Integrated educational projects as a method of human capital development in the knowledge economy

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Abstract. Human capital is linked to intellectual capital, so professional education is an important element in the process of training future professionals ready to develop innovations. The synergy of university education and work-based learning is necessary for the development of human capital. The creation of integrated educational projects takes into account this feature. To study the impact of these projects on human capital development, the authors conducted a four-stage research. According to the results of the study, universities want to realize their scientific potential and prepare in-demand young professionals, businesses need to hire experienced professionals focused on innovation. The needs of a young specialist are obtaining relevant knowledge and practical skills for employment. Integrated educational projects bring together numerous audiences, contribute to meeting their needs by connecting academic education, practice-oriented knowledge and practical skills through various learning formats. These projects contribute to the development of human capital, as the participants - students of these projects are more prepared for professional activities. Universities with the help of such projects develop a partner network, increase their own attractiveness and the overall level of knowledge of students. Business companies receive young professionals with practical skills and developed creative thinking.

1. Introduction

The development, implementation and use of innovations are an important condition for a company's success in the knowledge economy. A significant contribution to the development of innovation is made by employees of the company, in connection with which the development of human capital of the company directly affects the process of development and implementation of innovations [1], as well as the competitiveness of the organization [2]. Not every employee is able to generate new ideas, look for creative ways to solve problems and contribute to the creation of something new. Obtaining relevant knowledge of a practice-oriented nature, as well as continuous improvement of their skills and competencies, comprehensive development of the employee contributes not only to the development of human capital, but also activates the initiative of the employee to develop innovations. So, education is one of the significant elements influencing the formation of human capital for the economic development of the country in general [3].

There is a relationship between human, intellectual and social capital. The creation of close social ties between specialists, both within one professional niche and between different spheres, contributes to the exchange of knowledge and gaining new experience. Further, this experience is transformed and used by employees in relation to the specifics of their company. The combination of these three factors
affects not only the introduction of innovations in the activities of companies, but also forms a powerful organizational advantage [4, 5], which allows this company to be competitive in the market.

It is important to understand that in the knowledge economy, a set of competencies of a specialist is particularly relevant, which is formed in individual educational trajectories and contributes to the acquisition of highly specialized skills and skills of a wide profile [6]. The subject, forming such competences on a systematic basis, should be universities, as organizations that contribute to the acquisition of professional skills and competencies of future employees. An university accumulates intellectual capital, which is then distributed through social and academic ties [7], and is also a supplier of personnel for business [8]. In addition, universities create a new special value – they contribute to the increase of the intellectual component of human capital [9].

In this regard, in the era of the knowledge economy, the requirements to the standards and methods of training have increased [10]. After graduation, many young professionals face employment problems due to the lack of a number of important competencies for the employer [11]. In addition, educational institutions don’t always have a clear understanding of what knowledge and skills need to be given to students in order for their competencies to meet the requirements of the market at graduation. Another challenge for universities is to find a balance between theory and practice. Academic content and theoretical knowledge are necessary for the formation of a worldview and understanding of the basics of any activity, but it also requires practical content, knowledge of an applied nature, which are applicable in real professional activity.

One of the solutions to the above problems of an university education we see in the creation and implementation of integrated educational projects that combine academic knowledge and practical competence, formed as a result of building a system that combines the approaches of "learning by experience" and "learning by action", which requires a joint purposeful and coordinated activities of educational institutions and real business entities. This practice exists in different countries [12], but is little used in Russia and is not adapted to Russian realities.

The purpose of our study is to consider the impact of integrated educational projects on the development of human capital. The objectives of the study are:

1. The study of the needs of the subjects involved in the formation of professional and personal competencies of future professionals: educational institutions, business representatives and students themselves, in the future – young professionals in companies.
2. The study of the concept of integrated educational project, the features of integrated educational projects and the specifics of the implementation of this type of projects in practice.
3. Implementation of the integrated educational project in the process of education and training of specialists and the study of its impact on the formation of their professional skills and competencies.

