

**“UNFINISHED DRAFT”**

**A REAL OPTIONS THEORY  
OF STRATEGIC HUMAN RESOURCE MANAGEMENT**

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# **A REAL OPTIONS THEORY OF STRATEGIC HUMAN RESOURCE MANAGEMENT**

Traditional HR architecture, which views different employee groups as a portfolio based on specificity and value, is static and insufficient under uncertainty. We develop an alternative real options portfolio framework based on human capital (HC) flexibility or adaptive capability to respond to a range of future contingent landscapes. Linkage between dynamic capabilities and HC options enables transforming HR (make, buy, lease, or ally) strategies into flexible ones. This dynamic portfolio framework guides allocating, valuing and inter-temporally managing HC in a contingent landscape. In dynamic environments there is strategic flexibility value in maintaining active presence in a variety of employment modes, both base and flexible ones. Both the initial allocation among the modes matters as well as their contingent reallocation and management across time. The flexible modes act as a buffer, contracting or expanding in response to external demand or unexpected environmental shocks with less cost and time delays. This explains the recent rise in flexible workforce and delays in permanent hiring following uncertain down markets. We develop testable propositions about HC portfolio management with implications for staged internal development, the timing and type of market hiring in up or down markets, subcontracting and outsourcing policy, HR alliances, and multinational operations. Firms should develop adaptive firm-specific skills and manage HC flexibility for base employees, leveraged by utilizing flexible strategies involving a changing mix of external workers across organizational boundaries.

*Keywords:* real options; strategic human resource management (SHRM); flexible human capital; human resource flexibility

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## 1. Introduction

In a recent section of the *Financial Times*, on October 4, 2010, while the biggest US auto manufacturer (GM) was announcing shutting down its Opel plant in Antwerp and laying off eight thousand employees in Europe as part of restructuring its European operations, KPMG was announcing big employee expansion plans in the UK and hiring eight thousand new staff across Europe. Other Big 4 accounting/service firms announced similar hiring plans. While not yet safely out of the fear of recession, with their permanent employee base barely held steady or still contracting in many traditional sectors, such as manufacturing, many firms providing contingent employment services such as independent contracting or consulting services lead in hiring. Extant human resource theories are unable to explain such puzzling employment phenomena.

Although more than six million jobs have been cut in the US since the recession hit hard two years earlier, the impact has been far less reaching and long lasting than expected. Despite a most severe economic crisis of global proportions, recovery today has been much speedier than in earlier recessions, despite the high degree of uncertainty still looming in the markets. In many ways, the economy's increasing temporal shift to a more flexible workforce (which has more than tripled in the last 25 years) under increasing uncertainty has enabled companies to more effectively scale back and recuperate during difficult times, while repositioning themselves more effectively for a rebound and flexible expansion as the economy comes out of the recession. The increasing reliance on a flexible workforce across a range of industries is not a fashion of the moment.<sup>1</sup> It is a necessary response to the increased uncertainty in the marketplace over the past quarter century and is likely here to stay. Companies increasingly realize that a flexible workforce helps mitigate downside risks and offers opportunities for sustained competitive advantage. At the same time, a new generation of workers is increasingly comprised of more educated and skilled individuals who value independence and a work/life balance and are hence more tolerant or even prefer a flexible, contingent employment arrangement.

An ongoing, classic debate within strategic human resource management (SHRM) has centered around whether firms should develop firm-specific human capital (HC) internally relying on full-time core employees (e.g., Becker, 1964; Reed and DeFilippi, 1990; Prahalad and Hamel, 1990; Atchison, 1991; Boxall, 1996; Barney and Wright, 1998), or whether firms should use more flexible

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<sup>1</sup> According to the US Bureau of Labor Statistics latest (February 2005) report, Tables 4 and 8, contingent workers and alternative employment were higher in education and health services (especially on-call or pool workers), professional and business services (especially temp help agency workers), construction (independent contractors and contract firm workers), and less so in manufacturing (temp help agency workers), leisure and hospitality (on-call workers), and retail trade.

external employment such as temporary, contract or contingent workers, outsourcing, or HR alliances (e.g., Leonard-Barton, 1995; Lenz, 1996; von Hippel et al., 1997). However, different combinations of internal (base) or external (flexible) employment modes may affect the firm's adaptive capability and dynamic competitive advantage differently in a changing environment. Recently, SHRM highlighted the role of the human resources (HR) architecture as the locus for creating and leveraging HC value (Becker and Gerhart, 1996; Becker and Huselid, 1998; Lepak and Snell, 1999; Wright, Dunford, and Snell, 2001). Lepak and Snell's (1999) HR architecture suggests firms should view their collection of employee groups as a portfolio (see also Wright and McMahan, 1992; Huselid et al., 1997) based on their different value and uniqueness or firm-specificity. Although this portfolio should presumably be adjusted as the situation demands, the traditional HR architecture model is rather silent as to how this can be achieved intertemporally. In this sense, it is rather static and insufficient in the presence of uncertainty. In their classic paper, Lepak and Snell (1999) recognize this important challenge: "to examine how firms integrate flexibility into an HR architecture to adapt to dynamic changes while maintaining congruence among the individual components." That is, how, in the face of uncertainty, should organizations make and manage portfolio investments in employees such that the value and uniqueness of human capital can be sustained dynamically and competitive advantage maintained intertemporally across a range of future contingent landscapes? ADD CONTEXTUAL LITERATURE

Lepak and Snell (1999) discuss which mechanisms should be activated in response to unanticipated environmental changes, such as resource imitability by competitors or technological obsolescence. They argue that skills customization, meaning... (DEFINE), may enhance the uniqueness or firm-specificity of human capital by increasing employee tacit knowledge, and that the value of current employees can be nurtured through developing new talent that can be used in different business contexts. However, the value of HR flexibility both inside and outside organizational boundaries is neither well understood nor adequately addressed (e.g., Lengnick-Hall and Lengnick-Hall, 1988; Milliman, Von Glinow and Nathan, 1991; Snow and Snell, 1993; Sanchez, 1995; MacDuffie, 1995; Teece, Pisano and Shuen, 1997; Wright and Snell, 1998). Skills customization, while it may currently be most efficient and perfectly fit the current (or even the expected) landscape, may not be the most suitable in different future contingent landscapes. For a long time IBM thrived on skills customization and firm-specificity to produce the best computer hardware in the world, but the landscape eventually changed as the hardware business became commoditized and IBM had to rely on its adaptive capability to transform its employees' knowledge expertise into producing tech services rather than hardware, selling the computer hardware business to Lenovo in 1999. In 2003 IBM once again ventured to reinvent itself by

shifting away from tech services into business consultancy services, revamping and even running other businesses' operations, including human resources, accounting, customer care and procurement. In January 2004, IBM took over part of Procter & Gamble's human resources management in a 10-year deal valued at \$400 million. These reinventions resulted in significant intertemporal adjustments in the make up of its own employee workforce. IBM also engaged in external alliances with companies like Boeing and Mayo Clinic. "This alliance with IBM is unique in the industry," says Roger F. Roberts of Boeing. "We share our strategies, we share our R&D, and we offer joint solutions for customers."<sup>2</sup> What enabled IBM to successfully adapt and transform itself in a changing competitive landscape was not some static notion of sustained skills customization, specificity or uniqueness (indeed no one else could have better produced an IBM-branded machine) but rather their human capital (HC) flexibility, knowledge and adaptive capability.

