

Research: Understanding the drivers and implications of the architecture of economic activities

The last three years have provided a powerful demonstration of how the architecture of economic activities within a sector – the rules, roles and relationships that pertain to the division of labour – can shape collective outcomes. Over the preceding period, the vertical organization of financial services was gradually transformed through the dis-integration of mortgage banking, securitization, and the emergence of new business models along the value chain. This path of sectoral evolution was one of the main contributors to the vast risk misallocation and the near-meltdown of the financial services sector in 2008, and its continuing troubles ever since. Such changes are not limited to financial services: They can be seen in sectors from telecommunications and media to healthcare. In these sectors, competition does not just mean creating products that contend for market share. It also means attempting *to shape the market itself* – to rebalance the ecosystem in which firms compete.

Analysing the drivers of such “architectural change”, and their competitive implications, has been my core interest to date. It has allowed me to theorize on how economic activities are structured, and how such structures shape evolutionary dynamics within sectors, affecting both profitability and welfare.

1. *How the structure of economic activities affects capabilities: an industry-wide perspective*

My first area of interest has been the endogenous process through which industry boundaries are drawn. The contribution of my *AMJ* paper on mortgage banking [1], for instance, shows how firms, motivated by a desire to leverage skills and focus on competencies, invested in changing the transactional environment and pushed for an increasingly dis-integrated mode of production. This underscored the role of transaction costs as an endogenous feature of industry evolution, and highlighted agency as a key driver in the process of vertical dis-integration.

One of the important features of this process, induced through qualitative work, was the role of firm heterogeneity – specifically, the way heterogeneity in capabilities prompts firms not only to choose their scope, but also to alter the menu of transactional alternatives. To complement this qualitative work, my econometric paper with L. Hitt (*SMJ* [2]) considers how firms choose their degree of integration, showing how evidence derived from large sample data underscored the role of productive capabilities. My formal model (*OrgSci* [3]) provides an illustration of how industry evolution in the presence of firm heterogeneity drives vertical scope in a competitive context. It also clarifies how transaction costs and capability differences interact to shape aggregate scope.

The division of labour also plays an important role in shaping capabilities. My paper with E. Cacciatori in *Org Studies* [4] considers how the division of labour in the construction sector led to the increasingly dysfunctional and overly segmented capability structures found in the UK. These structures were then entrenched by regulation and industry standards, making it harder to reform the value chain. We also identify the conditions that allowed innovating firms to change the industry structure, offering new capabilities that spanned the value chain.

My paper with S. Winter (*SMJ* [5]) consolidates and expands this line of research, by offering a comprehensive conceptual framework for the way capabilities and transaction costs co-evolve to shape the institutional structure of production. Furthermore, our framework also shows how this institutional structure affects the trajectories of capability development in the sector, as well as its transactional attributes.

2. *From the sector to the organization: division of labour and capabilities*

While my early research focused on sectors in the foreground and firms in the background, later work complements this analysis by looking at issues of divisionalization within organizations. My *ICC* paper [6] provides an overview of how the division of labour shapes capabilities within (and between) organizations, suggesting that organizations operate as systems of decomposition, with each of the constituent parts attuned to a particular aspect of reality. This divisionalization, I argue, is inherently incomplete, and can generally be improved at least incrementally through organization design. This suggests that the division of labour within firms might change not only as a response to environmental change, but also as opportunities consistent with the existing divisionalization run out, and new ways of organizing become more attractive.

Continuing this line of work, my more recent working paper with P. Puranam [7] looks at the choice firms have between setting up firm boundaries and coordinating through rules on the one hand, or coordinating through interaction and unstructured mechanisms on the other. We consider the point in a firm's lifecycle at which it is worth shifting from one set of coordinating mechanisms to another. We also consider how environmental turbulence and learning speed should affect this shift.

