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BASIC INTERACTIONS BETWEEN MEMBERS OF THE KNOWLEDGE MARKET

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Abstract: The interconnections and information interactions between main members of the Knowledge Market are presented in the paper.

Keywords: Knowledge Market, Components of the Knowledge Market, Information Interaction

ACM Classification Keywords: K.4 Computers and Society – K.4.0 General; K.4.4 Electronic Commerce

Introduction

The growth of the global information society shows that the information and, especially – knowledge, becomes important and necessary article of trade. The open environment and the market attitudes of the society lead to arising of the knowledge customers and knowledge sellers, which step-by-step form the "Knowledge Markets". As the other markets the Knowledge Market is the organised aggregate of participants, which operates in the environment of common rules and principles [Markov et al, 2002].

The Structure of the Knowledge Market was presented in [Markov et al, 2002]. Let's remember its basic elements.

Usually a person or enterprise, called Employer (Er), hires Employees (Ee), who have exact skills and knowledge and transform them in real products or services during the work processes. This process is served by the Manpower Market. But the Employees, even owning a high education level, need additional knowledge to solve the new tasks of the Employers. In this moment they became customers of new knowledge, who arouse the necessity of the Knowledge Market, which should rapidly react to the customers' requests. In other words, the Manpower's Market causes the appearance of the Knowledge Market. These two members of KM form one side of the market – the knowledge customers.

The continuous changing of technological and social status of the society leads to appearance of new category – Consultants (C) – peoples/organisations, who have two main tasks:

- to promote new technologies to Employers in convenient way to implement them in practice;
- to determine the educational methods for training the staff for using the new technologies.

The educational process is carried out by the Lecturers (L), who transform new scientific knowledge into the pedagogical grounded lessons and exercises.

During the realising the concrete educational process the Lecturer is assisted by Tutor (T) who organises the educational process and supports the Employees to receive the new knowledge and to master theirs skills.

At the end of the educational process, a new participant of KM appears – Examiner (E) – who tests the result of the process and answers to the question "have the necessary knowledge and skills been received".

These six Components of the Knowledge Market, which contact each other via global information network, form the first level of the knowledge market, called the level of the "information interaction".

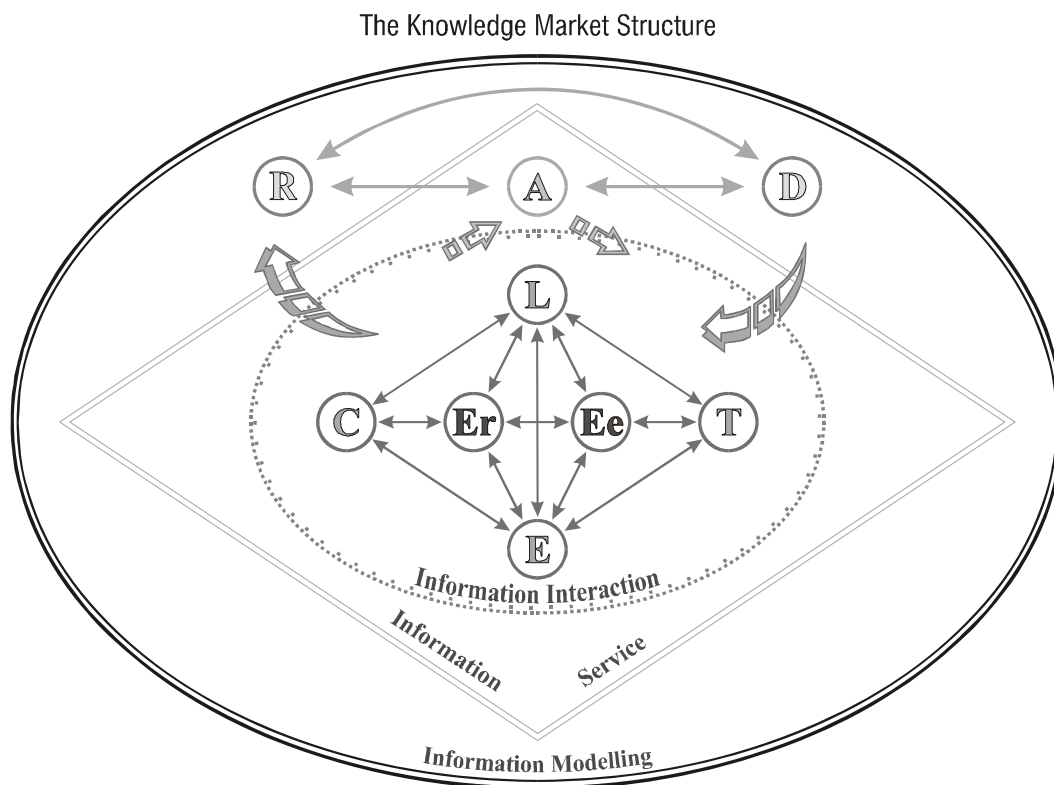
As far as these components are too much and are distributed in the world space, the organisation and co-ordination of theirs information interaction needs adequate "information service". It is provided by a new