#### REWRITE BELOW TEXT SHORT & CLEAR

HC flexibility represents the set of HC options and associated HR practices that enable the firm's management and employee workforce to dynamically adapt its knowledge, skills, resources, capabilities and future operations to a changing business environment. In this sense, we build upon and extend the notion of HC flexibility envisioned by Sanchez (1995) and Wright and Snell (1998). They viewed HC flexibility as a set of strategic options arising from adaptive HR systems and from organizational flexibility (ADD REFERENCES ON ORG FLEX), providing a broad array of skills that can be applied to a range of alternative future uses or strategic outcomes. In our view, HC options collectively provide the adaptive capability to respond to a range of future contingencies and landscapes. They help better leverage upside opportunities when they arise, while managing uncertainties and mitigating downside risks by repositioning the organization if adversity hits. The traditional HR architecture is more suitable in a stable environment. In a more uncertain and dynamic environment, it does not explicitly address how the organization should initially allocate its HC portfolio resources and how to inter-temporally adjust those resources among different types of (base vs. flexible) employee groups depending on evolving future scenarios. We propose an alternative real options HC portfolio management framework with clear prescriptions and distinct implications concerning the initial HC allocation mix and its dynamic revision over time.

The topical phenomenon described in the opening paragraph involving massive firing in the auto manufacturing sector and simultaneous hiring in the independent contracting/consulting services sector across Europe illustrates the subtle but distinct difference concerning the initial allocation. The traditional HR architecture is silent with regard to such puzzling phenomena. At

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<sup>2</sup> Beyond Blue: Never mind computers and tech services. IBM's radical new focus is on revamping customers' operations -- and even running them. *BusinessWeek*, April 18, 2005.

times of high uncertainty such as these, the real options portfolio framework (seen as a switching options network) predicts that when switching (hiring or firing) costs are significant, the flexible part of the workforce should respond first, rising during the start of economic upturns out of a recession such as the one we experience recently while declining in an up-market. Survey data from the Bureau of Labor Statistics of the U.S. Department of Labor seem to support this prediction. Figure 1 confirms that during the four recent periods the Bureau of Labor Statistics conducted population surveys (in February 1997, 1999, 2001, and 2005), the proportion of the U.S. labor force attributed to contingent workers, independent contractors and alternative flexible employment arrangements (the % of total flexible work) has declined in the up-market of 1999 and has risen during the subsequent down markets (2001 and 2005).

Our proposed portfolio framework suggests that the allocation of human capital should be made and managed flexibly in light of evolving future contingencies and that the firm's overall market value reflects the broader strategic value of HC flexibility (besides the immediate HR commitment value represented by NPV). In this way, the mechanism through which the HR architecture impacts on corporate financial performance (Huselid, 1995; Becker and Gerhart, 1996; Becker and Huselid, 1998; Gerhart, 2005; Huselid, Becker, and Beatty, 2005; Wright et al., 2005; Colakoglu, Lepak and Hong, 2006) can be better understood in a dynamic context. Becker and Huselid (2006) argue that a firm's HR contribute to firm performance if the strategic capabilities fit with the human resources management (HRM) system. We argue that HR adaptability is a key strategic capability in a dynamic competitive landscape that should be reflected both in more effective HRM and in better risk management and financial performance.

Human resource accounting (HRA) (Lev and Schwartz, 1971; Flamholtz, 1971, 1972, 2003; Morse, 1973) also views measurement and valuation of human capital as being instrumental in improving HRM. It argues that better processing of information about the value of human resources via appropriate appraisal techniques would lead to better decision-making and value creation.<sup>3</sup> The need to enrich SHRM with proper theoretical frameworks dates back to Wright and McMahan (1992) and Ulrich (1997). Nordhaug (2004) highlights the need for an economic theory of HRM. Colbert (2004) argues that a stronger theoretical framework will improve the effectiveness of HRM research and practice. In this article, we propose such a framework for human capital portfolio appraisal and management based on real options theory.

Our main contributions are the following. We develop a theoretical real options portfolio framework that enables the strategic growth option value potential of human capital to be properly assessed and managed. Rather than the specificity metric of the traditional HR architecture, we

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<sup>3</sup> Financial accounting, driven by the need for objectivity, conservatism and comparability, treats human resource investments as expenses rather than capital assets.

propose a more dynamic metric of HC flexibility. We then derive testable propositions for human capital allocation and management derived from real options theory. These differ from the prescriptions of the traditional HR architecture in a number of respects. Under uncertainty, there is strategic flexibility value in maintaining an active presence in all four employment modes or quadrants, not merely in migrating superior employees to the base quadrant of core employees. This is analogous to a multinational deriving network flexibility value by maintaining presence in several different countries rather than bringing home all superior employees from its global network. The more flexible external employment modes (contract/outsourcing and HR alliance) act as a buffer or cushion, contracting or expanding in response to external demand fluctuations or environmental shocks with less cost and time delays than would be involved with permanent base employees. The intertemporal, dynamic aspects of the real options portfolio allocation of human capital (viewed as a switching options network involving asymmetric switching costs) cause decision implementation delays or hysteresis effects in permanent employment (e.g., Dixit year, Kulatilaka and Trigeorgis year), thus allowing the flexible parts (such as independent contractors or consultants) to adjust first to demand shocks. This causes the initial allocation mix among the various employment modes under uncertainty (high  $\sigma$ ) to be different than under the traditional HR architecture. The temporal evolution of the portfolio mix among the diverse employment modes also varies as it depends on the initial allocation (endowment) and dynamic adjustments that are path dependent partly due to asymmetric switching costs. The allocation mix among the various employment modes thus depends on firm- or industry-specific switching costs as well as on industry dynamism and varies over time (with varying volatility and correlations). Firms in more dynamic industries give more weight to expanded flexible employment modes as do firms or industries facing increased uncertainty over time. A firm facing mixed environments (Eisenhardt, Furr, and Bingham, 2010), such as an established firm entering an emerging market, may prefer more base employment in the stable part of their business and alternative flexible employment modes in the more dynamically evolving segments. Multinationals aware of their options operate in all quadrants and adjust the mix as circumstances vary. The real options portfolio framework would reduce to the traditional HR architecture prescription for a single firm only when facing a stable environment ( $\sigma = 0$ ). It is questionable, however, if the (static) notions of specificity and environmental stability are as useful constructs today as they were a decade or two ago.

