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CONCEPTUAL MODEL OF THE HACKATHON ECOSYSTEM OF TECHNOLOGY TRANSFER IN AN INSTITUTION OF HIGHER EDUCATION

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BACKGROUND AND OBJECTIVES. The strategy of innovation development in Ukraine envisages the creation of innovative ecosystem of higher education institutions. Analysis of the current state of interaction between science, business and the state in Ukraine shows that most of the technologies and developments created as a result of scientific and technical activities of higher education institutions have not yet been implemented in the real economy. Communication interaction between representatives of higher school and enterprises involves the initiation of the innovation ecosystem. Practical implementation of conceptual model of Hackathon-ecosystem of technology transfer in higher education institution will allow to move to a new level of innovative development of higher education institution.

METHODS. The study used: the DFD method for constructing a context diagram and diagram 1 level of functioning of the Hackathon ecosystem of technology transfer in higher education institution; information and technological approaches to the project management of HETT creation in the university to ensure effective management of project data flow; qualitative and operational communication between the project stakeholders.

FINDINGS. The developed conceptual model of Hackathon-ecosystem of technology transfer in higher education institutions allows to take into account the specifics of functioning of higher education. The proposed block diagram of the initialization project of the creation of the Hackathon-ecosystem of technology transfer consists of 7 stages, which allows to take into account the specifics of the university. The optimal composition of stakeholders of the Hackathon-ecosystem of technology transfer in higher education institutions is defined: initiator, manager, team, customer, curator, owner, competitors, sponsor, authorities, community groups, consumers, organizations, suppliers and contractors.

CONCLUSION. Practical implementation of the developed conceptual model of Hackathon-ecosystem of technology transfer in higher education institutions allows to generate ideas in accordance with market requirements and implement the most effective; to determine the needs and interests in establishing cooperation between representatives of higher education and business; to determine the compliance of the prototypes created with the needs of stakeholders and will provide feedback regarding the functioning of Hackathon-ecosystem of technology transfer.

KEYWORDS: Hackathon ecosystem; technology transfer; institution of higher education.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
10	3	1

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КОНЦЕПТУАЛЬНА МОДЕЛЬ ХАКАТОН-ЕКОСИСТЕМИ ТРАНСФЕРУ ТЕХНОЛОГІЙ У ЗАКЛАДІ ВИЩОЇ ОСВІТИ

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ПОСТАНОВКА ПРОБЛЕМИ ТА ЗАВДАННЯ. Стратегія розвитку інновацій в Україні передбачає створення інноваційної екосистеми вищих навчальних закладів. Аналіз сучасного стану взаємодії науки, бізнесу і держави в Україні свідчить, що більшість технологій і розробок, створених в результаті науково-технічної діяльності закладів вищої освіти, поки ще не впроваджені в реальний сектор економіки. Комунікаційна взаємодія між представниками вищої школи і підприємствами передбачає ініціацію створення інноваційної екосистеми. Практична реалізація концептуальної моделі Хакатон-екосистеми трансферу технологій в установах вищої освіти дозволить перейти на новий рівень інноваційного розвитку закладів вищої освіти.

МЕТОДИ. У дослідженні були використані: метод DFD для побудови контекстної діаграми і діаграми першого рівня функціонування Хакатон-екосистеми трансферу технологій в закладі вищої освіти; інформаційно-технологічні підходи до управління проектом створення Хакатон-екосистеми трансферу технологій в закладі вищої освіти з метою забезпечення ефективного управління потоками даних по проекту; якісної і оперативної комунікації між стейкхолдерами проекту.

РЕЗУЛЬТАТИ. Розроблена концептуальна модель Хакатон-екосистеми трансферу технологій в закладах вищої освіти дозволяє враховувати специфіку функціонування вищої школи. Запропонована блок-схема ініціалізації проекту створення Хакатон-екосистеми трансферу технологій складається з семи етапів, що дозволяє врахувати особливості університету. Визначено оптимальний склад стейкхолдерів Хакатон-екосистеми трансферу технологій в закладах вищої освіти: ініціатор, керівник, команда, замовник, куратор, власник, конкуренти, спонсор, органи влади, громадські групи, споживачі, організації, постачальники і підрядники.

