

# Improving the Partnership between the Participants in the Vertical Chain of the Construction Market

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**Abstract** – On the construction market the participants tend to work in the short term and are limited rational using the accumulated knowledge and experience in their practice. In addition, it is characterized by a low level of inter-company connections, i.e. the same team seldom works together more than one project, resulting in a fragmentation of responsibility. The complex relationships between the firms involved in the vertical chain of value creation in construction objectively impose the need for their improvement and more efficient management. The aim of the study is the analysis the possibilities of creating a relatively stable relationship and a joint approach of clients, contractors and subcontractors by deepening the specialization and differentiation of each intermediate product, improving the quality of the final product, optimizing the costs, creating a higher additional value at each stage of the chain and ensuring economic, social and environmental performance of construction.

**Keywords** – *construction firm, construction market, integrated vertical chain of management, public-private partnerships (ppps), strategic alliances, vertical connections and constraints, vertical integration*

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## 1. INTRODUCTION

General trend in the development of modern economies is increasing role of the market in the allocation and use of scarce resources. This means that the process is carried out from private individuals, companies, which in their behavior are mainly guided by their personal interest and the realization of higher profits. On the construction market, participants tend to work in the short term, difficult to perceive innovations, and are rationally limited by using the accumulated knowledge and experience in their practice. A common feature is also the low level of inter-company relations, which means that the same team rarely works together more than one project. In other words, each project involves companies that are collected temporarily only for the realization of the project and specific goals. At the same time, these firms are likely to be involved in other projects where they coordinate their actions and allocate resources to other companies involved in the supply chain. Each construction firm realizes simultaneously several different, individual projects within the framework of its more widely defined mission and vision for development, which requires coordinating its actions with other companies outside the scope of each project.

The complex relationships between the firms involved in the vertical chain of value creation in construction objectively impose the need for their improvement and more efficient management. Unlike the construction market, other industrial activities are characterized by relatively few independent elements and a much higher level of coordination and management that allows the use of standardized procedures and products and provides higher quality, improved management and economies of scale. This suggests that the construction market is necessary improvement of the level of communication between the participating companies, development of partnership, whether formally through contracts or simply achieved through informal relations, which allow the creation of multidisciplinary teams of investors, architects, designers, contractors, end-users at the very beginning of the project. A partnership is required, which means a joint approach by customers, contractors and subcontractors to optimize costs, create more value at each stage of the chain, deepen the specialization and differentiation of each intermediate product, enhance the quality of the finished product, which can provide economic, social and environmental efficiency of construction.

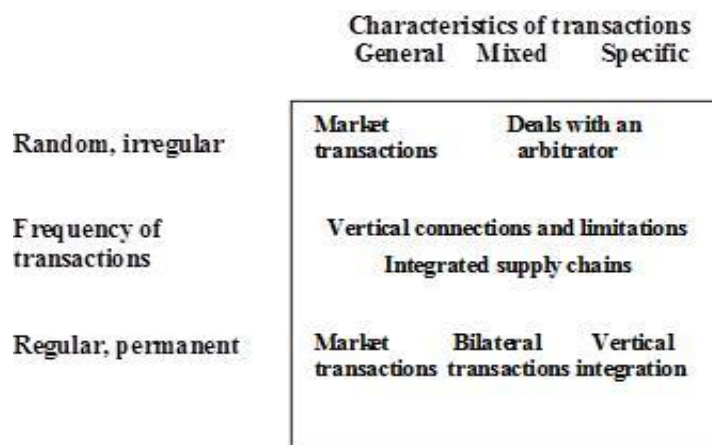
Realizing this goal is far from simple, especially when there is no trust and effective cooperation between the participants [1]. On the one hand, there is no commitment from larger contractors to subcontractors for training, education, innovation development, initiatives to improve organization and management of the activity, improvement of working conditions and environmental protection. On the other hand, the subcontractors (who actually carry out the projects) accept the projects they realize as prototypes, which is why many of the problems that have arisen during the implementation of some projects are not analyzed, but they are assumed to be normal functioning of the business. At the same time, solving a problem, a task in a single project, can and should be passed as a positive experience in subsequent projects. For this purpose it is necessary link between all participants sharing experiences and multiply each had a positive effect. Gathering information and revealing the essence of the problem can only happen with the active participation of all employees in a given company and the other companies participating in the vertical chain. Motivation and incentives for employees are a factor to overcome the problem and create a more efficient organization.