The paper is organized as follows. Section 2 reviews the relevant literatures. Section 3 develops a dynamic HR portfolio architecture from the perspective of real options theory. It proposes a HC Growth Options Matrix using the HC flexibility metric and develops testable propositions. Section

4 discusses HC strategies and leveraging options with additional propositions. The last section offers a discussion and implications.

## **2. Literature Review: Resource-Based View, HR Architecture and Real Options**

Referee 2, 2(d): give analytical review of static literature; more detailed reference to RBV; explain Real options theory; shorten standard stuff

A firm's human capital (HC) consists of the knowledge, skills and organizational conditions that enable its management and employees to contribute to corporate value creation. Human assets can be managed or motivated (but not owned) by the organization (Coff, 1997; Flamholtz et al., 2003). Human capital has certain distinct characteristics. ADD Characteristics of human capital

The resource-based view (RBV) of the firm recognizes the strategically important role of HC in attaining sustainable competitive advantage (Wernerfelt, 1984; Prahalad and Hamel, 1990; Barney, 1991; Atchison, 1991; Wright and McMahan, 1992; Peteraf, 1993; Stewart, 1997). FRANCESCO: EXPAND DISCUSSION ON RBV A LITTLE. As a strategic intangible asset, HC and related knowledge needs to be properly developed, managed and leveraged (Nordhaug, 2004). Recently, SHRM has followed an architectural or portfolio-type approach to managing different employee groups, as proposed by Becker and Gerhart (1996) and Lepak and Snell (1999).

Becker and Gerhart (1996) classify human assets as “core” vs. non-core. Base or core employees are those whose knowledge and skills are valuable and unique to the firm, while non-core employees have limited value and firm-specificity (as they are easily replaceable). The skills of core employees cannot be easily replicated or acquired readily in the external labor market. Non-core employees possess portable skills that are accruable to the firm via external hiring. The cost of acquiring widely available skills from the strategic factor markets should reflect their expected contribution, so they generally have low net value (Barney, 1986, 1991). EXPAND The acquisition vs. internal development/ accumulation or buy-or-make tradeoff used in RBV vs. transaction cost economics (Teece, 1984; Barney, 1986, 1991; Dierickx and Cool, 1989; Maritan and Peteraf, 2010) also applies to human capital (Miles and Snow, 1984). Firms may develop core human assets via a firm-specific internalization process (“make”) or acquire needed knowledge, portable skills and abilities from the external market (“buy”) (Snell and Dean, 1992; Koch and McGrath, 1996).<sup>4</sup>

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<sup>4</sup> A firm can “build” firm-specific human assets internally via long-term involvement activities, such as training, development and participation programs, that enhance the idiosyncratic knowledge and capabilities of core employees (Snow and Snell, 1993; Stewart, 1997). Developing unique or customized skills internally makes sense within a specific mode of operation or a given (existing or expected) landscape. Related HR practices provide mutual involvement for management and employees, supporting the “individual human capital development cycle” (Boxall and Purcell, 2003). A firm can “buy” generic or portable skills by hiring these resources in the external market. Occasionally, when external hires with general portable skills go through an appropriate internalization process they can be transformed into valuable core employees or managers.



Internalization or externalization thus represent alternative employment modes of acquiring specifically-skilled or portable human capital.

#### DEVELOP STEP BY STEP; AVOID MASS REFERENCING

Lepak and Snell's (1999) HR architecture goes beyond the traditional "make" or "buy" employment modes to include "lease" and "ally" employment modes, all assessed based on the two metrics of value and firm-specificity or uniqueness.<sup>5</sup> Alternative, flexible employment in non-permanent employees includes contract work or outsourcing ("lease") and HR alliances ("ally or cooperate"). Contingent work and outsourcing have been studied extensively (e.g., Pfeffer and Baron, 1988; Bettis et al., 1992; Davis-Blake and Uzzi, 1993; Abraham and Taylor, 1996; Matusik and Hill, 1998; Belcourt, 2006). Alliances were studied by Brush and Chagani (1997), Gardner (2005) and others. While external market hire ("buy") involves select human resources acquired from the labor market, subcontracting/outsourcing and alliances enable the firm to "externalize" HC in more flexible ways. These externally acquired or leveraged non-core human assets may flexibly contribute to the firm's strategy or operations. They can later be internalized via appropriate specific training and apprenticeship after market hiring or may be employed temporarily via subcontracting, outsourcing or collaborative relationships (HR alliances). Such market hiring of portable human resources supplemented with proper training and apprenticeship may help the firm implement its growth or expansion plans.

According to the HR architecture, subcontracting or outsourcing addresses the need for the use of contingent workers (or highly skilled consultants) to fulfil non-core organizational or production/service roles. This enables flexibly managing the workforce scale and the hiring timing for part of business operations (Foote and Folta, 2002; Mangum et al, 1985). HR alliances (Gardner, 2005) represent cooperative relationships among collaborating firms aiming at joining, sharing or exchanging knowledge or employees with specialized skills. Forming an alliance is a hybrid strategy for managing human assets. Joint development of employees via alliances enables reallocating employees and exploiting synergies via matching similar needs or complementary skills of partnering firms. Core employees focus on appropriating those specific skills to which the

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<sup>5</sup> According to Lepak and Snell (1999), when managing their human assets, firms take into account their immediate-value impact as well as their future strategic importance in sustaining competitive advantage. Only firm-specific HR which contribute to unique and inimitable strategic capabilities presumably generate sustainable competitive advantage. Based on the two HC characteristics of value and firm-specificity, four alternative employment modes (quadrants) are identified: (i) internal development of core employees, (ii) market acquisition (buy), (iii) subcontracting or outsourcing (lease), and (iv) HR alliances (ally). Once the various types of human assets are identified, management allocates work in a portfolio context via the most appropriate employment modes. We argue that specificity of human capital proxies for a strategic factor that, under uncertainty, must be viewed in a dynamic context, namely HC flexibility.

firm has devoted its development efforts, while other employees can share their abilities and knowledge acquired in the external market or through outsourcing or alliances.

