ARTICLE IN PRESS

Journal of World Business xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Journal of World Business

journal homepage: www.elsevier.com/locate/jwb

Firm internationalization from a network-centric complex-systems perspective

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ARTICLE INFO

Keywords:
Internationalization
Networks
Interaction
Complex adaptive systems
Agent-based models
Simulation

ABSTRACT

Drawing upon the science of complexity we propose a network-centric, complex-systems internationalization (NCCSI) perspective of firm internationalization that can help us understand observed patterns of internationalization that are difficult to explain using traditional theories. While individual firm internationalization behavior is impossible to predict, aggregate patterns are to some extent. We review existing research on the role of networks in the internationalization process and explain how theories of complexity apply. We also describe three ways in which we can build NCCSI models using social physics and agent based simulation models, the associated research opportunities, and their value for managers and policymakers.

1. Introduction

Most theories of internationalization are firm-centric, they seek to explain internationalization behavior and performance in terms of various characteristics and behavior of firms. Here we argue that this focus is misplaced and propose instead a network-centric, complex-systems internationalization (NCCSI) perspective, which can explain internationalization behavior that is difficult using firm-centric theories.

Existing theories explain the process of internationalization from four overlapping perspectives. First are the theories based on *international economics*, which are integrated in the eclectic or *Ownership, Location and Internalization* (OLI) theory developed by Dunning (1980). This theory focuses on the economic drivers of ownership (e.g., a firm's specific technical knowhow), location (e.g., low-cost labor in a foreign country) and internalization (e.g., the benefits of owning the production mechanisms rather than contracting through partnerships). A second theory, or set of theories, the *Internationalization Process Model* (IPM) explains firm internationalization in terms of an incremental process by which firms learn about and engage in international markets over time and the various types of mechanisms involved, such as incremental commitment, learning, and relationship building (e.g., Coviello & Munro, 1997; Johanson & Vahlne, 1977, 2009). A third theory, the *Opportunity-Based View of Internationalization* (OBV), explains internationalization as an entrepreneurial, innovation process in which firms discover, develop and exploit international market opportunities gradually, over time (Chandra, Styles, & Wilkinson, 2009; Chandra, Styles, & Wilkinson, 2012; Chandra, Styles, & Wilkinson, 2015; Chandra, 2017; Jones & Coviello, 2005; Knight & Liesch, 2016). A fourth theory, emphasizes the role and impact of the *relationships and networks* in which a firm operates and how this enables and/or constrains what the firm can learn and do (e.g., Coviello & Munro, 1997; Coviello, 2006; Johanson & Mattsson, 1988; Johanson & Vahlne 2009).

All these theories are based on *methodological individualism*, which seeks to explain social phenomena based on the characteristics of the individual agents, in this case a firm (Hodgson, 2007). "We want to believe that X succeeded because it had just the right attributes, but the only attributes we know are the attributes that X possesses; thus we conclude that these attributes must have been responsible for X's success" (Watts, 2011, p. 27). An example Watts uses concerns Leonardo da Vinci's Mona Lisa. We want to believe it is among the best-known paintings worldwide because of the painter's technical and painterly skills, and the painting's innovative style – the mysterious smile and three-quarter length pose against a landscape of trees and water. But, as Sassoon (2001) shows, the painting's fame is not necessarily due to its intrinsic characteristics nor da Vinci's genius. For centuries, the Mona Lisa was overlooked until, in August 1911, it was stolen from the Louvre. The resulting story of the theft and who stole it (a museum worker) catapulted this painting into the public consciousness, and it rose to prominence when the thief attempted to sell it to an Italian museum and it was recognized.

"The result is that what appear to us to be causal explanations are in fact just stories – descriptions of what happened that tell little, if anything, about the mechanisms at work" (Watts, 2011, p. 27). Such

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http://dx.doi.org/10.1016/j.jwb.2017.06.001
Received 16 February 2016; Received in revised form 8 May 2017; Accepted 2 June 2017

theories lack predictive power. They cannot say what will happen because the future depends on a complex set of factors and events taking place over time (Sewell, 2005; Watts, 2011). "History never flows in a predictable way. It is always a result of seemingly random currents and incidents, the significance of which can be determined – or, more often, disputed – only in hindsight" (Anderson, 2016, p. 2).

This kind of explanation is common in social science and business. In business, we try to explain highly successful firms in terms of a firm's key characteristics (e.g., technical knowhow, product portfolios, ambidexterity or market and learning orientation) and those of its leaders, such as Peters and Waterman's book In Search of Excellence (1982), only to find out later that these same firms with their key characteristics floundered (Chapman, 2006). Wiggins and Ruefli (2002) show that very few firms remain leaders in their industry over extended periods of time regardless of their intrinsic qualities. Business life is complex and attributing outcomes to firm specific characteristics and behavior is doomed. As James March characterizes the situation "An organization reacts to the actions of others that are reacting to it. Much of what happens is attributable to these interactions and thus not easily explicable as the consequences of autonomous action" (March, 1996, p. 283).

