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Towards a capability theory of (innovating) firms: implications for management and policy

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Business enterprises lie at the core of ecosystems that drive economic development and growth in market economies; yet, until recently, mainstream economics has mostly treated firms like homogeneous black boxes run by opportunistic managers. The field of strategic management has developed a more nuanced approach to the understanding of how firms are created, organized and grow, how they innovate and compete and how managers manage. One of the leading paradigms in the field is the dynamic capabilities framework. In this paper, contrasts and complementarities are drawn between dynamic capabilities and economic theories of the firm, including transaction cost economics and agency theory. Connections to the Cambridge school are highlighted, including the duality between Keynes's 'animal spirits' and the dynamic capabilities entrepreneurial owner/manager. Leibenstein's x-inefficiency is juxtaposed here with d-ineffectiveness. Knowledge-based theories of the firm consistent with Cambridge conventions emerge. Intellectual exchange between strategic management and economics is encouraged to help improve the intuition behind models of firms and the economy.

Key words: Dynamic capabilities, Transaction cost theory, Agency theory, Corporate governance, Economic development, x-inefficiency
JEL classification: B52, D21, L23

1. Introduction

The health and dynamism of national economies are inseparable from the health of the firms that operate there. As the business historian Alfred Chandler (2001, p. 5) observed, 'the competitive strength of national industries depends on the abilities of the core firms to function effectively and to maintain and enhance their integrated learning bases.' Relatedly, as Richard Nelson (1981) reminds us, the business enterprise is the enabler and nexus of innovation in a private enterprise economy. Moreover, it is not so much static market efficiency but the capability that firms have to innovate which makes private enterprise and capitalism distinctive. Accordingly, an understanding of

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the nature of the business enterprise and how it effectuates innovation and change can help us better understand not just the determinants of enterprise performance but also the effects of management and public policy on the business enterprise and on economic development more generally.

The nature of the business enterprise is seen rather differently in various disciplines and subfields. In one of the foundational and most influential articles in economics, Ronald Coase (1937, p. 388) anchored the essence of the firm on the 'entrepreneur-coordinator, who directs production'. The relative costs of transactions (either inside the firm or across a market interface) in turn define firm boundaries. Alchian and Demsetz (1972) expanded this paradigm by emphasizing that teamwork, monitoring and coordination facilitated inside firms allows them to generate useful outputs. Others have argued that the firm was simply 'a set of contracting relationships among individuals' (Jensen and Meckling, 1976, p. 310) so that the difference with the market was one of degree rather than of kind.[1] Williamson (1992), who built upon Coase's insights regarding transaction costs, also noted that internal organization helps maintain authority because pressure on an employee who rejects the authority of management will come not only from management but also from other employees who see their fortunes as tied to those of the firm. But, as Ronald Coase (1988) himself pointed out, it is not enough for a theory of the firm to merely explain firm boundaries; a proper theory of the firm needs to explain why firms develop capabilities and have different (heterogeneous) costs for administering their activities.[2]

The analysis here endeavours to fill voids and to remedy inadequacies in the theory of the firm by drawing on scholarship from the fields of strategic management, organizational theory and entrepreneurship. An emphasis on innovation and market creation leads to a capabilities model of the firm that fits comfortably in a combined post-Marshallian, post-Keynesian, and neo-Schumpeterian model of development and growth (Hanusch and Pyka, 2007). It is what Nelson and Winter (1982) would call an exercise in 'appreciative theory'.

While the business enterprise has been studied extensively in the fields of strategic management and entrepreneurship, scholarship in these fields has had relatively little impact to date on economic analysis. Nevertheless, it is recognized by some observers that both economic and strategic management perspectives are needed to fully illuminate the nature of the firm. As Oliver Williamson (1999, p. 1106) observed, the two approaches (transaction costs and capabilities) are 'both rival and complementary … more the latter than the former'. Teece (1982) has espoused a similar view. In particular, a capabilities perspective drawn from strategic management can help provide a framework within which interfirm heterogeneity and the survival or success of particular firms are natural areas of study. A capabilities approach yields critical insights into how business enterprises work and how public policy can be shaped to assist economic development.

The paper starts with an introduction to the capabilities view of the firm. Concepts similar to what is described below as 'ordinary capabilities' are beginning to gain recognition among economists, but a higher-level—and a more important—form of

[1] Masten (1988) refuted this claim by noting that the legal system in which firms are embedded imposes 'substantial differences in the obligations, sanctions, and procedures' that govern internal and external relationships in ways that 'alter the incentives of actors … in a meaningful way' (p. 196).

[2] While mainstream economics has not gone very far down this path, evolutionary economics (Nelson, 1991) and the field of strategic management are making headway (e.g. Dosi, 2007).

capabilities which has come to be known as 'dynamic capabilities' has gained traction in the field of strategic management. The paper compares the capabilities approach from (strategic) management theory with mainstream economic approaches. Special attention is given to contrasting the way managers are treated in the economics and capabilities literatures. Connections to both the Cambridge and Austrian schools of thought are highlighted. Finally, areas are identified where a capabilities approach can be used to inform economic policy, including antitrust, corporate governance and economic development. A final section summarizes and concludes.

2. The capabilities view of the firm: an introduction

The capabilities view of the firm has emerged mainly in the field of strategic management, with peripheral participation by economists. This view looks beyond 'factors of production' and production functions to recognize the importance of how firms learn and orchestrate assets in ways that markets cannot replicate. This functionality enables firms to achieve coordination and integration in the development and deployment of unpriced (non-marketable) assets. These distinct non-market traits enable firms to both create and capture value from innovation.

The capabilities view also recognizes that technology and know-how do not fall like manna from heaven but rather result from value creation activities, including search, learning, R&D and managerially directed asset orchestration processes. Moreover, the capturing of value by innovators and imitators is impacted by the nature of knowledge, the firm's complementary assets, the intellectual property regime, the firm's engagement with standards development activities, the firm's business model and the timing of investment decisions (Teece, 1986, 2006, 2010B). In this way, the capabilities view endeavours to help explain how interfirm heterogeneity arises, using concepts from both economics and strategic management.

Capabilities, as developed here, are not appropriately summarized by a production function because capabilities are untethered from particular products. For example, a capability to make machines powered by small, compact internal combustion engines can manifest itself in the manufacturing of automobiles, outboard (boat) motors or tractors and lawnmowers. Other capabilities, such as the ability to offer outstanding customer service, may not be tied to a particular product area at all.[3]

However, it is important to recognize that capabilities such as asset orchestration and market creation (or co-creation) are vital to resource allocation within firms and in the economy (Pitelis and Teece, 2010). They are non-market (inside the firm) processes that animate firms and undergird market activity. Capabilities arise in part from learning, from combining resources and from leveraging complementary assets.

[3] Capabilities are related to the concept of 'resources'. Resources are the tangible and intangible assets, broadly defined, that the firm can develop and control. Resources, which include the skills of the firm's employees, its equipment and the collective skills of the organization, generate streams of services that the firm can deploy. As theorized by Penrose (1959), a firm at any point in time is likely to have underemployed resources, including management skills. A firm with excess resources may find it more profitable to monetize those services via product diversification into new avenues of growth rather than through a market transaction that leases access to the surplus services to an independent party—assuming such a transaction would even be feasible (Teece, 1980A, 1982). A resource-based view of the firm emerged in the management literature during the 1980s (e.g. Wernerfelt, 1984), based on the idea that rents can be generated by firms, at least for a finite period, from the possession and protection of scarce and difficult-to-imitate resources.

Some firm-level capabilities become embedded in routines, and some reside with the top management team (Teece, 2012).

Firm-level capabilities can usefully be thought of as falling into one of two interconnected (but analytically separable) categories: ordinary capabilities and dynamic capabilities. Ordinary capabilities are to a large extent operational (doing things right), whereas dynamic capabilities are generally strategic in nature (doing the right things). This higher-level category of capabilities was developed by Teece *et al.* in a 1990 working paper later revised and published in 1997 (Teece *et al.*, 1990, 1997). They are integral to selecting, developing, and coordinating ordinary capabilities and help determine where and how companies allocate their financial technological and organizational resources to shape and respond to markets. The dynamic capabilities concept, which will be amplified below, has been partially recognized and endorsed by Nelson (1991), Chandler (1992), Winter (2006) and other heterodox economists, historians and social scientists.