According to Lepak and Snell (1999), no single optimal HR system exists for managing all employees. EXPAND CONTEXTUAL from their article They suggest that HC differs across various employee groups within a firm and from one firm to another as each employee group has different characteristics, embodying a different type of HC. In response to the key insight by Lepak and Snell (1999) that not all employees are inherently strategic and therefore employees should be managed differently depending on the mix of value and uniqueness they provide, Becker and Huselid (2006) assert that HC has strategic value only if it helps the firm implement its strategy by focusing on those tasks (rather than employees) that are most value-additive. The HR architecture has strategic value if its elements are structured to match uniquely a specific set of business conditions.

According to RBV, the knowledge embedded in HC is the foundation of a firm's core capabilities and drives value creation (Argote and Ingram, 2000). Knowledge can be viewed both as accumulated stock (Dierickx and Cool, 1989; Grant, 1996) and as flow (Leonard-Barton, 1995; Teece, Pisano and Shuen, 1997). Traditional RBV mostly concentrated on accumulated knowledge stock as a source of corporate value creation (Dierickx and Cool, 1989). In Lepak and Snell's (1999, 2002) HR architecture, it is the management of the stock of knowledge found in various employee groups that drives the value creation and strategic positioning of the firm. However, knowledge *flow*, acquired and transferred within or across organizational boundaries, can dynamically modify a firm's accumulated stock of skills, abilities and expertise to be more suitable in future contingent landscapes.

HC flexibility represents an organizational capability to dynamically adapt knowledge and operations to a changing business environment; it involves the continuous renewal of the firm's knowledge stock and skills via *new* knowledge flow within and across firm boundaries (Milliman et al., 1991; Snow & Snell, 1993; MacDuffie, 1995; Snell et al., 1996; Wright and Snell, 1998). Dynamic capabilities represent the next generation of RBV more suitable to a dynamic environment (Teece, Pisano & Shuen, 1997; Snell et al., 1996; Eisenhardt and Martin, 2000). Managing both knowledge flow as well as accumulated stock is therefore of strategic import (Kang, Morris and Snell, 2007). From a dynamic perspective of core capabilities in a changing environment, it is necessary to also focus on the flow or adaptation of knowledge rather than a static picture of the current stock of knowledge (Teece, Pisano & Shuen, 1997; Argote and Ingram, 2000). It is similarly necessary to replace a static notion of HC uniqueness or firm-specificity by a more general,

dynamic notion of HC flexibility representing the firm's adaptive capability to respond to a range of future contingent landscapes.

Becker and Huselid's (2006) observation above exemplifies the notion of knowledge flow and dynamic capability to adapt the firm's strategy and allocate HC resources to maintain a (changing) specificity match under different future contingent landscapes. Thus, the traditional HR architecture needs to be reinterpreted under uncertainty to better reflect the HC flexibility embedded in certain customized and in most generic HC through a set of embedded HC options and associated HR practices. Investing in a firm's HC often involves a trade-off between specificity, customized skills or efficiency and the strategic capability to adapt flexibly under different future contingent landscapes (see also Eisenhardt, Furr, and Bigham, 2010).<sup>6</sup> The traditional HR architecture must be replaced with a more dynamic portfolio allocation framework whereby HC is strategically allocated and periodically revised to enhance the firm's capability to dynamically adapt to changes in the business environment. We subsequently propose such a model, based on real options theory.

Real options theory has been used to extend options thinking from financial markets to real and intangible assets addressing various aspects of corporate decision making (e.g., Trigeorgis and Mason, 1987; Bowman and Hurry, 1993; Dixit and Pindyck, 1994; Kogut and Kulatilaka, 1994; Trigeorgis, 1996; Luehrman, 1998; Adner and Levinthal, 2004; McGrath et al, 2004). Real options may involve options on tangible assets (e.g., real estate, natural resources, R&D and patents, plants, strategic acquisitions) or intangible assets (brand name, loyal customer base, flexible human capital, adaptive organizational capabilities, joint venture agreements). Real options theory (Dixit and Pindyck, 1994; Trigeorgis, 1996) suggests that options on such tangible or intangible assets help better exploit future opportunities for expanded returns while reducing downside risk. Through embedded real options capabilities the firm may defer, stage, adjust, expand, contract, reposition, switch or abandon investment depending on contingent future developments. Real options collectively provide a strategic organizational capability to adapt to a future contingent landscape and flexibly manage relevant uncertainties (Trigeorgis, 1996; Kogut and Kulatilaka, 2001). Uncertainties may arise from fluctuations in the value of the underlying asset (e.g., human assets), investment costs, the scale of operations or the combination, coordination and management of resources (Dixit and Pindyck, 1994; Trigeorgis, 1996; Bhattacharya and Wright, 2005). Real options thinking has consequently been applied in various contexts in strategic management, such as market entry (Folta and O'Brien, 2004; Chi and Seth, 2009), R&D, technological or

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<sup>6</sup> Pursuing firm specificity, fit or skills customization does not preclude flexibility. The two notions can coexist in a dynamic environment, as the experience of Benetton suggests. We agree with Milliman et. al. (1991) and Wright and Snell (1998) that these notions are "complementary" rather than "orthogonal."

entrepreneurial investment (Hurry et al., 1992; McGrath 1997; McGrath and Nerkar, 2004), joint ventures/alliances (Kogut, 1991; Chi, 2000; Kumar, 2005; Tong et al., 2008).

The HR literature, to date, has not adequately addressed the applicability of real options theory to investments in human capital. Among the few exceptions, Malos and Campion (1995) and Foote and Folta (2002) use options thinking to address partner promotion in professional service organizations and the choice between permanent and temporary employees in workforce expansion decisions, respectively. Mangum, Mayall and Nelson (1985) view temporary help as providing flexibility to switch within the dual internal labor market. CHECK ABSTRACT FOR ACCURACY Bhattacharya and Wright (2005) highlight the various uncertainties associated with human assets and how they are managed with HR options and practices. EXPAND Wang and Lim (2008) examine the impact of employee incentives to invest in specific HC. Berk and Kase (2009) view training as a driver of organizational learning and absorptive capacity derived from improved employee capabilities to develop future skills in response to unforeseen circumstances. They suggest the use of real options to indirectly measure the value of organizational flexibility and associated HR options embedded in training as the difference between the value of the firm with vs. without such flexibility.

