Industry Architectures and Globalization:

Institutional modularity, value chain similarity and ease of foreign expansion

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Abstract

Much research to date on the challenge of international expansion has focused on the methods through which firms expand, and the relative difficulty of expanding into one country as compared with another. Far less attention has been paid to the question of why some industries seem far more amenable to globalisation than others, and why some firms fail to 'export' the competitive advantage they enjoy at home while others succeed. This paper looks beyond these 'company' and 'country' perspectives to focus on *industry architectures*, or the comparative structures of value chains in different countries. Value chains and industries evolve independently through path-dependent processes, meaning that 'who does what', the modularity or integration of the value chain and the nature and importance of supplier and partner relationships can vary widely between countries. Such international differences can cause problems for firms who want to play their current role – or even a narrower one – in a new country. Building on existing theory, we put forward five hypotheses on this theme and test them empirically using a survey of CIS countries. Our results and their interpretation suggest that the degree of 'fit' between industry architectures is an important predictor of success in international expansion, as is the extent of modularity along the value chain.

Preliminary working draft, v 0.6, 02/08

Success in global expansion is usually thought of as the trade-off between a firm's specific advantage (Hymer, 1976) and the challenges of going abroad (Ghemawat, 2001). Firms leverage their unique strengths in new markets through trade, foreign direct investment (FDI), licensing or joint ventures (JV), but are constrained by physical distance, cultural contrasts and "liabilities of foreignness" – operational differences between countries and variance in "the way we do things around here". Most of the emphasis in the international management literature has been either on the nature of these international differences (in terms of institutions, norms or culture), or in terms of the most appropriate *mode* of entry into a foreign market. Yet far less attention has been paid to the question of *when* and *whether* a firm's advantage in one country is "exportable" into another. This paper looks at this question head-on: what is it that drives the "exportability" of advantage, over and above the country-level variables?

Our focus, building on recent advances in institutional and evolutionary economics (see Jacobides & Winter, 2005; Jacobides, Knudsen & Augier, 2006) is on the role of *value chain structure* or *industry architecture* in the host country – the set of rules and roles that dictates how labor is divided. Following these recent works, we posit that each sector has a potentially country-specific way of being organized – i.e., it has its own "industry architecture", its own, evolutionarily derived way of breaking up the activities along the value chain. Based on this premise, we aim to demonstrate empirically that the "fit" between industry architectures (i.e. the similarity between the value chains in home and host countries) and the institutional modularity (i.e. the separability between the stages in a value chain in a segment where firms are active) are two key success factors in international expansion. This paper's contribution is to take this recently developed work on industry architectures and comparative value chain structures, ground these concepts in the international management literature and, more importantly, provide the first empirical test of the resulting propositions. We do this by surveying the success of firms in three former CIS countries who attempted global expansion, focusing on the importance of industry architectures, in terms of their *similarity* and *institutional modularity* as these two shape the ability to transport an advantage to another country.

By finding that these factors are empirically significant, we help advance a perspective that can also help address some open questions, such as why we see extensive international activity in some sectors and very little in others. Our findings also suggest that in order to understand what drives success in this area, we need to look beyond individual companies and countries and analyse sectors and industry architectures more deeply. By understanding how such industry architectures change in

different countries (often by becoming more similar and more modular) we can also understand why we observe such a drastic increase in international activity (in terms of trade, JV and FDI) through the "integration of trade [through] the dis-integration of production" (Feenstra, 1998). We can thus bridge recent perspectives on modularity and outsourcing and of the changing landscape of international management.

In terms of structure, this paper begins with an overview of current theory on the exportability of advantage. It then looks at how the analysis of industry architectures might help to cast a new light on the issue, leading to the hypotheses to be tested. We then introduce data and methods, provide results, and close with a discussion on the implications for research and practice.

Theory

Analysis of global expansion in the literature

What determines success in global expansion? We know that a firm expanding in a foreign country faces a potentially hostile environment. Lack of access to local resources, imperfect knowledge of the local operating environment and potential difficulties in establishing a competitive position put the expanding firm at a disadvantage vis-à-vis its local competitors (Buckley and Casson, 1976, Dunning, 1979, Caves, 1981, Rugman, 1981). As Hymer (1976) observed in his seminal contribution, there *have* to exist some firm-specific advantages that outweigh the "liability of foreignness" – generic disadvantages of expanding abroad (Zaheer, 1995; Zaheer and Mosakowski, 1997). In Hymer's words, "there are as many kinds of advantages as there are functions in making and selling a product". These advantages form the basis of global expansion because they are superior in absolute or in relative terms (Yip, 2003).

Kindleberger (1969) and Dunning (1979) suggested that firms expanding abroad possess "monopolistic advantages" or "ownership-specific advantages" that account for their success, while Vernon (1975) suggested that firms expand their products as a function of their position in the life cycle. Buckley and Casson (1976) argued that comparative advantage – the superiority of firms in developed countries in terms of capabilities – accounts for the patterns seen in both trade and FDI activity.

From the 1980s onwards, the development of the field of strategy established the concept of competitive, firm-specific advantages (Nelson, 1995), which has recently been more fully integrated

in international economics as well (cf. Markusen, 2002; Henisz, 2003). From this perspective, the aim of global expansion is to "export" competitive advantage through some market-based arrangement (licensing or franchising, for example) or through FDI, whether via a "greenfield" operation or through M&A activity. In this conceptual framework, expansion requires an advantage that a firm can leverage internationally in terms of its products, perhaps based on its superior knowledge (Teece, 1977, 1981; Buckley and Casson, 1976; Kogut and Zander, 1993).

Clearly, however, the firm's own capability is only part of the story. Success also depends on the differences between the home nation and the host nation, which have the potential to help or hinder expansion. Potentially helpful differences include lower labor and resource costs (Dunning, 1979, Rugman, 1981), while problems might stem from cultural, administrative, geographical and economic differences between home and host (Zaheer, 1995, Zaheer and Mosakowski, 1997, Ghemawat, 2001). Some good progress has been made in understanding the "problems of going abroad". As Guilen and Suarez (2004) note in their recent survey article, countries differ in terms of culture (Hofstede, 1980, 1991), authority/business systems (Hamilton and Biggart, 1988; Whitley, 1992; Guillen, 1994; Djelic, 1998), political economy/-friendliness to multinationals (Gereffi, 1989), legal tradition (La Porta, Lopez-de-Silanes, Shleifer & Vishny 1999) and political risk (Henisz & Williamson 1999; Henisz 2000).

However, all this literature looks at how particular *countries* differ, and as a result, how difficult it is for a firm to export its advantages into a different national context. The received wisdom cannot account for the substantial differences between different industries in patterns of globalization, and especially the lack of global expansion in some service sectors. Pavitt (1991) and Patel (1995), for instance, identify specific sectors where strengths in one national market did not lead to a successful expansion abroad. We must ask why is it that only *some* industries are global, and why there is global competition between some countries and not others, even though they all seem to have similar institutional environments. Why should it be that *some* types of competitive advantage in *some* types of industries can be exported to a particular country, while others cannot?

So far, the answers are partial at best. The extent of globalization has been considered in terms of "drivers of globalization" (Yip and Coundouriotis, 1991), such as globalization of customers, markets, and support of regulators; but the question remains, what drives these drivers? In other words, what leads to some industries having more global competitors? In a rare effort to address this issue, Hu (1995), expanding Hymer's approach, observed that not all sources of competitive

advantage are transferable on the global level. Some advantages are only relevant in specific countries and economies, and some advantages are hardly transferable at all. While certainly helpful, this observation still begs the question: *why* do these differences exist?

The role of comparative value chain structure

This paper provides an alternative approach, drawing on Jacobides (2008). Specifically, we argue that "institutional modularity" at the level of the *sector* plays a significant role, as does the extent of similarity in value chain structure between different countries. By institutional modularity we mean the degree of separability between parts of the value chain, which allows a firm to transplant easily if it focuses on only one part of the sector, without needing to re-create tight links to the existing (and potentially different) structure of the sector in the host country. By similarity of industry architectures we mean international compatibility in terms of the nature, structure and operation of the value chain (i.e. the vertical division of labour and the "rules and roles" that connect different industry participants, as described by Jacobides, Knudsen and Augier, 2006). When value chain structures are similar, and particularly when particular parts of a production structure are modular, then global expansion is significantly easier.