The dynamic capabilities framework has grown to become one of the leading perspectives in the field of strategic management (Di Stefano *et al.*, 2010). It seeks to explain something economists often assume away: firm-level heterogeneity. The overarching goal is to explain differential long-run growth and firm survival, stagnation or failure by detailing how particular firms can be better or worse at identifying new opportunities, managing competitive threats, orchestrating their resources and effectuating necessary transformations (Teece, 2010A).

Although it is not yet fully elaborated as a theory of the firm, the dynamic capabilities approach brings Knightian uncertainty, Marshallian evolution, Penrosean resources, Schumpeterian creative destruction, Keynesian 'animal spirits' and Coase-Williamsonian transaction costs together in a way that can potentially explain not only why firms exist, but also their scope and potential for growth and sustained profitability in highly competitive markets riddled with deep uncertainty.

The next section begins by defining the two main categories of firm-level capabilities: ordinary and dynamic. It then provides a brief analysis of some of the ways that the concept of capabilities has surfaced in the economics literature, with special reference to Cambridge antecedents, including Marshall, Keynes and Robinson.

2.1 Ordinary and dynamic capabilities defined

2.1.1 Ordinary (or 'necessary') capabilities. Ordinary capabilities, which encompass operations, administration and governance of the firm's activities, make a firm capable of producing and selling a defined (and hence static) set of products and services using known technologies, thereby generating at best competitive (and therefore competitively uninteresting) financial returns. Ordinary capabilities arise from the employment of (1) skilled and unskilled personnel, including, under certain circumstances, independent contractors; (2) facilities and equipment; (3) known processes and routines, including any supporting technical manuals; and (4) the administrative coordination needed to get the job done. Ordinary capabilities thus allow firms to get things done and, as Sidney Winter (2003) puts it, to 'make a living'. The associated employment may be substantial, but ordinary capabilities are insufficient to ensure that the jobs will last.

A firm's ordinary capabilities support technical efficiency in performing a fixed group of productive activities, regardless of how well or ill suited the outputs are to the firm's competitive needs (Teece, 2007, p. 1321). Quality control, performance

measurement and payroll execution are examples of ordinary capabilities. Ordinary capabilities can be measured against the requirements of specific tasks, such as labour productivity, quality standards, inventory turns and time to completion, and can thus be benchmarked internally or externally to industry best practices.

Best operational practices are those that increase speed, quality and efficiency. Best practices alone, however, are generally insufficient to ensure firm growth and survival, except in weak competitive environments (which admittedly are still ubiquitous in many countries). This is because much of the knowledge behind ordinary capabilities can be secured through consultants or through a modest investment in training (Bloom *et al.*, 2013). As a consequence, good and even 'best' practices diffuse more or less quickly at least amongst those firms in environments exposed to strong global competition. Such firms are likely to be aware of benchmarking data, can acquire and absorb competitive off-the-shelf technologies and can implement best practice training.

To take one example, the multidivisional (M-form) organizational structure diffused across large-scale corporations in the middle of the twentieth century. In the petroleum industry, the majority of leading firms adopted the M-form structure over a period of about 15 years (Armour and Teece, 1978; Teece, 1980B). Once this organizational best practice became commonplace, the higher profits that had accrued to its early adopters in the US petroleum industry dissipated. Steer and Cable (1978) found similar results in the UK. After ordinary capabilities and structures diffuse widely enough, firms with nothing better generate only competitive returns, as the economic model of atomistic competition teaches.

Although there is considerable dispersion of productivity across firms (Dosi, 2007), a relatively high level of ordinary capabilities exists in globally competitive firms in advanced economies facing strong competition. Best practices are close to universal among leading global competitors. This is more than enough to drive economic returns to zero even for the leaders. Bob Lutz (2011), the former vice chairman at General Motors, illustrates this point for the automotive industry:

> The operations portion of the automobile business has been thoroughly optimized over many decades, doesn't vary much from one automobile company to another, and can be managed with a focus on repetitive process. It ... requires little in the way of creativity, vision or imagination. Almost all car companies do this very well, and there is little or no competitive advantage to be gained by 'trying even harder' in procurement, manufacturing or wholesale.

As indicated earlier, the presence of well-developed ordinary capabilities in a firm says nothing about whether its current production schedule is the right path for the future. In fact, strong ordinary capabilities can lead a firm into complacency; a trap is sprung when market conditions change because a single-minded pursuit of efficiency can drive out the capacity to effectuate change towards the new suite of products and processes the market requires and technology allows. The problem is that the efficiency calculus, which is so much emphasized in (static) economic theory, abstracts away from uncertainty, innovation and the transformation of markets and organizations. Furthermore, organizational inertia is often inadvertently imposed by arrangements put in place to achieve best practice and static optimization. This is compounded when decision-making stalls while managers wait for uncertainty to be resolved.

Hence, as a practical matter, the perceived need to maintain best practices and to require full information to inform decisions can distract top management from making

good enough (but more timely) decisions and focusing on the right products. Doing things right (technical efficiency) is not the same as doing the right things (evolutionary fitness). It is the latter that is the goal of dynamic capabilities, and it is around this that a new theory of the firm is being built.

2.1.2 Dynamic capabilities. As noted, ordinary capabilities are about firms doing things right; dynamic capabilities are about doing the right things, at approximately the right time, based on new product (and process) development, unique managerial orchestration processes, a change-oriented organizational culture and a prescient assessment of the business environment and technological opportunities. Strong dynamic capabilities are possessed by the few, not the many. As Lutz (2011) notes with respect to automobiles:

> Where the real work of making a car company successful suddenly turns complex, and where the winners are separated from the losers, is in the long-cycle product development process, where short-term day-to-day metrics and the tabulation of results are meaningless.

Strong dynamic capabilities help enable an enterprise to profitably build and renew resources, reconfiguring them as needed to innovate and respond to (or bring about) changes in the market and in the business environment more generally (Pisano and Teece, 2007; Teece *et al.*, 1997). This is, of course, the essence of firm-based innovation. Dynamic capabilities allow the enterprise and its top management to develop conjectures about the evolution of consumer preferences, business problems and technology; validate and fine-tune them; and then act on them by realigning assets and activities. Successfully building strong dynamic capabilities allows firms to challenge competitors that prioritize efficiency over innovation, that ignore (or are ignorant of) changing customer needs or that fail to empower internal entrepreneurs and change agents.

For applied purposes, dynamic capabilities can usefully be broken down into three primary clusters of activities: (1) identification, development, co-development and assessment of technological opportunities in relationship to customer needs (*sensing*); (2) mobilization of resources to address needs and opportunities, and to capture value from doing so (*seizing*); and (3) continued renewal (*transforming*). Engagement in continuous or semi-continuous sensing, seizing and transforming is essential if the firm is to sustain itself as customers, competitors and technologies change (Teece, 2007). The microfoundations of capabilities are partially summarized in Figure 1. In the figure, the verbs (actions) associated with specific elements of the firm are shown in bold while the nouns (objects of actions) are shown in brackets.

Dynamic capabilities reside, in part, with individual managers and especially the top management team who are required to take an entrepreneurial role in detecting and exploiting opportunities. The latter requires 'asset orchestration' (combination and integration). At certain critical junctures, the ability of a CEO and the top management team to recognize a key development or trend, then delineate a response and lead the firm in its path forward, might be the most prominent feature of the firm's dynamic capabilities. But the organization's values, culture and collective ability to quickly implement a new business model or other changes are also integral to the strength or weakness of the firm's dynamic capabilities (Teece, 2010B).