We discuss below how real options theory can help disentangle the option-like nature of HC investment decisions under uncertainty, address HC allocation and management decisions in a dynamic portfolio context and reframe SHRM through a strategic options lens viewing the HR architecture as a dynamic adaptive capability in a contingent competitive landscape. By way of a roadmap and overview, a description of common real options (adapted from Trigeorgis, 1996) applied in the context of HC, key references, and propositions deriving from real options theory (discussed below) are summarized in Table 1.

[INSERT TABLE 1 ABOUT HERE]

### **3. A HC Portfolio Framework, HC Growth Options and Testable Propositions**

REWRITE TO REDUCE REPETITION & IMPRECISION

The traditional HR architecture is rather static in that the (initial) employment mode allocations may fit well the current (or expected) landscape but not a future contingent one. It may provide a good picture (snapshot) of the moment, but not a clear movie of the path-dependent evolution of competitive advantage across time (Chadwick and Dabu, 2009). Although it recognizes the multiplicity of employee modes according to firm-specificity (or uniqueness) and their fit with the current competitive environment, HR flexibility to adapt to unforeseen future contingent

scenarios and the time-evolution of dynamic competitive advantage are not adequately addressed. “Flexibility” is merely seen as the choice of an employment mode differentiating between core and non-core employees based on current firm specificity and value attributes according to the foreseeable environment (Reference). This does not adequately reflect the adaptive capability of HC under changing conditions over time (Snell, Youndt, and Wright, 1996). In a rather stable or predictable environment firm specificity and skills customization might indeed be more efficient; but in a dynamic, changing environment, flexible HC may add more to long-term value creation (Osterman, 1987). From a real options perspective, a more general HC flexibility value driver is more suitable in the contingent, dynamic environment most firms face today than the static firm-specificity metric found relevant in the more stable or predictable environments prevailing two decades ago.

HC flexibility extends the notion of specificity in multiple contingent landscapes in an adaptive, dynamic way over time. Eisehardt, Furr and Bingham (2010) discuss cognitive variety, the diversity of mental templates for problem solving that exist in an organization that are individually efficient but collectively flexible. Cognitive variety is used by many CEOs to enable flexible recombination of individually efficient mental templates in balancing flexibility and efficiency in dynamic environments. To counterbalance the natural tendency of organizations toward efficiency and structure as they grow and age, many leaders find it necessary to shift toward more flexibility as environments become more dynamic (Eisehardt, Furr and Bingham, 2010). Accordingly, dynamic human resource management should involve temporal managerial adaptation among a multiplicity of strategic employment modes and associated HC options that are individually specific or efficient at a point in time but collectively and temporally flexible. HC flexibility enables the firm to adapt to market evolution and absorb environmental shocks by expanding or contracting the alternative, flexible employment modes first as contingent events unfold, until more permanent changes in the firm’s employment base can be justified by sustained trends.

The notion of specificity, though possibly related to skills customization and efficiency in a stable or predictable environment, must be broadened up in a dynamic context to accommodate adaptive capability through multiple contingent landscapes in terms of employment modes that are individually efficient or specific but collectively flexible as a portfolio at a point in time as well as temporally. Consider the staffing of a space shuttle mission. Each individual staff is highly specialized and specific, but is also trained to handle multiple tasks and adapt to multiple future contingencies, as well as substitute for one another if need arises. Collectively as a HC portfolio there is workforce heterogeneity, coverage of a diverse set of tasks and the capability to respond

flexibly to multiple future contingencies. There is adaptive specificity and expertise at the individual level as well as adaptive flexibility collectively. Similarly, in a dynamic environment, the notion of “core” employees should not be merely interpreted as those with specific or customized skills that fit the firm’s needs at present, but those with unique but expandable knowledge that can be periodically updated (knowledge *flow*) through learning and cross training and adapted to multiple future contingent landscapes over time. Sanchez (1995) and Wright and Snell (1998) refer to coordination and resource flexibilities in the types of skills viewed as “core.”

Benetton is an example of a company that has been able to balance specificity (efficiency) with flexibility in its design, production and supply chain processes. REFERENCE BENETTON Back in the late 1960s the company pioneered outsourcing much of its production to women in villages in northern Italy who weaved and delivered garments in neutral colour. It also pioneered a new dyeing technique that allowed adding colour to the finished garments at the end of the production process, shortening lead times to better match changing fashion needs and trends. Today, Benetton’s production operations are based on a dual supply chain that balances specificity, efficiency and speed with process flexibility. The company’s flexible sequential supply system is designed to incorporate two production modes working in parallel around the globe, responding to different operational needs. Standardized or labor-intensive operations with longer lead time are outsourced to low-labour cost countries in the supply network, while design, R&D and production planning related to fashion-sensitive activities requiring shorter lead time are strategically maintained close to home. The latter fosters specialized expertise with adaptability, integration and speed. In 2007 Benetton redesigned its United Colors of Benetton collections to be more staged and modular, featuring strong seasonal segmentation with two principal collections: an initial in-store collection at the start of the season (reflecting the expected trend predicted for the season that can be outsourced overseas under a longer lead time), followed by a more flexible stage II collection giving stores the flexibility to add new contents and styles customized to the latest customer tastes and needs (produced in-house under shorter lead times). The added flexibility in its systems and supply chain did not sacrifice any of Benetton’s legendary specialized fashion expertise, efficiency and specificity. Hewlett Packard has followed the example of Benetton on the technology side, specifically using real options thinking in parallel situations. injets and flexible employment example

As seen from these examples, HC flexibility refers to a generalized notion of adaptive specificity better suited to dynamically match multiple templates and future contingent landscapes over time. “If we assume that competitive situations change, we must also assume that value and uniqueness of human capital change and evolve” (Lepak & Snell, 1999, p. 43); “[in a dynamic and

competitive environment] sustainable fit can be achieved only by developing a flexible organization. Strategic HRM must increasingly promote organizational flexibility in order for the firm to achieve a dynamic fit” (Wright & Snell, 1998).

This dynamic contingent notion of HR management is in sharp contrast to the universalist, “one-size-fits-all” best practices approach that dominated the SHRM literature (Becker & Gerhart, 1996; Delery & Doty, 1996), advocating the use of a set of best HR practices across all employees of a firm, within a firm intertemporally or across firms. We depart from this view and extend the contingent, contextual argument of Lepak and Snell to highlight the dimension of environmental uncertainty and dynamism and the firm’s ability to adapt.

