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MODELING INNOVATIVE PRODUCTS THROUGH DESIGN THINKING

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ABSTRACT

"Design thinking" (DT) is an innovative concept for making and implementing new business solutions (products, services, processes), contributing to an increase in their quality according to the expectations and requirements of their users. His methodology involves thorough research and understanding of stakeholders, as well as qualitative changes to the outcome with rapid implementation of corrective actions.

"Design thinking" is also a modern tool for achieving innovation through creative co-creation of the final solution by working in teams together with customers. Because of this, this methodology is increasingly used in making management decisions of a different nature, especially in product management – the area in which the goal is to create quality product innovations.

In connection with the practical interpretation of the DT methodology in product management, in making operational management decisions related to innovation and modelling of innovative products, the authors also created a short-term training course program for specialists in the field of standardization and quality management, members on "Club 9000".

The purpose of the training is to present the methodology of DT, its algorithm and the possibilities of its use as an innovative tool in the process of creating new products while minimizing risk. At the same time, it is aimed to support through interactive training the building of practical skills for work, using tools from the specially created Manual for the application of DT in modelling innovative products in a specific sector (Woodworking and furniture industry).

Key words: design thinking, innovative products, product management, innovation, innovative programs, training.

INTRODUCTION

"Design thinking" (DT) is an innovative concept for creating and implementing new business solutions related to products, services, and processes, thereby contributing to increasing their quality and keeping it in line with the demands and expectations of their users. His methodology involves thorough research and understanding of stakeholders, as well as qualitative changes to the outcome with rapid implementation of corrective actions. In general, DT demonstrates how, through process design and the release of creativity, unexpected innovations are generated in various areas of business, especially in creating products or their improvement to modernize, automate, digitalize, decarbonize, and a number of other new market requirements. In this sense, the contribution of DT to modern society has the opportunity to acquire immense scales, combined with modern technologies and discoveries in several revolutionary developing industries at the moment, such as artificial intelligence, space and biotechnologies, generics, etc.

In this article, fundamental explanations and analysis of four popular decision-making models in the specialized literature and in product management, which include elements of DT, are made. These models are: Double Diamond, proposed by the Design Council; "3-I's" model – human-centred by IDEO (Human-Centered Design of 3-I's); The 5-level model of "Design

Thinking" developed by Stanford "d.school" (5 Step Design Thinking Model) and the model "Evolution 6²" (Evolution 6²), developed by Katya Chimel. Brief characteristics of the mentioned models are described in order to better understand how and where they are applied.

The presentation also includes a useful sample of popular DT methodological tools selected by the authors according to their purpose for each step in the process. Systematized and presented in a table, they can serve as a direct selection when applying the process in real business conditions to create product innovations and not only.

As a practical result, a curriculum of a short-term course for specialists in the field of standardization and quality management will reveal to them the methodology of the DT process, its algorithm and the possibilities of using it as an innovative tool in the process of creating products with the minimization of risk in their acceptance by consumers.

Innovation tools with DT elements

Business modelling is a modern innovation tool that transforms the nature of business development, planning, and the overall approach to how business is run. It enables managers to create their own hypotheses and then test them to find the most appropriate solution for their company's goals. Thoughtful, modern business models create good communication between different units and stakeholders, determining what kind of value the organization wants for its customers and employees. Innovative business models in symbiosis with business strategies help establish boundaries for development and opportunities for large-scale practical value. Such a concept is fundamental regarding the overall presentation of business organizations and directing all activities in them to their main goals and tasks, including the creation of innovative products.

Innovation tools accessible to a wider audience have been created and incorporated into several new business process models with a corresponding set of similar design tools borrowed from the DT process methodology. Their main goal is to visualize, accelerate and improve creative processes in organizations to generate innovation. At first, they are all considered operations of the same nature, only roughly suggesting what the overall process will look like. Patterns emerge from design methodologies with the idea of changing the traditional way people work, as well as leading that process to more effective product innovations.