The dynamic capabilities approach helps explain why intangible assets, including a firm's collective knowledge and capabilities, have become the most valuable class of

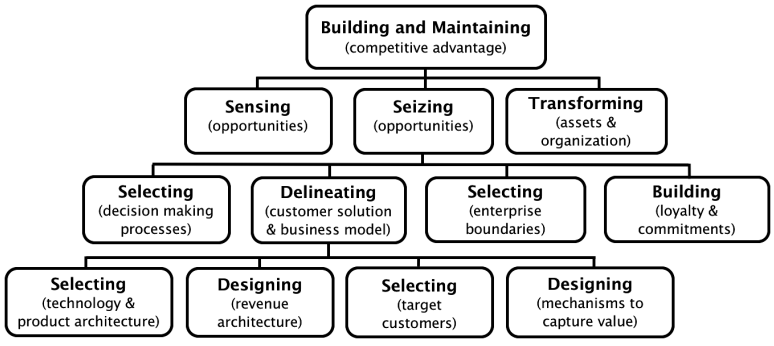

Fig. 1. The roots of competitive advantage: selected building blocks (organizational activities) *Source:* Adapted from Teece (2007).

assets in a wide range of industries (Lev, 2001; Hulten and Hao, 2008). The reason is that knowledge, capabilities and other intangibles are not only scarce; they are often difficult to imitate.

If ordinary, capabilities can be bought; dynamic capabilities must be 'built' through a process of investment in discovery, knowledge generation and learning (Teece, 2017). For example, Apple CEO Tim Cook said in February 2013 with reference to the company's ability to integrate hardware, software and services that 'Apple has the ability to innovate in all three of these spheres and create magic … This isn't something you can just write a check for. This is something you build over decades' (AFP, 2013). Put differently, whereas ordinary capabilities are tradable, dynamic capabilities are non-tradable. Table 1 summarizes important distinctions between ordinary (necessary) and dynamic capabilities.

2.2 Capabilities and economic theory: general

References to organizational and/or firm-level capabilities appear periodically in the economic literature, connected most often to notions of productivity.[4] Their lineage can be traced at least to Marshall (1920, p. 322), who recognized that management matters. Despite his use of the representative firm assumption, he saw firms as being different from one another. He also recognized the need for an evolutionary/capability approach to economics, noting:

> We shall need ever more to think of economic forces as resembling those which make a young man grow in strength, till he reaches his prime; after which he gradually becomes stiff and inactive, till at last he sinks to make room for other and more vigorous life.

As explained below, Marshall's reference to 'strength' is aligned with capabilities and evolutionary notions of firm heterogeneity. Joan Robinson (1977, p. 1324) noted that Marshall 'described industry as a forest in which each individual tree grows only to a certain height'.

[4] An economic concept similar to capabilities is 'organization capital'. The phrase was introduced by Prescott and Visscher (1980) as a proxy for proprietary information that a firm gathers about its employees and their tasks. It has since been made more general, encompassing a firm's 'operating capabilities ... investment capabilities ... and innovation capabilities' (Lev and Radhakrishnan, 2005, p. 75).

Table 1. *Some differences between ordinary and dynamic capabilities*

	Ordinary (necessary) capabilities	Dynamic capabilities
Goals/ Purpose	Operational (Technical efficiency in basic business functions)	Strategic (Achieving congruence with technological opportunities and market needs)
Domain of applicability	Risk	Deep uncertainty
Mode of attainability	Buy or build (operational learning)	Build (dynamic learning and adjustment)
Tripartite schema	Operate, administer and govern	Sense, seize and transform
Key activities	Best practices	Signature (beyond best practice) processes and activities
Managerial emphasis	Static optimization	Entrepreneurial asset orchestration and leadership
Priority	Doing things right	Doing the right things
Imitability	Relatively imitable	Relatively inimitable
Tradability (thick markets)	Yes	No
Result	Efficiency and technical fitness / 'doing things right'	Innovation and evolutionary fitness / 'doing the right things'

Source: Based on Teece (2014), Table 1.

A first step towards explaining this interfirm variation was made by Penrose (1959), who described the relation between a firm's resources and its production of final products. Richardson (1972, p. 888) further developed the idea, positioning capabilities, which he defined as the firm's 'knowledge, experience and skills,' as the driver of, and constraint on, the activities of the firm. Demsetz (1976, p. 373) pointed to the 'inherent capabilities of producers' as a possible socially benign explanation for large market shares. The term has continued to be used in this context (e.g. Bresnahan, 1992). More recently, Matsusaka (2001) developed a dynamic model of corporate diversification in which acquisition and divestment are driven by efforts to match a firm's activities to its capabilities. Capabilities were defined as 'the combined marketing, distribution, and development skills of top and middle management' (Matsusaka, 2001, p. 428). The capabilities model shows how diversified firms can trade at a discount even when diversification is value maximizing, which contradicts the results of agency models of diversification.

John Sutton (2002) has equated 'capabilities' more narrowly with the ability to enhance product quality and reduce cost. However, such capabilities are only the 'ordinary' or 'necessary' capabilities relevant to an enterprise endeavouring to remain competitive in established markets, not the 'dynamic' capabilities that can potentially help the corporate tree to grow beyond a 'certain height'. Nevertheless, in writing less formally on the capabilities required for economic development, Sutton has highlighted the ability (what can be classified as a dynamic capability) of managers to select promising markets (Sutton, 2012).

Although he did not use the language of capabilities, Garicano (2000) introduced a model of a firm in which workers are involved either in production or in solving problems. This model captures essential features of the process by which firms harness

resources to develop new capabilities. This model of a knowledge-based firm was later embedded by Garicano and Rossi-Hansberg (2012) in a general equilibrium model in which innovations displace old products and lead to the founding of new firms that learn and build internal hierarchies. Another model that captures elements of the dynamic capabilities framework without directly referring to it was presented by Dessein and Santos (2006). In their model, firms move to one of two equilibria: a strong division of labour resulting in organizational rigidity or an internal system of flexible coordination that permits better adaptation to local changes in circumstance. Work such as this shows a promising avenue for the incorporation of organizational capabilities and related concepts into formal models. For the most part, however, the concept of capabilities in modern economics has unfortunately migrated from the enterprise growth focus of Penrose to a narrower conception more consistent with a static, production-function model of the firm.

2.3 Marshall, managerial abilities, and dynamic capabilities

Despite Marshall's close association with modern microeconomics, any careful reading of his work also establishes his credentials as a management theorist who understood elements of capabilities, competitiveness and transformation. In *Industry and Trade* (Marshall, 1919), he even had elements of a knowledge-based theory of the firm. Because knowledge is continuously evolving, and because there is variety and selection in industrial development, Marshall has something in common with evolutionary economics and capabilities thinking. Moreover, in Marshall's framework, managers matter and some firms are better managed than others; so he also has much in common with the modern field of strategic management.

The nature of management is discussed at length in Marshall's *Principles of Economics* (1920), albeit without anything like the nomenclature of modern capabilities theory. He was very clear that managers fall into those 'who open out new and improved methods of business and those who follow beaten tracks'. He also understood 'sensing', and the importance of showing consumers 'something they have never thought of having before'.

In *Principles*, Marshall (1920) explicitly addresses, as no other economist of his time did, the role of management in determining enterprise performance. Managers, or 'businessmen', as Marshall prefers to call them, 'adventure' or 'undertake' the risks (and uncertainties) of business. They bring together capital and labour, conduct planning and superintend to minor details. At the same time, the manager is 'the natural leader of men' (bk. IV, ch. XII, p. 173). He notes that good managers are hard to find, and that management skills tend to atrophy over time.

Marshall, unlike Schumpeter, saw a clear role for the manager. Whereas Schumpeter belittles managers, seeing them as little more than 'superintendents' (Schumpeter, 1934, p. 20), Marshall recognized a role for the manager to engage in operations and 'scientific management' (Whitaker, 1999; Caldari, 2007). He also saw a critical role for the manager in what was defined earlier as dynamic capabilities (Metcalfe, 2016).

While Marshall embraced the role of management in general, he did not build this into his theory of the firm. That challenge is accepted in Section 3, below.