In my *OrgSci* paper on the Aegean Crisis [8] I focus on the way hierarchy allows organizations to overcome the inherent limitations imposed by the division of labour. Examining a case where a governmental hierarchy spectacularly failed to play its proper role, I observe how an organization on "autopilot" allows each of its parts to focus only on one side of a situation, absent the ability of hierarchy to reframe the problem, carry out exception management and synthesize the (inescapably) partial responses that it receives.

My *OrgSci* paper with S. Billinger [9] also considers a single organization (a textile firm facing a declining market), and the way in which divisionalization and firm boundaries shape capabilities. As well as looking at the vertical divisions within an organization, we also examine how firm boundaries are used, and how these are connected to the firm's decisions on resource allocation and performance management. We find that a vertically integrated firm opted to partly open up its vertical boundaries, becoming "vertically permeable". It did so to facilitate load-leveling, to take opportunities in intermediate product markets and to enhance its own performance and capabilities. We documented how such permeability led to external benchmarking and the use of competitive pressure to improve performance of previously sheltered units; and how the use of external components fostered the ability of the firm to come up with innovative responses, leading to what we called "dynamic benefits" of their "vertical architecture".

My research with D. Croson also fits in this category. Our early *AMR* [10] paper considers how information can be used in the context of agency relationships, pointing to the potential adverse side-effects of (ab)using information available to measure performance. Our more recent modelling

paper on small numbers outsourcing [11] shows how one particular organization can benefit by carefully structuring a mechanism of supplier networks where surplus is shared with the suppliers as a means to obtain non-contractible outputs. Competition between and within tiers of suppliers, along with disciplining mechanisms, ensures that most of the surplus is appropriated by the buyer. The model specifies the optimal sharing strategies and shows that under a wide range of assumptions, the optimal number of suppliers is between three and five for inputs where contracts are hard to specify *ex ante* – a figure that broadly concurs with what is seen in practice (e.g. Li & Fung, Apple, etc).

3. *Industry Architectures and sectoral dynamics*

Complementing the firm-wide focus, much of my recent research has looked at broader dynamics at the level of entire sectors. This work has focused increasingly on the rules, roles, and relationships that prescribe the templates through which labour is divided within sectors. These templates, dubbed Industry Architectures in my *ResPol* with T. Knudsen and M. Augier [12], drive “who does what”, which, as we argue, shapes “who takes what”. We suggest that firms that can create ecosystems with a substantial number of complementors in the adjoining parts of the value chain can benefit from the activities of their complementors by becoming the “bottleneck”, or critical element, of a sector. We thus offer a revised analysis of Teece’s (1986) take on innovation and the role of complementary assets as a means to appropriate returns, and show how firms can manage an innovation ecosystem through shaping its architecture.

My more recent working paper with my PhD student C.J. Tae [13] uses the principles we articulated in the *ResPol* paper to confront data from two very different sectors, with different patterns of value migration – automotive and computers. Our paper considers how the conditions *within* one segment of the value chain affect the ability of that part of the value chain to appropriate a share of the total sectoral profits, offering the first empirical study to span these two separate but causally connected levels of analysis. We find that variance in capabilities within a part of a value chain is a predictor of the degree of success of that part of the value chain in capturing market capitalization. We interpret this as evidence that segments with strong firms (i.e. firms that might be able to shape the rules on how the segments interact) can become “bottlenecks” and attract a disproportionate share of value in a sector.

Further work has considered empirical support for the existence and impact of Industry Architectures. My *MDE* paper [14] takes an international comparative analysis as an opportunity to provide direct evidence on Industry Architectures. Focusing on sectors such as construction and mortgage banking in advanced western economies, I show how similar sectors are very differently organized. These differences in architectures, enshrined in local regulations, standards, and laws, show that the division of labour, and Industry Architectures in general, are not the result of technological determinism and the inescapable transactional arrangements that go with them. Rather, they are the result of a sector- and country-specific struggle between firms to organize the division of labour and stabilize it through institutional arrangements that support the dominant firms. I also consider how these differences affect the prospects of firms that wish to expand abroad, drawing on qualitative evidence, arguing that such architectural differences do matter. This theme is explored more comprehensively in my recent paper with A. Kudina [15], where we provide

quantitative evidence on the role of Industry Architecture similarity (and sector modularity) as a predictor of success with global expansion.