component called **Administrator (A)**. Usually the Administrators are Internet and/or Intranet providers or organisations.

The rising activity of the knowledge market creates the need of developing modern tools for the information service in the frame of the global information network. This causes the appearance of the high knowledge market level, which allows the observing the processes, as well as developing and implementing new systems for information service. This is the "information modelling" level.

It consists of two important components – the **Researchers (R)** and the **Developers (D)**.

On the figure below is presented the scheme of the basic structure of Knowledge Market.



Of course, the Knowledge Market as a kind of Market follows the rules and laws given by the social environment. The interrelation between government and social structure and Knowledge Market need to be studied in separated investigation.

In several papers we have already investigate different problems of the Knowledge Market.

Some of the results given below are received during these works. For five years we have seen that the Knowledge Market is very important scientific area and need to be investigated. The main received results are given in [Markov et al, 2000a], [Markov et al, 2000b], [Ivanova et al, 2001], [Boikatchev et al, 2001a], [Boikatchev et al, 2001b], [Markov et al, 2002], [Ivanova et al, 2003], [Markov et al, 2003].

In global information society the e-commerce becomes as fundamental way for financial support of the Knowledge Market. The advantages of e-commerce are obvious. In the same time there exist many risks for beginners at this kind of market. From this point of view the society need to provide many tasks for training the citizens to use properly opportunities of the new environment [Markov, 1999].

The Interconnections between Members

In this section, the interrelations between members of the Knowledge Market are outlined. For easy reading we will denote the Knowledge Market's members with abbreviated names as they were given in the structure above. The next convention concerns the style of description of the corresponded interconnections. We consider that in every such interconnection the both participants have equal rights and the order of writing is not important. For instance, the denotation "L – T" represents the interconnection between Lecturers and Tutors without any precedence of any of them.

Er – Er

The group of the Employers in given domain causes the growing of the Knowledge Market in this direction.

The products of some Employers develop the new technologies, which are used from other Employers. This causes the development of the Knowledge Market in these new directions.

The role of the Employer from the point of view of the Manpower market is to buy and hold more qualified and skilled workers for less money in competition with other Employers.

Er – Ee

The Employer buys the result of the work of the Employee, which is closely depended to the received knowledge and skills, in one hand, and the possibilities of the Employee to realise them in concrete results in everyday work, on other hand.

The Employee informs the Employer for already received knowledge and skills or his intention for future. He need to prove this knowledge by correspond qualification procedure.

The Employee has to realise the requested knowledge and skills during the working process, because the Employer pays for the real results of the work, but not for the possibilities.

Er – C

The Employer can take advises from the Consultant for optimisation or future expansion of his business.

The Employer may ask the Consultant about information for the other components of the Knowledge Market or for the Knowledge Market as whole.

Special Interest for the Employer may be the data about the degree of the knowledge and skills of the Examiners, because of the importance of theirs role for the employers business.

One of the main tasks of the Consultants is to advise the Employers who can be the appropriate Lecturers or Examiners for the manpower they need.

During the interaction with the Consultant the Employer defines his intentions for the future of his business. This way the Consultant receives information about the future growing of the Knowledge Market. The Consultant investigates this growing by the interaction with the two types of Employers:

- Manufacturers of new products and technologies, which production will income on the real market;
- Users of the existing products and technologies.

The first type of Employers grows up a new niche of the Knowledge Market – the knowledge about using, service, etc. of theirs new products, technologies or theories.

The second type influences over the increasing or decreasing of that niche. From other side, the investigation of this group can focus the attention to the new problem, which solving may generate a new niche in the Knowledge Market.

Er – L

The Employer may consult the Lecturer about the present' and future' needs and changes of the business, he manages. The initiative for such consulting process usually belongs to the Lecturer, or to the Consultant. The Employer becomes as the corrective of the futures Lecturers' work.