2.4 Keynes, 'animal spirits', and dynamic capabilities

The Cambridge antecedents of the dynamic capabilities framework do not end with Marshall. Although Keynes was not interested in the theory of the firm *per se,* he was

keenly aware of the importance of firm-level investment decisions and long-term investor expectations for macroeconomic theory, and the concepts that Keynes developed around investment are relevant to the theory of the firm. In his *General Theory* (Keynes, 1936), he argued that animal spirits were a critical element of a framework for investment decisions under uncertainty. He invoked animal spirits not to signal irrational behaviour but to help explain that many investment decisions made by businesses in rapidly changing environments require some kind of 'leap of faith' because deep uncertainty raises a fog of ambiguity around financial outcomes. Waiting too long for the future to unfold will often cripple decision-making. As Keynes notes:

> Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as a result of animal spirits—of a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by probabilities ... Thus if the animal spirits are dimmed and the spontaneous optimism falters .... enterprise will fade and die.' (Keynes, 1936, p. 161)

Keynes saw owner-managers as managing and investing intuitively, paying little attention to the precise calculations of expected profits. He noted in Chapter 12 that businessmen play a mixed game of chance and skill, and that after-the-fact returns are often not known. Expressing a similar idea, Jeff Bezos, the CEO/founder of Amazon, noted that 'there are decisions that can be made by analysis … Unfortunately, there's this whole other set of decisions that you can't ultimately boil down to a math problem' (Deutschman, 2004, p. 57). Keynes stressed that if human nature felt no temptation to take a chance and investment had to rely on cold calculation, there might not be much investment. For Keynes, it was management's 'innate urge to activity which makes the wheels go round ... calculating where we can, but often falling back for our motive on whim or sentiment or chance' (Keynes, 1936, p. 162).

Many business investment decisions, even major ones, are not fully evidence-based, nor could they be. Apple's iPhone was not developed in such a manner. Nor was Chrysler's minivan, an earlier design success that also created a new product category. Deductive and inductive reasoning need to be supplanted by abduction and other sources of knowledge such as experts, 'superforecasters' (Tetlock and Gardner, 2015), the distributed 'practical wisdom' within the organization (Nonaka and Toyama, 2007) and sometimes even crowds.

While some economists have recently treated animal spirits as a form of irrationality (e.g. Akerlof and Shiller, 2009), Keynes was explicit that animal spirits aren't irrational in the sense of ignoring available information:

> we should not conclude that everything depends on waves of irrational psychology ... human decisions affecting the future, whether personal or political or economic, cannot depend on strict mathematical expectation, since the basis for making such calculations does not exist. (p. 162)

He made it clear that he was referring to the industrial sector, not financial institutions, and that he had in mind owner-managers.

The decision-makers in Keynes's *General Theory* are entrepreneurs and managers for whom business is

> a way of life ... with the ultimate result largely governed by whether the abilities and character of the managers were above or below the average. (Keynes, 1936, p. 150)

What he describes is very close to what business scholars refer to as 'entrepreneurial managers', who do not generally have a large ownership interest in the business over

which they have authority. As opposed to efficiency-focused administrative managers, entrepreneurial managers identify and pursue opportunities without allowing their organization's current resource endowment to limit their options (Stevenson *et al.*, 1989). The necessary resources can be mobilized either by acquisition (when feasible), by internal development (when time permits) or by cooperation within an interfirm network, including capital sources. Administrators, by comparison, allow existing resources, existing practices and existing job descriptions to constrain their vision and their actions.

Today, public financial markets also tend to constrain animal spirits, at least for listed firms, as they demand a more short-term focus given the short time horizon most investors have. Nevertheless, CEOs with a compelling vision, such as Jeff Bezos, Elon Musk and, arguably, Richard Branson, to take three recent examples, have been able to find willing shareholders even after years of losses on the promise of a highly profitable future.

The Keynesian concept of animal spirits is very consistent with dynamic capabilities and a knowledge-based theory of the firm. Such a theory sees knowledge generation, transfer and appropriation as core activities of the firm and its management. These activities require reliable and adaptable systems, which are difficult to establish and maintain if organized as a mere network of contracts. Animal spirits—an ability to envision a positive business outcome requiring an investment path for moving towards it—are part and parcel of strong dynamic capabilities. Firms with strong dynamic capabilities have strong animal spirits. They sense, seize and transform. Weaker firms and their management teams are indecisive, waiting for greater certainty with respect to returns. In most cases, by the time uncertainty has been resolved, competitive advantage is lost, especially in a globalized economy with pervasive network effects. Owner-managers with animal spirits allow the firm to act in the face of uncertainty rather than being paralyzed by it.

2.5 Other Cambridge antecedents

While the Cambridge school never quite launched a capabilities theory of the firm, there are elements of it beyond Marshall and the connections to Keynes just identified. Capabilities are consistent with the aspirations of the Cambridge school to do good, institutionally relevant research.

Indeed, Joan Robinson pointed out long ago that 'the production function has been a powerful instrument of miseducation' (Robinson, 1953–1954, p. 81). Her concerns were, amongst others, around measurement, particularly of capital. Related concerns are that the firm may not only not be operating on the production frontier; it may well be that the product/commodity being produced suddenly has no value. Innovation is about creating new production functions; and economic theory is silent on how a combination of existing technologies can enable quite different product types, such as when the combination of laser technology with computing enabled the transmission of data through optical fibres. Unlike the efficient firms of economic theory, actual firms not only need to do things right (i.e. locate on the production frontier and not below it), they must do the right things (i.e. select the right products to produce for the current market conditions).

As Pasinetti (2007) points out, the Cambridge school stood, as does capabilities theory, for reality (and not just rationality) as the starting point of economic theory; for economic logic with internal consistency (and not just mathematical rigor); for the

classical economists as the major inspiring source in the history of economic thought; for dynamic rather than static systems; for disequilibrium and instability (not equilibrium) as the normal state of the economy; for an analytic framework that recognizes technical change and economic growth; and for a deeply felt social and political conscience. Capabilities theory also draws from evolutionary theory and the Austrian school, and spotlights Knightian uncertainty as a key managerial challenge.

Contemporary Cambridge school economist Amartya Sen also grapples with capabilities, but his focus is on what can be called ordinary capabilities, in contrast to the dynamic capabilities that are the main focus here. Sen's capability framework is articulated more at the level of the individual, not that of the organization. Capabilities are seen as the fulcrum for leveraging tangible resources into human achievement. Sen recognized that individuals can differ greatly in their abilities to convert a given set of resources into outputs; capability theorists today expand this principle to embrace heterogeneity with respect to the effectiveness of joint efforts by individuals in organizational settings. Firms, too, can have strong or weak capabilities that differ from the average or modal capabilities of the individuals of which they are composed. This is because organizations are systems, and inspiring leadership, a positive culture, wise incentives or other organization-wide characteristics can help workers achieve far more together than their separate skill levels would suggest. For both Sen and capabilities theorists, resources are an input into capabilities. Sen's goal is to build a theory of justice. In the dynamic capabilities framework, the aim is to build a theory of the firm that can explain the competitive advantage of individual firms over time.

3. Toward a robust (knowledge-based) capabilities theory of the firm

This section begins by outlining some of the theories of the firm that have emerged outside mainstream economics. Subsequent sections use the dynamic capabilities framework to reconsider the economic 'problems' for which firms are supposedly the solution, showing the complementarity of the transaction cost and knowledge/capabilities perspectives. The final section argues that a more complete theory of the firm will recognize that firms exist in part to compensate for weak or nonexistent markets for know-how and other specialized and/or cospecialized assets. For the economic system to work, entrepreneurs and managers are required to orchestrate the resources/competences needed for creating and capturing the value of an innovation. Absent managers and management, economic theory cannot explain the evolution and growth of business firms or the economy (since business firms are central to it).

3.1 Modern firms

Other than start-up enterprises, firms have always been characterized as multiproduct, indicating that multiple lines of business co-exist within a single firm. Multiproduct firms, not single-product firms, are the norm, and theories of the firm should reflect that. Transaction cost economics (TCE) in the Coase-Williamson formulation does not, but Teece (1980A, 1982) has extended TCE by including knowledge/know-how assets. This was a small step in the direction of recognizing scope economies and complementarities. In today's digital economy, with convergence of technologies and product trajectories being commonplace, these considerations are even more salient.