As a result of the interest in the concept of Industry Architectures, and also to further encourage work in this area, I co-edited a Special Issue of *EMR* on “Industry Architectures and the Dynamics of Knowledge Integration” along with S. Brusoni and A. Prencipe. In our opening essay [16], we argued that firms not only need to consider how to integrate knowledge from within and outside their boundaries; they also need to consider how their strategies will shape their Industry Architectures – which in turn will affect their prospects. The healthy interest in submissions and solid download numbers of the special issue provide some comfort that this was not an unfounded view.

4. *Heterogeneity and competitive dynamics*

All my research on both vertical structure and Industry Architectures has considered the nature of heterogeneity, and, being informed by a behavioural view, has taken heterogeneity as a starting point. More recent research has focused on heterogeneity more directly, and has considered both its emergence and its competitive implications – as well as its implications for policy.

A forthcoming *OrgSci* paper with S. Winter [17] considers why heterogeneity emerges, and focuses on the very imperfect mechanisms to weed it out – for example, through imitation and competition. We maintain that there is a lot of heterogeneity that persists, and that sector structure (in particular, Industry Architectures) determines the selection mechanism and thus shapes collective outcomes. We thus highlight the role of architectures and show how they condition the evolution of a sector. We also discuss how agency within a system, and agency to *change the nature of a system*, needs to be conceptualized.

An earlier paper with S. Winter in *JMS* [18] also takes heterogeneity as its starting point, and looks at the choices faced by an entrepreneur when she is endowed with idiosyncratic and superior ways to produce along a value chain. By looking at a new venture in the context of competition (and limited access to capital markets), we demonstrate that even elementary choices (such as whether a firm will be integrated or not) depend more on the nature of the idiosyncratic advantage in the context of the capacity of the firm and of the sector, than on generic features such as transaction costs.

Perhaps my most ambitious modelling paper, co-authored with S. Winter and S. Kassberger [19], looks at the competitive implications of heterogeneity, going back to some fundamental issues in the economics of strategy. (The paper is included in this package and has been conditionally accepted in *SMJ*.) Taking the dynamics of one specific segment, with heterogeneous firms under a competitive regime, we ask what explains the co-existence of differentially capable firms in equilibrium, even barring the imperfections we allude to in our previous qualitative or theoretical work. We show that a sufficient condition for persistent heterogeneity is the existence of a (potentially one-off) customization cost that turns generic inputs into idiosyncratic resources that a firm can employ. Our modelling device can thus resolve the thorny problem of how resources (especially human resources) are “semi-permanently attached” to firms. It can also help us consider the dynamics in a sector with heterogeneous firms. We show that customization costs alone (even absent imperfections in the input and output markets) can lead to sustainable profits; and also show that sustainable profits are typically only a small part of total profitability in a sector (over time), if there

is heterogeneity. Given the pervasive, well- documented heterogeneity in sectors, we feel that this model may help redirect some of the research efforts in our field, which has been (perhaps unduly) infatuated with sustainable advantage as opposed to (potentially transient) profit.