Many of the problems are created by other participants at other stages of the construction process, resulting from short-sighted vertical chain management and difficult to remove from one firm. Contractors and sub-contractors do not want to recognize the impact of their behavior on other activities and stages. As a result, the problems are solved in a piece for the moment, which means high costs and inefficiency. Furthermore, there is often a causal link between problems along the chain and solving a problem means awareness of dependence and a common desire to overcome the problem through long-term cooperation, which is rarely happening.

The construction market prevailing short-term contract, which means that the parties have no interest in investing time and resources in such endeavors. Moreover, in the context of a decline in construction activity, short-term contracts allow the contractor to rationalize, optimize its activity by stopping it and reducing the number of subcontractors with which it works. This policy does not provide sustainability of construction in the long term and opportunities for quality improvement. These problems in the vertical chain of value creation in construction, objectively indicate a need for improvement and more effective management. The aim of the survey is: 1) analysis of the factors that influence the choice of vertical relations by the construction firm, 2) analysis of the directions for development and improvement of the relations between the companies participating in the vertical chain.

## 2. SELECTION OF THE VERTICAL RELATIONSHIP OF THE CONSTRUCTION FIRM

Problems in the vertical chain of links in the construction market, the impact of unfavorable factors make the seller and the buyer look for a relatively stable relationship. The choice of vertical relationships for each firm depends on the nature of the relationship between the firm and its partners (buyers and suppliers) and is determined by the frequency and complexity of the transactions between the two parties (Fig. 1). Market transactions are preferred for occasional or regular transactions, which are the subject of these transactions - a product with common features. The specifics of the deal, the product subject of the transaction and their increasing frequency itself as the most effective policy of vertical integration. The integrated vertical control chain and the system of vertical connections and constraints occupy an intermediate place but have a growing importance in company policy and practice, both because of the higher end efficiency and because of the limitations and control of vertical mergers imposed by antitrust law in each country.



**Fig. 1** Selecting the vertical relationship of the construction company

The process of vertical integration is mainly aimed at uniting the successfully functioning units of the production process into a single chain. Due to the specifics of the construction market there are four types of transactions that make vertical integration particularly effective [2]:

- 1) Transactions that require the use of specific assets by the seller or buyer. The specificity of the company assets is one of the main motives for vertical integration. These transactions include specialist vendor assets that are used only by a few buyers or physically specialized, specific buyer assets that require specific resources provided by a small number (often a single supplier) of suppliers and also the specialization and specificity of the human resources used in a given production that are acquire only subject to the requirements of the buyer.
- 2) Uncertainty of the deal, which makes control very difficult.
- 3) Asymmetry of information received by the buyer (when the resource provider presents true but incomplete information to their partner).
- 4) Need for extensive coordination, which means high costs and time to realize the goal.

The main reason for the vertical integration of companies is the increase in transaction costs. Merging with subcontractors and/or suppliers and/or distributors reduces these costs and turns them into internal company costs. In addition, control over important raw materials can provide the company with competitive advantages over other companies that are now denied access to this source of raw materials. Vertical mergers with feedstock suppliers create prerequisites for increased costs for competitors' production or penetration costs for new firms. Through the merger, the suppliers become employees of the company which ensures their loyalty and reduces asymmetry of information. On the other hand, vertical mergers of companies enable rhythmically to be supplied with vital raw materials, better control over the quality of raw materials used, and reduction of production and transport costs.