Moreover, a theory of the diversified firm must recognize that the nature (design) of the firm must embrace both the ability to create value as well as to capture it. The essence of management in the innovating firm involves both value creation and capture. Any theory that fails to do this is not coming to grips with the essence of the task of the modern innovating firm. The problems are compounded when the firm is creating 'enabling' or 'general purpose' technologies which are applicable far beyond the number of business lines where any diversification strategy would be feasible (Bresnahan and Trajtenberg, 1995). Inherent inefficiency in the market for know-how (Teece, 1980A, 1981, 1982) compromises market transactions, and inherent diversification limits of firms compromise the span of production diversification that is possible (Teece *et al.*, 1994). These issues at least need to be addressable in a theory of the firm if it is to have reasonable utility for our times. In short, one would hope that the theory of the firm would provide some insight into firms as they exist today.

Unfortunately, whether one uses the lens of transaction costs (e.g. Coase, 1937; Williamson, 1985), ownership perspectives (e.g. Hart and Moore, 1990), incentive perspectives (e.g. Holmström and Milgrom, 1994) or other 'modern' theories of the firm, nicely summarized and illustrated by Roberts (2004), the many theories available today still seem to caricature firms, at least those engaged in innovation. They provide almost no insight in terms of how firms create and capture value, despite the fact that it is the firm's ability in a private enterprise system to innovate (and not the twin theories of welfare economics) that encapsulates the reasons why capitalism outperforms socialism (Nelson, 1981). Moreover, in mainstream economics, there is no theory of firm heterogeneity, despite the ubiquity and obvious importance of heterogeneity. Mainstream economics must therefore reconceptualize how markets and market processes relate to the theory of the firm if economic theory is to be both relevant and rigorous. It is quite remarkable that, despite almost 80 years of work since Coase's 1937 article on the nature of the firm, neither the neoclassical, transaction cost, nor agency theories of the firm have any need for entrepreneurs.

Furthermore, as Gibbons (2005) has noted, many theories of the firm today can more properly be characterized as merely theories of the boundaries of the firm. Gibbons further points out, following Cyert and March (1963), that the term 'theory of the firm' is more apt for descriptive and prescriptive models of firms' decision-making processes. Gibbons provides an excellent survey of four theories of the firm that he calls (1) rent seeking, (2) property rights, (3) incentive systems, and (4) adaptations. The capabilities approach recognizes some value in all four streams and incorporates ideas from each. Gibbons makes oblique reference to the resources/capabilities approaches, which he indicates 'have mouthwatering potential implications', and he 'expects them to play key roles in future formal theories of the firm.' This section and those that follow are designed to turn some of Gibbons's perceived potential into actuality.

3.2 Incomplete contracts and knowledge

Several classes of economic theories of the firm involve the notion of incomplete contracts. One class of incomplete contract theories relates to incentive design and the problem of opportunism. Agency theory (e.g. Jensen and Meckling, 1976) fits into this category, as does transaction cost economics (e.g. Williamson, 1975). These theories all emphasize the need to constrain management in some way. A second but less well-known class of incomplete contract theories focused instead on knowledge

acquisition, sharing, learning and control. Authors such as Malmgren, Richardson, Teece and Loasby have made contributions, as have Dosi and Marengo.[5] Arrow possibly fits here as well.

The dynamic capabilities approach builds on the second, knowledge-based tradition. It recognizes that the essence of decision-making lies in sensing opportunities and threats in the environment and developing products and services to meet ever-changing customer needs. The firm learns through engagement in such activities, and this strengthens its capabilities. It learns how to do things while also ascertaining the rules of the game required to win—or at least to compete effectively —in the market. These capabilities and other intangible assets created to address customer needs are somewhat fungible and can potentially be redeployed by management. This reallocation can be more effective within the firm (coordinated by management) rather than across a market, particularly when the assets are idiosyncratic. When assets are idiosyncratic (specialized and cospecialized), value is context dependent and the market necessarily thin. The firm can allocate and if necessary reallocate/redeploy such assets internally better than the market could do so because the limited number of agents in the markets, coupled with asset specialization, undermines the price discovery mechanism. Put differently, markets for idiosyncratic assets are nonexistent or too thin to be efficient in the neoclassical sense.

Managerial rather than market allocation/reallocation works because managerial decisions and actions overcome not so much the risk of hold-up due to opportunism, *à la* Williamson, but rather the difficulty of understanding *ex ante* the potential productivity of assets in particular combinations. Firms (as opposed to independent inventors) are especially well suited to undertaking systemic innovations that require complex coordination among myriad elements (Teece, 1984). In a pure market setting, systemic innovation would entail a plethora of different and unwieldy contracts involving unpriced assets were it to be attempted at all. Coordination, orchestration and learning, not opportunism and asymmetric information, are the hallmarks of the dynamic capabilities approach to the firm.

3.3 Transaction cost economics and capabilities

Transaction cost economics arose in large part to address blatant deficiencies in the standard production function theory of the firm. Coase (1937), in his classic article on the nature of the firm, described firms and markets as alternative modes of governance, with firms choosing the mode that minimizes transaction costs. The boundaries of the firm are set by bringing transactions into the firms so that the marginal costs of organizing inside the firm are equilibrated with the costs associated with transacting in the market.

Despite the absence of a revenue dimension to help complete the cost-based perspective, a substantial literature has built on Coase's landmark article. Particularly noteworthy is the transaction cost economics (TCE) work by Nobel Laureate Oliver Williamson (1975, 1985). Williamson moved TCE beyond the binary market-versus-hierarchy choice by considering, among other factors, intermediate forms of organization such as strategic alliances.

[5] While there are hints of it in Marshall, the knowledge-based approach does not have strong Cambridge roots.

At the heart of the relative efficiency calculations in transaction cost economics lie contractual difficulties associated with asset specificity. When irreversible investments in assets specific to only one transaction are needed to support efficient production, then the preferred organizational mode is internalization in order to minimize exposure to the hazards of opportunistic recontracting.

TCE can be combined with knowledge-based theories of the firm. As already noted, Williamson himself sees the 'relation between competence and governance as both rival and complementary—more the latter than the former' (1999, p. 1106). Knowledge-based capabilities theories indirectly respond to the issues raised by Winter (1988), Demsetz (1988) and others with respect to prevailing approaches to the firm.

The capabilities literature in strategic management has not been directed towards formulating a theory of the firm, which is one aim of this article. The focus to date has been on how competitive advantage is developed and maintained (or not) by individual firms. This is, in fact, akin to certain of Marshall's ideas about the nature of firms as discussed above.

In some ways, but not in others, the dynamic capabilities approach is consistent with a Coasian perspective. It conceptualizes the firm and markets as alternative modes of governance. However, the selection of when to organize (manage) an activity internally, via alliances, or via the market depends on the degree of nontradability of resources, and to some extent on what Langlois (1992) has termed 'dynamic transaction costs' related to knowledge acquisition and transfer.

The notion advanced here that certain firm-specific assets are not tradable does not precisely match Coasian or Williamson concepts of 'transaction costs'. There is nevertheless a strong relationship between specific assets and nontraded or thinly traded assets. However, there are reasons why assets are not traded (or are thinly traded) that do not relate to asset specificity and transaction costs stemming from opportunism. For instance, there may simply be no viable business model for trading (licensing) certain types of know-how. Many owners of intellectual property will simply not license strategic technological assets, especially not to direct competitors. The reason, at one level, is because a contract cannot be written that would compensate the licensor for the likely loss of customers if the licensee uses the licensor's technology to compete against the licensor. Theoretically, a licensor ought to be indifferent between own sales and the sales of a licensee if the royalty rate is set to enable royalties to equalize with lost profits. However, such arrangements are rarely, if ever, seen, in part because there is likely to be ambiguity with respect to which customers and what sales are actually lost to the licensee. Accordingly, it is uncommon in the actual world to see exclusive licenses (to direct competitors) when the licensor is able to sell in the same territory. At another level, it may simply be because there are differences in expectations with respect to the profit potential associated with the use of the technology. In some cases, there are also likely concerns with respect to whether the licensor or the licensee will capture the 'learning by using' know-how associated with exploiting the technology.

However, as noted earlier, a theory of the firm should be more than a theory of the boundaries of the firm, or the financial structure of the firm. The real essence of the firm is its ability to both create and capture value (Katkalo *et al.*, 2010). How it innovates and designs and implements business models (of which firm boundaries are just one element) to appropriate sufficient returns to justify continued investment in innovation activities ought to be centre stage. A viable theory of the firm must be able to encapsulate these functions well if it is to be useful.

