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NEW INSTITUTIONAL APPROACH TO COLLABORATIVE NETWORKS

ANNOTATION. Advancement in communication technology leads to expansion of different types of virtual organizations (VO), virtual enterprises (VE), virtual breeding environments (VBE) etc. commonly referred to as «collaborative networks» (CNs). A large number of research projects have been carried out worldwide in this area the last decades. Nevertheless, one of the main weaknesses in the area is the lack of appropriate theories, consistent paradigms definition, and adoption of formal modeling tools. The main objective of this article is establishing of theoretical foundation for collaborative networks based mostly on new institutional approach.

KEYWORDS: agency theory, collaborative networks, collective intelligence, new institutional economics, transaction cost, process virtualization theory, virtualization

АННОТАЦИЯ. Развитие коммуникационных технологий привело к экспансии различных видов виртуальных организаций, виртуальных корпораций и виртуальных инкубаторов обобщенно называемых «коллаборативными сетями». Несмотря на то, что в мире было проведено множество исследовательских проектов в этой области, ощущается нехватка подходящих теорий, единой парадигмы и инструментов формального моделирования. Целью данной статьи является исследование коллаборативных сетей на основе неинституционального подхода.

КЛЮЧЕВЫЕ СЛОВА: виртуальные организации, коллаборативные сети, коллективный интеллект, неинституционализм, теория агентских отношений, транзакционные издержки, теория виртуализации процессов

АННОТАЦІЯ. Розвиток комунікаційних технологій призвів до експансії різних видів віртуальних організацій, віртуальних корпорацій і віртуальних інкубаторів, що мають узагальнену назву «Коллаборативні мережі». Незважаючи на те, що у світі було проведено безліч дослідницьких проектів у цій області, відчувається брак відповідних теорій, єдиної парадигми та інструментів формального моделювання. Метою даної статті є дослідження коллаборативні мереж на основі неінституціонального підходу.

КЛЮЧОВІ СЛОВА: віртуальні організації, коллаборативні мережі, колективний інтелект, неінституціоналізм, теорія агентських відносин, транзакційні витрати, теорія віртуалізації процесів

According to European Collaborative networked Organisations LEADership initiative (ECOLEAD) predictions:»In ten years, in response to fast changing market conditions, most enterprises and specially the social media enterprises (SME) will be part of some sustainable collaborative networks that will act as breeding environments for the formation of dynamic virtual organizations». [5, page 5] And this forecast is being confirmed by rapidly growing amount of various virtual organizations (VO), virtual companies, breeding environments etc. and their adoptions by hundreds of thousands of companies and communities around the world.

In economic science the area of collaborative networks is already extended over two decades of research and development since the first results on virtual enterprises were published. An extensive amount of empirical base knowledge that now needs to be organized and leveraged has been gathered. A large number of research projects and

pilot applications contributed to the worldwide establishment of the area since then, generating a vast amount of concepts, mechanisms, models, systems, approaches, etc. Nevertheless, one of the main weaknesses in the area is the lack of appropriate theories, consistent paradigms definition, and adoption of formal modeling tools.

Collaborative networks is a collective term embracing various kinds of organizational forms (Figure 1)

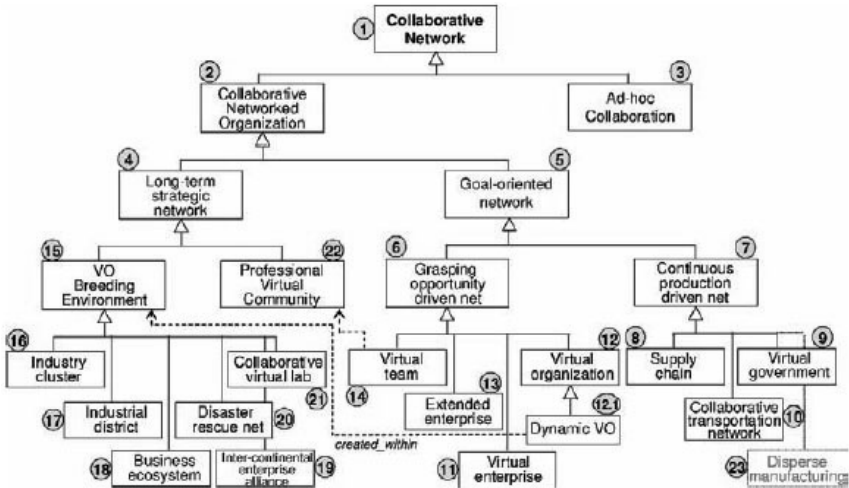


Figure 1. Examples of Collaborative Networks [5, page 64]

According to ECOLEAD’s definition [5, page 64] collaborative network (CN) is a network consisting of a variety of entities (e.g. organizations and people) that are largely autonomous, geographically distributed, and heterogeneous in terms of their operating environment, culture, social capital and goals, but that collaborate to better achieve common or compatible goals, and whose interactions are supported by computer network.