2. Methods
To achieve this goal and solve these problems, first of all, a study was conducted of the needs of the subjects involved in the formation of professional and personal competencies of future specialists: educational institutions, business representatives and students themselves, who in the future will take the places of young professionals in companies. This research included 4 parallel parts, each of which is described in detail below. Such an approach to the study allowed us to make a comprehensive picture of the situation on the education market in Russia and affecting the formation and development of human capital in Russian companies, as well as international companies with representative offices or branches in Russia.

The first part of the research was to study the needs of educational institutions, which was conducted with the help of expert interviews with teachers of Russian universities. Sample for expert interviews: volume – 14 respondents, type – non-random, quota (the following quotas were used: young teachers (teaching experience from 1 year to 5 years), experienced teachers (teaching experience from 6 years to 10 years), expert teachers (teaching experience from 11 years and above)). Geography of research – Russia (St. Petersburg, Moscow, Krasnoyarsk, Perm, Orel, Lipetsk, Kazan).
To study the business needs of relatively young professionals who come to the company after education, the second part of the research was conducted, which also included expert interviews with representatives of various companies operating both in the Russian and international markets, and actively implementing innovative solutions in the internal and external processes of the company (taking into account both product, technological, and management, marketing innovations). Sample for expert interviews: volume – 24 respondents, type – non-random, quota (used quotas such as representatives of companies belonging to small businesses, representatives of companies belonging to medium-sized businesses and, accordingly, to large). Geography of research – Russia (St. Petersburg, Moscow, Vladimir, Kazan, Novokuznetsk, Kemerovo).

For a detailed study of the professional needs of potential future employees who are at the entrance to different companies in the knowledge economy and at the same time in one of the stages of training – master's degree – as a tool for their own career development, the third part of the research was carried out, which included two steps at each stage. This part of the general study was conducted for 3 years from 2017 to 2019 among the 1st year students of the master's program "Innovative marketing" of ITMO University, located in St. Petersburg and is one of the largest universities in the Russian Federation. Research methodology: a series of in-depth interviews as the first step of this part of the study, the sample is non-random, the model, the total number of respondents: 6 (2017), 8 (2018), 10 (2019); a series of quantitative surveys in the second stage of this part of the study, the sample is random, simple, total respondents: 91 (2017), 94 people (2018), 100 (2019). Geography of research – Russia. The in-depth interviews included questions about the educational needs of respondents, their wishes and goals for the acquisition of professional and personal skills and competencies, as well as questions aimed at identifying the preferences of respondents in terms of their further career development and the main difficulties they faced if they already got a job. Also, quantitative interviews conducted among students enrolled in the first year of the master's program "Innovative marketing" of ITMO University included questions about what their area of interest related to marketing, in which areas of marketing they would like to develop, what special courses they choose, what professional and personal skills they would like to develop during their studies in the master's program.

In addition, as the fourth part of the general study, observations and express interviews were conducted at specialized forums and conferences for students and young professionals ("Professional growth", "Fair of opportunities", "Choose the future", "St. Petersburg international Youth Labour Forum", Student Baltic Weekend) to study the needs of future young professionals in the field of education (knowledge of general topics, specialized (relative to a particular profession) or highly specialized), orientation (academic knowledge, practice-oriented knowledge, practical skills) and methods of obtaining (courses, workshops, educational programs, practice, internship, case-championship, forum, etc.). In addition, the proposals of various companies and organizations represented at specialized forums and conferences, both from the educational environment (Universities, courses of additional education and other educational organizations) and from the business environment (companies and business entities), were analysed.

After that, the data obtained as a result of all parts of the study (the needs of educational institutions, the needs of companies as business representatives, the needs of future young professionals) were compared to each other to identify the links between the needs of the market and companies that aim to be competitive in the knowledge economy and the development of innovative solutions within companies (while taking into account both product, technological and managerial, marketing innovations) and the needs and opportunities of educational institutions in terms of training future specialists in various fields, as well as the needs of students themselves in terms of their own career development.

