

## Developing Interactive Ecosystem on Improving Creativity, Innovation, Patenting and Licensing, particularly in Life Sciences

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### Abstract

In a global world, it is impossible for a technology-based economy to think independently of other variables, underlying relational environment. In the higher education systems, different environments significantly affect the success of the new start-ups in the universities. In this study we try to look at what effects different interactive ecosystems might possibly have on improving creativity, innovation, patenting and licensing by showing different real-life examples from life sciences. Additionally, the paper tries to look at how exactly ethnographic studies affect participants in the process of creating innovative products. All this is given in a close connection with the interactive ecosystem in which the target participants become more active by developing empathy. Thus, by developing a new interactive ecosystem, specifically in the hospitals, participants' behaviours and attitudes have changed and they have become much more actively engaged in the problems and needs of the health shareholders.

**Keywords:** Higher education, higher education management, interactive ecosystems, new trends in higher education, creativity, innovation patenting and licensing, organizational structure and strategy in higher education, translational research, start-ups for universities.

### INTRODUCTION

In the global world, studies in all fields both trigger and affect each other. This caused crucial changes in life sciences after 1980s. Human is naturally based on social communication, so researches in the life sciences should take into consideration all environmental factors. The translational research environment is taken as an interactive environment to show the sustainable circles from the patients' bed to the laboratories, from the laboratories to the Technology Transfer Offices (TTOs) to have their patents, and from the attorney to the start-ups and to the corporates, in which the licensing period is critically short comparing to the other systems. In this situation, researchers' and participants' behaviours, attitudes, needs and expectations gain more importance if the interactive environment is held during research [1], [2], [3], [4], and [5].

In terms of participants of researches, the concept of "demand characteristics" was used by Martin Orne [10] and [11]. This is generally used within the domain of psychology but in terms of interactive ecosystems, participants are a crucial part of the researches too. If participants of the research know what the research is aimed at, they are more willing to help. He identified that research participants believed in the importance of science and tried to help advance it by playing the role of the "good subject", thereby seeking to satisfy the perceived needs of the researchers [10] and [11].

On the other side, researchers' attitudes and behaviours directly and naturally affect the research period. In an interactive environment, each variable influences another variable. Because of this reason, researchers' ability to empathize is one of the most important variables [2] and [6]. The concept of empathy in today's academic field, related to the subject, is a topic which has been well researched by scientists. Scientists, working on the

empathy concept, define it in many different angles, such as the concept of empathy for a specific person would mean to put the other person instead of oneself, so that their thoughts and feelings may be accurately sensed. The concepts of sympathy and empathy are at times perceived interchangeably. So, in order to avoid confusion with sympathy, one needs to specify different aspects of empathy in a clear way [7]. Empathic understanding of the other person is similar to a situation in which human society is to develop values according to its evaluation, and the values themselves require evaluation. In a similar way, empathic understanding of people against the human values are used [13]. After all, a research could be much more meaningful if the researcher could put him/herself in the participant's places. On the other hand, participants may trigger an effective communication with them, which will undoubtedly lead to a better understanding of the research results.

Regarding health-related areas, these cases become even more important. According to Outreville [12] the importance of health care sector is related to the health services, trade and foreign investment. For General Agreement Trade Services, health sector is vital in the global economy. When most researches, related to this sector, are conducted, researchers' empathy ability during the research period is the agent that increases success.

In the global interactive environment, each research in a strategic sense, on the other hand, may greatly contribute to our decision making process. Strategic plans have a tendency to encourage people and/or institutions to more deeply think about future [16]. Strategic planning takes care of both short-term and long-term objectives. Effective strategic planning directly and positively influences the quality. The development of creativity, innovation, patenting, and licensing are the quality indicators for universities. Most of them have TTOs [4]. Although TTOs in each university have different research disciplines and

organizational objectives, they all aim at maintaining a positive public image in order to reach their strategic goals [4]. On the other hand, Derrick [4] emphasizes that perceived differences of researchers and research organizations might negatively increase tension.

In an interactive environment, the community and university partnership is inevitable in life sciences [2] and [5]. As a result, individuals from different backgrounds have to work together to conduct researches in social fields. Among many, Greenberg, Howard and Desmond [5] handled health and public health domains, Lewis [7] emphasizes education, and include community improvement [8] into their research. We can say that a cumulative goal of all social fields is to improve society by making contributions and finding solutions to the problems.

In the process of creating innovative products and/or solutions in life sciences, researches should be conducted in interactive ecosystems where all factors and variables should be integrated with each other and managed accordingly [14]. When a new interactive ecosystem is developed, specifically in the hospitals, participants' behaviours and attitudes change and they become more engaged in the problems and needs of the patients. This indicates that human capital is crucial for any research period. Human capital is a part of intellectual capital that itself is composed of three distinct types of capital: human, structural and relational [15].

- Human capital: skills, talent and know-how of the researchers;

- Structural Capital: Knowledge applications, Information and Communication Technologies (ICT), Processes and technology infrastructures of universities;

- Relational capital: interactive ecosystem parts.

According to Marr et al [9], intellectual capital may be a guide to strategic planning, help institutions manage diversification and expansion decisions and facilitate communication with the stakeholders. The interactive ecosystems help them to be more aware of their needs, especially in life sciences. Intellectual capital management and conducting research in the social sciences are inevitable in order to support creativity and entrepreneurship. At the same time, intellectual capital allows to manage interactive ecosystems. When interactive ecosystem is enabled and effectively managed, the validity and reliability of university researches will probably increase [9] and [15].