However, before we look more closely at these two "comparative attributes" of the value chain, we need to elaborate on our starting point –that in general, there do exist substantial and understudied differences in industry organisation and division of labor. These differences exist because industry structures are not determined solely by technology: they are the result of path-dependent processes. This point has been made by the "varieties of capitalism" and "national business systems" literature (Whitley, 1992, 1999; Whitley and Kristensen, 1996; Hall and Soskice, 2001; Morgal et al, 2004), albeit at the level of the country as a whole, as well as sociological analyses of value chains (Gereffi, 1994; Gereffi et al, 2005), albeit focusing on global power structures.

What is worth stressing is that path-dependent processes lead to value chains breaking down into "vertical units" – different ecologies of vertically co-specialized participants. Prevailing norms of interaction also play a part (cf. Nishiguchi, 1994 and Lane, 1996). In Kristensen's words, "national types of firms and their institutional context change, but because the process of change happens through and by nationally patterned relations and interactions, nothing ensures convergence." (Kristensen, 1996)

This means that each industry, in each country, has a distinct evolutionary trajectory in which capabilities, scope and institutional context combine to create fairly distinct "vertical groups" (Shanley and Peteraf, 2004). As Winch (2000) illustrates in his comparative analysis of the construction sector,

> [there exists] extensive variation in the configuration of [the structure of the building sectors' value chain]. Construction business systems have evolved over very long periods, and display well-rooted rigidities, with the balance between the actors in the system hard fought and hard won… [For example,] the French *architecte* has a much more constrained and limited role in the construction process than the British architect; the German *Architekt* has a state-derived role in obtaining building permits which the British counterpart does not, and so on. In the case of some actors such as the German *Prufstatiker*, the British quantity surveyor, and the French *bureau de contrôle*, there is simply no close comparator in other systems.

It is exactly these international differences in value chain structure, in otherwise identical industries, that hamper the exportability of competitive advantage – and which are the starting point for this paper's contribution.

The structure of a sector also goes beyond the "vertical fault lines" that break up a sector into its constituent parts. It also encompasses the different "rules and roles" that tie the different participants together, as Jacobides, Knudsen and Augier (2006) have recently argued. As they posit,

> Once an industry architecture emerges and stabilizes, it is difficult to stray from it, for reasons relating to inter-operability (who else is willing to participate in a new architecture, or is capable in so doing); regulation (which reinforces some ways of dividing labor and excludes others); and information (what the customers have learnt to expect). Industry architectures are [partly] shaped by legal and regulatory authority, and this explains why in different jurisdictions (different states or countries) we observe different ways of organizing labor. Also, industry participants who stand to benefit from a given architecture usually fight the introduction of new alternatives through legislative or regulatory means (e.g. Shell, 2003).

This division of labor also influences the formation of capabilities, and hence the prospects for globalization (see Cacciatori & Jacobides, 2005; Jacobides & Winter, 2005). Specifically, firms develop their capabilities in relation to the existing vertical segments and co-specialized participants in their industry. Their capabilities are critically dependent on this context as scope prescribes organization and also the nature of capabilities. Take the architect example. In the UK, where architects are active in detailing (i.e. translating designs into specific guidance for buildings) as well as concept and design, their capabilities develop in a different way from those of their French counterparts, who concentrate on concept and design. It may well be that UK architects will not be able to work well in the French system, because their competencies in concept and design are

inseparable from those in detailing. So we cannot even say that a firm with a broad scope will do well in a country where its role will be narrower; the demands placed on it may be *qualitatively different.* So, given the strong correlation between capabilities and scope, some firms' scope may make them poor candidates for global expansion. In other words, if their capabilities are *integral* rather than *modular*, compatibility will be a problem.

The role of "industry architectures": Similarity, separability and success in global expansion

On the basis of this recent theory, we can now develop the analysis that links the dynamics of industry architectures and the potential for success in global expansion. Specifically, we can consider two different, related key aspects.

First, some local structures are clearly more institutionally and socially embedded than others, making it more difficult to expand from one part of a value chain in one country to a different part of the value chain in another. Correspondingly, if a value chain consists of relatively stand alone units which can be painlessly taken apart and substituted by similar industry participants, then replication of interdependencies in this particular value chain in a new economic and social environment (i.e. another country) should be less problematic than in a value chain characterised by dense linkages among its participants. Consequently, a firm should be able to export a part of its value chain (or the whole value chain) with a relative ease when substitution of some parts of the value chain by outsiders does not seriously affect its competitive advantage. In other words, "institutional modularity" (interchangeability within a value chain) can facilitate international expansion.

Second, any *similarity* in value chain structures should also be beneficial. If value chain structures in home and host countries differ significantly, then the internationalising firm will face serious difficulties in finding suitable business partners since the way the business is done in the host country is considerably different from the way it is done at home. Hence, it will not be able to simply copy its home modus operandi but will have to spend a considerable amount of time and resources to adjust its business model to the way the industry's value chain is organised in the host country. Furthermore, the success of this adjustment will depend on the firm's ability to understand and overcome these differences in the value chain, which may be trickier than one might expect at the outset (see Jacobides, 2008, for evidence on mortgage banking expansions). With this background, then, we are ready to articulate the role of these industry architectures in terms of global expansion, as it relates to the dual issues of similarity and modularity.

Starting with the analysis of modularity, it is important to note that often, the capabilities that firms have in one part of the value chain are critically dependent on capabilities developed by other vertically co-specialized firms in the same country and sector. This point has been well covered, albeit in the particular context of Japanese firms (mostly automotive assemblers) expanding to the US. As Pil and MacDuffie (1999: 60) note, "suffice it to say that the capabilities of a plant reside to some degree in the strengths of its relationships with the suppliers and in the abilities of those suppliers." Kenney and Florida (1993), who carefully documented the expansion of Japanese firms to the US, noted that successful expansion abroad

> combines the transfer of work and production organization within the plan with the simultaneous transfer of broader *interorganizational relationships* between plants and their parts suppliers. This is having a powerful effect in the broader environment and is creating a whole new and supportive environment for the Japanese system of production.

Toyota, hailed as the most successful Japanese example of global expansion, invested in training its new US suppliers to deal with it just as its home suppliers had. This suggests that even when the division of labor is similar in home and host countries (as with automobiles), some competitive advantage consists in the way a firm interfaces with other sector participants – and also, possibly, those participants' exact nature and capabilities. Therefore, a firm expanding overseas must either occupy an *institutionally modular* position in the value chain of a specific sector (i.e. it must be neatly separated from other industry participants in easy-to-replicate relations), or it must be able to reproduce the same (or substitute) structures in the host country's value chain, insofar as these structures drive its advantage.

Thus, to the extent to which an industry is "institutionally modular" (linkages between different parts of the value chain are "loose"), it will be easier to expand globally. Certainly, institutional modularity of a sector itself is not a sufficient condition for a successful international expansion (by international expansion we mean an establishment of a greenfield subsidiary in the host country). However, everything else being equal, if an internationalising firm operates in a sector which is characterised by close, non-substitutable links among industry participants (or institutionally non-modular sector), then it will find it more difficult to set up its foreign operations in a new country as it should be able to export or reproduce all the links with value chain participants the firm has established in its home country. Otherwise its competitive advantage will be seriously damaged. International expansion in such conditions is certainly a highly demanding task as it incurs much higher degree of complexity and requires more substantial resource commitment from the parent

firm. On the contrary, if the value chain of a sector the firm operates in can be easily broken down and some of its parts replaced with similar parts without a loss in the firm's competitive advantage, then the firm internationalising in this sector will be able to set up its foreign operations in this sector much easier. More formally, we can argue that:

> **Hypothesis 1: The more institutionally modular a sector in which a firm operates is, the more successful its international expansion will be.**

Furthermore, the extent of linkages of the firm with other companies in its home environment might also curtail its ability to expand globally. The dense linkages among the value chain participants create a set of locally contingent dependencies and habits that cannot be easily transferred when the firm expands abroad. The firm finds itself being dependent on its value chain partners and recognizes (or not) the challenge it poses to successful transfer of its competitive advantage. The recognition part is important, as a number of companies failed to grasp the significance of this part of their advantage that subsequently created considerable problems in their international expansion (see the examples in Jacobides, 2008).