Each of the models follows this sequence while simultaneously providing different techniques and tools for using different elements of the DT itself. Visual perception is known to play a leading role in the DT process. Therefore, in describing the presented models, we emphasize the importance of graphic representation in the process. Visualizing different aspects and thoughts on a project contributes to expanding the space around the problem at hand, and the result is additional space for new solutions and product innovations.

In the following exposition, we present the more popular business models with elements of the DT process that are successfully used in practice during creative sessions to create innovative products.

Double Diamond Pattern

The Design Council, primarily focused on using design as a "strategic tool to address major social challenges" (*www.designcouncil.org.uk*), is a charity that developed the Double Diamond Model. It is a kind of visual map that supports the design process. It is divided into four phases: "Discovery" (Discovery), "Define" (Define), "Development" (Development) and "Delivery" (Delivery). The model emphasizes the alternation of convergent and divergent thinking during the different phases of the creative process (Fig.1). Its name comes from its double-diamond-

like graphic representation and the first letters of its phase names. The model shows that during the creative process, convergent thinking is necessary for two reasons: to confirm the real problem and to define a solution. The model itself allows for iteration to refine, develop and test ideas multiple times.

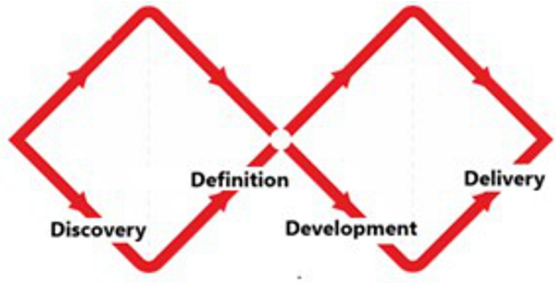

Figure 1: British Design Council Double Diamond. A visual representation of the design and innovation process – the British Design World Double Diamond (www.designcouncil.org.uk)

The "Double Diamond" model offers four phases, thanks to which the creative process as a whole is stimulated and managed until an innovative solution is generated. The first stage of the model is "Discovery" and involves the beginning of the project. Those who use it are offered the opportunity to notice the new things around them, to try to look at the world in a different way than the conventional way and to accumulate insights. In the next "Define" phase, it is necessary for the business project participants to look more critically at the opportunities that have opened up and the emerging insights that have been gathered in the "Discover" phase. At this stage, it is essential to consider and analyze the collected information, understand what is really important and what is not, what is more likely to be implemented and what is not, and prioritize needs and ideas. The goal here is to develop clear and concise information that outlines the main business and design challenge. The "Development" phase (also found: "Development") covers the time to further develop the "winning" idea through concept creation, prototyping, and testing, accompanied by some iteration. In this phase, participants in the process encounter unexpected errors and experiment anew with the application of new concepts until they are able to clarify and improve their ideas. The final phase, "Delivery" (also known as "Proposal"), is a summary of the entire process aimed at those for whom the result is intended and who need to select an adequate project. In this stage, it is expected that the final solution (process, product or service) will be completed, produced and realized in the market.

"3-I's" – IDEO's human-centred model

In 2001, IDEO announced its newly created DT model, with the help of which a creative process can be formed in three phases: "Inspiration" (Inspiration), "Ideation" (Ideation) and "Realization" (Implementation). The creator company is a global consulting and design organization (California), founded in 1991. and one of the first to launch the use of Design Thinking methodology in processes to create new technologies, products, services, and processes in virtual environments with a directed digital experience. IDEO uses Human-Centered Design as a creative approach to solving unusual problems (Fig. 2).