Some of my ongoing research aspires to extend our understanding of how profit evolves under competitive conditions, and link this back to the challenge of understanding profit evolution dynamics along interdependent value chains, which has been one of my starting points. My working paper with C. Wolter and F. Veloso [20] considers how profits evolve in a sector with two vertically related segments, which may face different potential values of transaction costs. Building on my earlier model ([3], included in this package), it looks at profits, as opposed to scope, as the dependent variable of interest, and considers a setting of a heterogeneous sector that evolves towards competitive equilibrium. It shows that transaction costs can act as an “isolating mechanism”, and sustain profits (especially for integrated firms), and slow down the hand of selection. Its main contribution, though, is to show how an innovation in one part of the value chain (an upstream innovation) can shape profits not only upstream (where innovators outcompete incumbents) but also downstream, where assemblers are shown to benefit substantially from the innovation. In relative terms, and despite the lack of strategic interaction, such assemblers become “bottlenecks”: valuable as complements, and as such able to appropriate a great part of the collective value add. By considering different types of innovation (e.g. modelled as an improvement of productive capabilities vs improvement in learning rates, or as available to entrants vs disproportionately available to incumbents) this allows us to link the dynamics of profit migration (and of “ripples along the value chain”) to the current strategy literature.

5. *Policy and strategy implications*

The study of Industry Architectures opens up some promising links between strategy and policy. Starting with the research opportunities, my working paper with S. Winter [21] (originally presented in the AEA in a symposium with G. Dosi, B. Shiller and J. Stiglitz) looks at how the mortgage banking sector evolved towards disaster, and substantiates the claim (found in the opening of this statement) that the changes in the architecture of the financial services sector, and mortgage banking in particular, predictably primed the reckless to survive and outcompete more prudent firms. This analysis provides a complement to existing research in economics and finance, and starts with a behavioural analysis of organizations and the imperfect workings of the selection mechanism. We expect to develop this work sometime this fall and submit two papers – one to an organization / strategy journal and another to an economics journal.

In addition to doing academic work directed to the top journals in the field, I have devoted substantial effort to considering the strategy and policy implications of that work. In terms of strategy, my AIM Industry paper [22], my paper in *Insights* [23] and the paper under review in *SMR* [24] have considered how firms can compete by managing their industry’s architecture, and how they can try to become the bottleneck – or at least ensure they leverage their position within their interdependent ecosystem. Much of my executive involvement in industry engagements, executive education, facilitation, speeches, and press presence has also been on some of these topics. Here and elsewhere, I have used my substantial executive involvement, documented in my CV, as an opportunity to test ideas and also refine my views, for practice and theory alike.

My *HBR* [25] and *BSR* [26] papers have combined the implications of my research with a side-interest in cognition and representation. This angle of research (which led me to co-organize workshops with M. Warglien and engage in a new research project) has helped clarify some of the limitations of strategy tools based on visual representations. Based on this, and on my experiences in my executive work, I have offered a proposal for a new, more narrative way to rethink and evaluate strategy based on a firm's "playscript".

A more recent focus has been on policy issues. The study of Industry Architectures, especially in sensitive areas such as financial services, carries substantial policy implications. Intent on exploring them, I complemented my increasing interaction with economists with an engagement with industry leaders. A series of dinners co-sponsored by the World Economic Forum, McKinsey Global Institute and BarCap led to the publication of a White Paper on the Future of Finance [27]. As a result of this, I organized a set of meetings in the Houses of Parliament (jointly with the Industry Parliament Trust) linking the key regulators with MPs and industry leaders, and liaising with the Independent Commission of Banking.

Following some executive work with senior executives in the National Health Service, we jointly submitted a response to the consultation on the NHS structural reforms, taking the perspective of the future Industry Architecture and its potential pathologies. In terms of broader research involvement, I have been invited to participate in seminars in government departments such as BERR and the Houses of Parliament, as well as a number of industry settings, to discuss the policy implications of my research.

Visibility, internal contribution, and teaching

Since I was awarded tenure in 2007, I have given 24 invited talks, presented in 26 sessions in academic conferences, and also presented in 28 symposia and panels, including a number of plenary and keynote panels, most of which I organized. I have also organized or co-organized several academic events, and my citation count has exceeded 400 (in ISI) and 1,500 (in Harzing).