Also, the local embeddedness damages the firm's ability to expand internationally, as it is likely that the "rules and roles" in its home country differ from those in the host. If the environments were similar, then the internationalising firm would not have faced as many problems settling in a new country as it would have otherwise. Yet, the dissimilarity of the environment is likely to create more problems for companies with dense linkages to their value chain partners in their home countries, than to those with loser links at home. Thus, *local* dependencies are likely to create a problem for global expansion, as it is unlikely that the new, local partners will be able to replicate the benefits that matter for success. In other words, the extent of local dependencies will mean that the firm will find it more difficult, *ceteris paribus,* to succeed in a new environment. As such, we posit that

> **Hypothesis 2: The more embedded a firm is in its home environment, the less successful its international expansion will be.**

Conversely, if a firm that expands abroad maintains the links to its own value chain (in the country of origin), where it is familiar with the mode of operating with local value chain partners, it might be able to be more successful in its attempt to "transplant" its advantage. Also, to the extent that a firm does not have to adapt to the local partners and the ways they need to interface (or does not depend on some co-specialized templates, roles, and capabilities that have not developed in the host country

which will tend to differ from the home country), its expansion will be easier. Thus, increased dependencies on either home or global participants, which will tend to have a more similar way of operating and interfacing with the firm in its own environment than the locals would, should facilitate global expansion. The reason is that home / global companies will be able to better provide an aspiring global entrant with services/products in the same way as they do at home. Thus, *ceteris paribus*, the firm's local embeddedness will be less of a problem (as it is linked with global not local firms), and it will be able to maintain some of its "distributed" source of advantage, which rests on the rest of the participants in the industry ecosystem. Such home / global links should be expected to alleviate some of the challenges of international expansion and will help the firm to exploit its advantage abroad. Thus we argue that

Hypothesis 3: The greater the dependencies a firm has on its home country / global value chain partners, the smaller the difficulty of international expansion

In addition to the modularity and linkages between / embeddedness in a country's value chain, the second set of attributes that matters is the extent to which the two industries are structured on a similar basis. If the structure of the value chain in home and host is similar, then it is more likely that the capabilities and competencies developed in one setting will be able to "fit" the host's value chain. Such similarity should also make it easier to adapt to the host country and transfer competitive advantage into it. The similarity of the overall business environment has been shown to be beneficial for international expansion, as it helps to overcome the liability of foreignness (Zaheer, 1995). Also, the similarity of the economic, social and cultural environments in the region is the basis of the regionalisation thesis as put forward by Rugman (2005), Rugman and Verbeke (2004). In this analysis we are going a step further and stress the importance of similarity of the *value chain structure / industry architecture* (in the spirit of Jacobides, Knudsen and Augier, 2006) instead of business environment in general, focusing at the *sectoral* level of analysis.

If the value chain structure is similar between the home and host countries, then the internationalising firm will be able to set up its operations in the new country more smoothly as the capabilities it developed in managing the value chain at home are directly transferable abroad. Hence, the firm will spend less time in adaptation to the new environment and adjustment of its business processes than otherwise, as we argued at length earlier. All in all, the firm will experience an easier, faster, and smoother expansion into an industry with similar value chain structure Thus, we can posit that:

Hypothesis 4: The greater the similarity in value chain structure between host and home country, the more successful international expansion will be.

Also, if managers are actively aware of the differences in terms of value chain structures, it is likely that they will try to overcome them ex ante, and as such may not face the unpleasant surprises involved in adapting to an unfamiliar environment. Therefore, a recognition of the problems created by the differences in the value chain structures is essential for successful internationalisation. If the firm is aware of the value chain differences and difficulties they might pose, it is likely to account for them at a planning stage and enter the new market with correspondingly adjusted strategies. At the same time, the failure to do a thorough homework regarding the fit between the value chain structures may considerably slow down establishment of operations in a new country, as the firm's value chain and corresponding capabilities will have to be re-organised to allow it to operate in the new environment.

Indeed, emerging evidence (see Jacobides, 2008) suggests that the lack of attention to such local, *industry-level* factors, and lack of appreciation of the different "rules and roles" that exist in a sector are quite often to blame for underwhelming or downright problematic expansion efforts. It also does seem that often, managers are caught off guard, possibly because this is not a set of issues that tend to be discussed and anticipated (nor are present in the literature!) This is certainly a lengthy and potentially painful process if conducted ad hoc. As such, we can argue that

Hypothesis 5: The more a firm is prepared to cope with problems in the value chain / industry structure, the greater the success in international expansion.

Finally, similarity and modularity along the value chain combine in interesting ways. If a sector is institutionally modular, then it becomes *comparatively easier* to overcome the differences between two value chain structures. The more modular a value chain, and the more separable the parts that constitute a sector, the smaller the impact of problems caused by the dissimilarity of the home and host sector, because a firm can focus on one part of the value chain without caring quite as much about the way in which connections with the other industry participants happen.

In order for us to put this down as a proposition, we can shift our attention to *the ease of overcoming value chain differences,* and see to what extent the modularity (separability) may make it easier to overcome these differences. This suggests a shift in the dependent variable in our last hypothesis to

explore factors predicting how easy or difficult it is to overcome value chain differences. More specifically, we could stipulate that

> **Hypothesis 6: The greater the institutional modularity of a sector, the easier it is for a company to overcome differences in value chain structure between host and home countries.**

These hypotheses, seen jointly, should provide a first set of testable propositions on how important the role of "industry architectures" might be in practice. In the following section, we provide an overview of the setting we used to test these hypotheses, and the methods followed.

Data and methods

To help us test these hypotheses, we conducted a survey in three CIS countries (Ukraine, Moldova and Kyrgyzstan) in summer 2007. First of all, we developed a preliminary questionnaire, which then was tested on four companies. The questionnaire was adjusted following this pilot study and mailed out to our target sample at a later stage.

Setting and data

The target sample was constructed as follows. Each country's chamber of commerce was approached in order to obtain a mailing list. Since there are few foreign investors in Moldova and Kyrgyzstan, the sample covered the majority of significant international companies operating there (about 100); whereas in Ukraine the questionnaire was mailed out to the largest 100 foreign companies. The mailing package consisted of a cover letter and a questionnaire. The cover letter was directed to the Managing Director and explained the aims of the study. The mailing was followed up a week later with a phone call to boost participation. We received 87 replies in total, representing a response rate of 31%, with almost equal participation by each country.

Most foreign companies operating in these countries started their business in the 1990s. The median company has been in business for 8.5 years, has revenues of about USD 6mn, and employs 156 people. Company profiles differ significantly among the countries. The Ukrainian companies are the largest in the sample, with average annual revenues exceeding five times those of Moldovan companies, who still earned twice as much as Kyrgyz companies, which are the smallest in the sample. Average market share for Ukrainian and Kyrgyz companies is about 28%, while Moldovan companies hold leading positions with average market share of about 47%.

The industry structure of the surveyed companies reflects FDI distribution by industries in the countries (see Table 1). Most companies are working in the food industry, financial services, trade, transport & communications and construction. These sectors are among the most rapidly developing sectors in the CIS, and hence are highly attractive for foreign investors. At the same time, substantial FDI inflow is one of the key reasons behind the growth of these sectors. Table 1 provides the descriptive statistics for our data composition, in terms of sectors and countries.

Insert Table 1 about here

Dependent variables

Our key dependent variable is a manager's perception of the subsidiary's performance (EXPERF). This, as with all perceptual variables in our survey, was measured on a five-point Likert scale. More specifically, the question was, "Please evaluate the performance of your [the country where the subsidiary is] subsidiary"**.**

This, of course, is not a true measure of performance as such, but a satisfaction effect, which is also subject to individual biases. However, we expect this measure to perform adequately, since our hypotheses are referring to the "success of international expansion", in which case the satisfaction measure effectively reflects the perception of the success of the process. It is also worth noting that any "objective" measure of success in global expansion would require controlling for all the inputs required; after all, the theory developed predicts how, *ceteris paribus,* the structure of the value chain makes global expansion easy. As such, a measure of satisfaction with global expansion should provide an appropriate test of our hypotheses.

Our second dependent variable (used to test Hypothesis 6) is a "difficulty of overcoming differences" measure (OVERCEASE). In addition to understanding the value chain / industry architecture's impact on global success, we also want to understand how easy it is to overcome such difficulties. In particular, it would be interesting to assess to what extent modularity and the extent of similarity of value chains independently and jointly explain the *difficulty* of overcoming these differences. As such, we used as a dependent variable the response to the question "How difficult was it for you to overcome the differences in the industry structure?"

Independent variables

Our two key independent variables, which are also measured on the same Likert scale, are sector similarity (the extent to which the two industry architectures are alike) and sector modularity (the

extent to which it is easy to separate the different parts of the sector). The "sector modularity" variable (SECMOD) is the answer to the question "how easy is it to break up the activities of your sector in separate components / modules?" This, as we verified in the pre-testing period, reflects fairly adequately the manager's perception of the easiness of breaking up the activities of the sector in separate components/modules (i.e. the sector's institutional modularity). SECMOD thus provides a direct test for H1.