2.1. Needs of the subjects involved in the process of formation of professional and personal competences of future specialists.

According to the results of the study, we identified the key needs of the subjects involved in the formation of professional and personal competencies of specialists, which will be described in detail in this paragraph.
Educational institutions of higher professional education need to produce specialists in demand on the market in the knowledge economy, who will occupy significant positions in large and well-known companies and organizations. Universities should be in demand from applicants, which means that not only constantly improve training programs, updating them in connection with dynamically developing technologies in various fields, but also create additional values that affect the choice of educational institution. These can be both social values (extracurricular activities, student clubs, student self-government bodies) and professional values (organization of practices and internships, workshops with representatives of companies, development of soft skills). In addition, universities need to achieve their goals in terms of scientific work, both within the University and among the world scientific community.

On the other hand, business in the knowledge economy is in need of specialists who are ready to join the workflow almost immediately after hiring without additional costs in terms of training and training. This means that young professionals must already either have experience or have practice-oriented knowledge that they can apply without additional training. In addition, the business is focused on the creation and implementation of innovations in its activities, the carriers and initiators of which are employees. In this regard, an important criterion for choosing a specialist is his strategic thinking and innovative views in professional terms.

Young professionals themselves also have a number of needs, in the implementation of which both educational institutions and business representatives participate. The primary need is not just education, but the development of a new profession. Already in the senior year of bachelor's degree or the first year of master's degree, a young specialist has made an informed choice of his future profession and wants to develop professional skills associated with this choice. Realization of this need is carried out through individual trajectories of training [13]. In addition, the student needs practice, and educational institutions actively interact with business [14, 15], acting as a link to meet this need. Throughout the training, the realization of this need is carried out in educational institutions through the organization of practices and internships. Also, a young specialist needs to develop practice-oriented knowledge, in the formation of a real portfolio for the employer, in obtaining practical skills, both through internships and through integration into the business environment.

So, the identified key needs of the subjects involved in the formation of professional and personal competencies of specialists are deeply interrelated and affect the process of human capital development in companies, depending on the extent to which they are satisfied. As already mentioned above, one of the effective ways to increase the level of satisfaction of these needs and solutions of current problems for university education, and therefore for companies operating in the knowledge economy, is the creation and implementation of integrated educational projects that combine academic knowledge and practical competence.

2.2. Integrated educational projects
In the course of the study, the initial hypothesis that an integrated solution is needed, which would allow to cover at the same time the key needs of all subjects involved in the formation of professional and personal competencies of specialists, was confirmed. Taking into account the findings, the concept of an integrated educational project was formed, its components, advantages and disadvantages were determined, which is described in detail in this paragraph.

An integrated educational project is a set of activities oriented at acquisition of knowledge of several types (academic, specialized and professional), as well as practical skills, connecting a variety of formats (case-championship, workshops, master classes), target audiences and accumulating the interaction of educational institutions and business.

According to the results of the study, integrated educational projects for young professionals should be based on several accumulating components:

1. Academic learning as a basis for the formation of skills and competencies of young professionals. The main performer here is an educational institution, additional - business companies and agencies as a source of practice.

2. Specialized learning as a basis for the formation of knowledge in a particular professional field. The main performer here are companies and universities offering courses of DPO aimed
at practice and conducting training in a narrow specific area in a short time. Additional performers may be organizations from the business environment, offering educational programs in the format of master classes, workshops and courses, offering practice-oriented content [16].

3. Practical skills as a basis for the formation of general professional and highly specialized competencies. The main performer here are business companies and agencies that interact with young professionals, conducting training in a practical format (case Championships, internships, strategic sessions), an additional performer is an educational institution as an organizational structure and a link that forms an individual trajectory.