ВИСНОВКИ. Практична реалізація розробленої концептуальної моделі Хакатон-екосистеми трансферу технологій в закладах вищої освіти дозволяє генерувати ідеї відповідно до вимог ринку і впроваджувати найбільш затребувані з них; визначити потреби і зацікавленість у налагодженні співпраці між представниками вищої школи і бізнесу; визначати відповідність створених прототипів Хакатон-екосистеми трансферу технологій потребам стейкхолдерів і дозволить отримати зворотній зв'язок щодо функціонування Хакатон-екосистеми.

Ключові слова: Хакатон-екосистема; трансфер технологій; заклад вищої освіти.

INTRODUCTION.

There are many factors that influence the level of social development and acceptance of change, among which culture is essential, the main elements of which are highlighted (Verenych, 2019). Ukrainian culture as a whole does not contribute to socio-economic development. This means that the state should make a lot of effort, orienting its policy to change the perception of society of the specified cultural factors (Afanasiev et al., 2013). Innovative culture as well as civil society in general is only being formed in Ukraine. The analysis showed that the issue of creating a project management system is not reflected in the international standards for project management, as well as not enough researched by domestic and foreign scientists (Sergeeva et al., 2014). The available research of scientists (Kolomiets et al., 2017) on the creation of the Hackathon ecosystem model of technology transfer concern the business sphere and do not take into account the specifics of higher education institutions (Dmitriev, 2017). However, organizational projects of creating a unit in the form of Hackathon ecosystem of technology transfer in the institution of higher education (HETT), have their own specifics (Bay et al., 2012; Verhoglyadova, 2004; Grin et al., 2013; Grinkevich, 2017; Grishchenko et al., 2015). Given the above, the construction of a conceptual model of management of the project of creation of HETT in the university is an important topical task, and given the vector of the state policy is simultaneously a necessity. The purpose of the study is to propose a conceptual model of the Hackathon ecosystem of technology transfer in the institution of higher education. The study was conducted in 2020 on the basis of the Kyiv National University of Technologies and Design (KNUTD).

MATHERIALS AND METHODS.