The roots of the Virtual Organization / Virtual Enterprise paradigm, which constitutes one of the first manifestations of the Collaborative Networks can be bound in the early works of economists such as Oliver Williamson. In the «Markets and Hierarchies» [11], Williamson used the study of Transaction Cost Economics as one of the first and most influential attempts to develop an economic theory of organizations. These ideas had a more evident

impact with the booming of the «outsourcing» wave in the 1980s. Outsourcing became very attractive when managers had to reduce the organization overheads and eliminate the internal inefficient services, the so called lean manufacturing, as it transfers the problem to the outside, namely other efficient service providers. In parallel with the outsourcing tendency, another transformation was observed in large companies that reorganize themselves in terms of their production lines, leading to some «federation» of relatively autonomous departments.

These transformations, putting the emphasis on networking and partnership / cooperation have raised a large interest for new disciplines such as the coordination theory, organizational theory, and sociology of the industrial organizations. The idea of virtual enterprise (VE) / virtual organization (VO) was not «invented» by a single researcher, rather it is a concept that has matured through a long evolution process.

Some of the early references first introducing the terms like virtual company, virtual enterprise, or virtual corporation go back to the early 1990s, including the work of Davidow and Malone (1992) [10]

Since then, a huge but disjoint body of literature has been produced mainly in two communities, the Information and Communications Technology community and the Management community.

Generalized access to Internet and the fast developments around the world-wide-web have led to the proliferation of many terms such as the e-commerce, e-business, e-work, e-government, etc. Such VO forms as virtual supply chains and web hubs became widespread.

The growing interest in academic community turns to a number of research projects and publications. Unfortunately most of them had of ad-doc nature, i.e. focused on solving specific application cases. Only a few contributions to a sounder basis can be found in the literature. For instance, one of the first references to a (partial) theoretical foundation for virtual organizations comes from Appel and Behr (1998) [2] which however limit their approach to the application of the transaction-costs theory.

Ahuja and Carley (1998) [1] focused on the structural aspects of the collaborative networks. An attempt to organize and categorize reference models for VOs can be found in Tolle, Bernus, Vesterager, Zwegers, Tolle as a result of the GLOBEMEN project [12]

From 2005 the boom of blogs, social networks and other so-called web 2.0. services (web services based on user generated content) started and is being continuing now. A new term «procumer»

(originated from **producer and consumer**) appeared. Virtual teams, professional communities, virtual enterprises became the most widespread forms of VOs. Although a lot of researches have been conducted during the last decade only few of them elaborated strong theoretical foundations for virtual organizations.

One of the most profound and comprehensive research ever been developed in this area were done in ECOLEAD project. ECOLEAD was a 4-year project co-funded by the European Commission within 6th Framework Program that started in April 2004 involving 20 partners from 14 countries across Europe. Considerable research efforts have been focused on identification of «anomaly» aspects for CNs, i.e. the identification of what is new in the collaborative networks in reference to the established body of knowledge, that has itself lead to the induction and progressive characterization of a new scientific paradigm.

Main ECOLEAD achievements in theoretical dimension were:

- ^ A collaborative networks reference model (ARCON) framework [5, p. 68-82]

- ^ Elaborating VBE (Virtual breeding environment) and PVC (Professional virtual communities) frameworks [3, 532 p.]

The main idea that lies inside ARCON framework is modeling through combining views from:

- ^ three perspectives:

- ^ environment characterization perspective,

- ^ life-cycle stages perspective,

- ^ modeling intent perspective

- ^ four dimensions:

- ^ structural

- ^ componential,

- ^ functional,

- ^ behavioral dimensions

As a result of such modeling the complex multidimensional structure describing chosen CN is obtained. ARCON frameworks has its pros and cons. From one side i combines methods and theories from various disciplines and lets the researcher make comprehensive CN description from every angle of view with most suitable tools and methods. This framework i well suited for fundamental science and for large CNs as customers. From the other side ARCON is rather heavy weighted. It takes too much time and effort to make all appropriate CN observations from different dimensions and perspectives and combine them all-together in effective and unambiguous manner.

