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Project supply chain management and fintech startups – relationship

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Abstract

The primary purpose of the article is to show the role of fintech startups in the operation of project supply chain. In the first part, based on the literature review, the theoretical issues concerning the taxonomic view of supply chain and project supply chain were presented. These considerations formed the basis for designing a model of fintech startup functioning in project supply chain. The model was created based on the recent studies on fintech and young companies. The model distinguishes three basic elements: digital management, transaction business process and smart contract which determine the process optimization and the efficiency of implementing financial innovations in project supply chain. The proposed model can be a further inspiration for researchers to undertake studies in this area, while for practitioners it can be a valuable source of knowledge on the use of financial innovations created by fintech startups in business operations.

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1. Introduction

A project supply chain is not often the subject of research as there is a lack of historical data from which to research and draw conclusions. As a result, there are many cognitive gaps that have not been filled in despite significant achievements in the field of logistics, especially in the field of supply chains. The problem, however, is that researchers often have difficulty with distinguishing many concepts from such a field of knowledge, because apart from classic supply chains, there are also construction supply chains, project supply chains or even supply chain projects. Such a conceptual mix may cause problems related to understanding the matter in question, the more difficult it is to navigate in it and research selected issues. Additionally, it should be taken into account that enterprises and groups built from them must be flexible and resistant to changes in the environment. It is becoming

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more and more turbulent, which is undoubtedly the result of globalization and growing competitive pressure, as well as the sanctions imposed on Russia. Therefore, all innovations that should be produced and later implemented can be considered extremely valuable in terms of theory and research, as well as practical applications. With this in mind, it is worth trying to analyze the area of fintech (short for financial technology) and fintech startups in. This area is cognitively interesting for many reasons. The most important ones include, for example, that the latest technical possibilities, which are used by entities from this area to provide mainly financial services, can improve the speed of money circulation, and thus increase the balance sheet value of the company, which is not without significance in the era of the economic slowdown, which we are undoubtedly dealing with. Secondly, the activity of such entities will be able to reduce the cost of financing, therefore the cost of capital of a group of enterprises forming supply chains, regardless of their type, will decrease. It is obvious that as financing costs decrease, the market value of such entities and their groups will also increase.

The aim of the article is to fill in one of the cognitive gaps, the finding of which results from the conducted literature research, on the basis of which the conclusions presented in further parts of the work were drawn. It is related to the structuring of knowledge, through the defining of four concepts, i.e. construction supply chains, project supply chains and supply chain projects. In addition, the goal is also to characterize the terms fintech (as mentioned, short for financial technology) and fintech startups. Additionally, the relationship between the management capabilities of project supply chains in the environment of fintech startups was presented. All the considerations that were carried out were based on the literature on the subject, also using scientific reflection.

2. The project supply chain and other logistic forms

The literature on the subject concerning the field of logistics is deep and broad, however, one can often encounter numerous definition problems. Often the same concepts are defined differently, and a review of the literature shows that new ones are constantly being added. However, if you want to define the three concepts presented in the introduction in a precise way, it is worth compiling them in the form of a table (Table 1), which will allow you to capture differences and similarities.

Table 1. The examples of supply chain forms definitions.

A term	Definition
Supply chain	„A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers, and even customers themselves. Within each organization, such as a manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service” [2].
Supply chain project	Supply chain projects are “dyadic activities between existing alliance partners that have already established a relationship. These dyadic activities include joint-improvement of existing processes and/ or building new ones (e.g., designing new information exchange or electronic procurement systems)” [1].
Construction supply chain	Construction supply chain “ consists of all the construction business processes, from the demands by the client, conceptual, design and construction to maintenance, replacement and eventual decommission of building, and organizations, which are involved in the construction process, such as client/ owner, designer, general contractor (GC), subcontractor, supplier, consultant, etc. CSC is not a chain of construction businesses with business-to-business relationships but a network of multiple organizations and relationships, which includes the flow of information, the flow of materials, services or products, and the flow funds between client, designer, contractor and supplier »” [19].