*Proposition 1: HR systems do not apply universally across all employee groups within a firm, intertemporally or across firms, but rather depend on the degree of uncertainty and dynamism in the firm’s environment (besides the value and uniqueness of human capital). Traditional internal employment (of permanent core employees) or immediate external market hiring (or firing) and related HR practices may be more suitable in stable environments. Contingent or alternative employment modes (e.g., subcontract and outsourcing relationships, HR alliances) and flexible HR practices may be more appropriate in dynamic environments. If a firm’s environment becomes more dynamic over time or if a firm faces multiple environments (e.g., stable in its established business and dynamic in a new market venture) then different or mixed employment modes and related HR practices may be warranted.*

Given the critical role of environmental uncertainty and dynamism, it is of strategic import to assess the value of HC flexibility. Multiple templates and employment modes (make, buy, lease, or ally) and adaptive mixed HR strategies involving collections of associated HC options and adaptive HR practices allow for varying degrees of flexibility in managing the firm’s dynamic human assets portfolio.

*Proposition 2: In dynamic environments, there is strategic HC flexibility value in maintaining an active presence in a variety of employment modes, both base and flexible ones. Firms facing higher complexity and uncertainty regarding market demand and future HR skills benefit more from managing a portfolio or network of multiple employment modes. Use of flexible external employment modes allows taking advantage of upside HR opportunities (e.g., utilizing highly trained personnel via outsourcing or HR alliances in low-cost countries like India). The flexible employment modes also provide more effective downside risk management. If trends move adversely in a part of the network, the firm (e.g., an MNC) can shift or relocate employees utilizing its flexible employment modes elsewhere in the network. More flexible external employment (independent contractors, outsourcing and HR alliances) acts as an insurance buffer adjusting first,*

*allowing the firm to more readily contract or expand its workforce in response to external demand fluctuations or unanticipated environmental shocks, with less cost and time delays.*

Real options theory (Trigeorgis, 1996, Engin Economist; Dixit, YYY) suggests that decision delays or hesitation are higher when the decision is irreversible (inflexible or involving high costs of switching back), and less so when the situation can readily readjust. This leads to:

*Proposition 3: In dynamic environments, firms will be reluctant to hire permanent skilled employees until they are more confident current market trends are sustainable. When switching costs and associated risks involved with permanent employment are high, there will be longer decision implementation delays or hysteresis effects in permanent employment. Thus, domestic firms not employing flexible external modes (e.g., relying only on base employees and external market hires) will be more reluctant to hire/fire as they have no insurance buffer and face higher costs and risks, hence will experience longer adjustment delays. By contrast, MNCs and other firms utilizing a multiplicity of employment modes with limited switching costs will make faster employment adjustments since the flexible modes provide effective downside risk containment in adverse scenarios.*

Real options theory (Trigeorgis, 1996, Engin Econ) also has specific implications concerning the drivers of flexibility value, performance and risk management, such as variability and correlations, with profound implications for strategic prioritizing among alternative employee modes:

*Proposition 4: The value of strategic HC flexibility and the effectiveness of downside risk management from employing a variety (portfolio) of employment modes is higher the greater the variability of alternative outcomes or employment choices and the lower their correlation. A firm (currently using only traditional base employment modes) should prefer to add the subcontracting/outsourcing mode if less correlated than the HR alliance mode. Among alternative choices of implementing a given flexible employment mode strategy (e.g., alliance), it should prefer one with high variability and low correlation with its current operations.*

Firms with more flexible employment modes (e.g., outsourcing and HR alliances) should also have higher performance and lower downside risk than firms relying on fewer employment modes (e.g., only traditional base modes). Among firms utilizing all four employment modes, those (e.g., MNCs) with greater implementation choices (e.g., with subcontracting, outsourcing or HR alliance partners in more countries) should have higher HC flexibility and performance and lower downside risk than those with less choices. However, as the number of countries with subcontracting, outsourcing or HR alliance partners rises, the correlation structure will tend to rise and the flexibility and risk management benefits will slow down. Further, among firms using the



same variety of employment modes (e.g., all four) and having the same number of implementation choices (e.g., same MNC countries with subsidiaries), those whose alternative employment choices are less correlated (e.g., located in Germany, India and Brazil, rather than Germany, Austria and France) should have higher HC flexibility and performance and lower downside risk. At the strategic level, if a firm currently employing only traditional base modes will consider adding an alternative external flexible employment mode, it should have preference for one (e.g., subcontracting/outsourcing with a foreign partner) with lower correlation with the existing base modes (than, say, an alliance with a domestic partner in the same business). Similarly, among alternative choices of implementing a given flexible employment mode strategy (e.g., alliance), it should prefer one with high variability and low correlation with current operations (e.g., an alliance in a different line of business or with a foreign partner involving future potential to co-develop new innovative products or co-enter new markets with higher spread of outcomes). EXAMPLE IBM alliance with Mayo clinic or Boeing.

Besides the above employment network or switching (portfolio-level) flexibility, real options theory (Trigeorgis, 1996) suggests that staging the various employment modes within the HR portfolio provides additional flexibility.

*Proposition 5a: Under high market or internal (organizational or employee) uncertainty, staging the HC portfolio allocation process provides valuable flexibility to continue, alter or discontinue current operations within specific employment modes as developments warrant. Staging internal or external workforce flexibility and more flexible work arrangements and related HR practices should enhance firm performance in more dynamic environments.*

In conjunction with portfolio switching (among employee modes) or staging flexibility (within a mode), the firm has valuable HC options to hire or fire, internally develop in a staged fashion, deploy, maintain, reallocate/switch or discontinue employees in different circumstances at multiple stages over time. Adaptive HC strategies embed real options that, when accounted for and properly valued and managed, may enable the firm to realize the full value of its human capital portfolio. This, however, necessitates the use of a real options perspective for valuing and managing human resources in a dynamic environment.

A starting point for visualizing or implementing an options portfolio approach to human capital allocation is proper classification of human capital investments in option-value space (Trigeorgis, 1996; Luehrman, 1998; Smit & Trigeorgis, 2004). Management must recognize the option value characteristics of each employee group, addressing questions like: “to what extent does the related human capital add strategic value through firm-specificity (e.g., focused skills customization) and to what extent does it enhance the firm’s core adaptive capability that allows

realigning specificity under different future contingent landscapes over time?” HC flexibility or Growth Option Value (GOV) partly depends on environmental uncertainty ( $\sigma$ ) and industry dynamism. GOV is higher in dynamic (high  $\sigma$ ) environments and low in stable (low  $\sigma$ ) ones.