Most often, vertical integration with sellers (resource providers) or forward with buyers leads to an increase in production capacity, technology competencies of the company and creates opportunities for using and transferring larger cash flows between individual enterprises and stimulating research and innovation. So large, leading construction companies create complex holding structures, which bring together a large number of subsidiaries, specialized in a particular activity from the different stages of the construction process or in the production of a product for a particular market segment. This is also proof of the high degree of horizontal integration achieved in them, which is an important condition for their higher efficiency - achieved economies of scale, pooling more financial resources and flexibility, adaptability to market changes. In addition, these companies include in their structure and companies related to the investment activity, the valuation and realization of real estates and of course the production and trade of building materials. These processes of horizontal and vertical mergers cover the whole process of vertical links in the construction market and reduce the monopoly power of suppliers and buyers.

Because of the high resource intensity of construction activity, the construction company links as buyers of building materials with its suppliers are particularly important. The supply of building materials is carried out by several large companies involved in an oligopoly structure (the concentration of this market reaches 60-70%) which are the active part of the entire construction process. These companies realize significant economies of scale and have high production potential, which is an important factor in reducing costs and hence in raw material prices. In turn, construction companies (contractors and subcontractors) also aim to reduce their costs (usually by around 20-30%) and the main factor for the realization of this goal are the relations and relations with the suppliers of materials. The relative share of materials used is about 40-45% of all construction activities. This share is relatively smaller in maintenance and repair of buildings and facilities, and significantly higher in the construction of new buildings and facilities. Construction firms strive to provide timely, reliable supplies and receive materials, different components at a lower cost, at best, favorable conditions for the payment of credit. Large construction companies negotiate directly with large manufacturers or wholesalers at discounts for large purchases. The highly concentrated market, with low competition between the suppliers of building materials on the one hand, and on the other hand the less concentrated and higher-performing construction market, gives the impression that strong suppliers exercise their market power. Practice shows that the suppliers of building materials do not use or impose a monopoly or oligopolistic power on the construction market. For these reasons, large unions of suppliers of building materials and construction companies are rare in practice.

Large construction companies build their own production bases for building materials, near the territory where they are localized, which provides them with stability, rhythmic

delivery and, most importantly, lower transaction and transportation costs. Vertical alliances usually implemented such as large construction companies buy small companies - manufacturers of building materials or are starting to develop their own business. Similarly develops and integration forward with distributors, real estate agencies.

In today's conditions, the most effective form of development of vertical relationships in construction that creates competitive advantages is the system of vertical connections and constraints and the integrated vertical chain of management. The vertical connections are relations of control and constraints in the activity of two independent, independent construction companies, which participate in successive stages of the production process. Vertical constraints help solve mismatches which derive mainly from asymmetry of information. In a relationship between a buyer and a seller of a construction product, asymmetric information can lead to the problem of "principal agent", which means one company to realize the benefits of the other company without paying for it.

A particularly effective form of interaction between all companies involved in the vertical chain of construction activities is the integrated vertical chain of management. It is a network of firms, organizations, activities that engage in links - up and down in different processes and create value in the form of end-user products and services. Thus, the scope of chain management covers the production and supply of materials, the production of the next product, the end product and its realization to the end user. Every participant in this chain depends on the other participant and active cooperation is needed in order to achieve higher efficiency. This cooperation is achieved through long-term relationships, connections, seamless collaboration and information sharing.

Firms in the integrated vertical chain of management share information and coordinate within the established chain, providing maximum benefit to all participants. Furthermore determine accurate assessments for execution of transactions and to assess the effectiveness of the chain. The final results in integrated vertical chains are an improvement in customer service, reducing inventories throughout the chain, offering a better product, realizing higher profits throughout the life cycle of the product and build a competitive advantage for participating companies.

The integrated vertical chain of management implies competition with other chains, not between companies, which allows achieving:

- 1) Higher efficiency of logistics, which includes planning, organization, coordination and control over the performance of the obligations of each participating company. The basis for this is the permanent links and the exchange of information between the participants - the construction firm-buyer and the firm-seller (contractor, subcontractor or supplier of building materials).