The sector similarity (SECSIM) variable corresponds to the manager's perception of the similarity between the value chain structures in host and home countries. Specifically, it is the answer to the question "how similar is the structure of your industry in your home country to the structure of the industry in [the country where the subsidiary is]?" This is further explicated by noting that this similarity should consider the way the value chain is organized and the nature of the players in each segment; so the question was further explained by noting that this construct is intended to cover both these elements; as such, the questionnaire notes: "(a) The vertical structure of the industry in my home country is the same as in [the country the subsidiary is in]. (i.e., there are similar segments along the value chain); and (b) The horizontal structure of the industry in my home country is the same as in [the country the subsidiary is in] (i.e., the industry participants in [the host country] are like those in the home country)." SECSIM provides a direct test for H4.

The next set of independent variables relates to H2 and tests the role of dependencies on the local ecosystem and the potential problems this may cause. We employ two different measures to test it. One, we consider to what extent there are close links with, and a dependency on the local partners. In particular, our "local dependency" (LOCDEP) variable was the answer to the question "What is the extent to which the success of your operations in [the host country] depends on the performance of and relationships to other *local* industry participants (e.g. other supply chain partners, providers, etc)?"

The second measure employed to test H2 is directly related to the firm's embeddedness in the *home* country (i.e. close linkages between the focal firm and other organizations in the country of origin). This variable (HOMEMB) is the response to the question "does your company have close relationships with buyers/suppliers in your home country?" It allows us to consider the impact of home embeddedness on the success of international expansion directly. The reason for employing these two measures is that they consider different constituent elements of H2: One looks at the *extent* of local dependence (extent of local embededness) and the other looks at the *relative importance* of

local dependence (how much local connections matter). We expect both to be important, as they represent different facets of the theory.

H3 is tested by the variable GLOBDEP, which is the answer to the question "What is the extent to which the success of your operations in [the host country] depend on the performance of and relationships to other international industry participants (e.g. other supply chain partners, providers, etc)?" (We explained that this included the home country). Note that we expect that firms would choose international partners as opposed to local partners inasmuch as there *are* differences in the value chain, which would introduce a conservative bias in our estimation, inasmuch as the very reliance on global (or home) country partners (as opposed to local partners) may be, for yet another reason, a manifestation of industry architecture differences. So we expect that a significant result to this correlation will signify that a difference in industry architecture does impact the potential success in global expansion.

In addition to these perceptual measures, we also added another, objective measure. One of the questionnaire items asked (for the parts of the value chain not done in-house) what is the percentage of the components of the value chain that is procured locally; and another asked what is the percentage of the components of the value chain that are procured from the home country or other subsidiaries. We thus constructed the variable PCVCGLOB which was the percentage of the value chain components that were procured from the home country or other subsidiaries. We expect that the greater this percentage, the lower the difficulties with global expansion. Note that this variable essentially provides an integrated test for both H2 and H3), as it provides a measure of the orientation towards global (as opposed to local) partners, itself a potential indication of the issues with the difference between the home and host industry architectures. As such, we expect that the percentage of the value chain components procured from non-local firms will *ceteris paribus* be positively associated with satisfaction as firms will find these firms more familiar and easier to deal with, and wont face the challenges of adapting to a potentially different industry architecture.

H4, as mentioned earlier, is tested through SECSIM, which is a key part of our theory.

H5, which is construed in a somewhat more explanatory fashion, aims to explore a more perceptual matter using the variable PROBVCANT, i.e. the extent to which anticipating any difficulties in terms of value chain / industry architectures is positively associated with manager's satisfaction – so that the more a firm can prepare itself for the changes in terms of its own industry architecture the more it is likely to be successful with, or at least satisfied with, global expansion.

For H6, which considers how easy or hard it is to overcome the difficulties of expansion (as opposed to how successful expansion was), we used some of the same independent variables. In addition, we also considered the extent to which the results were anticipated; in particular, we used PROBVCANT which was the response to the question "if there were some problems due to the value chain / industry structure), we anticipated the differences in the industry structure in [the country of the subsidiary operation]", which is precisely what H6 hypothesizes about.

Control variables

Our study also employs a number of standard control variables to account for their effect on performance (success of international expansion). Some of these relate to "objective measures"; others relate to perceptual measures, so as to ensure that our results are not driven by common method bias. (That is, the existence of a number of controls rated on the same Likert scale can help alleviate the concern that our results are spurious, *inasmuch as* a number of the controls are *not* significant, even if they are rated by the same raters on the same scale; if all controls that were rated on that Likert scale were to be similarly significant, then we would discount the findings on the main part of our analysis).

In terms of "objective" measures that can be reasonably expected to affect satisfaction with global expansion (or the ease of overcoming problems), we first control for the number of years a subsidiary was in operation (YEARSOP). Second, we control for the subsidiary size by including: 1) annual turnover variable (TURN), and 2) number of employees (EMPL). Third, we control for amount of the initial investment in the subsidiary (ININV). Fourth, we account for the market share a subsidiary has in the country (MKTSH), as it can significantly affect performance. Next, we account for export orientation of the subsidiary by controlling for the amount of goods exported: 1) intermediate products (INTPRPC), and 2) final products (FINPRPC). We also included country dummies to control for a presence of a country effect in the sample.

Two more important measures that we included concern the number of suppliers (NUMSUPL) and the number of customers (NUMCUST). While these measures do relate to industry architectures, they also relate to more traditional issues of power and dependency (Pfeffer and Salancik, 1978) or the potential risk for *post hoc* renegotiation (Williamson, 1985). However, including these variables should enable us to provide a more robust view of the ease or difficulty of expansion, *having taken into account* the power structures in the sector.

In terms of additional Likert-scale type questions, we control for investment orientation of the subsidiary, i.e. whether a company's global venture was initiated with the intention to get access to: 1) low-cost resources (RESCOST), 2) internal market (MARKACC), or 3) develop new products using the local expertise (DEVNEW). We also control for the extent to which firms depend on global links to be successful, as noted earlier (GLOBDEP). Furthermore, we control for the parent company's prior experience in the region (Eastern European countries) by including a variable (OTHINV) which takes the value of 1 if the company had made investment in other countries in the region.

We should note that the questionnaire could afford us additional controls, which did not, *ex ante*, appear to be theoretically relevant. We did include pretty much every variable that existed in our sample in our analysis to see if there was a strong relationship that we should consider, but none was present. As such, we decided not to use any of the other variables, are reported in the original questionnaire, attached here as an Appendix. The questionnaire included additional queries on issues such as the links of the subsidiary with the parent company, the nature of inputs that the subsidiary has to the mother company, the strategic reason for establishing the subsidiary, experience in other CIS countries or in global expansion, as well as questions focusing on the types of problems encountered in the host business environment, none of which proved to be statistically significant. As such, we can be reasonably confident not to have overlooked any obvious driver of results that would create problems of spurious causality.

Table 2 provides the descriptive statistics of all variables, and Table 3 provides the correlation table. The appendix provides the original questionnaire that the executives were given, whereas Table 4 presents the variables employed by this study and corresponding survey questions.

Include Tables 2, 3 and 4 about here

Methods

When the dependent variable is measured on an ordinal scale (as indeed is the case with our data), the standard OLS technique is not applicable as a number of its assumptions are violated, including measurement, homoskedasticity and normality of the error term. In the case of the categorical dependent variable, logistic models (based on a maximum likelihood estimation) are shown to produce more efficient and, more importantly, consistent estimates (Agresti, 2002). The standard logit or probit models are traditionally employed with the dichotomous dependent variable, whereas multinomial logit or probit are applied when the number of the categories exceeds two. However,

when the categories are ordered, multinomial logit or probit models are not appropriate because they fail to account for the ordinal nature of the outcomes (Greene 2002). In this case the ordered (or cumulative) logit model is the most appropriate as it does not rely on a subjectively chosen scores assigned to the categories and takes the ceiling and floor effects into account (Agresti, 2002). Furthermore, hypothesis testing is more powerful, and results are easier to interpret and present in ordered logit model as compared to multinomial logit (Allison, 1999).

Results

Table 5 presents the results of estimation of ordered logit models using *ologit* command in STATA 9.0. We must mention that we also estimated same specifications using the OLS, which despite its theoretical deficiencies for ordinal data analysis, has been shown to produce results qualitatively similar to results obtained using logit regression (Allison, 1999). Indeed, for our sample the OLS estimates are very similar to the ones we report in Table 5.