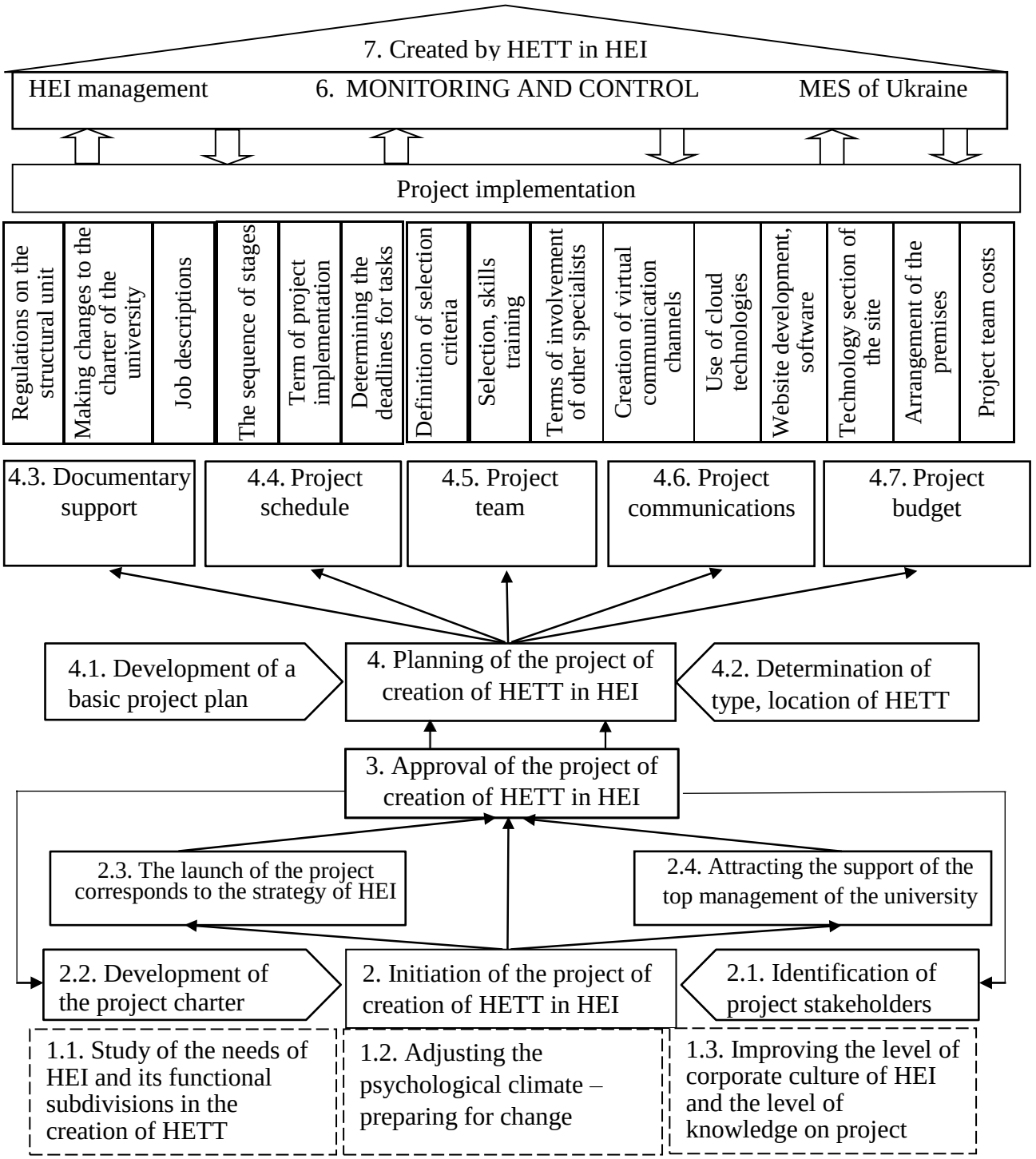
The information model of the project management process of HETT creation in the university was developed in order to ensure effective management of project data flows, quality and timely communication between the project stakeholders. This model includes a context diagram and a Level 1 diagram, which are built on the DFD notation. Within the framework of the proposed model the information flows between the stakeholders in the process of HETT project management in the university in general and at each stage of the management process in particular are defined.

RESULTS AND DISCUSSION.

The conceptual model of the Hackathon ecosystem of technology transfer in an institution of higher education is presented in Fig. 1.