Project supply chain	Project supply chain is “the global network used to deliver a project from raw materials to the final project customer through an engineered flow of information and physical distribution. A project supply chain thus involves the principal contractor who is in charge of the management of the project, the clients and their own clients, the suppliers and their own suppliers and subcontractors, the subcontractor and their own subcontractors ” [15].
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When analyzing the four definitions presented in the article, it can be noted that in a sense they show some similarities, although they characterize different beings. So we notice that their common feature is that they describe a set of links - that is, for example, enterprises that cooperate with each other, and this cooperation is quite close. Moreover, they present the view that these four entities are complex organizations, composed of many elements, that perform different functions. They are necessary for this mega-organization, as it can be called, to fulfill its most important role. Moreover, there is a noticeable emphasis on the flow of information between enterprises that create these entities. As for the differences, they mainly concern the essence of the activity of these entities, therefore it is also worth considering these differences. Well, the supply chain is the simplest form of the four mentioned, which does not mean that it is an uncomplicated entity. It is established to meet customer expectations. Against this background, the supply chain project is distinguished by the fact that it is an entity focused on improving or creating new processes, and therefore does not focus on creating a mega-organization, because it already creates it. The most characteristic entities are construction supply chain and project supply chain. The former is a unique supply chain that is built to carry out a construction project, the latter - to carry out any complex project. These two entities are distinguished by the fact that they may consist of many enterprises, the number of which may be counted in the hundreds [7]. Based on the literature research, one can get the impression that the number of works devoted to the issue of the project supply chain is poor. Nevertheless, its most important features can be listed, including [11]:

- creating it for a unique project, usually large,
- participation of enterprises that are also elements of other classic supply chains,
- the existence of a complex stream of materials, services, and money between its building blocks,
- specific duration, as it is built only for the implementation of the project;
- focus on maximizing the profits of both its links and the entire chain, regardless of the effectiveness of the entire chain,
- inefficiency of information flow in such a chain.

Due to the nature of the project supply chain, its graphical presentation including all possible elements of which it may consist is impossible. It was mentioned that it is a multi-element, complicated entity, which at the same time constitutes a meta-organization, established to perform many different functions. Its most important goal is the implementation of a specific project. It consists of three subsystems [7]:

- the first subsystem covers the production of materials,
- the second subsystem is called the operational one, it covers activities with the production of the final product,
- the third subsystem is responsible for the specification of each part of the final product.

It was mentioned that the project supply chain is an entity consisting of up to hundreds of companies. However, by focusing on the most important segments of enterprises that make up it, its concept can be presented as follows (Figure 1).