In terms of academic offices, I was elected to the Executive Committee of the Business Policy and Strategy Division of the Academy of Management in 2008; I was elected Representative-at-Large at the Strategic Management Society's Competitive Strategy IG in 2009; and I currently serve as Representative-at-Large at the Knowledge Management and Innovation IG. In LBS, I coordinated faculty recruitment from 2005 to 2011. I have also been involved with our Advancement team, and have participated in alumni events in several countries.

As I am particularly interested in engaging with practice, I have given 36 industry talks over the last four years; and worked with 22 companies in executive development or other thought leadership activities. As detailed in my CV, I have also been involved both with policy and strategy initiatives, including work with the World Economic Forum, the Advanced Institute of Management, McKinsey Global Management, and many corporates.

My teaching in LBS has also been split between our executive and degree programmes. In terms of my non-executive teaching, I have spent the last few years turning "Managing Corporate Turnarounds" into one of the most popular electives in Strategy. Having inherited the course to help

with our Area planning, I redesigned it, wrote new cases for all but one of the sessions (often with AV interactive material), and co-designed several sessions with industry leaders. I am now in the process of handing the course over to colleagues. Building on this teaching, I have forged close links with the turnarounds sector, and also engaged in related research and activities. Most recently, I have put together a meeting with a series of current officials (finance and labour ministers, MPs, senior bankers and a set of industry specialists) on the Greek debt crisis, and will be co-authoring a report with LBS's Richard Portes (Economics) and LSE's Dimitri Vayanos (Finance).

In terms of empirical settings, I have been engaging with renewed vigour in financial services, which is about to suffer yet another shock, and have been more interested in mobile telecommunications and media. This has informed my industry engagement, which I expect will continue to provide important stimuli for further research, but also a reality test for my ideas – or at least, an opportunity to consider how my views relate to practice. For, while I may be a theorist at heart, it is the world that I wish to explain – and influence, if I can.

Citation Count, as of October 12, 2011

ISI Web of Knowledge:	410 total citations
Harzing's Publish or Perish:	1,506 citations. H-index: 14
Google Scholar:	1,800 citations

Papers referenced in the Promotional Statement

- [1] M.G. Jacobides, 2005. "Industry Change through Vertical Dis-integration: How and Why Markets Emerged in Mortgage Banking", *Academy of Management Journal*, Vol. 48, No. 3, June: pp. 465–498
- [2] M.G. Jacobides and L.M. Hitt, 2005. "Losing Sight of the Forest for the Trees? Productive Capabilities and Gains from Trade as Drivers of Vertical Scope", *Strategic Management Journal*, Vol. 26, No.13, December: pp. 1209–1227.
- [3] M.G. Jacobides, 2008, "How Capability Differences, Transaction Costs, and Learning Curves Interact to Shape Vertical Scope", *Organization Science*, Vol. 19, pp. 306–326
- [4] E. Cacciatori and M.G. Jacobides, 2005. "The Dynamic Limits of Specialization: Vertical Integration Reconsidered", *Organization Studies*, Vol. 26, No.12, December: pp. 1851–1883
- [5] M.G. Jacobides and S.G. Winter, 2005. "The Co-evolution of Capability and Transaction Costs: Explaining the Institutional Structure of Production", *Strategic Management Journal*, Vol. 26, No.5, May: pp. 395–413
- [6] M.G. Jacobides, 2006. "The Architecture and Design of Organizational Capabilities", *Industrial and Corporate Change*, Vol. 15, No. 1, February: pp. 151–171
- [7] P. Puranam and M.G. Jacobides, 2011. *The Dynamics of Coordination Regimes: Implications for Organization Design*, Working Paper, London Business School, June.
- [8] M.G. Jacobides, 2007, "The Inherent Limits of Organizational Structure and the Unfulfilled Role of Hierarchy: Lessons from a Near War", *Organizational Science*, Vol. 18, pp. 455–477.
- [9] M.G. Jacobides and S. Billinger, 2006. "Designing the Boundaries of the Firm: From 'Make, Buy or Ally' to the Dynamic Benefits of Vertical Architecture", *Organization Science*, Vol. 17, No. 2 March/April: pp. 249–261.
- [10] M.G. Jacobides and D.C. Croson, 2001. "Information Policy: Shaping the Value of Agency Relationships", *Academy of Management Review*, Vol. 26, No. 2, April: pp. 202–223.
- [11] D.C. Croson and M.G. Jacobides, 2011, *Small Numbers Outsourcing: Efficient Procurement Mechanisms in a Repeated Agency Model*, Working Paper, London Business School, January.
- [12] M.G. Jacobides, T. Knudsen and M. Augier, 2006. "Benefiting from Innovation: Value Creation, Value Appropriation and the Role of Industry Architectures", *Research Policy*, Vol. 35, pp. 1200–21.
- [13] C.W. Tae and M.G. Jacobides, 2011. *How value is distributed between industry segments and why: An exploratory quantitative study*, Working Paper, London Business School, September.
- [14] M.G. Jacobides, 2008, "Playing Football in a Soccer Field: Value Chain and Structure, Institutional Modularity, and Success in Foreign Expansion" *Managerial and Decision Economics*, Special Issue on Strategy (M. Peteraf & C. Maritan, eds.), Vol. 29, pp. 257–276.
- [15] M.G. Jacobides and A. Kudina, 2011, "Industry Architectures and Globalization", under review, *Global Strategy Journal*.
- [16] S. Brusoni, M.G. Jacobides and A. Prencipe, 2009, "Strategic Dynamics of Industry Architectures and the Challenge of Knowledge Integration", *European Management Review*, Vol 6, pp. 209–216.