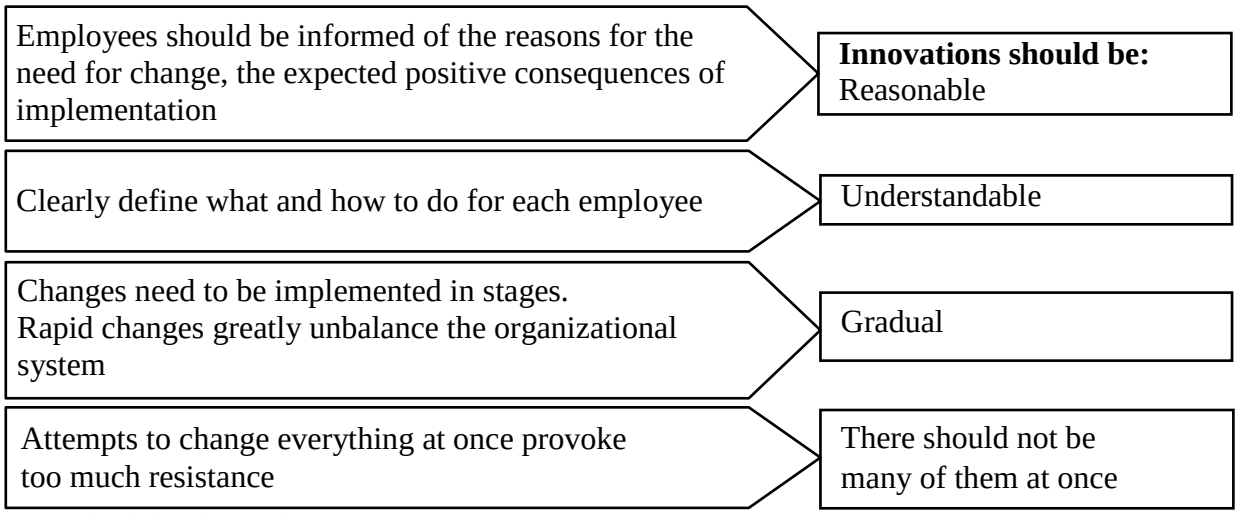
In state-owned institutions (HEIs), the biggest obstacles to development are bureaucracy, risk-aversion and high levels of responsibility, which leads to resistance in implementing change. The following rules or conditions are suggested for the perception of change, which must be met by the initiator –

Fig. 2. The most important is to communicate to employees the specific reasons for the need to implement changes and the expected positive results. For this purpose it is necessary to study beforehand the needs and problems arising in connection with technology transfer in the employees of the university.



Source: built by the author.

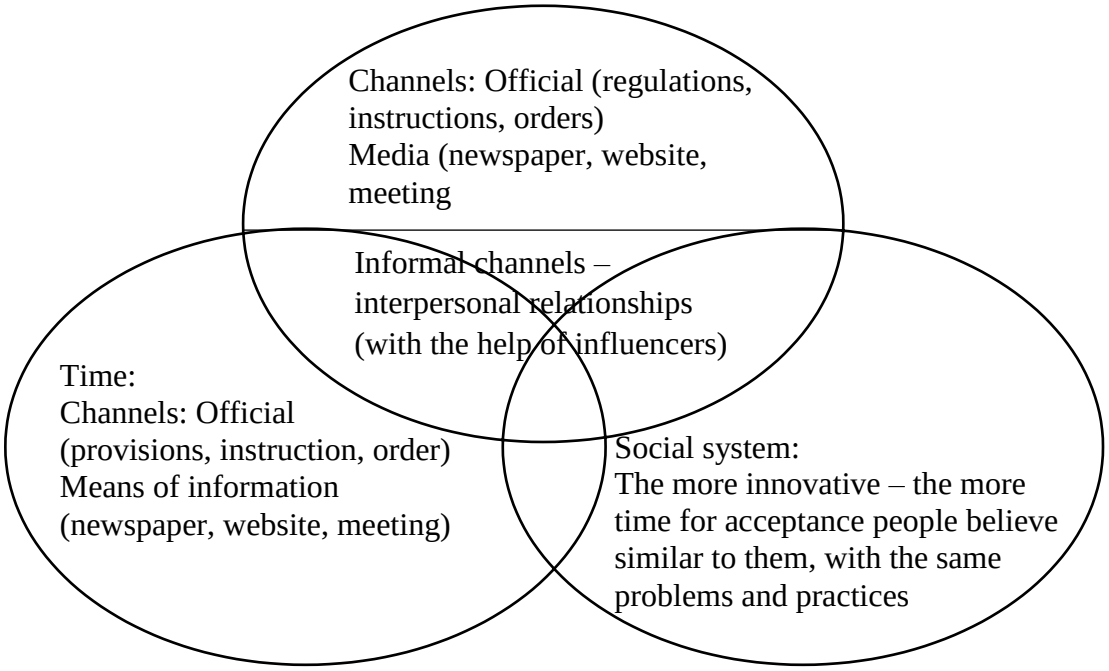
Fig. 1. **Conceptual model of project management of HETT creation in HEI**



Source: built by the author.