We developed the Human Capital Growth Options (HCGO) matrix shown in Figure 2 to incorporate the broader value of adaptive capability embedded in human capital investment decisions as more encompassing and better suited to a dynamic, contingent environment than the traditional HR architecture. The HCGO matrix uses two metrics for allocating employees along two dimensions of value. Along the vertical axis is the immediate net value (NPV) component of human capital, capturing current value based on exploiting specific skills given the current or expected landscape. Along the horizontal axis is the human capital (HC) flexibility or Growth Option Value (GOV) that incorporates the combined effects of market, firm or individual uncertainty with the firm’s adaptive capability. HC flexibility captures the firm’s ability to adapt to multiple future contingent landscapes by altering planned or staged HR investment decisions as the external environment changes. This new dynamic proxy of strategic value is more general than the static firm-specificity or uniqueness dimension in the traditional HR architecture. The extra value of treating HC allocation decisions as real options (i.e., the value of optionality in SHRM) comes from two main sources: (a) the staged management of the portfolio of alternative employment modes (internal, market, contingent, alliances) allowing for flexible strategic portfolio reallocations in response to environmental shocks; (b) individual HC options and related flexible HR practices embedded within each employment mode, with occasional flexibility to convert external employees into permanent core employees.<sup>7</sup> HC flexibility (both at the portfolio and individual level) to adapt planned HR actions in response to unexpected market or technological conditions expands HC value by benefiting from the upside potential while limiting downside risk through managing associated uncertainties with HC options and related HR practices during the staging and portfolio reallocation process, e.g., by switching to an alternative employment mode if adversity hits the currently dominant mode (e.g., outsourcing).

[INSERT FIGURE 2 ABOUT HERE]

ADD REFERENCING IN FOLLOWING 8 PAGES; RETHINK HOW TO MAKE THIS PART MORE DYNAMIC (TEMPORAL DIMENSION)

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<sup>7</sup> The latter reduces to the focus of traditional HR architecture more suitable in a stable (low  $\sigma$ ) environment. Its flexibility aspects in uncertain (high  $\sigma$ ) environments have been recognized in prior literature (discussed earlier), but the strategic flexibility implications of the former are new.

In the HCGO matrix of Figure 2, HC allocation decisions concerning different employee groups may fall in different regions in option-value space based on their immediate net value (NPV) versus HC flexibility or GOV potential, the latter depending on the degree of environmental uncertainty ( $\sigma$ ). Depending on the HR strategies followed to accommodate people across the organization (inside or outside the firm) and the degree of HC flexibility, the firm may involve a mix of internal or more flexible external employment modes. Each employment mode embeds different HC options.

The top-left (*quadrant I*) in the HCGO matrix represents internal development of core employees. In a stable environment, firm-specificity of core employees can bring organizational efficiency and enhance non-imitable tacit knowledge. Reference However, when the environment is dynamic more flexible specific HC enables creating or leveraging more future growth opportunities, allowing the firm to adapt its core employee base according to the evolving market conditions and better respond to market uncertainties. Skilled professionals with adaptive skills are better able to cope with multiple future landscapes. In this quadrant, HC options aim to internally develop human capital with flexible, multi-use or adaptive firm-specific competences, i.e., adaptable core employees. Core knowledge-based employees require continuous development --typically achieved internally (or sometimes cooperatively via HR alliances). The internal development of core-employees can be viewed as a multi-stage process embedding a sequence of options whose exercise allows employees to progress via training and successive promotions to higher organizational roles (Malos and Champion, 1995). By maintaining alternative employment modes, the organization can pace this progression contingent both on employee performance and external market developments.

*Proposition 5b: Firms facing higher uncertainties regarding demand for future skills benefit more from HC flexibility in their staged internal development process (e.g., in the form of learning options in future skills capabilities) supported by appropriate HR practices, such as training. KEEP OR SKIP?*

Generic or portable skills not specific to a particular firm can be acquired in the strategic factor market (Barney, 1986, 1991 etc). This hire or acquisition decision in the external market is represented at the bottom-left (*quadrant II*) in the HCGO matrix of Figure 2.. Hiring expensive talent from the market typically has low net value (NPV) and low flexibility value. Highly skilled human assets have relatively low net value as typically a high or nearly full price must be paid to attract them away from alternative opportunities. Reference In a relatively stable environment, hiring such skilled employees and developing them internally may help the firm implement its growth plans. Such external hiring can be framed as an incremental acquisition or expansion option, whose exercise allows enlarging the permanent or core employee base. The cost or exercise price of

this HC expansion option is the salary, benefits and development costs paid for the acquisition and internalization of the additional skilled human assets from the market.

*Proposition 6: Firms that need to grow their permanent employee base in an uncertain environment, value (and pay) more flexibly or generically skilled professionals when their total value added (including HC Growth Option Value) – not just the immediate value – exceeds the costs of employing and internalizing them. The value of such flexibly or generically-skilled employees or managers is higher (and hence employment is more justified, even at higher cost) in more dynamic industries. Such flexibility is more valuable at higher levels in the organization. This is more pronounced for top management (e.g., CEO) hires from outside the firm as they need to anticipate broader or future trends within or across industries.*

However, if growth expectations are not fully realized or growth is not sustainable, it may prove very costly to maintain or fire such highly-paid skilled employees (Foote and Folta, 2002). In more dynamic industries or at uncertain times this may lead to a reluctance or delay in hiring such permanent employees, in preference for temporary or alternative contingent work arrangements. When specific or replicable human skills are needed on a temporary or contingent basis, they may be subcontracted or outsourced to an external entity. This employment mode is represented in the top-right (*quadrant III*) of the HCGO matrix. This may provide an option to occasionally acquire select contingent employees and develop them internally at a future time under the right circumstances.<sup>8</sup> One motive for the use of such contingent workers is to provide more flexibility in terms of skill and workforce distribution and the desire to contain real and social costs associated with permanent employee layoffs. Foote and Folta (2002) analyze a firm's decision to replace permanent employees with temporary workers as a real option.<sup>9</sup> Employing temporary or contingent workers offers the firm flexibility and cost control benefits. More importantly, the portion of the

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<sup>8</sup> The skills and competences of such contingent employees may turn “in-the-money” depending on future conditions that may prevail in the market or industry.