We present five different estimation specifications in Table 5. The first four specifications share the subsidiary performance as a dependent variable, whereas the fifth specification is run with 'difficulty of overcoming differences' as a resulting variable (hypothesis 6). The first specification (S1) includes control variables only as regressors; more explanatory variables are added in specification 2. Most control variables have relatively low power in explaining the variance in our dependent variable in specification 1, other than market share, which is positive and in the expected direction (we would obviously expect that high market share would be associated with higher satisfaction, though the direction of the causality is not clear). Input measures, or size measures (such as investment or employee number) do not have a clear directional impact on satisfaction: It appears that size or magnitude of investment cut both ways, leading to higher expectations and as such no clear link to satisfaction. (Interestingly, investment has a borderline significant negative coefficient, supporting this idea of "higher expectations" and as such limited satisfaction with / ease of global expansion). It is also worth noting that the overall ability to explain variance is limited; the pseudo-R-squared, for instance, is below 7% if we exclude the country dummies, and goes to just below 11% if these are included. In terms of countries, it appears that the lowest satisfaction comes from Moldova, followed by Kyrgyzstan, whereas Ukrainian subsidiaries offer the greatest satisfaction levels to the management.

Insert Table 5 below

The results of the next specification (S2) show the impact of our key variables of interest – SECMOD, SECSIM, and global and local dependency / embeddedness – LOCDEP and GLOBDEP, and of the supply chain / power variables noted above. The first noteworthy fact is that the fit is very substantially improved here (if we introduce the variables one by one, the greatest improvement comes from SECMOD, followed by SECSIM). For instance, pseudo-R-squared has increased from 11% in the "controls only" setting to 55%, and the results appear to be quite intuitive. Other than controls (where the results do not change much), the role of suppliers is now significant and positive, suggesting that a small number of suppliers leads to problems in global expansion, as the potential threat from a small number of suppliers outweighs any transaction cost savings by dealing with fewer suppliers. It is also interesting that the number of customers is not significant, suggesting that upstream supply-chain dynamics are more important than local customer concentration. (As a matter of fact, the *non-significant* relationship between buyers and satisfaction is negative, perhaps showing that there are problems with managing a pool of many buyers for a foreign entity. This disparity would be an interesting area for future study, but goes outside the boundaries of our paper; we should also caution that the economic significance of these coefficients is limited. Another interesting relation is the role of previous experience in expansion (OTHINV), which, perhaps counter-intuitively, is significant in a *negative* direction – that is, if a firm has another subsidiary in another country, it tends to be *less* satisfied. This might seem odd at first, yet could be consistent with our thesis: firms with experience in moving abroad could possibly expect that they would be able to carry their expertise through to a different country (and different industry architecture) but fail to do so, finding themselves more dissatisfied that happy. Again, this would be an interesting issue for further research.

Moving to the results we are theoretically interested in, sector modularity and sector similarity are both highly significant (well below the 1% level) and in the expected direction; the more modular a sector is, and the more it looks like that of the home country, the greater the satisfaction. The economic significance is also quite high, as the elasticities are in the 0.7- 0.8 range. Ditto for the sector similarity, which is significant at the 0.5% level, and has an almost identical elasticity. We also find that local embeddedness (LOCDEP) is highly significant (at the 1% level) and at the expected direction – the more locally dependent (to other industry participants) a firm is, the smaller the satisfaction. Again, economic significance is quite high (0.7 standardized coefficient). HOMEMB – the extent to which a firm has strong links with other supply chain partners in its country of origin - appears to be in the expected direction, but is insignificant. The next variable of interest is

GLOBDEP, which also works in the expected direction (positive), but is not significant and as such not reliably linked to satisfaction.

We also ran a related specification (S3) where we tested H2 through the variable PCTVCGLOB (an objective measure). While this measure has more missing variables, and led to a less stable specification (with a warning of over-determination coming up through Stata), the results held up, and the variable was significant in the 8% level of confidence. The other relationships still held pretty much without change. Due to the over-determination issue, we decided to drop the control variable that had the most missing values (marketshare) that helped to eliminate any over-determination risks. We present the results in S3, which shows that the relevant variable is significant below the 1% level, and the relationship runs in the expected direction. Also, all other relationships remain by and large the same (except for the fact that similarity of the value chains becomes less significant –at the 7% level- once we introduce the percentage of intermediate products from the home country as an explanatory variable. This result is intuitive, as the importance of similarity is not as significant if the firm does not deal much with local counter-parties).

The fourth specification (S4) includes another somewhat more exploratory measure used to examine H5 – the question on the extent to which the potential problems were anticipated (PROBVCANT). This specification was initially run on the full model (which had 44 observations), but, again, as a result of over-determination of two variables (which is a potential concern with logit models) we dropped the marketshare variable. In this specification, the previous results hold with little change. We find that the extent to which a firm prepared itself for problems along the value chain *is* associated with satisfaction, and the sign is as expected. This, attributional issues aside, could be taken to mean that the more managers were prepared for the problems along the value chain, the more they were satisfied with the subsidiary's performance, suggesting that preparedness for such issues does increase potential success.

Finally, we test Hypothesis 6 in our fifth model (S5). This time, the dependent variable is the perceived difficulty of overcoming differences in the industry structure. All the other variables are the same. It is important to note that the controls here are largely not significant (and neither would there be any *ex ante* reason to expect them to be). Sector similarity is in the expected direction, but at the 19% is insignificant. However, sector modularity is very significant (again, below the 1% level). Also, the extent of problems along the value chain is, as expected, also significant. It is important to note that excluding this last variable (whose correlation is not surprising or theoretically important)

does not affect the significance or coefficient of sector modularity. Thus as predicted, modularity is what makes it easiest to overcome the difficulties – interestingly, even more so than the local dependencies which, while in the expected direction are not significant. It is also noteworthy that there is little in the way of other variables, be they measured on the same scale or not, that helps account for how difficult it is to overcome these problems. This thus supports Hypothesis 6 as higher levels of institutional modularity of a sector alleviate perceived difficulty of overcoming the differences in the industry structure between host and home economies.

Discussion

Interpreting our Results

Taking a general view, we can see that the results of our survey offer support, at varying levels, to our hypotheses . Starting with Hypothesis 1 ("the more institutionally modular a sector in the host country is, the more successful global expansion will be"), we find strong support regardless of specification. The related variable (SECMOD) is significant below the 1% level essentially regardless of specification, and when it is included to the regression, it adds substantially to the increase in the fit of overall fit. Its economic impact appears to be also quite important.

The second Hypothesis 2 ("the more embedded a firm is in its home environment, the less successful the international expansion will be") has received mixed support. Specifically, our first measure of local embeddedness (the extent of the firm's dependencies on local value chain partners) seems to support hypothesis 2 quite strongly, indicating that local links are indeed detrimental to ease of expansion (as they oblige the firm to adapt to new rules and roles). However, our second direct measure of home embeddedness is not significant (at least not in most specifications). Therefore we cannot be anything conclusive in this respect.

Our third hypothesis ("The greater the dependencies a firm has on its home / global dependencies in a firms' value chain partners, the smaller the difficulty of international expansion") is not supported either even though the sign is in the expected direction.

More important, perhaps, including both H2 and H3 helps us ensure that the correlation with H2, which is the one we are principally interested in, is not spurious. The greatest potential concern with H2 is that it could capture the extent of *dependencies/embeddedness* at large, as opposed to the issues of local dependencies along the value chain, and as we know from resource dependency, the more a firm is dependent on other actors, the greater the difficulties it faces. As such, if *both* H2 and H3

were significant and negative, it would simply mean that it is dependencies on the whole that make expansion difficult. However, a negative coefficient on H2 (first measure) and no statistical significance (let alone a positive sign) in H3 means that it is not dependencies in general but *local* dependencies that create problems. In our setting, we do indeed have a negative sign for H2, and a non-significant positive sign for H3.

Furthermore, in an additional, independent test, the joint consideration of H2 and H3 through the variable PCTVCGLOB (an objective measure) also provides weakly significant results. We find that the more a firm sources from its home country or its subsidiaries, the greater the satisfaction with global expansion. As such, Hypotheses 2 and 3 seems to receive further support through this independent and joint test.

Before moving to H4, it is also worth briefly considering the role of the number of buyers and suppliers in terms of satisfaction, as these also relate to the dynamics along a firm's value chain / industry architecture. We find that what really matters is the number of suppliers: The more suppliers there are, the greater the satisfaction. This is consistent with a "power along the value chain" argument (Porter, 1985), with a resource dependency approach (Pfeffer and Salancik, 1978) or with the arguments put forth in the "industry architecture" approach (Jacobides et al, 2006), which suggest that the more firms participate in the other parts of the supply chain, the greater the benefits to the focal firm. What is also interesting is that we do not have any such relationship with the number of customers; it seems that it is the issues with the supply chain upstream, rather than with the number of distributors, that make it difficult for a firm to expand internationally. This might have to do with the fact that distribution of a good is more "modular" and as such the dependencies might not be as critical as they are upstream – another venue for future research, on the interpretation of which we can only speculate in the confines of this paper.

