

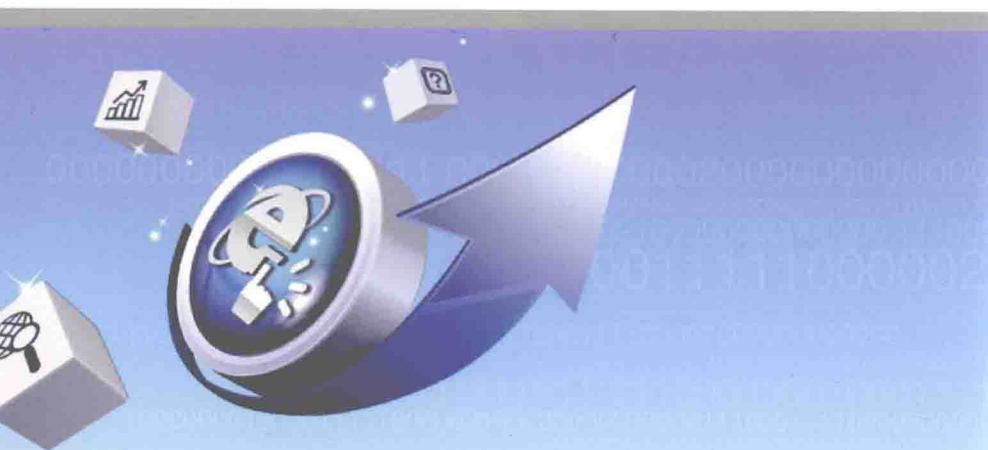
企业网络研究

——基于网络科学范式的产业组织分析

Research on Enterprise Network

——Analysis of Industrial Organization Based on Network Science Paradigm

洪振挺 ○ 著



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摘 要

企业在经营过程中意识到与相关企业进行联合研发，联盟生产、共同营销等合作运营的重要性，它们在开放的市场中择优选择能促进自己发展的企业进行合作（联接），最终将涌现出一个复杂的企业网络系统。

在理论研究方面，新制度经济学提出了中间性组织的概念，并对企业间的协调机制进行研究。经济社会学引入社会嵌入性概念，认为企业网络是在企业行为嵌入到不断演变的社会结构中而逐步形成的组织模式。越来越多的相关理论学者对企业网络的关注度和研究热情不断增长，并取得了一定的理论成果。

在实际的企业运营中，企业网络以业务外包、战略联盟、虚拟企业、企业集群等典型模式正在越来越多的产业领域和经济区域蓬勃发展着。网络信息技术的迅猛发展使得电子商务模式越来越受企业的青睐，基于网络平台的电商企业的相互联系与合作构成了一个电商网络，成为企业网络的一个新模式。市场的供方和需方，都在以联盟的方式为自己谋利益，整个市场呈现出一个个联盟网络的格局，似乎企业已不是市场的主角，而网络才是市场主体。



21 世纪以来,从自然科学到社会科学的各个学科领域的专家学者纷纷投入到对于网络的研究,他们密切关注和研究这一既古老又新鲜的课题,并取得了重大的理论突破,网络科学正在成为一个新兴的跨学科领域的理论体系。越来越多的经济学者开始重视关于经济运行中的社会嵌入性问题的研究,并尝试用网络的概念体系去分析企业网络。

企业网络的形成,在微观机制上,我们可以应用经济理论和社会理论进行解释,但是在宏观结构上,企业网络的结构和规模却很难用传统的理论进行解释,而网络科学的涌现、演化、自组织、复杂性、拓扑结构可以用来解释企业网络的宏观图景。

网络科学的概念和思想有助于我们比较清晰地、整体地把握企业网络的形成和运行机理、组织的网络属性和演化规律,这是传统的经济理论难于解释的。新古典经济学抛开了对企业网络的研究,新制度经济学提出的中间组织概念仅是从交易成本的角度来理解,经济社会学提出了基于社会关系的企业网络显得过于空泛,战略管理学则机械化地把企业网络作为一种获取优势资源的途径,而且这些理论更多的是说明企业网络的存在性,对于如何分析企业网络的方法和框架涉及较少,或者不深入,并且较多地是站在各自研究的角度或目的进行探索,缺乏整体地、一般性的深入论述。从网络科学的视角来研究企业网络,可以把企业网络抽象为节点属性与联接属性的研究,并统一于网络属性的研究,既有微观领域的探讨,又有宏观视域的描述,摆脱了传统的各个理论领域各自为政、自说自话的