In order to effectively manage and improve creativity and entrepreneurship, the real situations must be handled in order to help the researchers and managers in higher education institutions to develop new interactive ecosystems. The behaviours and attitudes of the participants change because their selected attention and awareness are improved. The interactive communication and teamwork capacity have increased to develop

innovative products and services, which have high market values.

This study focuses on the effects of different interactive ecosystems on improving creativity, innovation, patenting and licensing, critically taking them by showing different real examples from life sciences. Additionally, it is investigated how ethnographic studies affect the participants in the process of creating innovative products, provided with the interactive ecosystem in which the target participants have become more active by developing empathy.

## METHOD

In order to understand the reliability and validity of the system, the phenomenological interpretive analysis is used for investigation in a new interactive ecosystem, which is a translational research centre. In this way, mainly the behaviours and attitudes of the graduate level students and experienced researchers are analysed by training them with ethnographic study tools in order to improve empathy.

### Research Design

Present study was conducted by interviewing the participants (staff and students) using the semi-structured template. This was successfully done in Istanbul in two state colleges.

### Research Sample

There were two different sub-groups engaged in the present research. Participants were chosen from three departments: Science, Medical and Engineering; by means of Random Selection. Cluster Sampling was used and the Subjects were taken from Istanbul's two state colleges: graduate students of ages falling between 21 and 31; and faculty members of ages from 28 to 51. Staff members were of the following title groups: 8 Assistant Professors, 34 Associate Professors and 12 Professors. Refer to Table 1 for the details of the Participants' Gender/Faculty distribution.

### Research Instrument And Procedure

All interviews were conducted and core questions were developed based on a wide-scope literature review by the author of the study. Then, Pilot Study was conducted with 5 people in order to see if the interview questions were developed in a proper manner. The pilot study was to reveal what might be the major issues with the subject. According to the outcome, core questions were chosen and re-checked together with the pilot study participants and different stakeholders of the subject: Academicians, Researches, High Education managers and businessmen from various industrial sectors.

**Table1.** Department and Gender distribution of the Participant sub-groups

	Gender	Engineering	Social Sciences	Medicine	SUBTOTAL	TOTAL
Experienced Researchers	F	6	11	9	26	
	M	12	9	7	28	54
Graduate Students	F	12	11	9	32	
	M	13	14	11	38	70
GRAND TOTAL:						124

Each interview took 1.5 hours in average, was confidential and accepted by the consent of the participants, in the form of a conversation in person. Also, a digital sound recorder was used with their agreement. The author went to Istanbul's chosen colleges and conducted interviews with participants, previously having provided detailed explanation about the goal of the research. Entire study took around six months. It was done in the 2013-2014, Second Semester (spring term).

Core Interview Questions were these:

1. What plays major role in developing creativity of a person?
2. How can the spirit of entrepreneurship and innovation be encouraged in universities?
3. What psychological effect this may have on the students?
4. What will the future leadership model be based on?
5. How will standard University Management system be changed within a decade?
6. What will become most required for University Management?
7. How can the transition to a new University Management model be done practically?
8. How will industry be able to benefit from the future university leadership model?
9. In what direction will the industry-university collaboration develop?
10. How can the effectiveness of the industry-university collaboration be boosted?
11. How may the whole society benefit from these improvements?
12. What can your personal role be in all this process?

## DATA ANALYSIS

Firstly, author secured descriptive information. Atlas.ti 7 software was utilized in order to analyse the data. As required by the software tool, special coding was ascribed (ER1, ER2, ER3... and GS1, GS2, GS3... etc.) to the participants. Every interview was put into writing and then re-checked according to the voice digital samples. All answers were scrutinized and categorized accordingly. The author utilized Interpretative Phenomenological Analysis (IPA) for analysing the data. At the same time, while doing IPA, one of the best ways to gather information is using a semi-structured interview. Author could see how the participants perceived their own experiences by the help of IPA. Case by case in-depth analysis was done. Multiples interview note checking produced highly reliable topics of categorization, which in turn made it possible to come up with clear interpretations. These outcomes made it possible to further process and unite and group certain categories in a table. As the conclusive step of the research, all findings were translated into a coherent narrative.

## RESULTS AND DISCUSSIONS

The results show that those who have more empathy in comparison with those who have less, put forth better results in developing creativity, innovation, patenting and licensing since their products are directly related to the tangible and urgent needs. There is no doubt that the participants have learned how to make marketing research

and develop business models in order to be profitable for themselves and for their universities by means of royalties.

Multiple different studies show that only 6 weeks are needed to become more active, engaged and empathetic in order to develop new and technologically innovative products and services. The interactive ecosystems helped the participants to be more aware of the needs, especially in life sciences due to the fact that all the stakeholders, doctors, patients, nurses, other medical people, and patients' close relatives and friends are close to each other and willing to share their thoughts and ideas. Additionally, new ICT gadgets helped them to be much closer in terms of the knowledge transfer. Hence, the awareness of the participants helps to collect right data to transform it into new products and services, which can be easily licensed.

In the field of the life sciences in a globalized world, creativity, innovation, patenting and licensing in life sciences are the most popular issues in the higher education field. Successful start-ups for universities are getting more closely connected to the environmental factors. In a technology based economy, it is important to manage environmental factors as well as technology. Managing interactive ecosystem is the main success factor during research period, and it directly affects the reliability and validity of the research. So, not only structural capital but also human and relational capital should be taken into consideration while conducting research in life sciences. Participants and researchers are two of the most important parts of the interactive ecosystem. Attitudes, behaviours, talents and abilities of both directly affect the research period and influence the patenting and licensing time.

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