More generally, scholars have tried to explain firm performance based on correlations with managers' retrospective perceptions of their firms, such as its market orientation and its leaders' decisions, or its engineers' skills, or its learning orientation. The direction of causation here is problematic, because, as theories of sense making, selective perception, and causal attribution bias suggest, performance may drive managers' perceptions rather than the other way around (March & Sutton, 1997; Rong & Wilkinson, 2011). When managers know their firm is performing well (or poorly), this knowledge affects their perceptions of the firm. Their thinking goes like this: If my firm is performing well, it must produce superior products, have brilliant managers and engineers, cutting-edge marketing tactics and it must be market oriented and sensitive to the environment. If it is not performing well, then these attributes must be weaker or else the environment must be very challenging.

Theories of internationalization fall into the same trap. Retrospectively, we can trace the course of events affecting how a firm's internationalization behavior (e.g., timing or speed of international market entry) unfolded, and interpret it in terms of the firm's characteristics and the environment. These can include employees with the right international skills and experience, relevant resources and orientations; links to influential firms, a strong network position that enables it to identify and respond to opportunities, plus a degree of luck. And even this may be problematic, as a firm's path to internationalization can appear confusing, follow zig-zag directions, and lack apparent rhyme or reason (Ellis & Pecotich, 2001).

Here, we view the firm from the perspective of the network rather than the network from the perspective of the firm. Instead of focusing on explaining the internationalization behavior and performance of the individual firm over time, we focus on explaining the internationalization behavior and performance of the network as a whole. We argue that business networks are *complex adaptive systems*. The internationalization behavior and performance of the network over time are not a simple sum of the individual firm behavior and performance of the firms comprising the network; they emerge in a self-organizing way from the complex network of actions and interactions taking place over time across the network in an environment. The network structure is the primary driver of behavior and is itself shaped by the behavior taking place over time. Network structure shapes the flow of information, the nature of international market opportunities to be discovered and exploited. While individual firm internationalization behavior and performance over time is impossible to predict, aggregate patterns are to some extent.

Drawing upon the science of complexity we propose a network-centric, complex-systems internationalization (NCCSI) perspective of firm internationalization that can help us understand observed patterns of internationalization that are difficult to explain using traditional theories. The NCCSI perspective can shed light on why firms go international early or fast, or enter various countries in no apparent order (Knight & Cavusgil, 2004; McDougall, Shane, & Oviatt, 1994), pull out from international markets (Benito & Welch, 1994a; Chandra, 2017), re-internationalize (Welch & Welch, 2009), change entry modes (Chandra, 2017), or use multiple entry modes simultaneously (Benito & Welch, 1994b). The NCCSI approach also offers new lines of enquiry, new theories, alternative research methods, and unique management and policy implications.

The relevance of the theories and methods of complexity for advancing our understanding of business and economic systems is being increasingly recognized (e.g. Allen, Maguire, & McKelvey, 2011; Arthur, Durlauf, & Lane, 1997; Choi, Dooley, & Rungtusanatham, 2001; McKelvey, 2004; Surana, Kumara, Greaves, & Raghavan, 2005; Wilkinson & Young, 2013). But this perspective has not been applied to the study of firm internationalization. Therefore, the basic research question addressed here is: *How can a complex adaptive systems perspective advance our understanding of firm internationalization?*

The rest of the article is organized as follows. First, we review existing theories of firm internationalization and the role of networks. Second, we describe the nature complex adaptive systems and how they apply to firm internationalization. Third, we describe ways in which NCSSI models can be developed based on theories of social physics and agent based computer simulation models and their implications for research and practice. The concluding section summarizes the key contributions and their implications.

2. Internationalization theories and the role of relationships and networks

Firms operate in markets and industries comprised of networks of interconnected and interacting firms, which enable and constrain their behavior and performance (Anderson, Håkansson, & Johanson, 1994; Håkansson & Snehota, 2000; Johanson & Vahlne, 2010; Johansson & Mattsson, 1994; Ritter, Wilkinson, & Johnston, 2004; White, 2002; Wilkinson, 2008). The role of relationships and networks in firm internationalization has been emphasized by many (e.g., Coviello & Munro, 1995, 1997; Hånell & Ghauri, 2015; Hertenstein, 2015; Johanson & Vahlne, 2009; Wilkinson, Mattsson, & Easton, 2000). Relationships and networks affect firm internationalization in two main ways: they affect *international opportunity recognition* (discovery, creation, and actualization) and a firm's ability to *develop and exploit international market opportunities.* We summarize these processes in Fig. 1.

The internationalization process model (IPM) proposed by Johanson and Vahlne (1977, 2009) provides a starting point for understanding the ways in which relationships and networks impact firm internationalization. Change processes within the firm result in changes in a firm's position in an industry and/or in global networks, and the international opportunities it can discover or create and actualize (Chandra, 2017; Ramoglou & Tsang, 2016). This has feedback effects on a firm's decisions to commit effort and resources to these relationships and its subsequent learning, co-creation of knowledge and development of trust with other firms. To gain access to a network's benefits, the firm must first become an "insider", an established participant in the relevant industry network. The firm gains entry into networks through direct and indirect interactions with established network members. Otherwise, the firm suffers from the liability of outsidership (Johanson & Vahlne, 2009), or the disadvantage of network exclusion. This highlights network interactions as an important characteristic or driver of firm internationalization.

Firms gain market-specific and general knowledge via their network relationships and this allow them to discover, create, actualize, and develop international market opportunities. Over time, firms develop and *revise* their opportunities and change how they create or discover