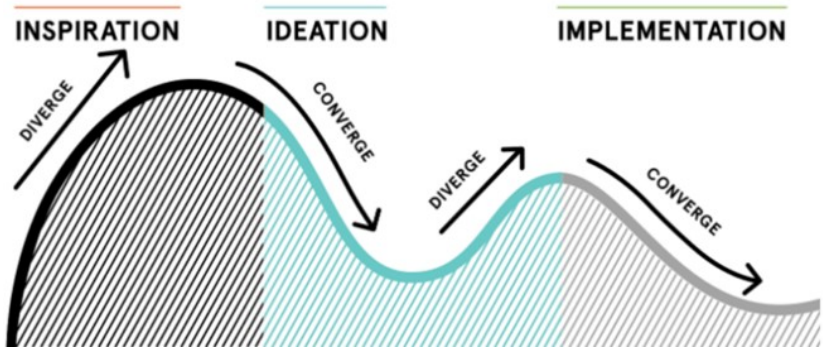

Figure 2: Systematic innovation through IDEO 's 3 – I 's model : Inspiration, Ideation, Implementation (www.designthinking.ideo.com)

In the first phase of "Inspiration", a design challenge is framed, a project plan is formulated, the team is formed, and the necessary tools and techniques are selected for action – ways to collect data and to execute the stages. Depending on the goals set for the project, the work techniques themselves may change: observation, interview, deepening ("immersion"), incubation, etc.

The second phase is of the "Idea". It is intended to analyze all collected data from the first phase. Here, the possibilities for real solutions and feasible prototypes of the selected product ideas are determined. Needed: a narrower approach to all accumulated information, building, refining and iterating until a final market-ready solution is prepared. The tools that can be used in this phase are very different and largely borrowed from DT, such as creating a strategy "development framework", "completing an insight statement" and "brainstorming", idea selection, rapid prototyping, "gathering feedback", etc. (*www.designthinking.ideo.com*).

The "Implementation" phase is after the two preparation and implementation phases and represents the introduction of the new product solutions (for example) to the market. It includes all kinds of practical testing and implementation of the final idea in a real environment, presenting the new idea to potential customers or investors, creating partnerships, and evaluating and monitoring user feedback.

The Evolution 6² model

The Evolution 6² model was developed by Katya Chimel between 2012 and 2015. The creative process is divided into six phases: "Emergence", "Empathy", "Experimentation", "Elaboration", "Exposition", and "Extension". Each of the phases contains two sub-stages of divergent and convergent thinking, and 36 tools are provided for their implementation. Evolution 6² is a version of the design thinking model but created in a more adaptive and flexible framework so that it can be easily and quickly implemented in any type of business and organization without the intervention of a facilitator. The model simulates the processes for transformation and creation of innovations according to the goals and tasks of the respective organizations (Fig. 3).

Figure 3: Model Evolution 6² with elements of "Design Thinking" created by Katya Chimel (www.mindshake.pt)

It was originally created as a model entirely for creative processes, but during the research for its development, it was changed to a DT model. So by following these characteristics of creative thinking – "flexibility, originality and fluidity" (*Drucker, P., 1984*), thinking in general can be directed so that, at a cognitive level, its efficiency is increased. It is known that DT is described precisely as a cognitive activity, using the techniques and approach of designers to connect people's needs with technological feasibility and business strategies. A difference between the two types of thinking, creative and design thinking, is that the former is a broader concept of achieving something creatively new, while DT is a more practically oriented and applied concept that refers to the transformation of needs into opportunities. Creative thinking is a kind of starting point for an innovation process, and DT is more of an applied approach.

The Evolution 6² model follows this understanding of the mentioned two types of the thinking. Therefore, it is designed according to these principles, and a more grounded study of the innovation process is included. That is, Evolution 6² is based on five postulates: the design methodology, creativity research, business viability, necessity for people and technological feasibility (*www.mindshake.pt*). As a consequence of this approach, the model becomes more flexible and applicable in different areas, such as the development of new services or products, methodology lessons and research projects, coaching sessions, various seminars, and many others.