During the interaction with the Employers, the Lecturer receives theirs:

- requests for training and additional education of new skilled Employees;
- requests for consulting the specialists already appointed in the enterprises of the Employers;
- requirements for preparing adequate educational programs and courses for theirs Employees;
- In the same time, the Lecturer gives information to the Employers for the level of the skills received by the Employees during the implemented courses.

Er – T

The direct interactions between Employer and the Tutor are not so strong, i.e. the direct interaction between the Tutor and the Employer is not always present.

In one side, the Tutor organises the educational process in correspondence to the requirements of the Employers' business work environment. Usually the Consultant defines these conditions directly or through the Lecturer. The Employer defines the concrete duties, which usually are subset of the Consultant' recommendations.

Meanwhile the Tutor contacts directly with the Employer, if it's a question of consultation, check of the level of the skills and knowledge or re-education of already hired Employees.

The Tutor has to establish appropriate educational environment for training the Employees to satisfy given requirements.

In other side, the Tutor can receive the concrete information for the current Employees, which information may facilitate the learning process.

Er – E

The interaction between Employer and Examiner is aimed to define the specific characteristics, which the Employee has to satisfy. These characteristics are subset of the general requirements and rules for given business activity. Usually the Consultant in collaboration with the Employer generates the definition of the specific rules. It is possible, during the process of qualification of the Employee, the set of rules to be changed in direction to extend or to shrink in correspondence to:

- The real needs and possibilities of the Employer;
- The set of candidates for given workplace.

The Employer can ask the Examiner to examine some of the employees, which already work for the Employer in accordance with the current (or near-future) duties-rules.

The Examiner informs the Employer for the Employees results in the education course.

Er – A

It is clear that the concrete needs of the given Employer are subset of the general Employers' information model. In every concrete case as well as for every concrete event the Employer needs specialised administration support.

The Administrator interacts directly with the Employer for:

- co-ordinating and service the information interaction between him and other Employers as well as with all other Knowledge Market participants;

- advising him how to use the information service tools to establish interconnections;
- placing the tools and lines for distant information exchange at Employers' disposal;
- supporting the creation of the specialised internet and/or intranet sites and other communication possibilities for representing the Employers;
- Software and hardware support of Employers' activities.

Er – R&D

There are several sources for financing the scientific research and its implementation in the Knowledge Market.

The main sources are the Employers. They may order specialised research and developing of correspond tools, which may extend service of the Knowledge Market in the new directions.

Another source is the government or public financial support. In such case the corresponded authorised institutions became as specific Employers but the scientific results could not be implemented immediately. This possibility is very important because of the increase in the production of scientific "garbage".

As corollary we have two types of interaction between Researchers, respectively – Developers, and Employers:

- Interaction based on concrete request and corresponded scientific or practical projects;
- Interaction determined by future prognostic government, social or scientific goals, needs, expectations, etc.

Ee – Ee

The connections between Employees are mainly in two dimensions:

- collaboration with others during the educational process;
- competition with others in the Manpower market as well as during the educational process.

The collaboration is very important because of possibility to receive new knowledge from "colleagues" and the need to discuss in free style the problems arisen from the tasks given by the Lecturer and the Tutor.

Competition has significant role in growing the personal knowledge and skills.

Ee – C

The Employee receives information from the Consultant usually through the other components of the Knowledge Market and in rare case directly. This information concerns the present and future growth of the Manpower and Knowledge Markets and serves the orientation of the Employee in the social environment. This knowledge may help the Employee to make decision for his future professional and social growing.

In addition, the Consultant makes studies on the state of the Employees' commonwealth and generates conclusions about the advance or reduction of any parts of Knowledge Market.

Ee – L

From point of view of the Employee the Lecturer is integrated set of education sources, from which he can receive general or specialized knowledge and skills.

The Lecturer transfers knowledge to the Employees, using modern methods and devices of delivering. He participates in development of the training program, study materials, study tasks and exercises that the Employees should be carried out during the training before beginning of the educational process.

During preparation of a course the Lecturer should give study materials, which can be written in appropriate formats and media and the references to the additional sources of information.

The Lecturer may be connected with each Employee directly and has access to the discussion forum and the Employees' diaries where he can estimate the Employees' knowledge and make the comments.

Ee – T

One very important point of the interaction between the Employee and the Lecturer is to determine the currently received knowledge and skills level of the Employee for choosing the appropriate approach and capacity of the material for education. This process needs to be supported by the Tutor.