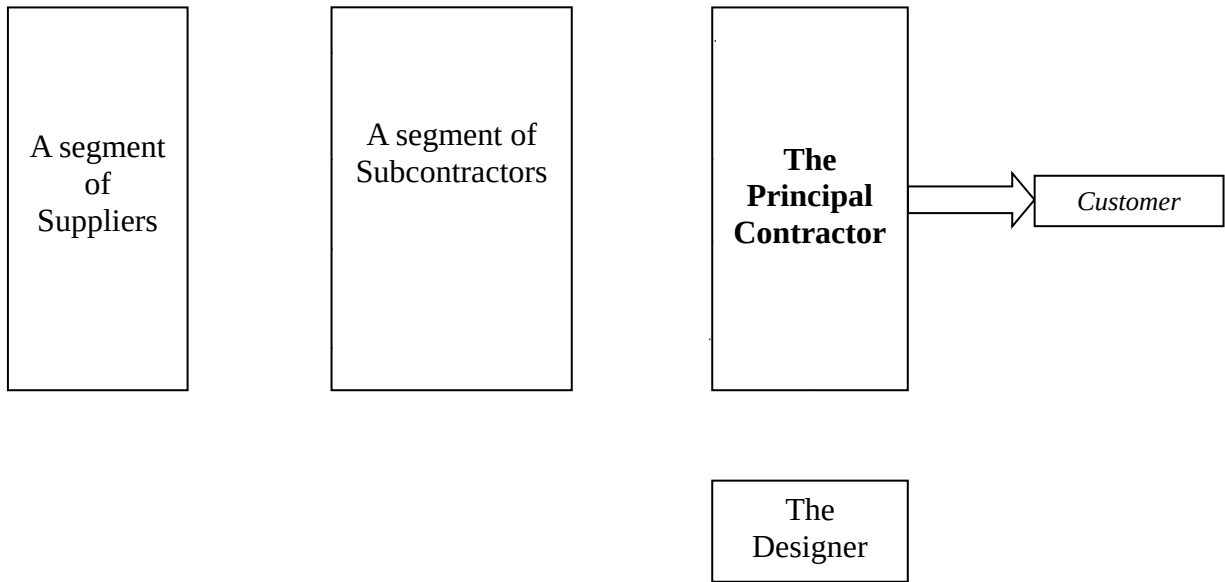


Fig. 1. The concept of a simplified project supply chain.

Without going into details, the project supply chain can be divided into three most important segments that cooperate with each other to meet the customer's requirements and implement a unique project for him. It belongs to them:

- a segment of suppliers,
- a segment of subcontractors,
- a segment of the principal contractor, together with its designer.

The principal contractor is the most important segment consisting of one link in the project supply chain. This is due to many reasons. First, it is responsible for coordinating the implementation of the project. Secondly, it manages the resources belonging to many links belonging to different segments, while making the most important and thus strategic decisions. The principal contractor works directly with the segment of subcontractors and with the designer. The first segment carries out orders, while the second develops a plan according to which the project should be carried out, thus deciding about materials and goods. This approach is important because these goods flow between the largest segment, and thus numerous links in the project supply chain. The segment of suppliers is precisely the segment through which the aforementioned materials and goods flow. The chain constructed in this way, implementing a unique project, is designed to meet the customer's needs. In terms of funding and the cash flow itself, the characteristics of a project supply chain can be problematic.

First, it can be made up of hundreds of companies, so that cash flows can move between many links at once, especially since they can also be links in other supply chains. Secondly, each of the links may have a different creditworthiness and thus a different level of risk identified in the balance sheets. Third, they may be unable to fulfil their function in the chain by various disasters which may reduce their operational capacity. Then, the restoration of "normal" operational capacity is associated with the use of resources that the cells may not have [8]. Fourth, cash flows can change their values over the course of the project, and therefore its financing which is extremely important to the success of the project, should also be taken into account when managing the project supply chain. It also seems problematic that the above issues are not areas covered in the literature on the subject.

Despite this, an attempt was made to indicate the most important places in the project supply chain, where broadly understood financing is extremely important (Figure 2).