3.4 Complementarities

As Samuelson (1974) has noted, 'the time is ripe for a fresh, modern look at the concept of complementarity ... the last word has not been said on this ancient preoccupation of literary and mathematical economists' (p. 1255). This paper endeavours to shed additional light on complementarities, the leveraging of which is central to both the value creation and capture associated with innovation. The complementarity concept must be carefully integrated into any effort at a full understanding of the modern firm.

The essence of innovation, as Schumpeter reminds us, is new combinations, which implies the presence of underlying complementary elements. To expand on this, it is posited that competitive advantage is achieved in part by accomplishing the alignment of complementary assets and technologies so that (a) economies of scope are generated, (b) returns to innovation are captured, and (c) new products and production possibilities are created through the combination and recombination of existing assets. Such combinations and recombinations allow value to be (i) created (e.g. an internal combustion engine combined with a miniature mechanical reaper becomes a lawnmower) and (ii) captured (Hirshleifer, 1971).

While different types of complementarities (e.g. Hicksian, Edgeworthian) are recognized in the literature, they have not hitherto had much impact on the theory of the firm. Economies of scope yield Edgeworth complementarities, and they can play a role in creating value inside the firm, as can technological complementarities. Exploiting Hirshleifer (1971) complementarities by arbitraging expected asset price shifts caused by innovation can assist in capturing value, as can other strategies which lead to ownership/control over bottleneck assets (Teece, 1986, 2006).

In terms of value capture, the concept of cospecialization, which combines complementarity with two-way asset specificity, is particularly important (Teece, 1986, 2006). Assets that are cospecialized to each other need to be employed together, usually inside the firm (Teece, 1980B). Cospecialization and the organizational necessities and challenges associated with achieving scope economies and seizing new opportunities is not even hinted at in the path-breaking scholarship of Ronald Coase, Armen Alchian, Harold Demsetz, Oliver Williamson or Oliver Hart. However, it is a phenomenon that requires (theoretical) attention.

Cospecialized assets are the building blocks of firms. Building and assembling assets designed specifically to perform some joint purpose inside the firm rather than accessing commercially available assets through a skein of contracts is not done primarily to guard against opportunism and recontracting hazards, as TCE claims (although in some cases that may be important). Instead, it is done to ensure the maintenance of effective coordination and alignment of assets/resources/competences over time as circumstances change. This adaptation is often more easily accomplished by managerial fiat inside the firm than through the price system, an argument perhaps first made by Barnard (1938).

In the dynamic capabilities framework, the distinctive roles of the (entrepreneurial) manager are (1) to pursue opportunities that require the use of resources beyond those currently controlled,[6] (2) to keep cospecialized assets in value-creating alignment, (3) to identify new cospecialized assets to be developed through the investment process, and (4) to divest or run down cospecialized assets that no longer yield special

[6] This point was embedded in Harvard Business School professor Howard Stevenson's definition of entrepreneurship (e.g. Stevenson and Gumpert, 1985).

value. These goals cannot be readily achieved through contracting mechanisms in part because of dynamic transaction costs (the costs of negotiating, etc.) but also because there may not be a competent entity to build or supply the assets that are needed. Capabilities (ordinary, and especially dynamic) are an important type of intangible asset that must often be built because they cannot be bought, and there is limited utility in attributing their internalization to a transaction cost problem.

Rather than stressing opportunism (although opportunism surely exists and must be guarded against), the emphasis in dynamic capabilities is on building (through investment and through learning) unique specialized assets and on keeping the enterprise aligned with its business environment. The associated activities include research and development, business architecture transformation, asset selection and asset orchestration. The emphasis in dynamic capabilities is on creating valuable and distinctive assets that transaction cost economics assumes are somehow also available from external sources.

3.5 A new theory of the firm?

The dynamic capabilities framework incorporates an entrepreneurial theory of the firm that starts from a more primitive initial state than the one assumed in most economic models. In the Coase–Williamson framework, for example, markets, technologies and prices exist already (Boudreaux and Holcombe, 1989). In reality, entrepreneurs must first cut through uncertainty and create each market before there are preferences and prices that can lead to market activity, an observation that dates back to at least the work of Frank Knight (1921).

The emphasis on knowledge and capabilities in the dynamic capabilities framework is compatible with a neo-Schumpeterian view of the economy (Winter, 2006; Augier and Teece, 2007). It recognizes that deep uncertainty impacts decision-making. In this regard, it is consistent with Keynes and Robinson. The framework also recognizes that, as firms innovate, recombine assets and compete, they create economic dynamism and disequilibrium. As opposed to many other types of investments, innovation requires robust animal spirits because the outcome is most uncertain and payoffs hard to calibrate.

The dynamic capabilities framework also recognizes the distinctive role of managers in asset orchestration. In endeavouring to build a theory of the firm without fully acknowledging the economic importance of internally managed coordination, Williamson, Jensen and others have deflected attention away from the important role the business enterprise, led by entrepreneurs and managers, plays in allocating resources to expand the existing set of economic possibilities. Coordination is also crucial for the initial identification of these opportunities. Because the market for information/knowledge about new opportunities (Arora *et al.*, 2001, Gans and Stern, 2010; Teece, 1981) isn't well developed, entrepreneurs and managers must build organizational capabilities inside businesses firms to assist in knowledge creation and knowledge capture.

The sensing, seizing and transforming capabilities of managers and their organizations bring dynamism to the business environment. Most importantly for a more complete theory of the firm, they are the critical factors that distinguish between what can be done inside the firm as opposed to what is possible under a system of pure contracts.

While all firms have elements of dynamic capabilities, some have developed theirs to a far greater extent, which helps account for interfirm heterogeneity. Put a different way, it is difficult to create strong dynamic capabilities. Sensing and seizing, for example, are similar to exploration and exploitation, two activities discussed in the organizational behaviour literature as potentially incompatible inside a single organization (March, 1991). Exploration (e.g. research on a potentially disruptive technology) has a longer time horizon and greater uncertainty than exploitation (e.g. selling mature products). The two types of activities require different management styles; one solution is an 'ambidextrous organization' where two separate subunits with different cultures are linked by shared company-wide values and senior managers with a broad view (O'Reilly and Tushman, 2004, 2016). But the tensions between subunits must still be astutely managed so that the integrated structure reaps the full learning benefits.

While the organization and its capabilities together provide managers with the raw material required to perpetuate the enterprise, it is incumbent on top management to make the key decisions as to whether the enterprise is currently making the right products and addressing the right market segment and whether its future plans are appropriately matched to consumer needs and technological and competitive opportunities. Top management must develop conjectures, validate them and realign assets and competences for new requirements. The combined dynamic capabilities of the managers and the organization enable the enterprise to profitably orchestrate its resources, competences and other assets.

With the dynamic capabilities framework, I would like to believe that we are indeed a few steps closer to a truly fundamental understanding of the origins of firm-level heterogeneity and the sources of enterprise-level value creation, capture and durable growth. No other framework is as ambitious in its reach. Understanding the origins of long-term cash flow generation is the deepest unanswered question in microeconomic and financial theory. It is the question that directly and indirectly animates management theory and investment choices and motivates the quest for understanding the ways that enterprises are far from being interchangeable black boxes.

4. Implications for resource allocation, governance and policy

Different theories of the firm can have divergent managerial, governance and public policy ramifications. Policymakers must strive to carry multiple models of the firm in mind as they make judgments about possible emerging avenues of intervention. Few do.

The dominant paradigm in economics is the neoclassical (production function) theory of the firm. Quite at odds with the capabilities theories outlined here, it treats firms as interchangeable black boxes. It leads to a jaundiced view of the firm and its management, despite the fact that innovating firms are the lynchpin of the private enterprise system, and of economic development and growth more generally.

While the neoclassical view of the firm as a production function can illuminate certain issues surrounding the supply and demand for inputs, it assumes that new products and new markets exist rather than that they must first be created. Furthermore, it assumes that setting marginal revenue equal to marginal cost is the main job of the manager. Joan Robinson's instincts in this matter were right; the neoclassical view is a caricature of how firms (especially innovating firms) actually operate.