In the first phase of the model – "Emergence", the project opportunity is discovered and the challenge is identified. In the second stage of "Empathy", one gets to know the users in depth. It is followed by the "Experiment" phase, when new ideas are generated, the best ones are screened, and the concepts are developed. In the "Development" stage, work is done on the material and meaningful expression of the results of the selected concepts. Quickly are created product prototypes, service implementation plans or proof of concept. Next comes the fifth phase, "Exposition", where the focus is on the correct presentation of the innovations in order to move to the last stage in the Evolution 6² model – "Extension", in which, with the help of the tools used there, the subsequent development of those selected in the previous ones is monitored and improved phase decisions.

The model also developed supporting tools, such as "Mindshake Design Thinking Cards" and "Printable templates", which are 78 non-game-like cards that guide the creative process. They are supported by a further 36 in number, comprising 36 techniques with example photos of how to perform them, accompanied by detailed instructions for using the entire set of cards.

Model of d.school

Stanford University's Department of Design – d.school is developing a five-step "Design Thinking" Model that enables the application of design-related methodologies to any problem in any field. The sequence of its five phases (Fig.4) shows the basic logic behind uncovering the needs and latent needs of the customer, with multiple sequences allowed and even encouraged based on the specific organizational context, actual customer experience and existing resources over time. The process uses tools from the world of design and focuses on human behaviour. In this way, it collects the necessary data, directing it to the creation of new products and services.

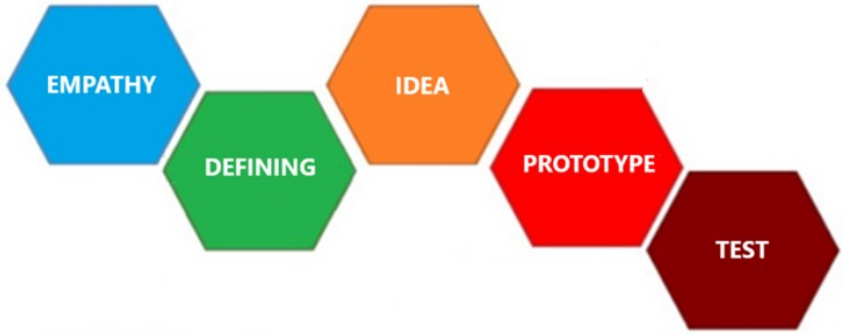

Figure 4: Phases of the DT process modelled by d.school, Stanford. Interpretation of David Terrar, published by Benedek and Neary in the series "Visual Learning..." (Benedek, A., Nyíri, K., 2019) (author's translation)

The DT methodology allows for easier adaptation of the methodology to specific needs, such as creating innovative products. Various elements such as purpose and scope, the process model and the involved constructs of the methods are recommended for the formal description of the methods (*Blom, S., Bub, U., Offermann, P., 2010*). Typically, a method has specific verifiable utility claims based on its objectives (*Gregor, S., Jones, D, 2007*).

Regarding utility, it is argued that DT can achieve its goal more successfully than other innovation techniques. The implementation of the approach requires the operationalization of these success criteria so that DT can lead to solutions that will be more widely accepted by the relevant stakeholders. For this purpose, it is necessary to focus on the process model and the structures involved in it.

Summary

The DT models presented in this article are similar because their main stages (regardless of their number) are similar and largely overlap. All models emphasize user focus, creativity and interactiveness in the process of creating innovative products and services. Depending on its specific needs, a business organization can choose one model or a combination of models.

One of the most popular models in theory and practice is that of the D-School. In the specialized literature, there are different interpretations of this model, which are mainly expressed in changing the number of phases for its implementation. We focus on the D-School's

five-circle model, as the most widely used, and detail its individual phases for generating innovative solutions.