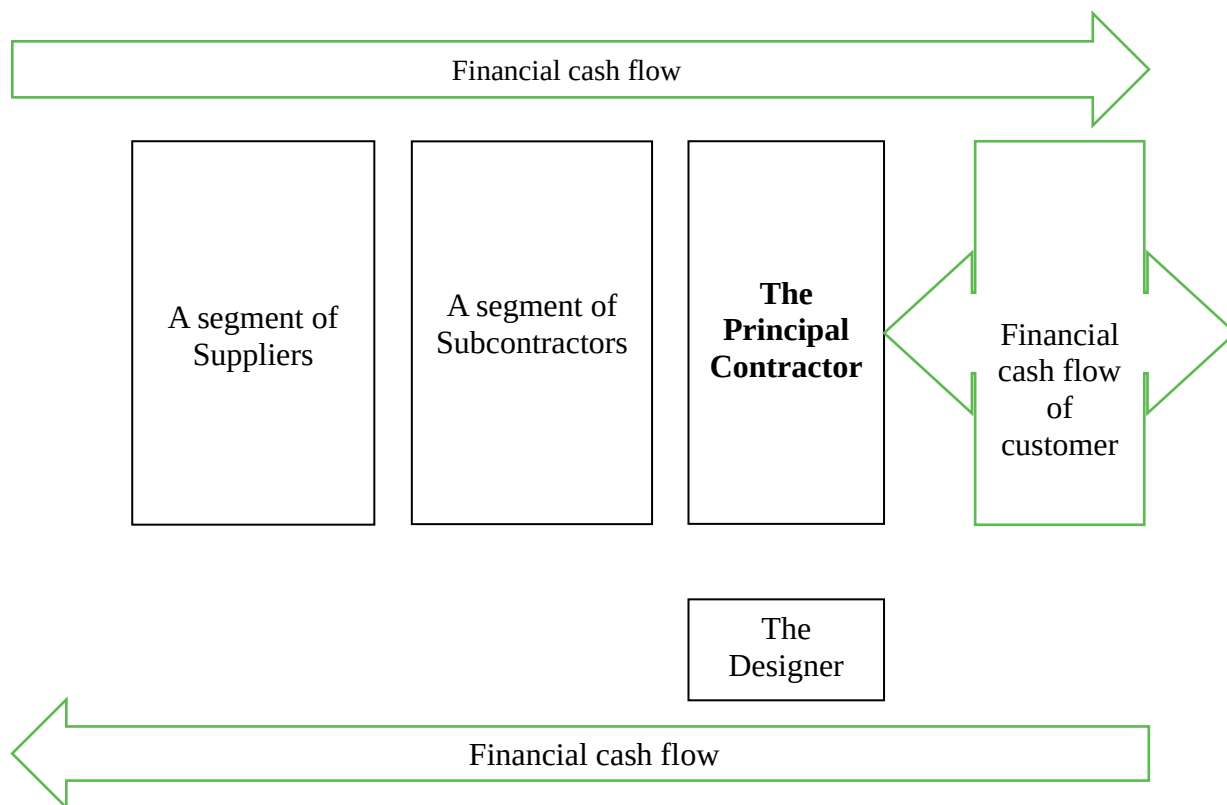


Fig. 2. The concept of a simplified project supply chain with financial cash flow approach.

When analyzing the project supply chain in terms of financing, its complexity should be taken into account, therefore it is impossible to capture the most important financial flows that can be encountered in its structure. However, such an existence needs diversified sources of financing as well as new opportunities to obtain financial resources. Figure 2 shows the possible directions of flows of financial resources, not only along the chain, but also across it. The principal contractor who is responsible for the project implementation is at the forefront of this financing map, therefore project supply chain management must take into account the efficiency of the cash flow while minimizing the project duration as well as an informed cost approach.

3. Fintech startups versus project supply chain

There are various definitions of fintech in the literature. Leong and Sung consider fintech as a technological financial innovation that results in new business models, applications, processes or products that have a significant impact on the operation of financial markets and the provision of financial services [13]. Varga [18] defines a fintech solution as an organization that, despite devoid of a specific legal form, is designed to provide forward-looking and innovative financial services with the use of new technologies[2]. Kim et al. see fintech from the perspective of the financial services sector which, with the use of information technology, is becoming increasingly important in building a global supply and value chain. The researchers also emphasize that, in individual terms, fintech should be considered as a company that provides payment and investment services by means of innovative

technologies [9]. In a similar vein, Milian [14] defines fintech as an innovative enterprise operating in the financial sector, which provides financial services through internet accessibility and automated and digitized information processing [14]. For Feng, fintech is financial innovation based on artificial intelligence, big data, cloud computing, blockchain technology and mobile internet [4]. In the stream of Feng's definition, Chen and other authors approach fintech as an organization that uses machine learning to create financial and technological innovations. This process is centered on seven interconnected elements and properties i.e. cyber security, mobile transactions, data - mining, blockchain, peer-to-peer, robo-advising and internet of things [10]. It is worth mentioning here that recent studies show that due to the use of machine learning in its activities, fintech is increasingly often seen as an entity that regulates market mechanisms in the cryptocurrency market as well as determines the strength of this market compared to other markets. Moreover, in the future fintech will also be an important regulator of electronic money [16]. In the context of considerations, it should also be kept in mind that an interesting definition of fintech is proposed by Lee, for whom it is a disruptor organization functioning in the financial market. Such a company is characterized by greater flexibility, security, efficiency and effectiveness than traditional financial institutions [12]. Zavolokina et al. distinguish three basic elements for fintech companies:

- input - the combination of applied technology, organizational structure of the company and capital flows,
- mechanism - the source of the process of creating the new or of modifying the existing financial solutions based on the use of technological innovations,
- output - creation and dissemination of a product or service innovation in the financial market [20].