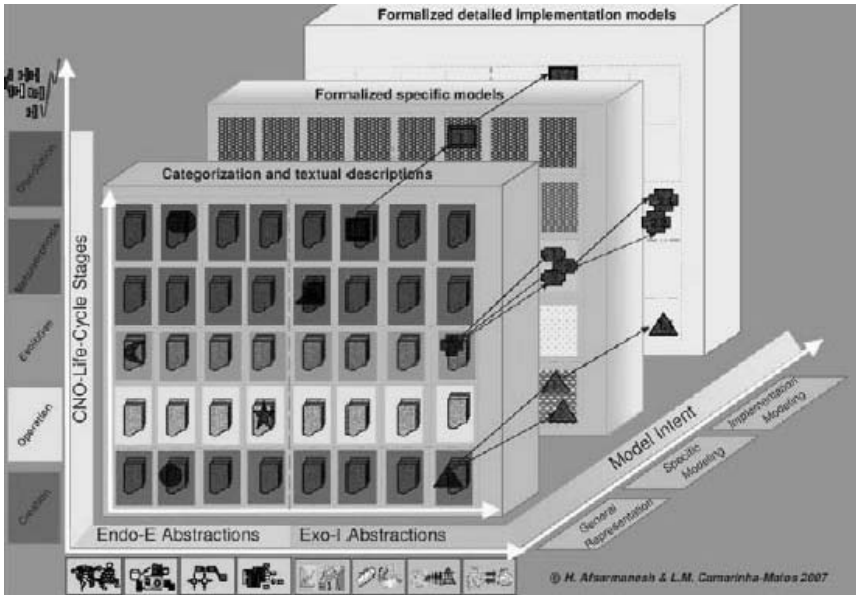


Figure 2, ACRON framework perspectives and their intersections.

Today average collaborative network (like virtual team, professional community) is rather small and is constantly changes. Stakeholders often need the answers to rather simple and typical questions: how to set up an effective CN to reach their own goals and boost its growth, how to establish fruitful collaboration and avoid opportunistic behavior of its members, etc. Lightweight and fast methods are needed. ACRON methodology seems to heavy and overcomplicated for such CNs and thus impractical.

Excessive complexity of ACRON methodology might have its roots in the assumption that CNs and all their manifestations are something complex and dissimilar to any other social interactional and organization forms and thus need completely new scientific paradigm.

In my opinion CNs in spite of their novelty and singularity can be regarded as a special kind of organization forms. And accordingly like any other social and economic organization forms they can be with certain amendments described by most general organization theories. One of the most applicable theory for CN description is new institutional economics with its sub-theories (transaction cost theory, contracts and agency theories etc.).

Like any other network or organization CN can be represented as a graph of independent intelligent entities (people and organizations) that interact with each other in accordance with their mental models, conducted contracts, general rules and rule enforcement systems. Conducting transactions, monitoring, establishing and removing connections takes time, effort, money or other transaction cost. All entities have bounded rationality and possess incomplete information about others.

This is the most general model that feats new institutional paradigm and can be put as a basis. In order to use it for CN modeling with more or less appropriate accuracy some peculiarities should be taken into consideration.

- ^ Collaborative networks are products of human-computer interactions and thus are closely tighten to software/web interfaces and technological infrastructure.

- ^ There is an entry barrier for a new user based on time and money (as well as their estimations) expenses on IT infrastructure, learning, setting up an account, transferring information from another networks etc.

- ^ Most of the communication is text based and asynchronous. Some transactions are automated and can be initiated either by human or by CN algorithms and automated entities.

- ^ Along with people automated entities (often called bot, robots and automated agents) and automated transactions. In some fields [9] automated enteties and their transactions even prevail.

- ^ Enteties interact with each other through user profiles and thus are exposed to specific risks (like»fishing» and identity stealing).

- ^ Institutions (as»rules of the game» and enforcement systems) can now be set up not only by humans but also by algorithms, automated entities and their interactions with humans. (i.e. collaborative filtering [4], human computations etc.)

- ^ Expert systems and assessment algorithms can increase actors rationality. There is a theory called»Extended mind» [13] which refers to an emerging concept that addresses the question as to the division point between the mind and the environment by promoting the view of active externalism. This view proposes that some objects in the external environment are utilized by the mind in such a way that the objects can be seen as extensions of the mind itself. Specifically, the mind is seen to encompass every level of the cognitive process, which will often include the use of environmental aids.which constitutes that a mind of a human (i.e. a human with PC and wikipedia is more clever than without them).