The DT process methodology based on the d.school model

The methodology of the DT process, according to the d.school model, includes: 1) Extensive research with the manifestation of empathy to discover hidden needs of users, which the new product (result) needs to satisfy; 2) Determination of the framework possibilities and the scope of the problem to be solved by considering and defining the root causes of its occurrence; 3) Team creation of multiple ideas to solve the problem and satisfy the identified needs by visualizing and projecting them in the future until selecting and refining the "winning" idea; 4) Preparation of a rapid prototype of the innovative product (the new solution) with the possibility of flexible adjustments; 5) Testing the finished result directly with the interested parties under constant supervision by the team, and reflecting the client's impressions.

If necessary, some of the steps in the process are repeated until the final product (solution) is fully and thoroughly refined. The process ends with documenting the results, the purpose of which is to evaluate each of the actions performed and to draw lessons from the mistakes made.

Design Thinking Process Tools

Each operational action in the implementation of the DT process is determined by a specific tool, which, in its own way, contributes to the achievement of innovation. The selection and interpretation of each of the tools described in Table 1 is done by the mediator of the design session to generate a new solution according to the DT methodology. It determines exactly which tool to put into action according to its experience, the situation, the participants and the end goal. Each of the steps is based on reflection and creativity, combined with the perception of new information and even learning, which are vital to the success of any experiment with the DT process. In this regard, creativity has become an integral part of the work of mediators, and we accept that the tools they implement in their work are not only for a separate phase of the process, but are universal and interchangeable components. In the table below, we have selected just a few of the most commonly used tools in DT that we find easier to implement, most of which are an abridged sample of the DT Toolbox, which is a kind of "mastery guide to the most popular and valuable methods of innovation" (Lewrick, M., Link, P., 2020).

Table 1: Design Thinking Tools for Purpose (Lewrick, M., Link, P., 2020).

Kind	*A tool*	*Characteristics*
1	**Tools in the pre-warm-up phase**	
	"***Clap Game"***	And it is used to generate a positive mood.
	"***Bingo"***	A suitable tool for better getting to know the participants among themselves in a fun and fast way.
	"***Stop and Go"***	To overcome social obstacles. For increasing concentration and for fun.
	"***30 rounds"***	To encourage participants to act creatively and confidently. To eliminate the "blockade of the white sheet" (the uncertainty as to whether the task is correctly performed). To direct the focus on the content, not on the vision or the technique of execution.
	"Ninja"	To distract participants so they can refocus later. It's fun, but requires quick thinking and body control.
	"***Marshmallow challenge"*** ("*Marshmallow Challenge* ")	To encourage participants to quickly put their ideas into practice, as well as to promote teamwork.