While transaction cost economics brought attention to important contracting issues and highlighted the risk of opportunistic recontracting by parties outside the firm, TCE largely ignores differences in production costs amongst firms and the value of integrating diverse pools of technology and know-how within firms. And while there is some truth to the related agency theory view that managers waste or even steal shareholder dollars in various ways, it completely fails to provide any understanding of how firms first create the value that wayward managers and sometimes boards then supposedly dissipate or steal.

Bad economic theory can mislead managers if they were to ever take advice from economists on management, which they rarely do. More seriously, bad theory produces bad public policy, and bad, poorly informed, public policies can sap innovation and weaken economies. Without the conceptual lens of the capabilities approach, policymakers may inadvertently impede innovative and capability-building activities that offer development and growth opportunities. In this section, I consider three areas where a capabilities perspective on the firm can lead to different management decisions and public policies than more conventional thinking.

4.1 Resource allocation: x-inefficiency and d-ineffectiveness

The central problem in economic theory is the achievement of efficient resource allocation. Economists often assume that, if firms maximize profits, they will achieve efficiency through Adam Smith's invisible hand. Alfred Chandler (1977) reminds us that the visible hand of the manager supports the price system. But the underlying assumption in both views was that resources were allocated efficiently.

After Alfred Marshall (and the Austrian school), Leibenstein (1966) was one of the few economists to explicitly recognize that firms may not, in fact, achieve technological efficiency, and that the production function may therefore be different for different firms in the same industry. He proposed the concept of x-inefficiency, which occurs when a firm operates above its cost curve. X-inefficiency made room for the possibility that managers (as opposed to entrepreneurs) might matter in economic theory after all. However, Leibenstein's x-inefficiency theory, despite being cited occasionally, has not really been embraced by economists. It has arrived at an enigmatic dead end in the economics literature.

A very recent, welcome exception is Bloom *et al.* (2013), who interestingly declared (consistent with Marshall) that 'management matters' (p. 40) based on a controlled study in which 14 Indian textile plants were taught a set of 38 well-known (in developed countries) management practices, resulting in a 17% increase in productivity in the first year. The apparent reason for the firms' initial (avoidable) inefficiency was that the Indian managers had either not known about the superior practices or had been sceptical of what they had heard. This confirms basic Austrian school notions about imperfect information (and inaction) being ubiquitous in the economic system.

Bloom *et al.* focus on quite ordinary organizational capabilities, which are amenable to transfer and testing in an experimental setting. In the dynamic capabilities framework, that is merely the tip of the iceberg in terms of the ways that management matters.

While not couched in the language of x-inefficiency, the dynamic capabilities framework implicitly accepts elements of that 50-year-old concept. Leibenstein and others attributed x-inefficiency to a lack of competition, but the more fundamental causes are likely to be poor management, limited information and weak ordinary capabilities.

The dynamic capabilities framework suggests a theory of the firm that not only recognizes firms with x-inefficiency (i.e. firms with weak ordinary capabilities, as evidenced by costs above the technically efficient level). It also recognizes firms that suffer from what might be called 'd-ineffectiveness' (i.e. weak dynamic capabilities). In fact, I posit that most firms are d-ineffective, because at any point in time, many are likely to produce a portfolio of products not ideally suited to customer needs. Put differently, they are not 'fit' in an evolutionary sense.

Strategic management scholars have long recognized the problem of sub-optimal management practices that economic theory for the most part assumes away. As noted, a key tenet of the field of strategic management is that not all firms will follow best practice, let alone generate and adapt new practices which outclass all others.

In the dynamic capabilities framework, only d-effective firms are destined to last. Developments in trade and technology have placed a premium on the ability of companies to become entrepreneurial and agile at home and abroad, requiring in turn that management sense emerging opportunities and threats and organize to allow and promote flexibility, learning and, of course, innovation. Ordinary capabilities are less salient and can often be outsourced to expert suppliers that achieve economies of scale by serving multiple customers. Internal operational efficiency is not enough for survival and growth in today's global economy.

Capability theory is thus the portmanteau that allows (strategic) management theory to inform both a deeper understanding of durable firm-level competitiveness and the proper functioning of the economic system. This in turn will lead to better understanding by policymakers of how the firms under their jurisdiction actually operate, not as mere bundles of capital, labour, and technology, but rather as complex organizations that thrive and wither as a result of differentiated human activities.

4.2 Corporate governance and oversight

Regulatory and legal frameworks that rely on economic analysis, particularly agency theory, have steered corporate governance away from a focus on the future health of the organization towards more short-term concerns. As Garicano (2000, p. 874) notes, 'with a few recent exceptions, most previous economics literature has equated the study of organizations with the study of incentive problems.' Accordingly, policy frameworks have over-emphasized at least two potentially major sets of 'problems' for corporate longevity and growth. One is the issues arising between management and the board of directors. The other set of issues is between management and shareholders. The 'solutions' that have been adopted, which involve board composition and financial structure, cause unfortunate collateral damage because they constrain the scope of management to fully leverage the capabilities of the firm, sometimes reducing long-run growth in employment and output.

The mainstream (agency) theory of the firm takes a contrary approach to that of the capabilities framework by focusing on the potential for misallocation of resources by non-owner-managers. In most large corporations, ownership resides with a more or less fragmented group of traders who do not hold stocks for the long term. Day-to-day control is exercised by professional managers who may or may not own a significant number of shares in the firm. This raises the possibility that managers could choose to operate the firm in ways that benefit themselves rather than the shareholders.

Concerns about this potential misallocation problem date back to at least the work of Berle and Means (1932). In the 1960s, a flurry of books by economists, such as Williamson (1964), Marris (1964) and Baumol (1967), expanded on the Berle and Means thesis that incentive misalignment between managers and shareholders was inimical to economic performance. The concerns articulated relate neither to x-inefficiency nor to d-ineffectiveness.

In the finance literature, Jensen and Meckling (1976) offered an influential 'solution' based on the financial structure of the firm, i.e. the balance between the firm's use of equity (stock) and debt (bonds). They argued that misalignments in the objectives and information sets of the principal (owners) and the agent (managers) impose agency costs such as contracting and monitoring expenses. Their solution relied on a trade-off between the agency costs of equity financing (which weakens the incentives for managers by reducing their ownership) and the agency costs of debt (which strengthens incentives for managers but can lead them to pursue overly risky strategies). Total agency costs are minimized when the marginal agency cost of additional debt equals the marginal agency cost of additional equity. The logic behind all such agency models is that management discretion must be limited and shareholder value maximized.

In the dynamic capabilities approach, the risk of self-interested behaviour by managers is not ignored, but it is of secondary concern relative to poor management of the future prospects of the firm (d-ineffectiveness). Appropriate incentive systems and board oversight are recognized as desirable. However, the most important job of organizational design is to unleash the creative contributions of employees and managers and to empower and align 'expert talent' (Teece, 2011).[7] Long-term shareholder interests are served by strong dynamic capabilities. Principal-agent concerns are of lesser importance. The task of the board is to help managers keep dynamic considerations prioritized over technical efficiency, as the pursuit of the latter cannot lead to (and can undermine) long-run competitive advantage in tight selection environments. In this regard, the dynamic capabilities framework is consistent with recent efforts to promote 'commonsense corporate governance' (Bryan, 2016).

The dynamic capabilities approach also highlights the importance of strategy, which is often downplayed when it comes to populating boards. There are usually too few board members with any idea about strategy, despite the fact that the future of the company depends on it. The business judgment rule makes it difficult for the law to second-guess strategic management decisions, but boards of directors should be active in assessing performance in this regard. The reality, however, is that boards often give management a 'free pass' on strategy because its importance is underappreciated and the skill to assess is no longer resident in many public boards that see monitoring principal-agent and accounting issues as their primary responsibility. Nevertheless, agency and capability perspectives each have their role to play. Owners (i.e. shareholders and their representatives on the board) must find ways to prevent managerial excess and fraud while simultaneously harnessing the skill of managers to build capabilities and guide the firm in hypercompetitive global markets.