Fig. 2. **Rules for implementing innovations**

Diffusion of innovation is proposed to be considered through the model of diffusion of innovation proposed by E. Rogers (a process in which innovation is transmitted through certain channels over time among members of the social system) – Fig. 3.



Source: built by the author.

Fig. 3. **The main elements that are important in the implementation of innovations**

Thus, the most effective channel of introduction of innovation is informal (interpersonal relations) with the help of agents of influence who have already

accepted the innovation and at the same time are similar to other employees, because they face the same problems, work in the same department. Paul Dolan proposed a model of mental space, through the use of factors which provide "nonviolent", but self-motivated change. Managing the mental space of projects and programs is the main use of HETT. The proposed models can be taken into account in the implementation of projects in the university. Some sources suggest determining an organization's level of maturity with respect to project management before implementing HETT. Others define a characterization of competency levels according to the following criteria: subject area, project management area, IT technologies, and tools. The experience of creating a HETT in an institution of higher education is new to our state. The creation of a HETT has not been explored with project management approaches. University technology transfer activities are just beginning in our state. The university's level of competence in HETT creation projects is "embryonic." Therefore, there is a need to increase the level of knowledge on project management, first of all, in the functional managers of the university. The project initiation stage also includes identification of stakeholders and their interests. Project stakeholders, their roles and interests in the creation of HETT in the university are presented in Table 1.

Table 1

Stakeholders of the HETT project at the university

№	Stakeholders	Role	Interest
1	Project initiator	The person who initiated the project of creating OTT in ZVO, prepared an application for consideration of the initiative (ZVO employee who professionally carries out scientific, scientific-technical or scientific-pedagogical activity)	High-quality and timely project implementation, gaining experience and skills in the field of project management
2	Project Manager	Employee of the Free Economic Zone, who is responsible for project planning and implementation, risk response (head of the department, professor or associate professor of the department)	High-quality and timely implementation of the project in accordance with the established requirements, gaining experience and skills in the field of project management, receiving material incentives
3	Project team	A group of freelancers who plan and implement a project to create an OTT in freelance according to the instructions of the project manager (freelancers who professionally carry out scientific, scientific-technical or scientific-pedagogical activities)	High-quality and timely implementation of the project in accordance with the established requirements, gaining experience and skills in the field of project management, receiving material incentives

End Table 1

№	Stakeholders	Role	Interest
4	Project curator	Employee of the top management of the Free Economic Zone, who will monitor and control the activities of the team and the project manager (vice-rector)	Qualitative and timely implementation of the project in accordance with the established requirements, raising the rating of free economic zones, attracting extra-budgetary funding and additional funding from the Ministry of Education and Science
5	Customer	Rector of the Free Economic Zone, who finances and monitors the implementation of the project	Qualitative and timely implementation of the project in accordance with the established requirements, raising the rating of free economic zones, attracting extra-budgetary funding and additional funding from the Ministry of Education and Science, achieving the strategic goal of free economic zones
6	Owner	ZVO - has the rights to the result of the project	Achieving the strategic goal of the Free Economic Zone, raising the rating of the Free Economic Zone, attracting extra-budgetary funding and additional funding from the Ministry of Education and Science
7	Investor	The Rector of the Free Economic Zone and the Ministry of Education and Science co-finance the project. It is also possible to involve local governments and business representatives	Qualitative and timely implementation of the project, raising the rating of free economic zones, region, state
8	Competitors of the main project participants	Other free economic zones in which OTTs are created or planned and which are interested in raising the rating of own free economic zones. At the same time, other free economic zones can become partners	Poor and / or untimely project implementation
9	Authorities	MES, Ministry of Economy, local governments, as well as international organizations interested in developing cooperation between science and business	Qualitative and timely implementation of the project, raising the rating of the region, the state, receiving budget revenues, attracting investment to the state