4. Independent work as an integral part of the regulation of their own professional trajectory [17], comprehensive development and obtaining additional skills needed in further work activities. Independent work predominantly includes specialized training, Soft Skills, as well as academic training on online education platforms.

So, the integrated educational project is a unifying link for all subjects interested in the formation and development of human capital: educational institutions, business representatives and students. The synergistic effect is achieved through the accumulation of opportunities of these subjects and the use of mechanics that stimulate proactivity and independent work and development. The system of interaction of these subjects is presented in figure 1, taking into account the identified needs and the resources available to the subjects, which they are willing to invest in the educational process.

Figure 1. The scheme of interaction of the subjects participating in the process of formation of competence of specialists through integrated educational projects

Being at the junction of the usual for educational institutions and important for a deep understanding and development of professional disciplines of academic content and market practice, which is included in the integrated educational projects by studying cases, inviting speakers, practitioners, solving real market problems, integrated educational project becomes the key factor that accelerates and deepens the development of professional disciplines by students. The place of the
integrated educational project in the system of knowledge obtained by students in the process of training in higher educational institutions is shown in figure 2.

![Figure 2. The place of integrated educational projects in the system of knowledge received by students of higher educational institutions](image)

In addition, the results of the study revealed possible shortcomings of integrated educational projects. These disadvantages are the complexity and, depending on volume and duration, the high cost of such projects, the need for comprehensive training and additional training of teaching staff working with students in the process of integrated educational projects, the inability to conduct a project exclusively by educational institutions and the mandatory search for partners in the view of companies corresponding to the profile of students’ training fields of activity.

As highlighted by the results of studies of advantages of integrated educational projects can be their complexity, the combination of academic knowledge, creating a powerful platform based on real market practices, tasks, interactivity, and a focus on the practical development of students' professional skills, close to real market conditions, flexibility (allows you to adjust the project during its preparation and implementation, depending on changing environmental conditions), increasing the proactivity of students as a result of participation in such projects, preparation of students for real conditions of work in companies based on the results of participation in these projects.

2.3. Integrated educational project Marketorium

To assess the impact of integrated educational projects on the development of human capital, a study was conducted on the basis of the Marketorium project, as well as recommendations were prepared and the project was adjusted in accordance with these recommendations.

The Marketorium project is an integrated educational project in the field of marketing, which includes several formats for obtaining knowledge and professional competencies and cooperates with the master's program "Innovative marketing" of ITMO University, as well as with other educational institutions and business entities, including marketing, branding, digital agencies, Russian and international companies in various fields.

The main idea of the Marketorium project is to create an educational and competitive environment that brings together students, teachers, company representatives and expert practitioners to exchange ideas, experiences and inspiration. Future marketers, participating in the various activities of Marketorium, simultaneously develop in three important areas: educational, scientific and practical, which will be discussed in detail later in this paragraph.

Within the framework of the educational direction of Marketorium School, students receive knowledge of a practice-oriented nature in the professional field. There are the following formats of classes: master class, workshop, creative workshop and case study. To ensure the practical component of the Marketorium School classes are conducted by invited experts-speakers from marketing agencies and partner companies. In addition, students can initiate the creation of courses for certain topics that
are in demand for them. This is an important component [18], as students also participate in the development of their own training program.

For the development of students in the direction of scientific activity, the study of trends, market innovations and modern marketing tools twice a year, the Marketorium Forum is held, where speakers from large companies and marketing agencies are invited to share their practical experience and talk about innovations in the field of marketing. The forum consists of several parts: speech marathon, case marathon, creative sessions and workshops. It was revealed that many students and young professionals would like to start forming a personal brand of a marketing expert to create a professional portfolio, move up the career ladder faster and accelerate the development of the profession. To meet this need, the Marketorium Speech project was created within the framework of Marketorium and Marketorium Forum, which includes speeches by young marketers on the common platform of the forum. The purpose of Marketorium Speech is to show students and novice professionals that despite their little experience, they have interesting cases and topics for discussion, and to provide an opportunity to speak on stage, thereby forming a personal brand of a marketing expert.

