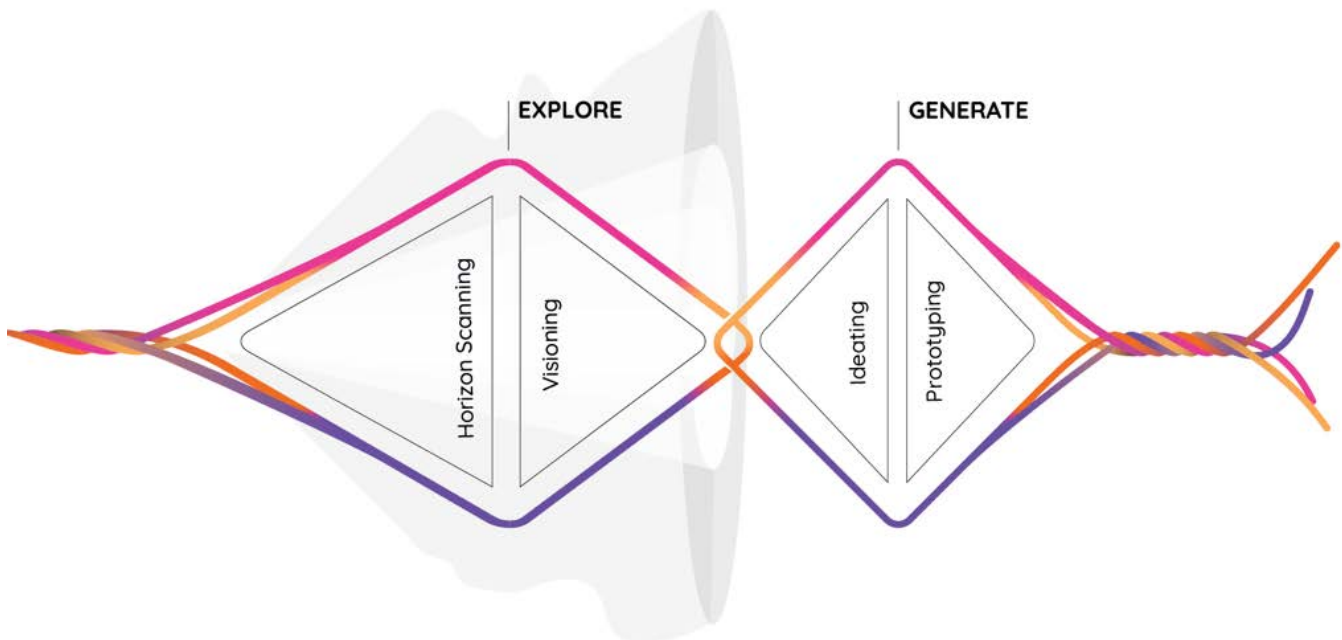
Therefore, a traditional Design Thinking process can no longer be considered suitable for a forward-looking and innovative approach in the DC4DM is revised to meet the need to manage the future of digital technologies (Canina et al. 2021).

The DC4DM model adopts own **Design Futures process that integrates Futures Thinking (FT) and Design Thinking methods**. Thus, on the one hand, the Futures Thinking mindset helps designers consider the multiple possibilities and define a preferable future, on the other hand, Design Thinking can help provide valuable and concrete ideas to start moving towards the scenario.

Moreover, ***FT and DT share another key feature: both are participatory, human-centred disciplines.***

The two processes have a similar approach based on succeeding convergent and divergent phases. Such configuration of the processes allows the integration of DF tools and approaches in the DT to render it a futures-ready method.

As shown below, **the first diamond in the process, overlying the Voros cone, dedicated to the exploration phase now includes the activities of horizon scanning, visioning and scenario generation.**



These activities identify a future preferred scenario, and after having explored and having become aware of the multiple technologies available, it is easier to embark on complex projects in the digital realm.

Within the first phase, **Explore, futures thinking employs several tools to broaden the scope of DT, both expanding the timeframe and the range of possibilities** in which it operates.

Among the FT methods that contribute to expanding DT reach in the future, a primary step is horizon scanning. ***Horizon scanning is the process of identifying significant changes.*** When undertaking horizon scanning, the aim is to identify and understand those phenomena or aspects of the world, or future trends, that are most relevant to decision making, called signals. In particular, the focus is on weak signals refers to the early signs of possible but not confirmed changes that may later become more significant indicators of critical forces for development, threats, and technical innovation.

DC4DM TOOLKIT

It is in this context that arises the need for an operational toolkit to systematize the existing resources that might be useful to provide people with the essential DCAs included in the Drivers as well as to train and enhance such skillset and make people thrive in the contemporary ongoing digital transformation. In order to train all the DCAs belonging to a driver as well as to achieve the driver's learning objective successfully, it is necessary to integrate existing tools with other resources to be designed from scratch or taken from other fields of application.

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