- 2) Establishing long-term partnerships between all participating companies based on common interest and good personal relationships, which is factor for joint problem solving, information sharing and risk. In view of the good end result, the active participation of suppliers of building materials is particularly important throughout the process - from design to realization of the object together with the construction contractor. This reduces costs by up to 10% and increases productivity.

The basis for effective joint work in the integrated vertical chain is trust. Effective connections between all participants combined with effective management of all units of the vertical chain with other good practices of customer relationship management ensures greater competitiveness on the market and allows creating a high quality, differentiated product with specific features desired by customers, as well as a reduction in production costs and the price.

### 3. GUIDELINES FOR DEVELOPMENT AND IMPROVEMENT OF THE LINKS BETWEEN THE FIRMS IN THE VERTICAL CHAIN

One major opportunity to improve the links between the firms in the vertical chain and especially for the development of the small subcontractors is to unification with other companies and create strategic alliances. They are defined as "voluntary partnerships between firms on the basis of contractual relationships that allow for development and change through cooperative production and the development of the end product created through the transfer of technology, knowledge and services" [3], with the participating companies retain their relative independence in the time of its existence, i.e. are practically excluded and no merger and takeover processes are observed.

Strategic alliances can be realized both between companies that are equal partners and between companies with different market positions and potential [4]. If a small company participates in a union with a big, established firm on the market, it gives it access to the experience of the big ones, to the "good practices", the opportunity to improve the internal organization, to improve its activity, to expand the knowledge and to create a new, allowing initiate necessary changes. The creation of an alliance involving small, medium, equivalent firms limits the potential, reduces the flexibility to the dynamics of the environment and their future development. A small business has a chance to succeed if it participates in a strategic alliance where other actors have innovative capabilities and therefore the potential for technological and market change.

If for small business players in such a system the result is a better business and learning of "good practices", for big, key players, building these relationships is an opportunity to realize economies of scale and / or economies of scope, reducing switching costs associated with choice of suppliers and other contractors, which stimulates the development of innovations in a product, technology, and allows the creation of a higher added value for customers and thus the realization of higher profits. An important factor in achieving the desired success, greater than the success that can be realized in each individual company taken or a synergy effect is the realization of the necessary control and coordination of the overall activity.

The links in the strategic alliance are developing on the activities of the included firms that create separate parts, elements, components of the final general product. The company leader, a key player, sets the standards, the product requirements created at each stage of total production. Under these conditions, the small company must develop and deepen its specialization and differentiation of the created product. Realizing a common objective requires maintenance of formal and informal links between different companies and personalities based on the generic resource created by acquiring different assets. A key success factor is access to information, experience and their exchange in order to solve current problems. Building effective links at all levels, formal and informal, the trust between all subjects is critical for each union (fig.2).

The unification between companies can to ensure a more efficient allocation and use of scarce resources, the realization of a synergistic effect in one or more companies, successful adaptation to external changes, through know-how, knowledge sharing, information, technology and products, which in turn increases the productivity and effectiveness of vertical links.

Another major direction to improve the performance of the construction company and the effectiveness of buyer-seller relationships, especially in the civil construction market, where the buyer (state and municipalities) has a strong monopsony power is the development of public-private partnerships (PPPs). The need for higher efficiency of the

public funds used, coupled with the increasingly limited budget opportunities, require reorientation of the state from a policy of acquiring assets to a policy of getting a service. In practice, this means involvement of the public sector in the overall process of design, construction, financing and exploitation at shared risk between the public and the private partner.