The knowledge and skills acquired in the framework of educational and scientific directions should be implemented in practice so that the skill is fixed, and the student can develop it further in his professional activity. This function is performed by the practical direction – Marketorium Game. It includes several business games and a marketing accelerator of startup projects, participating in which students can work with cases of large companies in conditions as close as possible to the real market, or develop their own project. Thus, students and young professionals implement their knowledge, get practical experience and cases on working with well-known companies in a professional portfolio. This training of students helps to remove the existing barrier of future employers, expressed in the concern that the young specialist has no experience and will not be able to immediately perform their work effectively, as well as increases the professional confidence of the student, removing the stereotype that large companies do not work with young professionals.

In addition, the Marketorium project creates additional value in all three areas, forming a professional community, developing social ties between students, young professionals, representatives of companies and experts from marketing agencies, which also has a positive impact on the formation and development of human capital in companies in the knowledge economy. This community exists both in the online environment, which is very important in the era of digitalization [19], and actively interacts offline. As a result of the work with this project, recommendations were prepared and implemented to finalize the project, aimed at expanding the project line to meet the needs of a larger number of target audience groups and strengthening its impact on the formation of human capital.

3. Results and Discussion

3.1. Assessment of the impact of integrated educational projects on human capital development

Measuring the efficiency of intangible resources, such as human capital, is quite difficult due to the complex specifics of the object of study [20, 21]. Therefore, for the final evaluation of the results of the use of integrated projects and their correlation with the development of human capital, we have identified a number of criteria. The measurement of results was based on meeting the needs of the project subjects. In addition, we noted that the participants of integrated educational projects are more prepared for work and offer non-standard solutions in professional activities. This fact directly affects the growth of innovation within the company, and therefore the development of human capital.

The conducted researches allow to estimate influence of the integrated educational projects on development of the human capital as positive. This conclusion was made on the basis of the following data, based on the achievement of meeting the needs of the subjects of interaction.

First, the positive impact is expressed in improving the quality of training of young professionals, which was noted by employers. Such young professionals are ready for changes and unplanned changes in the process of work, as well as generate creative solutions within the framework of tasks, based on the use of knowledge and experience in the framework of integrated educational projects.
Secondly, the positive impact is reflected in the increase in the number of companies applying for participation in such projects. This not only affects the development of the network of University partnerships, but also contributes to providing young professionals and students with good places to develop knowledge and practical skills, which also increases the flow of applicants to educational programs that are integrated into such projects (an example is given in Table 1).

| Table 1. The number of applicants who registered for the master's program "Innovative marketing" of ITMO University in 2017-2019 years and entered it according to the results of entrance tests (according to the information system of the University). |
|-------------------------------------------------|------------------|------------------|
| Number of registrations for this program         | 2017 year        | 2018 year        | 2019 year        |
| Number of applicants admitted on a budget basis  | 324              | 321              | 412              |
| Number of applicants enrolled on a fee basis     | 87               | 85               | 85               |
| Competition for this program at the University - 1,8-2 people per place | 9                | 10               | 14               |

Third, positive impact is reflected in the growth of scientific activity of universities, promote science and improve accessibility for students and to increase the development and deployment of innovation in a business environment and educational institutions.

Fourth, the positive impact is expressed in increasing the number of young professionals working in the specialty. This is achieved due to the presence of an impressive portfolio of students at the time of graduation, as well as professional skills acquired in the framework of real work with the company. Young professionals are more confident in their qualifications, and therefore are not afraid to go to work in the specialty, including immediately on the management positions of the middle level.