The tutor directs and plans the education of the Employee. He also plans and organizes Employee's interaction with the Lecturer and informs the Employee about all the courses that he can get from the Lecturer.

The Employee demands from the Tutor maximal effective organization of the educational process for acceptable expenses.

Let's remark that the concept of acceptable expenses closely depends of financial status of the Employee. These expenses include not only concrete charges for education, but also the charges for existence of the Employee during the educational process.

Ee – E

The Employee must prove to the Examiner that his received knowledge and skills cover chosen qualification level. If the Employee does not cover all the requirements, the Examiner need to explain in appropriate form what the Employee have to learn in addition. These explanations need to be directed to the Tutor (respectively to the Lecturer) for future extension of the education of this Employee, his group or whole educational process.

The Examiner conducts the Employee's attestation on different levels of the education course. Within the interaction with the Employee, he gives him the terms and the conditions of the test or exam Employee's about take. The Examiner sets the tests and gets the Employee's answers.

At the end, the Examiner takes a decision for a final or level test and gives the Employee a certificate based on the tests.

Ee – A

The Employee interact with the Administrator for receiving the appropriate information service for every of given above information interactions.

The concrete needs of the given Employee are subset of the general Employee' information model.

The specific characteristics of the Employee such as physiological characteristic, language specific, professional background, national and religious affiliations, the level of skills for using the information service, etc. strongly influence to the type and degree of the automated information service, provided and conducted by the Administrator.

Ee – R&D

The interaction of the Employee with the Researches and Developers mainly is based on the using of the tools and approaches for information service of the education and self-education.

In this interaction the Employee usually play passive role.

As a rule, the Researchers carry out specialized research or general investigation and developing of corresponding tools for information service. These tools are provided for the specific characteristic of given group of Employees or, respectively, for common (future) needs of the Employees' group.

C – C

The interaction between Consultants may be structured at least on three levels:

- scientific level;
- business level;
- state (government) and social level.

At the scientific level, the Consultants interact to investigate new theoretical or practical domains and to generate new common knowledge. As a rule, this interaction is based on the scientific norms for collaboration and exchange of the new ideas. Some political or socioeconomic processes as well as the business restrictions in the given field may restrict this interaction.

At the business level the main goal of interaction between Consultants is to extend already existing knowledge for decision of concrete practical problems. It is important to remark that often the experts in the same domain do not collaborate because of the concurrency between them.

At the state (government) and social level the Consultants play subordinate role to the Government or Social Institutions, such as the parliament, ministry, syndicates, associations, foundations etc. The knowledge of the consultants plays advising role for the decision making of the governing organization or institution. In such way this knowledge became active in the Knowledge Market.

C – L

The interaction between Consultants and Lecturers has significance place in the Knowledge Market. The Consultants are the sources of the new knowledge and the Lecturers need to be continuously in touch with them.

In many cases the Lecturers collect parts of knowledge from different Consultants and integrate it in educational materials. This way the Consultants may affect to the educational processes in the Knowledge Market.

Beside of this, the Consultants may influence the Knowledge Market by theirs ability to investigate the results of the previous cycle of education and to draw conclusions for eventual corrections in the educational processes.

At the end, the Consultants are the persons or organisations that can and have to test and certify the Lecturers in given knowledge domain.

C – T

At glance, the Consultants and the Tutors not interact at all.

The interaction may be realised indirectly by other components of the Knowledge Market – mainly by the Lecturers.

Nevertheless, they exchange via Knowledge Environment much information for practical implementation of the Consultants recommendations for Employees training.

C – E

The main goal of the interaction between Consultants and Examiners is to clear the real needs of the Employers for high qualified and skilled workers. The Examiners need exact information what the Employees really have to know. The qualification procedure includes large scale of tests and other examination steps. For every one, the Consultant may be the source of the knowledge.

In this interaction the Consultants may influence by:

- conclusions for the results of the previous qualification cycles;
- certifying the Examiners in given knowledge domain;
- playing role of the Examiner.

The Examiner receives from the Consultant new test materials and education methods of conducting the attestation activities and informs the Tutor for the results of the use of the new attestation materials and methods.

C – A

The Consultant interact with the Administrator for receiving the appropriate information service for every of given above information interactions.