Kind	*A tool*	*Characteristics*
2	**Tools for understanding the problem**	
	"***5W+H* Questions**"	To fully understand the problem and find accurate interview questions.
	"***Ask 5 times***"	To understand the problem in depth, looking for its root cause.
	"Problem Statement"	To define consistency in stating the key issue and covering it in simple sentences.
	"Design Principles"	To determine the guidelines that will form the framework for the team during the execution of the thought project.
	"Empathy Interview" ***"Journey Map"***	To look at the problem from the user's point of view and to build empathy for it. Variation there is also *"In-Depth Interview with Question Card"*.
	"Research Interview"	To learn more about the consumer before he thinks about a new product or service, that is, his latent, unconscious needs are explored.
	"Jobs that need to be done" *("Works to be done" – WTBD)*	To focus the solution of the problem on things that add value to the customer. Ones that help him complete his tasks and feel good while doing it.
	"Extreme Users/Lead Users"	To find new, innovative ideas and user needs unknown to the average user.
	"Stakeholder Map"	To form a general visual overview of all interested parties who have a claim or interest in the problem and the potential solution (product, service).
	"Emotional Response Cards"	To learn more about user feelings when interacting with the product and to get more accurate results from interviews and insights.
3	**Monitoring tools**	
	"***The AEIOU Framework***" (Activities Environment Interaction Objects User)	It is used in field observations and as a technique to visualize new insights, to learn more about the problem, the user, their environment and activities, interactions and objects in it.
	"Empathy Map"	For a better understanding of the user, to perceive his feelings and empathize with his actions, with the possibility of statistically documenting the information.
	"Person/User Profile", ***"Freestyle Persona"*** and ***"Prospective User"***	To learn more about the user and the possible solution for him, his motivation, expectations, dreams, values, income, hobbies, family occupation, etc.
	"Customer Journey Map"	To "walk in the customer's shoes" and understand in great detail what they experience when they interact with the company, product or service in question.
	"Analysis Question Builder"	To initiate insights from big data analysis that are useful in different phases of DT, it includes supporting tools from those to understand the problem.
	"Peers watching peers" (Peers watching peers – P W P)	For "eye level" understanding, like between peers or in a "natural" and imperceptible way, it is clarified what actually happens and how exactly the process "lives" in the real world. Convenient when interviews are not possible and when it is necessary to expand information about the problem.
	"Trend Analysis" –	To recognize trends at an early stage and integrate them into the problem definition and to find a solution. Its purpose is to identify and quantify trends, opportunities and risks and to derive options for action.
4	**Point of view tools**	
	"Context Mapping" *("Context Map")*	To better discover the picture of the particular situation clarified by information with additional context.
	" Defining Success"	To support the team throughout the design cycle, aligning what success might look like and clearly defining expectations early on.
	"Vision of the Cone: Past – Present – Future"	To project a desired future and explore what needs to be done now to achieve the goal over time, ie. the present idea is placed in a temporal context, as well as the concrete next steps – a plausible, possible, preferred or absurd future, invites dis. team to actively create an uncertain future that is never just one, but instead has

Kind	*A tool*	*Characteristics*
		multiple possible (so-called "futures") that push the limits of the possible by assuming the unthinkable.
	"Critical Elements Diagram"	To structure the findings from the early phases and prepare for upcoming ideas and experiments. The diagram helps the team agree on the critical success elements for the target group. It is done in a timely manner, because as new insights or other needs are discovered, elements can undergo changes that are later incorporated into the final prototype.
5	**Idea generation tools**	
	" Point Voting"	To visually, flexibly and quickly make a clear team decision about what options should be pursued in the form of ideas or concepts.
	" 2x2 Decision Matrix"	To categorize and prioritize ideas, identify strategic opportunities and models, focusing not on new ideas, but on current practices and available opportunities, in order to identify areas not yet covered by ideas.
	" Brain Attack" ***"6-3-5 Method"*** and ***"Special Brainstorming"***	Stimulation of enhanced, fast and productive creative brain activity. To quickly generate ideas in a large the quantity, which is more important in this case than their quality. It enables all participants, regardless of their hierarchical level, to publicize their ideas and solutions.
	"Special Brainstorming"	For the generation of a large number of non-standard ideas in a limited period of time.
	"Negative Brainstorming"	Do n't focus on anything that could make the problem worse.
	"Assault Figuring"	The attack is performed from the perspective of a third party.
	Bodystorming	P physically puts the team members in a certain physically real situation during idea generation.
	"Need NABC" (Need, Advantage, Base, Competition)	It helps reduce information "richness" or distraction. The idea is considered under four different aspects: need (problem), approach (solution, promise of performance), benefit and competition (alternatives in the market).
	*"**Blue Ocean**" and "**Buyer Utility Map**"*	To differentiate these products or services from the competition and to open up new market opportunities. " *Red Ocean* " and " *Blue Ocean* ".
6	**Prototyping tools**	
	"Focused Experiments"	To learn more about the user and their problem through experiments, simulating a function that is critical to the overall design by provoking emotions in them that are not normally visible. Other variations: *"Critical Experience Prototype" and "Prototype for Critical Function".*
	"Combined Experiments – Funky Prototype"	To combine the findings of the initial experiments and to complete the exploration of the problem space, quickly arriving at finding better combinations and removing any remaining uncertainties about the elements that are critical to the solution. It with helps to reach complete functionalities and an initial vision of the final goal (solution, product).
	"Vision prototype – an idea of the future"	It creates a vision of a future solution based on all previous findings, designed to help the team overcome the "groan zone" (the transition from the divergent phase of problem exploration to the convergent phase of problem solving) and see the decision in a more distant time horizon.
	"Prototype with first function – functional (system) prototype"	To develop a first working prototype that focuses on that part of the vision, a specific core function that can be achieved early and easily, with the goal of making it tangible, and later refined to incorporate into a system of multiple functionalities, which must also be technically feasible.
	"Solutions in Detail – X is Complete"	A tool for prototyping the important elements or sub-functions of the desired solution and for entering their details.
	"Final Prototype"	To conclude and put the final touches on the solution to the MEP, which checks if it still meets the initially defined needs and problem of the target group.