[7] Top management holds the key to unlocking the firm's innovation capabilities. Hitt *et al.* (1996) showed that companies in which managers are rewarded primarily on periodic financial measures rather than on an evaluation of their long-term strategic initiatives are less likely to invest in R&D (and more likely to acquire other firms) even after controlling for industry-specific R&D intensity.

4.3 Development policy

The dynamic capabilities framework can also be used to inform policy with respect to economic development. Consider, for example, the successes of the Asian 'tiger' economies and the lacklustre outcomes in many other countries. Whereas traditional economic development theorists stress resource accumulation (propelled by high rates of investment), the dynamic capabilities framework stresses the importance of enterprise-level entrepreneurship, innovation, learning and good strategy.

This resonates with emerging theories of development (Lall and Teubal, 1998). Nelson and Pack (1999) distinguish between accumulation and assimilation theories of development. The assimilation approach aligns with dynamic capabilities theories of the development and growth of the business enterprise. The accumulation approach is more akin to the resource-based view of the firm (Barney, 1991). When Nelson and Pack (1999, p. 434) noted that 'if … one marshals [inputs] but does not innovate and learn, development does not follow', they implicitly endorsed the importance of firm-level dynamic capabilities for national economic development.

Firms are the 'engines' of economic development. Policymakers must therefore not only get the legal system and institutions of government right; they must also understand learning and value capture processes inside firms. It is up to government to provide the fundamental economic, political and legal conditions favourable to enterprise and national growth, including a functional electrical and transportation infrastructure, macroeconomic stability, non-predatory taxation, incentives for saving, internal and external peace, relatively high levels of literacy and the rule of law. But this is not enough. An entrepreneurial-managerial class that can create and populate dynamically capable firms is also necessary.

A consensus, summarized in a World Bank (1993) study of the high-growth economies of East Asia, has emerged on the ideal institutional bases for economic growth: (1) a mechanism for broad distribution of the benefits of growth; (2) a powerful, meritocratic bureaucracy insulated from particularistic political and business influences; and (3) channels for sharing information between the bureaucracy and the private sector. Although subsequent events and later reassessments (summarized in Yusuf, 2001) have called into question several aspects of the 'East Asian Miracle' and underlying policies, it is clear that public policy can play a more positive or negative role in a country's economic development. Given how important firms are to industrial learning processes, an understanding of firm-level capabilities would seem to be essential to augment extant theories of economic development.

It is worth noting from the economic history of the USA that it was only with the emergence of the railroad, the telegraph and the professional managers required to run them that large, innovative, industry-dominating companies such as Standard Oil and General Motors emerged. Chandler (1977) labelled the dynamism he chronicled in his study of the long-run development of the industrial business enterprise as a period of 'managerial capitalism' (Mason, 1958). In the knowledge economy, the analogous process might be thought of as 'entrepreneurial-managerial capitalism'.

The entrepreneurial functions embedded in the dynamic capabilities framework are not confined to start-ups and to individual actors. They are associated with a new hybrid: entrepreneurial managerial capitalism. Public policy can help encourage the improvement of the local pool of entrepreneurial management talent. For example, programs that support entrepreneurial and management education in advanced countries (including running incubators and accelerators), periods of overseas employment

and eventual return to work at local firms can, over time, raise the quality level of the talent pool. In countries that already have a number of foreign subsidiaries, establishing programs with those who are willing to provide management training to local employees is another potential avenue to increase the stock of human capital.

Even with competent management, the positions of firms in industrializing economies may not initially be advantageous. Nevertheless, as discussed in the dynamic capabilities framework, these firms can catch up by being better at processes and by carefully choosing the markets in which to compete. Thus, many firms in Asia have had tremendous success by setting themselves on a promising path as complementors to firms in advanced countries. This could be a simple supply relationship, but multinational enterprises (MNEs) have an incentive to invest resources in spurring the improvement of capabilities at local suppliers in low-wage countries in order to reduce the MNE's own costs while maintaining quality. Most notably, local firms became strategic complementors to MNEs in manufacturing (East Asia) and in software and services (India). These relationships bring higher employment and export earnings to the developing country, but they may not involve much value added because of the limited power of the local firms in global supply chains, where the MNE, as owner of the valuable bottleneck assets, can sometimes extract the major share of value (Dedrick *et al.*, 2010), although this is by no means the case for all global production arrangements.

Many local firms in global value chains never develop the capabilities to compete on their own. In a few cases, however, local companies such as Acer in Taiwan and Samsung in Korea successfully graduated from supplier to competitor. This required establishing managerial processes to facilitate the absorption and integration of technical and industrial knowledge from partner firms and other sources while developing capabilities to acquire and apply market knowledge, to build distribution and service networks and to create a valuable brand image. Strong dynamic capabilities are required to compete in global industries.

In other cases, suppliers in global value chains can use their capabilities to expand horizontally to pursue local market opportunities (Humphrey and Schmitz, 2002). Developing countries have a relatively large share of inefficient, poorly managed firms (Bloom *et al.*, 2012). Once a particular firm develops excellence in manufacturing in one industry, it can often apply its operational know-how to other, import-substituting industries where global competition is less strong (Amsden and Hikino, 1994). For this reason, conglomerates remain much more common in developing than in advanced economies. Large business groups can be a source of national advantage, provided that local institutions are strong enough to prevent the corruption that often comes with concentrated wealth.

A capabilities perspective can also be helpful in developing regional clusters. A cluster is a geographic concentration of firms, suppliers and associated institutions in a particular industry (see Pitelis *et al.*, 2006, for an overview). Such groupings can realize agglomeration economies from phenomena such as specialization, labour pooling and shared services.

Policy interventions can assist the development of existing clusters or the emergence of new ones. A capability inventory, for example, can reveal gaps in local activities, such as legal services or IT management, that are raising costs or hampering development. Promoting ties with a local university or other educational and training institutions can improve learning and innovation or enhance the supply of skilled labour, including potential entrepreneurial managers. Reducing administrative burdens associated with starting new companies and investing in new facilities is also vital.

5. Conclusion

The capabilities approach is only starting to receive attention from scholars in the field of economics, despite roots in the work of Marshall, Knight, Keynes and Schumpeter and the availability of a growing theoretical and empirical literature in the field of strategic management. So far, the emphasis in economics has been on the ordinary capabilities relevant to maintaining and improving productivity. Despite the ubiquity of deep uncertainty in economic life, dynamic considerations are largely absent and complex interdependencies are ignored. Mainstream economics has yet to fully embrace the reality of heterogeneous, entrepreneurial firms creating and co-creating markets, developing unique and differentiated knowledge and transforming internal structure and business models to promote disruptive competition and earn supernormal profits.

Moreover, the dynamic capabilities approach gives new meaning and context to Keynesian 'animal spirits' that impact long-term investments. Managers and investors engage in a Keynesian leap of faith supported by sensing, seizing and transforming capabilities developed at the organizational level, along with mechanisms to make the business enterprise more resilient. Strong dynamic capabilities enable uncertainty to be managed and opportunities seized.

Without capabilities, there is no economic theory that supports a proactive entrepreneurial role for management in the economic system. In economic theory, managers have little to do. They get squeezed out of the economic theory of the firm, with homogeneous production functions/production sets being used to summarize the essence of firms. This has left policymakers with a poor grasp of the reasons for differential firm performance. One result is convoluted regulatory and governance frameworks for the oversight of business conduct.

Moreover, in the mainstream theory, the role of the manager in the economic system is underappreciated, and too much of the resource allocation function falls by default to the price system. If managers are absent from the theory, entrepreneurs rarely observed and institutions ignored, then the price system takes on an over-amplified role as a coordination mechanism. The policy implications are enormous, ranging from blind faith in the role of prices as resource allocation signals to an unbalanced view of the requirements for effective governance as well as a misunderstanding of how firms and their (entrepreneurial) management create value.

The absence of a capabilities perspective in the theory of the firm has led to policy myopia. Management's hand is forced by shareholder activists in a manner which discourages investment in longer-term value-enhancing projects. Likewise, if corporate boards are forced to worry excessively about audit trails and are distracted from strategizing, innovation will lag and performance will suffer. If developing countries focus on investment for technical efficiency without consideration of market needs and the building of (dynamic) managerial competences, the d-ineffectiveness of local firms will grow worse and national economic growth will be hamstrung.

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