窘境，可以把相关理论的研究纳入到统一的企业网络研究框架下，使得对于企业网络的研究既有既定理论的研究基础又有综合研究的理论发展，这是理论创新的科学态度。基于网络科学范式的企业网络研究，突破了传统的基于交易成本的组织分析范式，超越了用经济学方法工具研究经济现象的认识，创造性地把网络科学分析思维和工具应用到经济学领域的研究，为跨学科领域的研究作出了进一步的探索，具有重大的理论创新意义。

企业网络已成为经济社会里的一种常态，传统意义上的市场竞争的格局正在被改写，市场的竞争不再是独立企业之间的单打独斗，而是企业网络之间的群体竞争，企业网络作为一个整体对市场份额进行重新分割，由此可能形成基于企业网络的垄断，企业网络越来越成为市场竞争或垄断的主体，并成为一种新型的产业组织形态，这使得基于单个企业的垄断竞争分析显得不合时宜，市场结构的界定也将因为企业网络的发展而重新考虑，从而推动产业组织理论的新发展。基于企业网络的市场结构分析突破了传统的产业组织理论对于单个企业的垄断竞争的分析，从而使得政府、学界和企业界对于市场垄断要有新的认识和应对，进一步地，产业组织理论的企业行为策略、政府规制和反垄断等理论都将因企业网络的发展而创新发展。从这个意义上说，企业网络的研究对于产业组织理论的新发展具有理论创新意义和实践指导意义。

把企业网络的研究推进到产业组织市场结构的研究，这是对新制度学派中间性组织理论的突破和超越。中间性

组织理论只是关注企业间的关系研究和治理机制的探索，它从交易成本的角度对企业网络进行研究，是一种非网络分析的范式，它止步于对企业间交易协调问题的研究，而没有把企业网络作为一个整体放在市场中去考察。在网络科学范式分析中，企业网络是一个整体的概念，是具有自主决策能力的智能体，它以群体行为参与市场竞争，自然要对市场结构产生影响，从而把企业网络的研究嫁接到产业组织理论中来，而且突破了传统产业组织理论基于单个企业的行为研究。因此，本书将要进行的基于网络科学范式的企业网络研究是对传统的产业组织理论、新制度学派中间性组织理论和非网络分析范式的企业网络理论的较大突破和超越，具有重大的理论创新价值。

本书在系统梳理产业组织理论、复杂系统理论和社会网络理论的基础上，从网络科学的视角对企业网络进行研究，建立一个基于网络科学范式的企业网络研究框架，并进一步研究了企业网络对市场结构和市场竞争的影响，得出了以下基本结论。

1. 企业网络具有复杂系统的主要特征，是一个复杂系统，企业网络的复杂性表现在联接复杂性、结构复杂性、动态性、自组织性、自相似性、演化复杂性等特点上。此外，企业网络还具有层次性、嵌入性、外部性、锁定性、多属性等网络属性。

2. 企业网络是在企业个体理性选择的过程中涌现出的一个结果，企业网络的宏观特征具有不可预估性。在企业之间非线性的相互作用下，企业网络的拓扑结构往往表现

为具有小世界性质和无标度性质。

3. 企业网络的边界是可以确定的，可以从联接强度、联接频率、多企业节点、动态稳定性四个维度来确定企业网络边界。企业网络是个不断演进的概念，根据不同的划分标准可以对企业网络进行多种分类。

4. 企业间的联接是企业网络形成的关键，企业可以通过契约联接、产权联接、关系联接、聚集联接、模块化联接、互联网联接等方式建立合作关系，相应地，企业网络类型有战略联盟、虚拟企业、外包网络、特许经营网络、企业集团、企业集群、模块化网络、电商网络等。

5. 企业网络随着时间不断地动态演化，在遵循择优联接的原则下，网络具有不断增长的趋势，表现出复杂的拓扑结构，许多复杂网络演化模型可以对企业网络的演化进行模拟研究。企业网络的演化能够涌现出社团结构，并具有小世界性。

6. 企业网络具有较强的市场影响力，在网络联接效应的作用下表现出垄断的特征，网络效应和锁定效应强化了企业网络的垄断地位。

7. 企业网络的出现改变了传统的竞争模式，呈现出一种基于企业网络的合作竞争模式，同时企业网络强化了市场竞争，并使得竞争更加多样化，表现为企业网络中企业之间的竞争、企业网络中的企业与外部企业的竞争、企业网络之间的竞争，以及企业网络与单个企业之间的竞争等多种竞争类型。