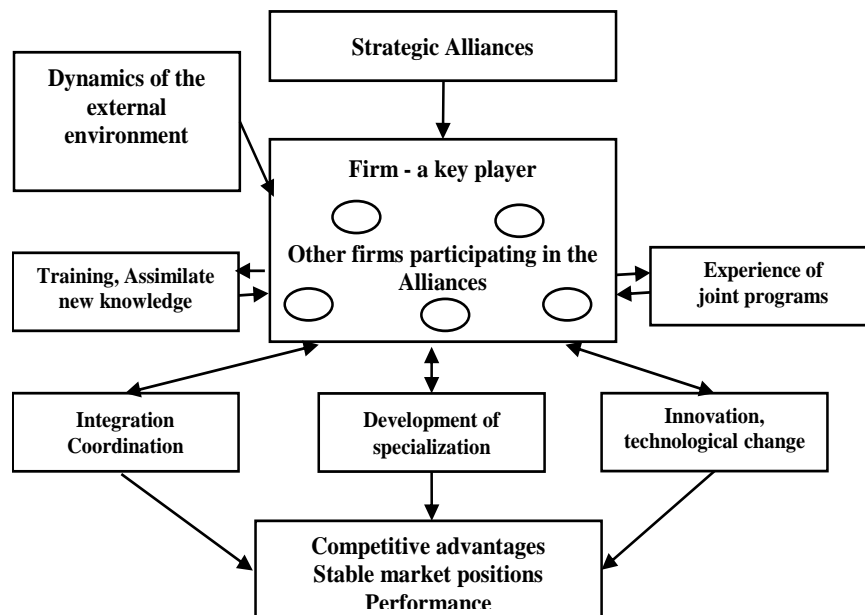


Fig. 2 Strategic Alliances

Traditionally, the state finances the construction of infrastructure as a threat to the realization of the object of a company contractor. After completion of the construction works the state is committed to the maintenance and operation of the sites, taking all risks, related to the construction and operation of these sites- higher prices than forecast, quality control, execution on time, etc. PPPs is a long-term contractual relationship between private and public sector entities for the financing, construction, reconstruction, management and maintenance of infrastructure in order to achieve a higher level of service, with the private partner assuming the risk of construction and at least one of the two risks associated with the availability of the service or its search. Payments for the service provided by the private partner are bound by its quantity and quality and the state reduces its payments when providing a different service of the desired quality and quantity. PPPs offers and provides the necessary quality of public service because:

- 1) There is a holistic approach to the design, construction, and exploitation.
- 2) Payments from the state are after providing the desired service in the desired volume and quality, which means that it is without obligations in the construction phase.
- 3) Risk-sharing between participating partners means that the state transfers to the private partner the financial security risk and the construction of the site and it remains the risk of ensuring the demand for the service offered, with which to cover the costs of the investor.
- 4) PPPs actively use private resources and experience which provides effective use of resources within the set budget and time of realization of the site.

The basis for the successful operation of the PPPs system is to ensure a better, higher value of the public funds, defined as Value of Money, by carrying out full control and analysis of the costs and benefits of the project. The assessment is made using quantitative methods that determine the net present value (NPV) and a qualitative analysis of the project's economic efficiency. This quantitative and qualitative assessment of the service is compared with a benchmark, called comparable public expenditure (CPE). CPE includes all costs, also in line with risk, if the site is implemented by the public sector. If the net present value (NPV) is higher than the comparable public expenditure (CPE), the realization of the object of PPPs is more efficient and gives higher Value of Money. The realization of this higher value (Value of Money) is primarily the result of innovative private partner searches and the optimization of the overall design and construction cycle. Especially important is the problem of conducting transparent tender procedures and making a mechanism for the determination of net present value (NPV) and comparable public expenditure (CPE) and their comparison.