More important, though, the control variables for numbers of suppliers or buyers is not as significant as the explanations relating to value chain modularity or similarity; and neither do they add nearly as much explanatory power. Relatedly, it is also worth noting that other control variables (be they measured on the same Likert scale, or based on structural attributes of the venture such as investment amount, market share, personnel or turnover) are not significant in explaining satisfaction. This makes the significance of our theoretically pertinent variables all the more notable.

Moving back to the heart of our theory, H4 ("The greater the similarity in value chain structure between host and home country, the more successful global expansion will be") appears to be supported quite strongly: SECSIM has a strong positive coefficient, and is significant in the regressions we report at around the 1% (though depending on specification its significance can drop somewhat, unlike that of modularity, up to the 6% level, yet is still robust). Thus, similarity in terms of industry architectures, even when we account for numbers of suppliers and buyers, modularity, etc, still seems to be a substantial driver of success with (or, more strictly put, satisfaction with) international expansion, as we predicted.

The results for H5 ("The more a firm is prepared to cope with problems in the value chain / industry structure, the greater the success in international expansion") seem to be pointing to the same direction, and are significant. The coefficient is significant at the 2% level, suggesting that the more a firm is prepared for differences in terms of the value chain / industry structure, the greater the satisfaction is. While we should caution about the risk of attribution by managers responding to the questionnaire, this is consistent with our expectations.

Shifting to the second dependent variable, we move to H6. This hypothesis ("The greater the institutional modularity of a sector, the easier it is for a company to overcome differences in value chain structure between host and home countries") is also supported at a high level of confidence. This further reinforces the findings that highlight the role of modularity as a factor that eases the transition to a new industry / country ecosystem. What is more interesting is that this relationship (which is valid below the 1% significance level) is still important if we throw in the "sector similarity" variable, and is actually more significant (statistically and economically) than similarity itself. In other words, modularity is a better predictor of how easy it is to adapt to a different structure than the extent of the difference between the home and the host country.

Summing up, our findings do seem to suggest a fairly broad support to the proposition that both similarities between the firm's sector in its home country and the same sector in the host country, and particularly the modularity in the sector, are good predictors of satisfaction with, and probably success with international expansion. As such, the basic tenet of the paper appears to be supported.

Limitations and, method, and qualitative support

Before moving to the implications that these findings have for theory and practice, as well as their relationship to recent literature, some words of caution are called for in terms of this study's

limitations. First, our analysis aspires to examine satisfaction with global expansion as subjectively identified by managers, as opposed to an objective measure, with all the potential shortcomings that this might entail. And while we believe that our approach is consistent, and that it deals with the potential problem of dealing with the inputs that have gone into making a successful global venture work, we should still use caution in interpreting these results. Second, any survey study can only cover a particular set of conditions, which may or may not be general. It might be that some of these issues are more relevant to countries such as Moldova, Ukraine and Kyrgyzstan, and of course similar studies should be made to different sectors to ensure broader application of the results.

That being said, it might be worth pointing out a few things with regards to our approach. First, it is important to note that both of the questions that we put to managers, and the independent variables derived from the responses, relate to the *structure* of sectors, industries and value chains rather than the capabilities or performance of the individual firm or the acumen of its managers. Therefore, there is no *a priori* reason to expect that the executive providing the rating will fall prey to any attribution bias that might distort the results. In addition, since respondents are also assessing a broad range of other attributes of settings and sectors, there is no reason to expect that their evaluation of our independent variables will show a spurious correlation.[1]

Our findings in context

By emphasizing the role of *industry architectures* and the nature of the value chain (in terms of modularity and similarity), our paper sheds light on a relatively neglected driver of success in international expansion. This approach contextualizes some of the comparative institutional analyses of "varieties of capitalism" (e.g. Whitley, 1992), as our focus is not on a country overall, but rather on the *sector* within a country. Through this approach, we help address some nagging questions, such as understanding why we see substantial international activity in some sectors and far less in others. It suggests that the extent of modularity and the degree of similarity between different countries are important predictors of successful global expansion.

[1] In terms of current, ongoing work, to address any risk of spurious result reporting (already rather unlikely, given the robustness and significance of our estimations), and also to ensure we interpret the results correctly, we are engaged in follow-on interviews and qualitative work. In particular, we are in the process of interviewing as sub-sample of our respondents. What we have set up to do, and intend to present in the next iteration of this paper, is (a) to ask the managers "what they thought the problems were" (so as to get an unbiased view on what was actually driving the problems, rather than imputing our own findings); and (b) present the findings, *after* the managers give us their objective assessment to see if these findings did correspond to their own experience, and how these could be interpreted.

In that regard, it is important to note that the growing harmonization of business practices, either mandated by national and international regulatory agencies or brought about by the institution of actual or presumed "best institutional practices", may lead to greater isomorphism in value chain "junctures" and structures. This, in turn, can help foster international inter-penetration. Thus, our approach provides a rationale for the phenomenon observed by Feenstra (1998) of the "dis-integration of production and integration of trade". As industry structures in different countries converge, and as they become *both* more modular and more similar, substantial benefits for inter-country specialization and international activities come about.

Such convergence is reinforced by global competitive dynamics: as some very effective global competitors emerge in particular parts of the value chain in one country, they may force changes in the value chains of other, host countries. Local firms in these countries, in turn, try to accommodate and capitalize on these global competitors' capabilities in their national setting, by finding more effective, modular ways to link with them. As such the structures of industries are endogenously changed, with modularization of capabilities begetting institutional modularization, which in turn begets even more pronounced benefits from being modularized, in a process similar to that described by Jacobides and Winter (2005). Thus, through competition, a global convergence in terms of value chain structures is often self-reinforcing, and this process, when initiated, leads to increasing globalization of previously insular sectors, as evidenced by the drastic increase in intermediate trade.

Additionally, changes in information technology might affect strategy on the global and national level, by virtue of their creating a homogenized, decomposable value chain (Evans and Wurster, 1997; Tallon et al. 2000; Koh et al. 2007). While the impact of IT on industry structure might not be quite as pervasive as we once thought, efforts to homogenize value chains internationally do continue apace, driven not only by regulators but also, and mainly, by the firms that expect to profit from it – an element that has been overlooked in much extant research (see Jacobides, 2008, for a more extended discussion).

Be that as it may, our empirical findings on the role of institutional modularity and similarity in global ventures confirm the earlier speculations that efforts to manipulate an 'industry architecture' (see Jacobides et al., 2006) can lead to drastic changes in the nature of global competition. Thus, our approach provides a further strategic spin on Henisz's (2003) recent discussion on how firms succeed in global expansion through their capabilities in shaping their institutional environment abroad, by looking at the level of the *sector* and its attendant industry architecture.

On the practical level, the rapid growth of outsourcing and off-shoring shows how firms such as Infosys or Capita try to develop modules that do fit in particular industries; they try to adapt or potentially change the value chain structure. This paper's angle, which combines the analysis of value chains with exportability of competitive advantage, can thus help shed some further light to the growing phenomena of outsourcing and off-shoring, which surely merit more dedicated research. Our approach, supported by our empirical findings provides a foundation for further study, and a set of hypotheses into why and when we would see more such trade as a result of value chain modularization and of increasing similarity along the value chain.

Finally, while recent research has started looking at the dynamics of "globally modular structures" (see Sturgeon, 2002) we have yet to consider the similarity along the value chain as a driver of globalization. This may be an important area of study, as for many service sectors (which constitute the *majority* of the GDP – such as healthcare, education, or financial services) there is still substantial (albeit declining) international heterogeneity. The degree to which countries might converge or diverge (within zones such as the European Union / ASEAN / NAFTA or globally) could be a substantial predictor of international activity in sectors that have traditionally been more modular. Given the empirical / economic importance of these sectors, the study of industry architecture dynamics at the global level seems called for.

To return to the broader theoretical context, it is worth quoting Meyer and Rowan (1977), who noted that organizations encompass 'systems of coordinated and controlled activities that arise when work is embedded in complex networks and boundary spanning relations'. This paper has provided one specific new way of looking at the evolution of these networks. It looks at the structure and the dynamics of the institutional layout of sectors; at the nature of the value chain and the relationships of actors within it.