本书的创新表现在：建立网络科学范式的企业网络分

析框架，并引入网络科学分析方法，创造性地把网络科学分析思维和工具应用到经济学领域的研究，是研究范式、工具与视角的重大创新；对基于企业网络的市场结构的研究突破了传统的基于单个企业的垄断竞争分析范式，是对产业组织理论的创新、丰富和发展；在已有研究的基础上，融入网络科学分析范式，创造性地提出一些新概念，比如契约联接、产权联接、关系联接、聚集联接、模块化联接等概念是在结合现有理论和网络联接分析的融合发展而定义的，这些新提法体现了理论发展的连续性与突破性，具有创新意义。

本书试图以企业网络研究为基点，把网络科学理论与经济学理论进行融合研究，然而由于两个不同的体系都有其既定的分析框架，由于存在理论研究的路径依赖，要打破这种传统的分析框架存在较大的难度，本书只是作一个开启式的初步探索，两个理论体系的融合有待进一步探索。

关键词：企业网络；网络科学；复杂系统；网络科学范式；产业组织

Abstract

In the course of business, enterprises realize the importance of joint research and development with related enterprises, cooperative operations such as union production, co-marketing. They choose enterprises which promote their development in the open market to cooperate (link), which will eventually emerge a complex enterprise network system.

For theoretical research, new institutional economics put forward the concept of intermediate organizations, and research coordination mechanism between enterprises. Economic sociology introduced the concept of social embeddedness, realized the enterprise network is an organizational model that formed in the course of embedding in corporate behavior to the evolving social structure. More and more related theorists pay more attention on the enterprise network research gradually and achieve certain theoretical results.

In actual business operations, enterprise network based on the typical pattern of outsourcing, strategic alliances, virtual enterprises and enterprise clusters is booming in more and more in-



industries and economic region. The rapid development of network information technology makes more and more e-commerce model favored by the enterprise, constitute an electricity network of mutual ties and cooperation in electric commercial enterprises based network platform, which is a new model of the enterprise network. The supply side and the demand side of the market are in the union for interests for themselves, the entire market is showing a pattern of a network, and it seems that companies have not the protagonist of the market, while the network is the market players.

Since the beginning of the new century, experts and scholars from the natural sciences to the social science disciplines have put in and pay close attention to the network research, which is a both ancient and fresh topic, and have made a major theoretical breakthrough. Network science is becoming an emerging interdisciplinary field of theoretical system. More and more economists have begun to attach importance to the research on the social embeddedness of economic operation and try to analyze the enterprise network using the concept of network system.

In the microscopic mechanism, we can apply economic theory and social theory to explain the formation of the enterprise network, but on the macro-structure, the structure and size of the enterprise network is difficult to use traditional theory to explain; the theory of network science, such as emergence evolution, self-organization, complexity, topology can be used to explain the

macro-structure of the enterprise network.

Network science concepts and ideas help us more clearly, overall to grasp the formation of the enterprise network and the operation mechanism, network properties of the organization and evolution rules, which are difficult to explain by traditional economic theory. Neoclassical economics aside the study of the enterprise network, new institutional economics put forward the concept of intermediate organizations only to understand from the point of view of the transaction costs, economic sociology present that enterprise networks based on social relations is too vague, and strategic management use automatically the enterprise network as a way to get to superior resources, these theories are introducing the existence of the enterprise network, the methodology and framework for how to analyze network involve fewer or no in-depth and more ground standing in their respective research point of view or purpose to explore, and the lack of a holistic and general depth discussion. From the perspective of network science to study the enterprise network, the enterprise network is the abstraction research of node attributes and coupling attributes and unified network properties, which is based on both microscopic fields exploring, and a description of the macro-sight, getting rid of the traditional various theoretical fields independently, the dilemma of telling their own stories, incorporated into the study of the theory of the unified enterprise network research framework, making the enterprise network research based on the



established theory and have the theoretical development of the comprehensive study, which is the theoretical innovation scientific attitude. Enterprise network research basing on network science paradigm, breaks the traditional organization based on transaction cost analysis paradigm, surpasses the understanding of studying economic phenomena by economics methodological tools, creatively applies to the field of economics research by network science and analytical thinking and tools, explores a study of an interdisciplinary field, which has the major theoretical innovation significance.