A specific characteristic of this interaction is the ability of the Consultant to interrupt any of the educational processes in the Knowledge Market via the Administrator's support. This interruption need to be done when from point of view of the Consultant:

- any new events, external for the educational process, appear and the structure of given steps of the educational process need to be changed;
- any deviations in the educational process have registered by the Consultant.

In this role the Consultant can be qualified as a regulator of the Knowledge Market. This is very important that the main way the Consultant can play this role is by the support of the Administrator.

C – R&D

The interaction of the Consultants with the Researchers and Developers usually is provided in two directions:

- the Consultants became as a source for information modelling of their work;
- the Consultants assist the creation and verify the implementation of the information models of the other components of the Knowledge Market. In this interaction the Consultant usually play active role.

Let's remark that the second function is very important not only of the work of the Researchers and Developers, but also for the stability and growing of the Knowledge Market.

The interaction of the Researchers and Developers with the Consultants is caused by:

- the needs of the scientific information modelling of the consultants' work as well as the activities of all connected to them Knowledge Market subjects;
- the implementation of the information models – in this case the Consultants need to play active role to assist the creation and to verify the realisations of scientific models.

The integration of the Researchers' and Developers' knowledge with the Consultants' one is very important for the making correct and appropriate solutions.

L – L

The main goal of the interaction between Lecturers is to deliver concrete material and pedagogical methods as well as to exchange their educational experience.

In other hand, the competition between Lecturers in one and the same subject can harm the Knowledge Market stability. In the same time, just the competition is the source of stimulus for the Lecturers advance and growth.

L – T

The Lecturer keeps in touch with the Tutor in mean to present him the information and educational materials needed for developing the curriculum during the education course as well as consults him in given application domain.

The Tutor is the Lecturer's main assistant – he has a permanent contact with the Lecturer and plans the interaction between him and the Employees. The Tutor gets the latest information about Lecturer's knowledge and education courses, and helps him to build the advertising strategy for the Knowledge Market. The Tutor also helps the Lecturer in using modern information technologies.

L – E

The Lecturer consults the Examiner about the plans for providing the tests and exams, as well as about the methodical recommendations for the contents of the tests and the educational methods for organizing and providing them.

The Examiner informs the Lecturer for the results of the attestation activities and suggests corrections to the current educational process.

L – A

Owning the basic wares of the knowledge market, namely the knowledge information objects, the Lecturer needs everyday information service for each one of the information interactions.

The Lecturer has to receive the actual knowledge and data and accumulate them, transforming in a resource for selling as a ware at the Knowledge Market.

The Lecturer always has to take into consideration all the specific characteristics of the customer of every ware (such as language specification, professional orientation, nationality and religion, information services' skill level etc.). So he has to own this kind of data as well. This type of information service of the Lecturer should be realised by the Administrator.

The interaction between the Administrator and the Lecturer consists in realization the hardware and software support as well as for all participants of the Knowledge Market, and in particular – service for realization the main function of the Lecturer – receiving new knowledge information objects and their transformation in the new articles of trade.

L – R&D

Special attention needs to be paid to the interaction of the Researchers and Developers with the Lecturers.

For some of the specific types of activity (like rapid and/or network education) the Lecturer can order special scientific research or a development accorded to the devices and the technologies, which can enlarge the service of the Knowledge Market in new direction. Such special scientific investigations and/or developments the Lecturer can order to the Researcher and the Developer, cooperating with the Employer. The Lecturer has to receive the information for the new scientific results and research-based technologies created from that participant in the Knowledge Market, and deliver it to the Employees.

The Lecturers play leading role for Employees' education and training. Because of this, the continual investigation of their possibilities and activities is very important.

The main goal of the interaction between Researchers and Developers and Lecturers is to enhance the effectiveness of the Lecturers work.

The achieving of this goal requires to build appropriate models of the Lecturer activities and to develop convenient subsidiary tools for receiving the new information and knowledge and creating educational courses and additional illustrative material.

T – T

The Tutors transfer to each other the educational plans, and compare the information needed for the coordination of the different courses of the whole education process.

In the same time, the competency of the Tutors is not enough to control the educational process. Because of this the collaboration between Tutors need to be provided through the Lecturers and under theirs management. Individual Tutors' initiative may cause embarrassments during the knowledge exchange.

T – E

The Examiner receives from the Tutor the plans for the expected tests and exams conducting as well as the test materials.

He also informs the Tutor for the results of the attestation activities.

