

## THE UNDERDETERMINED KNOWLEDGE-BASED THEORY OF THE MNC

**Abstract:** This paper revisits two core propositions in the knowledge-based view of the firm propounded in the seminal work by Kogut and Zander (1993): (a) that MNCs exist because transfers and re-combinations of knowledge occur more efficiently inside MNCs than between MNCs and third parties, and (b) the threat of opportunism is not necessary (although it may be sufficient), to explain the existence of the MNC. We question these conclusions, arguing that firms are only one of many types of 'epistemic communities' possessing and nurturing procedural norms, identity, and the cognitive, linguistic and reflexive attributes conducive to efficient exchange and recombination of knowledge. Through their ability to attenuate opportunism, the existence of non-firm epistemic communities has interesting implications not only for the knowledge-based view but also for the applicability of transaction cost economics in the analysis of the scope of the firm.

**Key Words:** theory of the MNC, knowledge, epistemic communities, transaction cost economics.

## INTRODUCTION

It is nearly two decades since Kogut and Zander's (K&Z's) 2003 JIBS Decade Award winning article was first published (K&Z, 1993). It initiated a new turn in international business scholarship – a justified and fruitful focus on the strategic and organizational significance of 'knowledge' and 'knowledge-creation' in MNCs (and other firms). The K&Z contribution attracted interest, in part, because of its departure from the orthodoxy of the time. Centered on a core issue – the very existence of the MNC – it excited diffusive commentary, reflective of the multiple disciplinary heritages of the international business academic community. Over the years, K&Z's (1993) article was subjected both to criticism (McFetridge, 1995; Love, 1995; Foss, 1996a, 1996b) and defense (K&Z, 1995, 1996, 2003; Tallman, 2003; Verbeke, 2003). The scrutiny was a sign of vitality – theorizing leads to good theory only by being tested, contested, defended and refined.

In this vein, this note subjects K&Z's version of the KBV to further scrutiny, applying its own theoretical underpinnings to highlight what we consider to be specious argument in its critique of transaction cost economics (TCE). The result, we hope, is that both TCE and the KBV remain to offer insight in international business theorizing, and will benefit from some clarification on core precepts, in their applications to theorizing about the MNC. We focus on two conclusions drawn by K&Z (1993, 1995, 1996, 2003), that (1) MNCs *exist because* transfers and re-combinations of knowledge occur more efficiently inside MNCs than between MNCs and third parties; and that (2) the threat of opportunism, which in TCE is one of the pre-conditions to the existence of the firm, is not necessary, although it may be sufficient, to explain the existence of the MNC.

We contend that firms, as hierarchical entities, are not the only types of 'social communities' possessing and nurturing procedural norms, identity, and the cognitive, linguistic and reflexive attributes conducive to efficient exchange and recombination of knowledge. These characteristics and capabilities, we shall argue, can be found also in other types of communities and forms of governance, including non-hierarchical or only partially hierarchical ones (Grandori, 2001). K&Z's (1993, 1995,

1996, 2003) conclusion, that MNCs *exist because* transfers and re-combinations of knowledge occur more efficiently inside the firm than between MNCs and third parties, assumed that firms are *always* the most efficient governance forms for transferring and recombining poorly codified knowledge. This explained how the MNC evolves through the addition of new members into its community via the establishment of foreign subsidiaries. An important option, not recognized by K&Z (1993) nor evidenced in their empirical data, is the internalization of these members into a non-firm entity. Finally, we argue that the results of K&Z's empirical study – that there is a correlation between the 'codifiability' of knowledge and the probability that its exploitation will take place through licensing rather than through wholly-owned subsidiaries – can in fact, equally well, and perhaps more convincingly, be explained by TCE logic.

This note is structured as follows. We begin by briefly setting out the theoretical context within which the above propositions are presented. We follow with an outline of K&Z's arguments that are the subject of this note, along with a summary of the existing literature in both censure and defense of those arguments. We thereafter develop the arguments summarized above and conclude this note.