Enterprise network has become the norm in the economic and social, and the pattern of competition in the market in the traditional sense is being rewritten, the market competition is no longer between independent enterprises alone, but the competition between the groups in the enterprise network, the enterprise network as a whole shares the repartition market, which may form a monopoly-based enterprise network, enterprise networks increasingly become the main body of market competition or monopoly, and become a new type of industrial organization forms, which makes the monopolistic competition analysis based on a single enterprise outdated. Definition of market structure will also be reconsidered because of the development of the enterprise network, thereby promoting the new development of the theory of industrial organization. Market structure analysis based on the enterprise network will break through the traditional industrial or-

ganization theory based on the monopolistic competition analysis for a single enterprise, so that the government, academia and the business community have a new understanding and responding to the monopolization of the market, further, the theory of industrial organization, corporate behavior policy, government regulation and antitrust theory will have an innovation and development due to the development of the enterprise network. In this sense, the enterprise network research has theoretical innovation significance and practical significance for the new development of the theory of industrial organization.

Promoting the study of the enterprise network to the study of market structure of industrial organization is a breakthrough and surpassing to intermediate organization theory of New System School. Intermediate organization theory is only concerned about the research on the relationship between enterprises and the exploration to enterprise governance mechanism, to study the enterprise network from the point of view of the transaction costs of the enterprise, based on a non-network analysis paradigm. It stalled in the study of the problem of inter-enterprise transaction coordination without investigating the enterprise network as a whole on the market. In the network science paradigm analysis, the enterprise network is a whole concept, it is an agent with independent decision-making ability, and it participates in market competition with group behavior, which is natural to have an impact on market structure. So that the enterprise network research is grafted to

the industrial organization theory, and breaks through the traditional industrial organization theory based on study the behavior of a single enterprise. Therefore, the enterprise network research based on the network science paradigm this book will present is a larger breakthrough and surpassing to the traditional industrial organization theory, the intermediate organization theory of new system school and the enterprise network theory based on non-network analysis paradigm, which has great theoretical significance.

This book is based on the industrial organization theory, complex systems theory and social network theory, from the perspective of network science to study the enterprise network, establishing a research framework for enterprise networks based on network science paradigm, and further study the enterprise network how to impact on the market structure and market competition, then reach the following basic conclusions.

1. The enterprise network is a complex system, which has the main features of a complex system. The complexity of the enterprise network reflects in the link complexity, structural complexity, dynamic, self-organization, self-similarity, evolutionary complexity. In addition, the enterprise network has network properties such as layered, embedded, external, lock, multi-attribute.

2. The enterprise network is an emerged result in the process of rational choice of the enterprise, the macroscopic

characteristics of the enterprise network is unpredictable. In the nonlinear interaction between enterprises, enterprise network topology is often manifested in the nature of small-world and scale-free nature.

3. The boundary of the enterprise network can be determined, from the four dimensions of the link strength, link frequency, multi-enterprise nodes, and dynamic stability to determine the boundary of the enterprise network. The enterprise network is an evolving concept, for a variety of classification according to different criteria for the classification of the enterprise network.

4. Link between enterprises is the key to the formation of the enterprise network; enterprises can join partnerships through contract link, property link, relationship link, cluster link, modular link, and internet link. Accordingly enterprise network types are strategic alliance, virtual enterprise, outsourcing network, franchise network, enterprise groups, enterprise clusters, modular network, and electricity network.

5. The enterprise network is a process of dynamic evolution. The enterprise network grows continually with a selection of the best link principle, and manifests a complex topology structure. Many complex network evolution models can be applied to simulate the evolution of the enterprise network. The evolution of the enterprise network can emerge a community structure and small-world network.

6. The enterprise network has a strong influence on the market, monopoly characteristics showing on the effect of network link, the network effects and lock-in effect strengthen the monopoly position of the enterprise network.

7. The emergence of the enterprise network changes the traditional mode of competition, showing a cooperative competition mode based on the enterprise network, at the same time the enterprise network strengthens competition in the market, and makes competition more diverse, manifests as a competition between enterprises in the enterprise network, between enterprises in the enterprise network and external business competition, enterprise networks, and the competition between the enterprise network and a single enterprise, and other competitive types.

The innovation of this book are as follows: Building a analysis framework for the enterprise network based on network science paradigm, the introduction of the network science analysis method, and putting creatively network science analysis thinking and tools applied to the field of economics, which is a major innovation of research paradigm, tools and perspectives; The research on the market structure based on the enterprise network breaks through the traditional monopolistic competitive analysis paradigm based on a single enterprise, which is the innovation, enrich and development of the theory of industrial organization; Based on the existing research, this book integrates into network science paradigm, puts forward some new concepts creatively,