T – A

The Administrator supplies the Tutor with all needed hardware and software support for realisation of his activities – mainly connection with other participants, especially with the Lecturers, Employees and Examiners, for organising the education cycle.

As far as the Tutor's role is often played by the automated systems, the Administrator may perform a part of the Tutor duties – especially in the cases of the self-education.

T – R&D

The interaction between the Tutors and the Researchers and Developers is usually realised through the Lecturers. The Tutor doesn't take decisions about using new methods or technologies without Lecturer's opinion. He can get the new information from the Researchers and Developers and transfer it to the Lecturer. Only the Lecturer can decide how to use it.

The accent of the investigation of the Tutor's activities lies on the increasing the effectiveness of the organization of educational process as whole. The major element of this organization is the coordination with the other Knowledge Market participants (mainly with the Employee, Lecturer and Examiner) and external structures for optimal planning the activities of the participants in time and in place.

E – E

The Examiners transfer to each other the results of using attestation materials and methods.

At the state (government) and social level there exist similar structures, which are aimed to examine the educational organizations and to give them rights to provide the education in accordance to government and social requests.

E – A

To keep the knowledge level needed for conducting the Employee's exams, as well as all the information interactions, the Examiner needs everyday information service. It should be realised by the Administrator. The Administrator supplies the Examiner with all needed hardware and software support for realisation of his activities – mainly connection with other participants of the Knowledge Market for preparing and processing the process of the educational testing.

E – R&D

Taking into account that the main activity of the Examiner is to estimate the available knowledge and skills of the learner in the beginning, intermediate and final stage of the educational process in order:

- to evaluate the possibilities of the examinee person (Employee);
- to guide and correct the educational process, provided by the Lecturer and the Tutor;
- to estimate the adequacy of the received possibilities in given learning cycle to the requirements of the Employer, which usually come to Examiner via Consultant,

the major tasks of the Researcher and Developer are:

- to investigate pointed Examiner's activities;
- to build their appropriate information models;
- to develop correspond tools for information servicing of these activities.

A – A

As a rule the single Administrator could not support and serve all information activities in the global net. Because of this he needs of participation of other Administrators in his concrete information service activity.

The Administrators of the Knowledge Market are the part of the global administrators' society for the information service and support of the business and social activities.

A – R&D

Every Administrator became as a source of information for building the Knowledge Market Administrator abstract information model by the Researchers and Developers.

The Administrator is the integrating component that is always in connection with all participants in the Knowledge Market. Because of this, he is valued helper of the Researchers' and Developers' work for investigation and modelling the components and communication processes between them.

In other hand, the implementation of the results of the Researchers' and Developers' work closely depends on Administrator's activity.

R&D – R&D

As a rule the single Researcher could not support and serve all investigation activities in the global net. Because of this, he needs of participation of other Researchers in his concrete scientific work. The same is true for Developers. So, the Researchers and Developers of the Knowledge Market need to be part of the global society of Researchers and Developers.

Special interest for us is the interaction between Researchers and Developers.

As it is remarked above, the Developers are obligated to implement new scientific knowledge for advance of the Knowledge Market information service and to abide by the scientific rules and recommendations.

Contrariwise, the Researchers need to interact with the Developers for collecting knowledge for implementation of the scientific results and theirs possibilities as well as for the new and not investigated areas of the Knowledge Market information interaction and service. Such way the Researchers may extend theirs knowledge and generate new scientific results to be implemented in the practice. So, the cycle "practice – science – practice – etc." may be complete.

Conclusion

In this paper the interconnections and information interactions between main members of the Knowledge Market have been presented. The discussion has been based on the direct interconnections between Knowledge Markets' participants. It is clear that there exist many indirect relations and influences which need to be investigated.

The Knowledge Markets are social phenomenon and, because of this, one very important task, not included in this paper, is the investigation of the relations of Knowledge Markets and other social formations. At the first place, it is obligatory for the government organizations to regulate and control the functionality of the Knowledge Markets.

Till now there not exist special laws and other normative documents aimed to regulate the interactions at the Knowledge Markets. Our expectations are turned to future research just in this area.

At the end we need to point one crucial direction for future research work. The new kind of human interconnections at the Knowledge Markets requires new pedagogical approaches. We are at the beginning of new kind of knowledge exchange based on the market principles and regulated by market laws. Many beginners will be embarrassed by the unknown environment and this may cause great social problems. The payable electronic way for exchanging the knowledge information objects will throw aside the destitute groups of people as well as nations of the world.

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