### **THE KNOWLEDGE-BASED VIEW AND THE THEORY OF THE FIRM**

The neo-classical theory of the firm explained micro-economic phenomena by reference to markets, the price mechanism and optimal resource allocation. It did not attempt to analyze what happens inside firms (Penrose, 1959) and lacked the theoretical tools to explain their existence and boundaries (Coase, 1937; Penrose, 1959; Williamson, 1975, 1985). Transaction cost theory (TCE), postulated by Coase (1937) and subsequently developed by Williamson (1979) and others, and applied to multinational corporations (Buckley & Casson, 1976; Rugman, 1981, Hennart, 1982, 2000, 2009) addressed these shortcomings and became widely accepted among international business theorists. Central to TCE is (1) the transaction as the unit of analysis, (2) that firms exist as a consequence of transaction cost economizing, and (3) that the boundaries of firms are determined by the relative costs of transacting in the external market *vis-à-vis* the costs of coordinating transactions internally (Williamson, 1985). According to TCE, market failure (and internalization) occurs if all of the following conditions

are present: the environment is complex and the future uncertain (bringing bounded rationality of human actors into play), there are small numbers of suppliers or buyers, the production process involves asset specificity *and* there is a possibility/likelihood that the individuals involved will act opportunistically (Williamson, 1985). Under these conditions, market transaction costs (or, *a fortiori*, unworkable contracts) are high relative to the costs of coordinating internal transactions (Williamson, 1985).

Parallel to the development of TCE, scholars propounded alternative conceptualizations of the firm, prominent among which was the resource-based view (RBV), emphasizing the resource heterogeneity between firms and that firms possessing valuable, rare, inimitable and non-substitutable resources may enjoy sustained competitive advantage and super-normal rents (e.g., Wernerfelt, 1984; Barney, 1991). RBV did not, however, challenge TCE's theoretical underpinnings. K&Z's (1992, 1993, 1996, 2003) knowledge-based theory did just that, evidencing a shift in the conceptualization of the firm from consequence of market failure and transactions costs economizing to progeny of market imperfections and superior knowledge recombination (Tallman, 2003).

K&Z (1993) provided a perspective of the firm, not as a contractually based markets internalization construction (Williamson, 1985), but as a "social community whose productive knowledge defines a comparative advantage" (K&Z, 2003: 516). Adopting this lens, they argued that the TCE perception of firms as a means to address market failure through internalization is over-determined, in that opportunism is not necessary to *explain the existence of the firm* (although the presence of it may be sufficient to do so). The existence of the firm, they argued, can be explained (without reliance on opportunism) by the firm's possession of unique and superior knowledge transfer capabilities (founded on "higher order organizing principles" (K&Z, 1993: 638)). These 'higher order organizing principles' enable them to transfer and re-combine knowledge, especially tacit knowledge, less costly in-house than can be done in market interactions with third parties. The resulting cost differentials, in turn, influence the mode of knowledge transfer, and therefore, growth within the firm and across national borders (K&Z, 1993).

## **Identity and the Human Need to Belong**

K&Z's (1993) argument that opportunism need not to be assumed in order to explain the existence of the firm or of its boundaries has been challenged on a number of grounds. McFetridge (1995) argued that the transfer of technology might be more efficient within a firm because of the nature of the incentives that prevail within it. These lead to greater cooperation and less opportunistic behavior, an argument consistent with conventional TCE logic. Similarly, Foss (1996a) argued that the possession by firms of superior 'higher order organizing principles' could be interpreted as an argument *for* the precondition of opportunism, because without opportunism, there would be no reason why equally efficient 'higher order organizing principles' could not be obtained through contractually based arms' length teamwork, without hierarchical control. K&Z's social community and higher order organizing principles could, he argued, be seen as a consequence of the mitigation of opportunism through hierarchical governance (Foss, 1996a).

Responding, K&Z (1996), in an argument that was later described by Verbeke (2003: 498) as "brilliant", reverted to first principles and drew upon Kant's view of individuals as having a tendency toward 'unsocial sociability', and invoked individuals' propensities to be motivated *both* by self-interest *and* by a need to belong to a group with a common identity. This dual characteristic, K&Z (1996) argued, determines the superiority of firms over markets because the need to belong leads to (and is associated with) groups of individuals within firms developing a firm-specific shared identity that supports communication and coordination on the basis of firm-specific procedural norms. This gives knowledge within the firm greater economic value than it would otherwise have if it were dependent on market transacting. Because of the resulting shared identity and normative behavior, the need to belong also acts to restrain self-interest. But it is the former and not the latter that K&Z (1993, 1996) argue to be the primary driver for explaining the firm and its advantage over the market.