Considering the above definitions, we can say that a characteristic feature of fintech organizations is the creation of financial innovations through the use of IT solutions. Thus, in the era of the industrial revolution 4.0 and the revolution 5.0 which started last year, the fintech operations are particularly concerned with the following areas: social trading, robo-advice, personal financial management, investment and banking, provision of payment services including alternative payment methods, blockchain technology, cryptocurrencies, lending marketplaces, mobile wallets, value transfer networks, FX wholesale [3]. In the current research on fintech, increasingly often the researchers highlight the role of startups that use innovative technology, mainly ICT-based, to create new financial solutions. In this view, fintech startups are defined as companies that do not have a scalable and repeatable business model, are most often not typical financial industry companies, and offer innovative solutions. Fintech startups create and use cutting-edge technology in the process of delivering value and financial products to the customer. It is also worth pointing out that there are three basic areas that distinguish a fintech startup from traditional financial companies.

The first component is customization. Fintech startups are young emerging companies, thus they need to create and offer customer-dedicated products and services in order to ensure their sustainable operations in the market. Unlike financial companies operating in the market, they constantly analyse customer needs and offer unprecedented solutions [6]. The second principal element that distinguishes a fintech startup from other businesses is data processing and the use of data analytics capability. With advanced technology, fintech startups are not only able to meet the value expected by the customer but also predict and to a certain extent influence future market trends. The third element is creating new monetization models. Due to the emergence of innovative technologies, fintech startup customers are not obliged to pay for products and services with money as there are other means of payment such as tokens, cryptocurrencies or even other services provided by customers to fintech companies.

Additionally, the solutions that fintech startups develop are more and more often used in the global supply chain [5]. Undoubtedly, this is happening due to the evolution of blockchain instruments, which, among other things, offer the execution of fast payments among the parties of a given supply chain. Moreover, a pandemic was also a key factor which exposed the vulnerability of global chains in terms of the movement of physical and financial capital. Thus, the demand for resilience, agility, and flexibility, especially as regards financial flows, has increased, resulting in enhanced interest in fintech-startups in the global market. The research also has shown that the majority of organizations operating in the global market would like to use such technological solutions as the blockchain to bring about significant improvements in the supply chain system in order to trade in a more secure, transparent,

efficient, and environmentally friendly manner, thereby increasing the trustworthiness of all supply chain participants [17]. In this regard, basing on the concept of supply chain, it is possible to design a model of fintech startup operation in the project supply chain (Figure 3).