Kind	*A tool*	*Characteristics*
	"Test Prototype"	A tool to assess whether the user's needs are fully satisfied with the implemented ideas and to gain indispensable feedback on various dimensions of liking, feasibility and practicality of the prototype to be tested against the user perception.
	"Journey Map", "Service Plan" and ***"Minimum Viable Product"***	They are used in a group aimed at the strategic implementation of the new solution (product, service), so that it is unquestionably successful and accepted by its users.
7	**Tools for testing out-of-the-box solutions**	
	"Test Sheet"	Suitable for descriptively preparing the test sequence to make optimal use of time and resources, as well as for documenting the test results.
	"Feedback Capture Network"	It is based on the principle of developing similarities or main differences to narrow theses. The emphasis is on emotions, contradictory body language and the initial reactions of the test takers.
	"Decision Interview"	To understand whether the solution to the problem is accepted by the targeted users and whether it is convincing in terms of functionality, convenience and customer experience.
	"Structured Usability Testing"	To test prototypes with real users who perform tasks with them under the same conditions, in order to compare several ideas or options based on the same criteria.
	"A/B Testing"	To test two variants of a prototype at the same time or to test a new variant against a basic prototype, evaluating them by their users, surveying the quality and evaluating the number and content of feedback.
	"Powerful Experience Testing Questions"	Speeds up the process of finding the right solution. A simplified test plan is created: the objectives, the test environment, the process, moderation and the test participants. It is tested with real users and collects mostly qualitative and quantitative data, findings related to the experience.
	"A gallery walk" ***("Gallery walk")***	Information boards are being prepared clients, which hang on the walls in the room, for viewing and discussion. In the offices of the interested parties, write down on sticky notes the information from each experience, which is important and determines the quality of the final decision. After that, a team is assembled, which in turn distributes and discusses the ideas, and evaluates where to make chenges.
8	**Tools for reporting results**	
	"I like, I want, I wonder – IL, IW, IW" ***(I Liket, I Want, I Wonder)***	O provides constructive feedback from work teams, in which it is allowed to state only what its members like and want, complete with "I wonder...", "what if..." "I learned...".
	"Retrospective Sailboat"	To reflect on the process and to learn something new by stimulating a "failure mindset", where mistakes are an opportunity to change and learn, and the goal is to improve each subsequent iteration by encouraging collaboration, speed, purposefulness, gratitude and structuredness.
	"Creating Terrain"	With facilities to share results and insights with the team at the end of an iteration and also at regular intervals with stakeholders. " The pitch " describes one's own idea or result for a brief presentation in the form of a presentation to teams or stakeholders.

Summary

Each of the tools discussed in the table is described in detail in the specially created "Manual for the application of DT in modeling innovative products in WFI". Some of the tools are to be tested during the implementation of the training program for experts in innovative product modeling through DT (2024).

Practical interpretation of DT methodology

In connection with the practical interpretation of the DT methodology in product management, in making operational management decisions related to innovation and the modeling of innovative products, we created ***a Program for training short course of specialists in the field of standardization and quality management, members of the "Club 9000*** " association.