K&Z's (1996) defense explicitly appealed to Coasian thinking, by pointing out that (a) Coase (1991) himself had argued that "market failure due to self-interest is not necessary to an argument that a firm organizes those activities in which it is economically favored relative to the market" (K&Z, 1996: 503), and (b) K&Z's theory is one based on a broader assumption with respect to human motivation not "alien to the spirit of Coase's seminal contribution" (K&Z, 1996: 503). Taking a middle

ground, Verbeke (2003: 501) suggested that economizing on bounded rationality is more-so a “primary decision making issue than the creation of safeguards”, and that the TCE/KBV debate over opportunism would likely go away if opportunism were seen as a constraint rather than a primary focus. But this was more an argument based on emphasis, rather than one that obviated the need to consider opportunism. According to Verbeke (2003: 501), safeguarding against opportunism “remains important”.

### **FIRM AND NON-FIRM EPISTEMIC COMMUNITIES**

K&Z’s (1996) invocation of the human desire for community cannot, in our view, be simply dismissed as being ‘extra-economic’ as Foss asserted (1996b). After all, as K&Z (1993, 1996) pointed out, human behavior underpins other economic explanations, including TCE. Williamson (1993) himself alluded to the socialization of economic agents acting to mitigate opportunism and contended that any social device that lessens opportunism should be valued as it economizes on transaction costs. Furthermore, TCE assumes that the human agents who make decisions on behalf of firms are boundedly rational (Williamson, 1985). However, it is one thing to analyze the attributes of firms, and to emphasize their social community, but it is another to explain why firms exist. Have K&Z explained why firms exist? Have they argued compellingly that TCE’s requirement of opportunism as a precondition to the existence of the firm is over-determined?

To address these questions we take the simple case of an MNC with  $k$  members, with the  $(k+1)$  member (referred to as ‘K’) being a candidate next considered for internalization. We assume further that:

- (a) the MNC considers whether to undertake knowledge transactions with K through the market, or to internalize K;
- (b) the knowledge is complex, difficult to codify and teach;
- (c) all of TCE’s preconditions to internalization of K are present, except that threat of opportunism is absent; and
- (d) all of KBV’s preconditions to internalization are present.

K&Z's (1993) thesis is that the MNC with  $k$  members will internalize  $K$  *because* the MNC with  $K$  as member is better at exchanging and recombining knowledge with  $K$  than it would be if  $K$  was to remain external to the firm, irrespective of any question of opportunism. We contend that K&Z's (1993) thesis does not *necessarily* follow from the argument that they invoke in its support. Our reasons are as follows:

First, it must be the case that the social community, being the firm in K&Z (1993), would also be the firm under TCE, for if this were not the case, then any criticism of TCE's preconditions to the existence of a firm by K&Z would be incomprehensible – one assumes that K&Z (1993) were comparing like with like. Thus, it must be the case that K&Z's social community involves hierarchy, managerial planning and direction (see Williamson, 1985). This is consistent with Nelson and Winter's (1982) and Penrose's (1959) concept of a 'firm'.

Second, K&Z's thesis rested on arguments that have been developed also in many other strands of literature, including social identity theory (Burke & Stets, 2009; Hogg, 2006), cognition theory (Reed, 2006; Hutchins, 1995), language and discourse theory (Hatch, 1992; Heracleus, 2006), communities of practice (Wenger, 1999) and sociology of knowledge (Holzner, 1968). All of these assume that many types of communities, organizations or groups can provide their members with identities, shared categories, compatible cognitive models, fruitful discourse and reflexive processes that enable them to efficiently exchange and recombine knowledge (including tacit knowledge).

However, none of these theories support a conclusion that only groups or social communities organized in *firms* are able to develop the individual and group-wide attributes, including any embedded organizing principles that are conducive to more efficient communication, exchange and learning. Nor do they support a conclusion that a firm's procedural norms are necessarily superior to equivalent norms upheld within non-firm communities, such as occupational or religious groups, guilds, universities or open source software developers, in the sociology of knowledge sometimes referred to as '*epistemic communities*' (Holzner, 1968). K&Z's (1993) empirical evidence is limited to a comparison between intra-firm knowledge transfers and knowledge transfers between firms and third parties, without specifying whether those third parties occupy the same knowledge communities

as the sample firms, and without addressing the relative efficiencies of knowledge exchange between firms and other agents inhabiting the same epistemic communities.