There are four points I would like to put the stress on:

- ^ algorithms and automated agents can perform actions that are impossible without them. Different heuristic algorithms can be used in coordination of thousands and millions of people, work even without their presence (i.e. automated scheduling systems where it is enough to point out your preferences once and all other work will be done by system without your presence).

- ^ algorithms and automated agents (unless hacked or cheated) are not exposed to opportunistic behavior. That makes them useful in solving agent-principal dilemma and in establishment of organization structures that can operate more effective than market in various fields.

- ^ due to extensive usage of different algorithm it is possible to mix artificial and human intelligence. There is a theory and a term Collective intelligence [8] Collective intelligence (CI) is a shared or group intelligence that emerges from the collaboration and competition of many individuals and appears in consensus decision-making in bacteria, animals, humans and computer networks. There are methods of CI measurement that can be partially used in evaluating of the efficiency of CN.

- ^ Virtualization has its limitations. Even with the same level of technological infrastructure the transaction cost may vary in many times. There is a theory called Process virtualization theory [7] which describes how amenable a process is to being conducted without physical interaction between people or between people and objects and is based mostly on five main and four moderating factors (Figure 3)

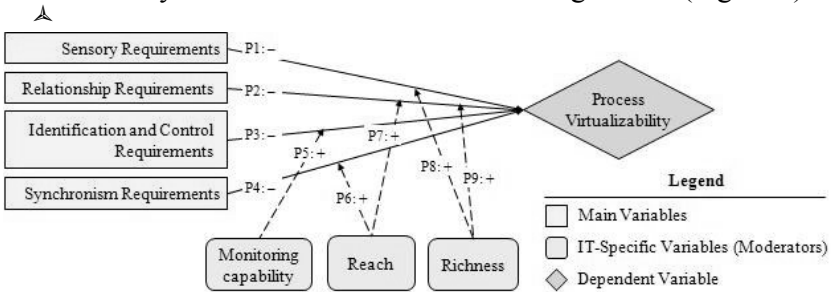


Figure 3. Process virtualization theory, key factors [7]

With new institutional approach and all CN's features taken into account it is possible to develop a reference model for collaborative networks based on new institutionalism that will be lighter than

ACRON and thus more applicable for small and medium collaborative networks.

In the same time some improvements should be made in the new institutional theory itself. Advancement in communication technology not only reduces the communication costs but also adds new types of agents (automated agents), institutions («wizards» and algorithms as»rules of the game»), transactions (automated and semi-automated) and relationships. The new institutional theory should evolve to reflect all these changes. Huge transaction cost reduction caused by IT affects organizational network topology, institutions and transaction routing. New organizational forms (collaborative networks, crowd-sourcing, open-source development, etc) are being created on the basis of these changes. In this article mechanisms of these processes have been researched with a primary focus on new institutional and interdisciplinary approaches. The model applicable for describing CNs has been proposed.

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ЛОГИЧЕСКОЕ И ИСТОРИЧЕСКОЕ В ТЕОРИИ СОВРЕМЕННЫХ ДЕНЕГ

АННОТАЦИЯ. Статья посвящена анализу некоторых аспектов соотношения исторического и логического в исследовании современных денег в рамках метода марксистской политической экономии. Рассмотрены основания логической и исторической критики теории денег К. Маркса. Затронуты проблемы логики построения специальной теории денег и значения волевого воздействия в эволюции денег.

КЛЮЧЕВЫЕ СЛОВА: метод, историческое, логическое, деньги, К. Маркс.

АННОТАЦІЯ. Стаття присвячена аналізу деяких аспектів співвідношення логічного та історичного у дослідженні сучасних грошей у межах методу марксистської політичної економії. Розглянуто засади логічної та історичної критики теорії грошей К. Маркса. Приділено увагу проблемам логіки побудови спеціальної теорії грошей та значенню вольового впливу в еволюції грошей.

КЛЮЧОВІ СЛОВА: метод, історичне, логічне, гроші, К. Маркс.

ANNOTATION. The article is devoted to the analysis of some aspects of historic and logic relation in research of modern money within the frames of the Marxist's political economy method. The bases of logic and historic criticism of K. Marx's theory of money are considered in the article. The problems of logic of construction of the special theory of money and the role of strong-willed influence in evolution of money is put.

KEYWORDS: method, historical, logical, money, K. Marx.