The activity of the Marketorium project on the basis of the master's program "Innovative marketing" of ITMO University has allowed to achieve the following results, steadily recorded over the past 5 years:

- employers are willing to invite successful Marketorium participants (winners of competitions, case-tournaments, participants of acceleration programs, students of special courses, intensives and schools) for training and work – every year about 100 people receive such invitations,
- the pool of business partners of Marketorium is growing, business representatives put forward initiatives on new formats of cooperation, new projects with their participation, willingly become members of expert commissions, participants of strategic and creative sessions, which gives them the opportunity to directly interact with students and select among them the most motivated and competent; currently, the pool of active, regularly participating in the project partners is more than 50 subjects,
- students of the master's program "Innovative marketing", as a rule, find a job in the specialty during training, and after graduation in accordance with the profession or in related fields, more than 80% of graduates work (according to the results of the annual survey and monitoring of career tracks of students and graduates),
- develops multi-format, open and grow new projects Marketorium focused on different target audience (startups, marketers in various innovative industries), to meet the needs of the participants more individualized, taking into account special requests, to provide real choice for fulfillment, find their professional niche; this leads to an increase of student satisfaction such organization of educational process and receive knowledge and skills - conducted 2 times per year surveys of the satisfaction is over 85%.

3.2. Recommendations for the implementation of integrated educational projects in the educational environment
Based on the results of the research and work on the implementation of the integrated educational project Marketorium in the process of training and training of marketing specialists on the master's program "Innovative marketing" of ITMO University, the following recommendations can be made for the development and implementation of similar projects in other educational institutions:

1. It is necessary to conduct a study of the needs of the intended target audiences of the project as the first stage of work on an integrated educational project.
2. The development of the project should be carried out by specialists taking into account these needs and focusing on meeting all of them to create an integrated proposal.
3. In the process of working on an integrated educational project, special emphasis should be placed on the creation and development of new formats and educational mechanics based on interactivity, flexibility of approach, integration of academic and practical content.
4. After the formation of the value proposition and the essence of the project, it is necessary to work out a strategic phased plan for its implementation in the work of the educational institution and the learning process.
5. Special attention should be paid to the creation of a partner network around the project, establishing partnerships to enable active involvement of business in the learning process of students.

As for the further development of the Marketorium project, the following recommendations were made as a result of the work:

- further development of the integrated educational project, its improvement according to results of intermediate researches after the allocated stages of work;
- development of individual trajectories on the master's program, allowing to satisfy various requests of students for the development of certain professional competencies, more widely use the available opportunities of both the University and existing partners, and to master in a short time a greater amount of academic and practical content.

4. Conclusions
As a result of the research, the impact of integrated educational projects on the development of human capital was considered. According to the results of this study, we can say that:

1. The needs of the subjects involved in the formation of professional and personal competencies of future specialists: educational institutions, business representatives and students themselves, in the future – young professionals in companies, are as follows: for educational institutions – the release of specialists in demand in the market in the economy of knowledge, the demand on the part of applicants, the creation of additional values that affect the choice of educational institution, the achievement of goals in terms of scientific work;
   for business representatives and companies – the need for specialists who are ready to join the workflow, the need to create and implement innovations;
   for students-the development of a new profession, the need for practice, practice-oriented knowledge, the formation of a real portfolio, integration into the business environment.
2. The concept of an integrated educational project includes such key points as combining several types of knowledge, formats of work and target audiences. The peculiarity of integrated educational projects is the accumulation of such components as academic training, specialized training, practical skills, independent work. The specifics of the implementation of this type of projects in practice implies a long and comprehensive preparation, taking into account the interests and needs of all target audiences in an integrated proposal, paying special attention to the selection of partners.
3. The introduction of an integrated education project in the learning process and training have a positive effect on the formation of their professional skills and competencies, increasing the employment rate of young professionals in their field of study, the number of students applying to the master's program, which was held implementation of this project as well as the number of companies applying to an educational institution for cooperation of such a plan.
Therefore, thanks to this research, it was revealed that the introduction and development of integrated educational projects is a way of forming the human capital of companies operating in the knowledge economy.

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