Thus, we posit that non-hierarchical or partially hierarchical epistemic communities (which we will refer to as ‘non-firm epistemic communities’) might be as efficient at exchanging and recombining knowledge (including tacit knowledge) as firms might be. To be sure, recent literature both assumes the existence of non-firm epistemic communities (Lusch *et al.*, 2007) and, in some cases, suggests that firms positioning themselves within such communities can achieve increased competitiveness, and superior innovative and adaptive capabilities (Pitelis & Teece, 2009; Schilling & Phelps, 2007). For example, recent research in marketing increasingly expounds the benefits to firms of taking a collaborative approach with customers to create value, and, to that end, promotes the virtues of fostering compatibility between the firm and its customers in terms of language, culture and identity. Treating customers as if they were endogenous to the firm helps bridge the gap between the knowledge and capabilities of firms and their customers, facilitating the creation of new products and services (Lusch, *et al.*, 2007). The creation of a non-firm epistemic community comprising the firm and its customers is thus encouraged (Zwick *et al.*, 2008). Identity, shared culture and discourse need not be correlated with the boundaries of a *firm* in order to improve communication and learning.

Similarly, the dynamic capabilities literature highlights the benefits of co-creating value by sharing ideas and taking a collaborative approach with other value chain members (Pitelis & Teece, 2009). Likewise, the recent innovation management literature stresses how innovation can be furthered by maintaining knowledge links between members of the firm and different kinds of agents located *outside* the firm (Schilling & Phelps, 2007). Neither the dynamic capabilities literature nor the innovation management literature promotes the idea that firms are more dynamic or innovative when they internalize the firms or other agents with whom they are transacting knowledge.

We return now to our example of the MNC that considers internalizing the additional member, K. Given the possibility that K and some of the existing members of the firm belong to the same epistemic community (or that some such community may be able to be created by the firm and K), it may be both possible and advantageous to create and maintain knowledge exchange across the boundaries of the firm rather than internalizing K. It cannot be assumed that K will be internalized



unless it can be specified under what conditions firms are superior to other epistemic communities at knowledge exchanges and recombinations – a consideration not discussed by K&Z (1993). K&Z's (1993) assertion that firms exist because they are better at exchanging and recombining knowledge in-house than with third parties remains a mere postulation. It follows that K&Z's (1993) statement to the effect that the requirement of opportunism under TCE as a precondition to internalization is overdetermined is a *non sequitur*, because in order to make that statement K&Z would need first to explain why firms exist. It should be noted that through their ability to attenuate opportunism, the existence of non-firm epistemic communities has interesting implications also for the applicability of TCE in the analysis of the scope of the firm.

K&Z (1993) found empirical support for their argument in an analysis indicating a statistical correlation between the 'codifiability' of manufacturing technologies and the probability that their transfer to foreign countries takes place through licensing rather than foreign direct investment. However, in their analysis, the characteristics of technologies measured in 1989 were used to explain decisions regarding the mode of their foreign exploitation, in some cases, two or three decades earlier (Zander, 1991). The assumption that manufacturing technologies can meaningfully be characterized in terms of their inherent 'codifiability', and that this characteristic remains unchanged over several decades, is implausible. Moreover, the observed correlation can equally well be interpreted in terms of TCE logic, which suggests the reverse order of causality: The completion of agreements involving the sale of tacit or incompletely codified knowledge is difficult. The wish (regardless of reason) to complete a licensing agreement therefore provides a powerful incentive to invest in the articulation and codification of the technologies involved. Technologies licensed to third parties can therefore be expected, on average, to be more completely codified than those exploited only internally.

## CONCLUSION

We have argued in this paper that two of the conclusions made by K&Z (1993, 1995, 1996, 2003) did not follow from the fundamental tenets they drew upon, nor did they derive from their empirical research. K&Z (1993) proposed that (1) MNCs *exist because* transfers and re-combinations of knowledge occur more efficiently inside MNCs than between those MNCs and third parties; and (2)

the existence of opportunism, which is one of the pre-conditions to the existence of the firm under TCE, is not necessary, although it may be sufficient, to explain the existence of the MNC.