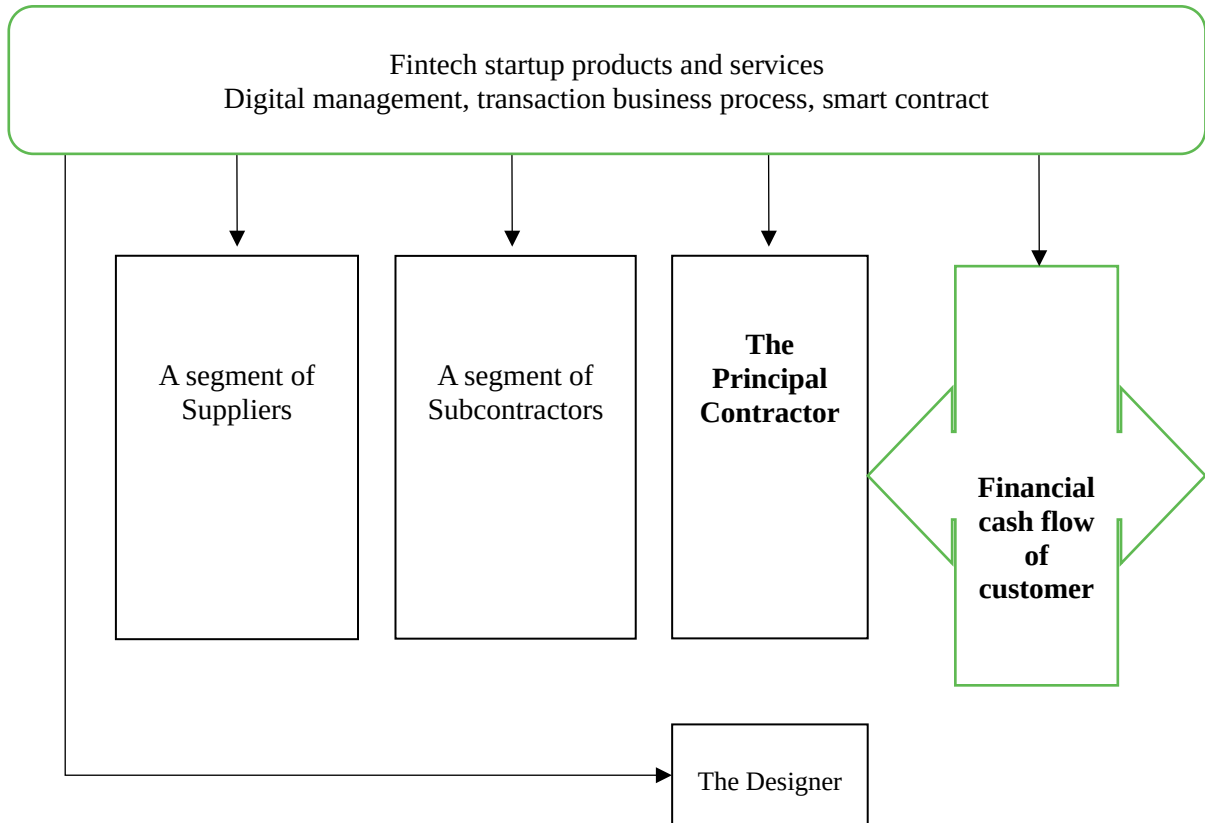


Fig. 3. The fintech startup in the project supply chain.

Supply chain participants can take advantage of solutions offered by fintech startups in three primary areas:

- digital management of the flow of assets, knowledge and communication between the participants of the project supply chain. This is possible thanks to, among others, the use of artificial intelligence, sensors, big data, cloud computing or the Internet of Things,
- transaction business process where new instruments and mechanisms of payments and settlements between players in the project supply chain are created using the blockchain concept
- smart contract, i.e. the application of technological tools to conclude contracts in the form of a computer program code, thus ensuring the self-executability and autonomous nature of its provisions.

The above fintech solutions applied in the process of project supply chain operation will permit to:

- optimize processes (reduce resource consumption; improve efficiency; automate and digitalize processes);
- create innovative processes and products (enhance effectiveness of R&D processes; create new business models);
- expand markets (increase accessibility to niche customers and global markets; help to identify customer needs better).

Considering the above, it seems that the concept of applying fintech-startup solutions in the project supply chain in the era of globalized digitalization development is nowadays a necessary condition to secure sustainable and effective operation of supply chain participants. Thus, in the years to come this concept will certainly become one of the main directions of research into the supply chain management.

4. Conclusion

The project supply chain is a multi-element and complex entity, not only due to the large number of links that make up it, but also due to the multitude of processes that accompany its functioning. The project supply chain is exposed to numerous risks that arise during the performance of its role by its links. It is also exposed to unforeseeable and difficult to identify factors, which results in operating under uncertainty that makes any analysis difficult. As a result of this, the analysis of the project supply chain, related to its various aspects, causes many problems, especially since the number of its links, counted in hundreds, increases the level of complexity. Despite this, the literature makes more and more attempts to analyze its functioning, although they pose a challenge to researchers due to the turbulent environment in which they usually have to function. On the basis of the conducted literature research, many cognitive gaps were discovered, one of them is the relationship between the possibilities of managing project supply chains in the environment of fintech startups.

The paper shows the essence of project supply chains and their most important elements, while at the same time displaying three basic elements for fintech companies. It takes into account a characteristic feature of fintech organizations, which is the creation of financial innovations in case there is the use of IT solutions. The considerations made allowed for the design of a model of fintech startup operation within project supply chain organizations, which can be considered cognitively interesting. Through the proposed approach, it was shown that project supply chain participants can use many solutions offered by fintech startups and should mainly consider three primary areas. To sum up, the presented concept of a fintech-startup in the area of such chains in the times of digitization and globalization seems to be a condition that should be considered necessary to ensure the effective functioning of links that perform numerous functions in large entities, which are project supply chains.

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