Conclusions

In this paper, we offered a new explanation for the question of whether and how firms can capitalize on their competitive advantage in international expansion. Over and above the "normal" challenges of such expansion (cultural, institutional, physical and so on), the *comparative structure* of the value chain was shown to be a crucial determinant of success. In particular, we found substantial empirical support for both the role of institutional modularity, and of the similarity of industry architectures.

The focus on industry architectures could thus help expand our theoretical arsenal. Based on the premise that value chains are broken down differently in different countries, our findings suggest that we need to understand the nature, structure and capabilities of the vertical modules for the same industry in different countries. We also need to consider the "compatibility" of similar sectors in two different countries, as well as their respective degrees of modularity. Thus, the essential contribution of this paper is to identify an additional, critical level required in the analysis of globalisation: the structure of the value chain. If we aspire to understand why some sectors are so open to globalisation, others hardly at all, we have to move beyond the study of individual firms and individual countries, focusing instead on the similarities and contrasts between similar value chains in different countries. By doing so, we can identify the competitive advantages that can be transferred to new surroundings – those that have the potential to live "out of context".

Our findings point towards new sets of prescriptions for firms – and for regulators too. For managers considering international expansion, assessing their own resources and capabilities and analysing the potential host nation should be accompanied by a careful assessment of the potential set of interdependencies within the home and host country's value chains; and the similarity of the value chains in different countries. Our findings also suggest that firms might benefit from shaping the industry structures in countries they aspire to operate in, as well as ensuring there are modular interfaces to facilitate international relations (see Puranam and Srikanth, 2007). This set of prescriptions could also yield useful advice for firms that might face new challenges from global competitors, brought about by the increasing modularization and homogenization between sectors that is facilitated by technology and international treaties.

Regulators could also benefit by considering such sector-level analyses. First, this might help them understand where the real bottlenecks for globalization are. For instance, the examination of the international differences at the level of the sector could help baffled European regulators understand why European integration in services or sectors such as construction (Winch, 2000) is so slow to emerge; and it could help identify factors that might promote more international activity. It might also provide a blueprint on how changes in technology and regulation (which may affect value chain structure and modularity) might stimulate changes in terms of local and global competition.

As we have seen, some sectors are more heterogeneous, others less so. But the picture is always changing, which is why studies in this area are so important. It is not an exaggeration to state that worldwide economic development in the coming decades will be shaped by the global

homogenization of value chain structures. There can be no doubt that the trend is towards greater homogeneity. Production is becoming less integrated, while trade is becoming more so (Feenstra, 1998). Service globalization, aided by the offshoring of service components to low-cost economies, is here to stay. Regulatory changes have the effect of opening up the competitive landscape, preparing the ground for FDI and other vehicles through which firms can try their hand at international expansion. As such, the *explicit study* of the "comparative industry architectures", and the examination of whether they converge or diverge can prove to be a useful tool not only to predict success of particular firms as they try to expand their advantage abroad, but also an important predictor of globalization trends. In this spirit, we hope that this study might become part of a growing body of evidence and theory, with concrete implications for practice.

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Table 1.

Company Distribution by Sector and Country

Industry	Ukraine	Moldova	Kyrgyzstan	Total
Food industry	4	4	7	15
Financial services	4	7	4	15
Trade	7	2	4	13
Transport & Communications	3	4	4	11
Construction	1	4	4	9
Oil refinery		3	1	4
Machinery and equipment	2		1	3
Chemicals	2		1	3
Textile and leather industry	1		1	2
Woodworking, pulp and paper industry, publishing	1		1	2
Mining	1			1
Energy		1		1
Agriculture	1			1
Other activities	2	4	1	7
Total	**29**	**29**	**29**	**87**

Source: survey results

Table 2.

Descriptive Statistics

	Mean	**Median**	**Standard Deviation**
EXPERF	4.30	4.00	0.75
YEARSOP	11.30	8.50	17.75
TURN	36.25	3.40	141.70
EMPL	365.35		605.49
ININV	34.58	3.00	92.53
MKTSH	34.81	27.00	27.90
NUMCUST	24135.28	20.00	121179.10
NUMSUPL	132.17	6.50	833.66
SECMOD	2.95	3.00	1.35
SECSIM	3.28	3.00	1.21
INTPRPC	19.72	0.00	38.05
FINPRPC	30.49	0.00	39.60
MARKACC	4.24	5.00	1.30
DEVNEW	3.01	.00	1.62
RESCOST	1.99	1.00	1.50
OTHINV	0.68	1.00	0.47
LOCDEP	3.13	3.00	1.42
GLOBDEP	3.60	4.00	1.29
PCTVCGLOB	0.67	0.75	0.33
HOMEMB	3.63	4.00	1.58
PERVCIMP	2.06	2.00	1.09
PROBVCANT	3.05	3.00	1.44
OVERCEASE	2.33	2.00	0.98

Table 3. Common Sample Correlations

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	EXPERF	1.00																						
2	YEARSOP	0.00	1.00																					
3	TURN	0.15	0.02	1.00																				
4	EMPL	0.12	0.03	0.82	1.00																			
5	ININV	0.18	0.04	0.92	0.72	1.00																		
6	MKTSH	0.27	0.01	0.35	0.42	0.33	1.00																	
7	NUMCUST	-0.07	-0.05	0.38	0.55	0.32	0.26	1.00																
8	NUMSUPL	0.10	-0.15	-0.02	0.02	0.01	0.01	0.13	1.00															
9	SECMOD	0.26	0.06	-0.08	-0.06	-0.14	0.12	0.00	-0.20	1.00														
10	SECSIM	0.33	0.17	0.28	0.28	0.28	0.24	0.08	0.10	-0.06	1.00													
11	INTPRPC	-0.33	0.03	0.03	-0.03	-0.08	0.22	-0.05	-0.09	0.04	-0.21	1.00												
12	FINPRPC	-0.17	0.18	-0.15	-0.04	-0.19	0.05	-0.12	-0.13	-0.02	-0.21	-0.01	1.00											
13	MARKACC	0.26	-0.61	0.01	-0.07	-0.03	-0.10	-0.15	0.05	-0.01	-0.08	0.09	-0.13	1.00										
14	DEVNEW	0.18	-0.11	0.26	0.42	0.24	0.15	0.09	-0.08	0.03	-0.06	-0.24	0.29	-0.02	1.00									
15	RESCOST	0.00	0.02	-0.06	0.04	-0.03	0.19	-0.10	-0.07	0.25	-0.38	0.24	0.47	0.10	0.27	1.00								
16	OTHINV	-0.09	0.12	0.14	0.01	0.09	0.15	-0.15	0.20	0.05	0.45	0.16	-0.06	-0.26	-0.10	0.00	1.00							
17	LOCDEP	-0.23	0.01	0.27	0.21	0.17	0.32	0.10	0.19	0.25	-0.08	0.35	0.03	-0.13	-0.03	0.26	0.40	1.00						
18	GLOBDEP	0.16	-0.05	-0.17	-0.30	-0.19	0.11	0.03	0.06	0.05	0.18	0.00	-0.01	0.13	-0.47	-0.12	0.11	-0.11	1.00					
19	PCTVCGLOB	0.02	0.13	-0.48	-0.59	-0.44	-0.21	-0.27	-0.33	-0.02	-0.01	0.09	0.08	-0.04	-0.47	-0.15	-0.03	-0.38	0.59	1.00				
20	HOMEMB	-0.10	0.13	-0.24	-0.37	-0.19	0.04	-0.07	-0.10	-0.09	-0.10	0.15	0.04	-0.16	-0.40	-0.03	0.07	-0.02	0.66	0.68	1.00			
21	PERVCIMP	-0.61	0.16	-0.06	-0.09	-0.09	-0.05	0.04	-0.17	-0.09	-0.30	0.45	-0.10	-0.25	-0.19	-0.11	0.22	0.27	-0.23	0.01	0.16	1.00		
22	PROBVCANT	0.53	0.06	-0.28	-0.15	-0.16	0.14	-0.14	0.02	0.05	0.11	-0.22	0.15	0.03	0.04	0.04	-0.25	-0.55	0.27	0.32	0.18	-0.46	1.00	
23	OVERCEASE	-0.49	0.16	-0.11	-0.09	-0.17	0.11	0.13	-0.12	-0.27	-0.31	0.23	0.11	-0.35	-0.14	0.00	0.00	0.13	0.05	0.15	0.29	0.49	-0.27	1.00