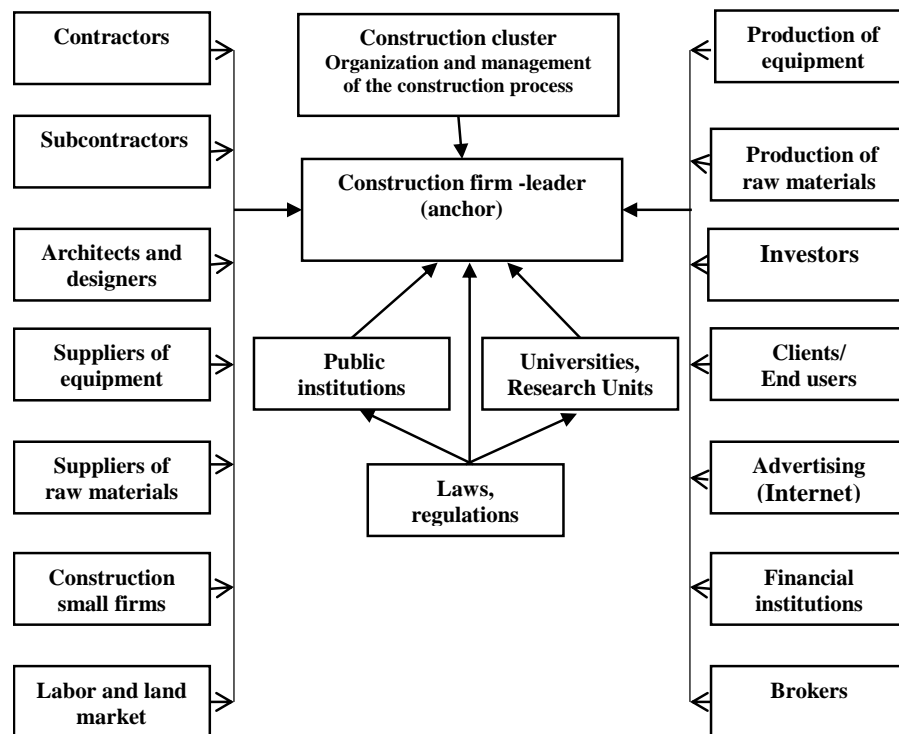
PPPs system must be supported by well-developed and working mechanism for making payments, which may be direct charges paid by users, hidden fees (the state pays to private partners and the source of the money is paid by all citizens) or all costs are borne by the state and it allocates payments for the entire period of the contract concession. The state must take the risk of demand differently than expected (greater or less) and to compensate for the risk assumed by private partners increasing additional payments at lower demand and vice versa. The creation of PPPs also requires active participation banks, consulting firms, with the help of which to define the structure, the relationships of the actors involved and to share the risk.

As world practice shows, the benefits of PPPs are associated primarily with the proposed lower price, higher quality and timeliness of the performance of the objects, realized by private partners, which increases the efficiency of the vertical links in the construction and minimizes the risk. PPPs combine innovation, experience and business sense of the private sector with the ever-increasing need a good infrastructure of public sector which ensures higher profits for private companies and higher efficiency for taxpayers.

A more effective partnership between the public and private sectors can also be realized by creating a construction cluster, which includes interconnected companies/subjects, involved in the vertical chain of created value - construction company with strong positions - leader or anchor, investors, suppliers of construction equipment, raw materials, architectural and design offices, contractors and subcontractors, distributors, marketing and advertising agencies, state and local public institutions, universities, research units, construction (branch) organizations, each with specific rights and obligations (Fig. 3). Clusters are geographically concentrated associations (region, state, or even a city, and may be extended to neighboring towns, regions, or even neighboring countries), which primarily recognize the priority of education and research and provide specialized training, education, information, research, technical support of the participating firms and whose activities as a whole are developed on competition and cooperation [5].

The efficiency of clusters is due to the applied integrative approach to various activities, projects that are interconnected, complementary. The main factor ensuring the efficient functioning of the construction cluster is the availability of a basic, leading company (often called anchor), well-built infrastructure, and access to markets, raw materials, social services and financial resources. Most cluster participants are not direct competitors, they work on different market segments, have common problems, opportunities and threats in their business. Practice proves that the success of the cluster is

primarily a function of the development and use of intangible assets (innovation, knowledge and education) that are the basis for building an effective system of inter-firm relationships on trust. Opportunities for coordination and mutual improvement of activity in each cluster reduce the risk of ineffective competition or limiting the intensity of rivalry. The realization of these processes depends to a great extent on the built personal relationships, communication and networks of private persons and institutions. Close links with buyers, suppliers, and other institutions are an important factor for the realization of competitive advantages company goals, while at the same time the system does not exclude competition between participating companies, on the contrary- it implies. Especially important is the availability of an educated workforce, proximity to research, higher education, an entrepreneurial spirit and culture that values education and knowledge. These services must be provided by public institutions.