We posit that non-firm epistemic communities exist or can be created that may be equally or more efficient than firms at transferring and recombining knowledge. It cannot be assumed that firms are *always* better at transferring and recombining knowledge in-house than through market transacting – although there may be conditions, as yet unspecified, when this is the case. Therefore, one cannot conclude that firms *exist merely because* they are better at transferring and recombining knowledge. Furthermore, since K&Z's argument cannot explain the existence of firms, it also cannot be used to disprove the importance of opportunism as postulated in inherited TCE theory (Williamson, 1975). If K&Z's (1993) intention was to balance an over-emphasis on TCE at the expense of a broader, more humanistic view of individuals' motivations within social groups (K&Z, 2003), they could have achieved this without seeking to undermine TCE. They might have done so through a broader focus on epistemic communities (of which firms might be a large and important subset). Our argument extends Foss (1996a), who posits that one might be able to achieve K&Z's "higher order organizing principles" (K&Z, 1993, 2003b: 524) through contractually based arms' length teamwork in the market rather than relying on hierarchical control. Moreover, we believe that humanistic motivations can be accommodated within TCE (Williamson, 1985, 1993). The assumption that opportunism constitutes a fundamental threat in many economic transactions needs not imply that firms' knowledge-based advantages derive solely from clever design of incentives and control systems (Ghoshal & Moran, 1996, Verbeke, 2003) – a conclusion that underestimates managers' abilities simultaneously to adopt different perspectives and implement different practices (Bolman & Deal, 2003).

The focus on *firms* as superior contexts for knowledge transfers and re-combinations has detracted from a focus on other non-hierarchical forums, which may be just as efficient. Managers should not translate a need for knowledge and innovation with a need for internalization, without considering alternatives – like K&Z (2003: 513) we believe that "knowledge grows out of healthy social communities", but we are not sure that firms are always preferable to other community structures in this context. Having said that, K&Z's contribution invited important new perspectives for strategic management. They highlighted the strategic significance of an MNC's capability to transfer and

recombine knowledge, as part of the MNC's dynamic capabilities (Teece, 2007). It directed attention to the nature of such capabilities and to the processes whereby they are acquired, fostered and protected. Make-or-buy decisions and decisions to expand across borders must take this into account (Tallman, 2003; Verbeke, 2003). As K&Z (1993) emphasized, strategic advantages can be gained through the option value of the potential income that might be made through the acquisition and recombination of knowledge via an MNC's decision to invest abroad (Verbeke, 2003; Luo, 2000).

## REFERENCES

- Barney, J.B. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17(1): 99-120.
- Bolman, L.G. & Deal, T.E. 2003. *Reframing organization: artistry, choice, and leadership* (3<sup>rd</sup> ed.). San Francisco: Jossey-Bass.
- Buckley, P. J. & Casson, M. 1976. *The Future of the Multinational Enterprise*. London: Macmillan.
- Burke, P. J., & Stets, J. E. (2009). *Identity theory*. New York: Oxford University Press.
- Coase, R. H. 1937. The nature of the firm. *Economica*, 4(16): 386-405.
- Coase, R. H. 1991. The institutional structure of production. Nobel Prize Lecture to the Memory of Alfred Nobel, December 9, 1991, [www.nobel.se/economics/laureates/1991/coase-lecture.html](http://www.nobel.se/economics/laureates/1991/coase-lecture.html)
- Foss, N.J. 1996a. Knowledge-based approaches to the firm: Some critical comments. *Organization Science*, 7(5):470-476.
- Foss, N.J. 1996b. More critical comments on knowledge-based theories of the firm. *Organization Science*, 7(5): 519-523.
- Grandori, A. 2001. Neither hierarchy nor identity: Knowledge Governance mechanisms and the theory of the firm. *Journal of Management and Governance*, 5: 381-399.
- Ghoshal, S. & Moran, P. 1996. Bad for practice: A critique of the transaction cost theory. *Academy of Management Review*, 21(1): 13-47.
- Hatch 1992. *Discourse and Language Education*. Cambridge: Cambridge University Press.
- Hennart, J.-F. 1992. *A Theory of Multinational Enterprise*. Ann Arbor: University of Michigan Press.