- [17] M.G. Jacobides and S.G. Winter, 2011, "Capabilities: Structure, Agency and Evolution", forthcoming, *Organization Science*.
- [18] M.G. Jacobides and S.G. Winter, 2007, "Entrepreneurship and Firm Boundaries: The Theory of A Firm", *Journal of Management Studies*, Special Issue on Entrepreneurship and the Entrepreneurship of the Firm (J.B. Barney & S. Alvarez, eds.), Vol. 44, pp. 1213–1241.
- [19] M.G. Jacobides, S.G. Winter and S.M. Kassberger, 2011, "The Dynamics of Profit, Wealth, and Competitive Advantage", Conditionally accepted, *Strategic Management Journal*.
- [20] M.G. Jacobides, F. Veloso and C. Wolter, 2011, *Ripples through the Value Chain: Scope and Profit Co-evolution as technology changes*, Working Paper, London Business School, August.
- [21] M.G. Jacobides and S.G. Winter, 2011. "Survival of the Reckless: Feedback, Foresight and the Evolutionary Roots of the Financial Crisis", appeared in the American Economics Association Meetings Electronic Proceedings, 2010, then revised, January 2011.
- [22] M.G. Jacobides, T. Knudsen and M. Augier, 2006. "Who Does What and Who Takes What: Benefiting from Innovation", *AIM Management Briefing*, December.
- [23] M.G. Jacobides, 2011. Strategy Bottlenecks: How TME Players can Shape and Win Control of their Industry Architecture, *Insights*, vol 9 no 1, pp. 84-91.
- [24] M.G. Jacobides, 2009, "Building Architectural Advantage: Don't Just Compete in Your Sector. Shape Your Sector and Win", Under revision for resubmission to the *Sloan Management Review*.
- [25] M.G. Jacobides, 2010, "Strategy Tools for a Shifting Landscape", *Harvard Business Review*, Vol. 88, No. 1, January–February, pp. 76–85
- [26] M.G. Jacobides, 2010, "The Play's the Thing", *Business Strategy Review*, Vol. 21, Issue 2, pp. 58–63.
- [27] M.G. Jacobides, 2011, *The Future of Finance: Issues in re-shaping the Sector's Landscape*, AIM Research Briefing Note, April.