**Fig. 3** Construction Cluster

The public sector plays the role of an intermediary between participating private firms, a role of initiator of programs and concrete implementation plans, a listener of problems that need to be quickly mastered and resolved. Public institutions at national or local level have three main objectives:

- 1) Ensure cooperation, interaction and equality to all actors involved and to create conditions for a strategic partnership.
- 2) To maintain the necessary infrastructure - transport, social and opportunities for permanent development, training and raising the qualification of the required workforce.
- 3) Ensure coordination of the different programs and funding of interconnected activities, not individual activities and projects that are isolated from one another.

Interaction, cooperation and competition with all participating companies in the construction cluster requires the creation and implementation of new business models, where specialization, the development of open innovation of the company and its cooperation with other interconnected and complementary companies and assets are central. The creation of the construction cluster facilitates the creation of an effective integrated vertical link system, because it includes from related and supporting the main production activities, "from the development of innovation and the idea to its realization".

#### 4. CONCLUSIONS

The object of study in the article is the complex relationships between the companies participating in the vertical chain of value creation in the construction. The construction market has ineffective vertical links between the participating companies as they tend to work in the short term, there is a low level of cross-company relationships, meaning that the same team rarely works together more than one project and is usually absent among the participants trust. On the one hand, there is no commitment of larger contractors to subcontractors for training, education, development of innovation, initiatives to improve its organization management of the activity, improvement of working conditions and protection of the environment, and on the other hand, the subcontractors (who actually realize the objects) accept the projects they realize as prototypes without analyzing and solving any problems. The problems show that it is necessary link between all participants sharing experiences and multiply each had a positive effect.

The final construction products which are in demand by consumers are a complex system of different elements, components, parts with strong functional dependence, which to a large extent defines and the need for unification between most independent firms in a vertical chain, and is a factor for the application and development of best practices in the field of design, construction, maintenance and reconstruction.

There is a need for partnership, which means a joint approach of clients, contractors and subcontractors in order to ensure the economic, social and environmental efficiency of the construction. In modern conditions, the most efficient form of development and improvement of vertical relationships in construction is the integrated vertical chain of management. Integrated vertical chain management is based on competition and includes a network of companies, organizations, activities that cover the entire construction process (from production and supply of materials, the production of various intermediates, to the creation of the final product and its realization) and create value in the form of end-user products and services. Efficiency is achieved through cooperation and long-term contracts, long-term relationships, links, continuity of collaboration, information sharing and trust. The establishment and effective management of an integrated vertical chain of links and competitive relationships is an important factor in stimulating innovation, especially "open innovation", reducing information asymmetry and transaction costs, increasing specialization, developing technology inside and outside the company and their use in creating the final construction product.

According to the author, the main guidelines for development and improvement of links between firms in the vertical chain are related to building strategic alliances, construction clusters, development of PPPs, or simply informal relationships that allow the construction of multidisciplinary teams right from the beginning of a project, whose main purpose is to create an object corresponding to high expectations consumers and society, i.e. the requirements of sustainable construction. In the traditional approach of designing,

uncoordinated work of the various actors leads to permanent corrections and sometimes the necessary changes are noticed too late when started construction itself and removing them can be much more expensive. Therefore, the improvement of vertical links and coordination should start from the earliest stages of the project and require the application of integrated design principles (the approach to completed building systems) which means responsible commitment of all participants in the process from beginning to end: investors and clients, architects, constructors, designers, contractors and subcontractors, suppliers of raw materials, administrative authorities, lawyers, researchers, which in practice means substantial changes in the organization, coordination and management of the construction company at all levels and its vertical relationships.

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