End Table 1

№	Stakeholders	Role	Interest
10	Public groups and organizations, population	Freelance employees	Establishing cooperation with business representatives
11	Suppliers / contractors	Persons who supply computer equipment, furniture for the organization of premises under OTT, as well as provide IT services for the creation of software products for OTT	Qualitative and timely fulfillment of terms of supply / contract agreements
12	Consumers	Freelancers, representatives of business, region, state, community of scientists and inventors, international organizations	Obtaining a quality project product

Initiation of the project of HETT creation in the university also has its own features, because it is usually a state structure, and therefore the coordination and approval of documents is long, involves more steps than in a private company, where speed of decision-making and elimination of bureaucratic procedures are of paramount importance. Initialization of the project will be successful only in case of compliance with the university strategy, MES and in case of support from the university top management. After project approval, the planning stage begins, the basis of which is the development of the basic project plan, definition of the type and place of HETT in the organizational management structure of the university. Also at this stage planning is carried out:

- Documentary support of the project, which includes a set of works on creation of new organizational structure in the university – preparation and approval of the decision of the academic council of the university on creation of HETT, making changes in the charter of the university, preparation and approval of regulations on structural subdivision, job descriptions, approval of staff number, etc.
- Project schedule, according to which the deadline for the project, the deadline for each task of the project, the sequence of their implementation, while planning the schedule is carried out simultaneously with the definition of the project content (goals and objectives).
- Project teams – the criteria for selecting a team, the conditions for involving specialists from other structural units, the functions, powers and responsibilities of each team member are defined. Formation of a highly effective project team, the resulting conceptual model can be adapted to manage the project of HETT creation in the university.

- Communications – determines the most convenient for the project team virtual channel of communication between the available messengers, analyzes the compatibility of cloud storage technology with the necessary HETT software, plans the implementation of cloud storage technology and remote work – a virtual office to be able to work in quarantine, plans to develop a website section for communication with business representatives or other stakeholders. The developed models can be adapted to the implementation of the necessary software for HETT in the university.

- The project budget, which includes the costs associated with the project team (salaries, training costs, training), and unrelated costs for equipping the room for the project team and holding joint meetings with the heads or staff of functional departments of the university, the cost of software and the creation of the site section.

The next stage is the implementation of the project, which should be carried out in accordance with the basic plan of the project. It should also be noted that at any stage of the project to create HETT in the university can be a risk. The monitoring and control phase is carried out by the curator (Vice Rector) and the project customer (Rector), as well as the MES of Ukraine on the results of the project to assess the effectiveness of its implementation. In addition, monitoring and control is carried out by the project manager at each stage. According to the results of monitoring and control an assessment of the effectiveness of the project is given and in fact begins to work again organizational structure in the university – HETT.

CONCLUSION.

It was found that the introduction of the project approach will create an effective innovation infrastructure, the main element of which are HETTs in the university. It was proposed to distinguish projects and portfolios of technology transfer projects, their main differences from other types of projects implemented in the university were determined. The conceptual model for project management of Hackathon-ecosystem of technology transfer in higher education institution which takes into account the specific functioning of the university and includes seven stages, including psychological climate adjustment, initiation, launch, planning, execution, monitoring and control, the completion stage – establishment of HETT in the university was developed. Within the framework of the specified model a flowchart of the initialization of the project of creation of HETT in the university was developed. Also, the stakeholders of the project were identified, indicating the role and interest of each. Organizational model of HETT in universities was developed, which includes a template of DFD project creation HETT in high school, a template of the organizational structure of HETT in high school. The functions of HETT

project team members, the functions of HETT staff and the place of HETT in the organizational structure of the university were defined.

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ABBREVIATIONS:

fig.	Figure
HEI	Higher education institution
HETT	Hackathon Ecosystem of Technology Transfer
KNUTD	Kyiv National University of Technologies and Design
MES	Ministry of Education and Science in Ukraine

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