The curriculum includes the following explanatory elements and structure:

The training approach presents to the participants in the course, short training units in the context of the broad theme "design thinking" and practical interpretation of the DT methodology in product management, in making operational management decisions related to innovation and modeling of innovative products.

The purpose of the training is *to present the DT methodology,* its algorithm and possibilities for its use as an innovative tool in the process of creating new quality products and their successful implementation on the market, reducing the risk in advance and in a timely manner. At the same time, it aims to support through interactive training the building of practical skills for work, using tools from the specially created Manual for the application of DT in modeling innovative products in a specific sector.

Trainers in the implementation of the program are competent lecturers with many years of teaching experience and targeted scientific interests in the field of DT in the last 10 years, who developed the curriculum and the study schedule on the subject.

Duration of training is short-term and concentrated with a duration of six hours within one or two days. The schedule is designed so that participants remain in the appropriate environment to absorb the material throughout the training day.

Benefits for the participants are indisputable, they will get a general theoretical idea of the nature and scope of DT, the elements of its algorithm and the possibilities of use in organizational management, the generation of product innovations and more. At the same time, they will acquire basic knowledge about the specific tools in the process of practical use of DT in modeling innovative products.

Materials and certificates – participants will be provided with literature and materials from the course in an electronic version. As an additional possibility – access to the specially created Handbook for the application of DT in the modeling of innovative products. And at the end of the training, they will receive certificates from the "Club 9000" Association with details of the acquired competences

With content of the curriculum is structured in three interconnected parts (Table 2). In everythingof them are provided the specific topics necessary for mastering the basic knowledge about the "design thinking" process and the possibilities for its application in product management and the creation of innovations. For each of the topics, the required minimum number of hours is set, sufficient for familiarizing the quality specialists with those aspects of the problem that would help them the most in their work.

The planned lessons include information on acquiring new knowledge, short exercises, visual materials, presentation and discussion of ideas for projects, a professional discussion aimed at stimulating and developing creative communication skills aimed at innovative thinking and initiative.

The teaching content allows to be updated by the lecturers according to new research in the field in order to reflect the innovations in the subject.

Table 2: Curriculum of a short-term course for specialists in the field of standardization and quality management.

No	NAMES OF SECTIONS AND TOPICS	STUDY HOURS
1.	**First part**: Introduction.	2
	Design Thinking – essence and algorithm of the process. Possibilities for the use of DT in organizational management.	1 1
2.	**Second part**: Design thinking as an approach in product management.	2
	Practical use of DT in the process of modeling innovative products.	2
3.	**Third part**: Model of the DT process when creating innovative products in the organization.	2
	Interactive training for using methodological tools of the DT process in modeling innovative products.	2
	References: Koleva, G. (2023). Manual for application of DT in modeling innovative products in WFI. Sofia: Avangard Prima.	Total: 6

The educational content of the program can be further expanded according to the interest that will provoke and the demand that exists in the field of product quality, product management, innovations in the field, and more. There are prerequisites, according to the interest, for it to be supplemented with specific plans for implementation for training with the aim of applying the methodology of the process through inclusion in continuing professional training, workshops, etc.

CONCLUSION

"Design thinking" is a modern tool for achieving innovation, through which all possible solutions are fully exploited in advance and are always tied to the wishes of the interested parties. It represents the creative co-creation of the final solution (new or improved product) by work teams together with customers. Therefore, his methodology finds application in various business models for making managerial decisions, especially in product management – the field in which the goal is to create quality innovations, closely related and highly necessary, so that they are preferred by consumers over competing products.

Specific approaches in applying DT in innovation are: brainstorming (changes in existing products and services); low-resolution prototyping (quick tests without significant investments in time and resources); fast feedback loops (users provide valuable information that leads to design improvements and refinements), etc.

DT's toolset helps creative teams create innovative and user-centric products and services. Design thinking enables the organization to timely create products that meet the elevated and dynamically changing needs and demands of their users.

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