Table 4. Survey Variables and their Descriptions

Variable	Corresponding Survey Questions
EXPERF	Please evaluate the performance of your Ukrainian subsidiary
OVERCEASE	How difficult was it for you to overcome the differences in the industry structure?
SECMOD	How easy is it to break up the activities of your sector in separate components / modules? (i.e., to what extent are there or can there be firms specializing in each part of the value chain?)
SECSIM	How similar is the structure of your industry in your home country to the structure of the industry in [the host country]?
LOCDEP	What is the extent to which the success of your operations in [the host country] depend on the performance of and relationships to other *local* industry participants (e.g. other supply chain partners, providers, etc)?
GLOBDEP	What is the extent to which the success of your operations in [the host country] depend on the performance of and relationships to other *international* industry participants (e.g. other supply chain partners, providers, etc)?
HOMEMB	Does your company have close relationships with buyers/suppliers in your home country?
PERVCIMP	To what extent did differences in the structure of the value chain or the way firms in the industry collaborate pose a problem for your expansion?
PROBVCANT	(If there were some problems due to the value chain / industry structure), we anticipated the differences in the industry structure in [the host country]

Table 5. Results

Dependent Variable	**EXPERF**				**OVERCEASE**
Independent Variables	S1	S2	S3	S4	S5
SECMOD		2.189*** (0.002)	1.498** (0.011)	1.582*** (0.002)	-0.662*** (0.007)
SECSIM		2.227** (0.005)	1.169* (0.070)	1.457** (0.014)	-0.629** (0.022)
NUMSUPL		0.053*** (0.005)	0.064*** (0.003)	0.029** (0.046)	0.001 (0.362)
NUMCUST		-3.17e-06 (0.602)	-0.000001*** (0.003)	-5.30e-06 (0.342)	0.001 (0.56)
HOMEMB		-0.019 (0.967)	-0.679 (0.106)	-0.046 (0.924)	
LOCDEP		-1.779** (0.011)		-0.939** (0.039)	0.101 (0.633)
GLOBDEP		0.253 (0.624)		0.148 (0.757)	0.233 (0.359)
PCTVCGLOB			10.398*** (0.002)		
PERVCIMP				-1.049 (0.135)	
PROBVCANT				0.969** (0.025)	
Control Variables					
YEARSOP	8.75e-07 (1.000)	-0.134* (0.093)	0.016 (0.800)	0.005 (0.918)	0.009 (0.817)
TURN	-0.011 (0.227)	0.013 (0.759)	0.037 (0.358)	0.023 (0.577)	-0.004 (0.857)
EMPL	-0.001 (0.865)	-0.002 (0.411)	0.002 (0.562)	-0.002 (0.499)	0.001 (0.570)
ININV	0.016 (0.265)	0.001 (0.986)	0.011 (0.639)	0.011 (0.322)	-0.004 (0.667)
MKTSH	0.036** (0.040)	0.135*** (0.010)			
INTPRPC	0.005 (0.791)	-0.052* (0.075)	-0.048* (0.068)	0.006 (0.790)	-0.023 (0.192)
FINPRPC	-0.010 (0.434)	0.016 (0.426)	-0.023 (0.257)	-0.009 (0.548)	-0.006 (0.635)
MARKACC	-1.094 (0.308)	-3.966** (0.025)	1.302* (0.100)	0.489 (0.364)	-0.661 (0.112)

DEVNEW	0.172 (0.441)	0.446 (0.256)	0.811** (0.035)	0.424 (0.193)	0.009 (0.970)
RESCOST	-0.133 (0.592)	1.046* (0.064)	1.029** (0.037)	0.840* (0.081)	0.233 (0.442)
OTHINV	-0.133 (0.844)	-4.132*** (0.010)	-3.849** (0.022)	-2.485* (0.057)	-0.992 (0.252)
DK	0.736 (0.358)	-5.938*** (0.008)	-2.409 (0.118)	-5.187*** (0.004)	1.259 (0.221)
DM	-3.692 (0.137)	-14.712*** (0.008)	1.246 (0.587)	-1.929 (0.297)	1.827 (0.201)
Pseudo R-squared	0.111	0.557	0.451	0.529	0.299
LR chi2	11.57	52.63	40.36	56.45	40.53
Number of observations	51	45	44	51	51

* p-values in parentheses

APPENDIX: Questionnaire (for Ukraine)

Section I: A Profile of the Foreign Affiliate

1.When was the subsidiary established? _____

2.What is the annual revenue (turnover) of the subsidiary? _____
$ millions

3.How many personnel does the subsidiary employ? _____

4.What is the total amount of your capital invested in the subsidiary? _____
$ millions

5.What is your market share in Ukraine? _____

6.What is your main industry? _____

7.What percentage of the following is exported? Please indicate %.
- intermediate products % _____
- final products % _____

8.Which products the Ukrainian subsidiary receives from parent company? Please tick.
- technology, know-how _____
- materials _____
- components parts _____
- final products _____
- others (please specify) _____

9.What is the strategic role of the Ukrainian subsidiary in your MNE group's operations?
Please rank from 1 to 5 (1 – unimportant, 5 – very important):
a) supply existing products to Ukrainian and other CIS markets _____
b) develop new products for Ukrainian and other CIS markets _____
c) exploit Ukrainian cost-effective production to export products to established (e.g. European markets)

Section II. Decision To Invest In Ukraine

10. Why did you choose to invest in Ukraine? Please evaluate each of the reasons presented below.
Please rank from 1 to 5. (1 – the least important, 5 – the most important):
a) availability of low-cost input factors
(e.g. cheap labor; energy; raw materials) _____
b) skilled labor _____
c) to serve Ukrainian market _____
d) to achieve access to a new regional (Central and Eastern European) market____
e) to access the Ukrainian research and technological expertise _____
f) other (please specify) _____

11. What do you think are the current problems investors face in Ukraine?

Please rank from 1 to 5. (1 – the least important, 5 – the most important):

a) volatility of the political environment _____
b) uncertainty of the economic environment _____
c) ambiguity of the legal system _____
d) corruption _____
e) bureaucracy _____
f) finding a suitable partner _____
g) problems in establishing clear ownership conditions _____
h) lack of physical infrastructure _____
i) backward technology _____
j) lack of business skills

12. Does your parent MNE company have investments in other Eastern European countries?

Yes ____ No_____

13. What is the extent to which the success of your operations in Ukraine depend on the performance of and relationships to other *local* industry participants (e.g. other supply chain partners, providers, etc)?

Please rank from 1 to 5. (1 – very small, 5 – very substantial) _____

14. What is the extent to which the success of your operations in Ukraine depend on the performance of and relationships to other *international* industry participants (e.g. other supply chain partners, providers, etc)?

Please rank from 1 to 5. (1 – very small, 5 – very substantial) _____

15. What part of the value chain components or activities are NOT produced in house by the Ukrainian subsidiary? _____

From the amount *not* produced in-house, what proportion is:

15 a. Imported to the Ukraine from the home country (or other subsidiaries) _

15, b. Supplied by local (Ukrainian) companies _____

16. How easy is it to break up the activities of your sector in separate components / modules? (i.e., to what extent are there or can there be firms specializing in each part of the value chain?)

Please rank from 1 to 5. (1 – very difficult, 5 – very easy): _____

17. What is the number of your local key suppliers/partners?

Please indicate _____

18. What is the number of your local key customers/distributors?

Please indicate _____

19. Does your company have close relationships with buyers/suppliers in your home country?

Please rank from 1 to 5. (1 – not at all, 5 – very close): _____

20. How similar is the structure of your industry in your home country to the structure of the industry in Ukraine?

Please rank from 1 to 5. (1 – not at all, 5 – greatly): _____

The <u>vertical</u> structure of the industry in my home country is the same as in Ukraine. (I.e., there are similar segments along the value chain)

The <u>horizontal</u> structure of the industry in my home country is the same as in Ukraine (i.e., the industry participants in Ukraine are like those in the home country).

21. To what extent did differences in the structure of the value chain or the way firms in the industry collaborate pose a problem for your expansion?

Please rank from 1 to 5. (1 – not at all, 5 – they are a great problem): _____

22. (If there were some problems due to the value chain / industry structure), we anticipated the differences in the industry structure in Ukraine

Please rank from 1 to 5. (1 – strongly agree, 5 – strongly disagree): _____

23. How difficult was it for you to overcome the differences in the industry structure?

Please rank from 1 to 5. (1 – quite easy, 5 – very difficult): _____

24. How easy is it for your company to work in Ukraine?

Please rank from 1 to 5. (1 – very difficult, 5 – very easy): _____

25. Please evaluate the performance of your Ukrainian subsidiary.

Please rank from 1 to 5. (1 – very poor, 5 – very successful) _____