- Hennart, J.-F. 2000. Transaction costs theory and the multinational enterprise. In C. Pitelis & R. Sugden (Eds) *The Nature of the Transnational Firm* (2<sup>nd</sup> ed.). London: Routledge.
- Hennart, J.-F. 2009. Down with MNE-centric theories! Market entry and expansion as the bundling of MNE and local assets. *Journal of International Business Studies*, 40(9): 1432-1454.
- Heracleous, L. 2006, *Discourse, Interpretation, Organization*, New York: Cambridge University Press.
- Hogg, M.A. 2006, Social Identity Theory, in P.J. Burke (Ed.) *Contemporary Social Psychological Theories*, Stanford University Press: Stanford, CA.
- Holzner, B. 1968. *Reality construction in society*. Cambridge: Schenkman.
- Hutchins, E. 1995, *Cognition in the Wild*, Cambridge, Mass.: MIT Press.
- Kogut, B. & Zander, U. 1992, Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3(3): 383-397.
- Kogut, B. & Zander, U. 1993. Knowledge of the firm and the evolutionary theory of the multinational corporation. *Journal of International Business Studies*, 24(4): 625-645.
- Kogut, B. & Zander, U. 1995. Knowledge, market failure and the multinational enterprise: A reply. *Journal of International Business Studies*, 26(2): 417 -426.
- Kogut, B. & Zander, U. 1996. What firms do? Coordination, identity and learning. *Organization Science* 7(5): 502 -518.
- Kogut, B. & Zander, U. 2003. A memoir and reflection: knowledge and an evolutionary theory of the multinational firm 10 years later. *Journal of International Business Studies*, 34(6): 505-515.
- Love, J. H. 1995. Knowledge, market failure and the multinational enterprise: A theoretical note. *Journal of International Business Studies*, 26(2): 399-407.
- Luo, Y. 2000. Dynamic capabilities in international expansion. *Journal of World Business*, 35(4): 355-378.
- Lusch, R.F., Vargo, S.L. & O'Brien, M. 2007. Competing through service: Insights from service-dominant logic. *Journal of Retailing*, 83(1): 5-18.
- McFetridge, D.G. 1995. Knowledge, market failure and the multinational enterprise: A comment. *Journal of International Business Studies*, 26(2): 409-415.

- Nelson, R. R. & Winter, S. G. 1982. *An evolutionary theory of economic change*. Cambridge: Harvard University Press.
- Penrose, E., 1959, *The Theory of the Growth of the Firm*. Oxford: Basil Blackwell.
- Pitelis, C.N. & Teece, D.J. 2009. The (new) nature and essence of the firm. *European Management Review*, 6(1): 5-15.
- Reed, S.K. 2007. *Cognition: Theory and applications*, 7<sup>th</sup> Ed. Belmont, CA: Wadsworth.
- Rugman, A. M. 1981. *Inside the Multinationals*. New York: Columbia University Press.
- Schilling, M.A. & Phelps, C.C. 2007. Interfirm collaboration networks: The impact of large-scale network structure on firm innovation. *Management Science*, 53(7): 1113-1126.
- Tallman, S. 2003. The significance of Bruce Kogut's and Udo Zander's article, 'Knowledge of the firm and the evolutionary theory of the multinational corporation'. *Journal of International Business Studies*, 34(6): 495-497
- Teece, D.J. 2007. Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13): 1319-1350.
- Verbeke, A. 2003. The evolutionary view of the MNC and the future of internalisation theory", *Journal of International Business Studies*, 34(6): 498-504.
- Wenger, E. 1999. *Communities of Practice: Learning, Meaning and Identity*, Cambridge: Cambridge University Press.
- Wernerfelt, B. 1984. A resource-based view of the firm. *Strategic Management Journal*, 5(2): 171-180.
- Williamson, O.E. 1975. *Markets and Hierarchies*. New York: The Free Press.
- Williamson, O.E. 1979. Transaction cost economics: The governance of contractual relations. *Journal of Law and Economics*, 22(2): 233-262.
- Williamson, O.E. 1985 *The economic institutions of capitalism*. New York: The Free Press.
- Williamson, O.E. 1993. Opportunism and its critics. *Managerial and Decision Economics*, 14(2): 97-107.

Zander, U. 1991. *Exploiting a Technological Edge - Voluntary and Involuntary Dissemination of Technology*. Doctoral dissertation. Stockholm: Institute of International Business at the Stockholm School of Economics.

Zwick, D., Bonsu, S.K. & Darmody, A. 2008. Putting the consumers to work: 'Co-creation' and new marketing govern-mentality. *Journal of Consumer Culture*,8(2): 163-19.