<sup>9</sup> Foote and Folta (2002) suggest that the use of contingent or temporary workers in the form of subcontracting or outsourcing gives the firm the right to potentially hire some of these as full employees if future contingent circumstances so warrant. Outsourcing thus also provides a valuable deferral option. Having the flexibility to defer full employment of such non-core employees with different specialized or generic knowledge gives the firm the right to upgrade and import the skills of parts of the subcontracted or outsourced human capital in case of favorable future market conditions. The downside risk of a committed internal development of temporary employees under unfavourable conditions can be avoided, as management has no obligation to further invest in them. Thus, when utilizing contingent workers management effectively holds an option to defer their potential future internalization. This strategic subcontracting or outsourcing of human assets can be viewed as a call option on the value of internalized human assets. The firm can wait and make the investment to convert contingent or temporary workers into core employees if their growth option value exceeds the costs or internalization outlays.

workforce employed on a contingent basis can be more flexibly adjusted in response to favourable or unfavourable market developments at lower costs. This contingent or temporary part of the workforce thus acts as a valuable flexibility buffer and risk management tool. Subcontracting or outsourcing non-core activities enables the firm to flexibly alter operating scale depending on future demand conditions, with HC options to expand, contract, switch or discontinue operations with limited cost.

*Proposition 7: Firms facing higher product demand uncertainty benefit more from HC flexibility in the form of options to alter operating scale (e.g., expand or contract) and will engage more external contingent workers (subcontract and outsourcing relationships). Firms that build in more delay, staging, switch or abandonment HC options (e.g., through temporary or part-time workers) should exhibit better performance (and greater downside risk reduction) in more dynamic industries. Firms in more stable industries will rely more on specifically skilled permanent employee hires from the external market.*

An alternative way for firms to enhance organizational flexibility and co-develop strategic growth options is by forming alliances or JVs with affiliated organizations. Besides the strategic flexibility benefits, the costs of development can be shared with the affiliated partner. References This alternative mode is represented in the lower-right (*quadrant IV*) of the HCGO matrix. HR alliances allow for cost-effective knowledge or product co-development and reallocation decisions, switching among alternative modes of employment over time at specific switching costs. The collaborative human capital externally cultivated through a cooperative and synergistic relationship with other organizations may enhance value and develop competences, ideas and innovations that may become important in enhancing the firm's competitive advantage under specific future contingent scenarios. Some of those shared employees or the knowledge and innovations they help generate can potentially be internalized by the firm in the future or exploited jointly with partner organizations in new markets or areas of application. This external synergistic relationship with other organizations in the shared development of new knowledge can produce new ideas, innovative products or strategic growth opportunities that the firm can exploit, alone or with partner organizations. IBM alliance examples Occasionally it may also generate "new" core employees whose value can be internalized via the optimal exercise of a switching option.<sup>10</sup> The flexibility to switch such human resources from one employment mode to another can be quite valuable.

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<sup>10</sup> Conversely, some current core-employees may lose their ability to create value of strategic importance to the organization. The HR alliance can flexibly allow for such obsolete or "mismatched" core-employees or employees who can add more value outside the firm to be transferred to the external HR alliance with limited cost.

Recognizing that employees are not of the same value-added in all settings may be a source of sustainable competitive advantage. This more flexible, synergistic and cooperative use of human capital across organizational boundaries enables expanding or contracting the size of the external workforce (lower-right quadrant) leveraging the internal development mode (upper-left quadrant) via co-developing human capital and occasionally switching firm-specific employees among the best future uses according to their value-enhancement potential.

*Proposition 8: Firms facing higher uncertainty regarding switching or reallocation needs (e.g., geographic operations or client work uncertainty) benefit more from HC flexibility in the form of switching options and should utilize more HR alliance relationships and related internal HR practices, such as project-based assignments and job rotation. In a multinational context, there is a positive relation between the degree of multinationality (e.g., number of countries with foreign subsidiaries) and the extend of use of HR alliances and related practices.*

From another perspective, the strategic HC options embedded in the HR allocation strategies illustrated by the HCGO matrix can be further subdivided into two categories, according to the degree of skill and knowledge appropriability (or ownership) they allow (Trigeorgis, 1996). Internal development and HR alliances represent proprietary HC in that they provide the firm and its partners with the exclusive right of whether and when to decide to invest or switch the HC allocation mix. In this case, the firm is not threatened by potential competition in appropriating the knowledge, skills and capabilities of those workers that are internally developed or cooperatively trained and employed within the HR alliance. The growth opportunities provided by these human assets are not easily replicable by competitors and are thus integral in sustaining the firm's competitive advantage. We refer to these HC options as "proprietary". Transaction or contractual type investment opportunities in human capital involving external market hiring and subcontracting or outsourcing, risk sharing external employees' knowledge, skills and capabilities with the rest of the market. These investment opportunities might also be pursued by other industry participants. We refer to these as "shared" HC options. This leads to the following pair of propositions:

*Proposition 9a: The internal development and HR alliance employment modes embed proprietary strategic options whose exercise allows the firm to appropriate the knowledge, skills and capabilities of human capital, whether developed internally or cooperatively trained and employed externally. The market acquisition, subcontract and outsourcing modes embed shared HC*

options whose exercise may risk sharing the knowledge and skills with outside parties or even rivals.

*Proposition 9b: Intellectual Property (IP) development and market concentration are positively related to proprietary internal development and HR alliances, and negatively related to external market acquisition, subcontracting and outsourcing practices. The latter practices are less prevalent in industries with high spillover (shared) benefits. SKIP?*

#### **4. Human Capital Strategies and Leveraging Options**

##### ADD REFERENCES

Effective HR strategies in a changing business environment must be flexible to enable the firm to ascertain the right strategic moves and adjust to future contingent landscapes. Dynamic HC strategies set a broad contingent strategic direction enabling the firm to adapt, leveraging various HC growth options as depicted in Figure 2. HC extension options (extending the base of key employees by leveraging on the contract/outsource or alliance employment modes) are more valuable in dynamic (high  $\sigma$ ) landscapes. HC expansion options (leveraging on external market hires) are exercised in more predictable or stable (low  $\sigma$ ) environments.

[INSERT FIGURE 3 ABOUT HERE]

Figure 3 shows the contingent evolution of HC strategies in an up market (upper solid circular clockwise arrow) or in a down market (lower dotted arrow) in a dynamic environment. When the environment is stable and trends sustainable, direct market hiring/expansion or discontinuation of employment will likely occur. In the top-left region of the growth option-value (GOV) space in Figure 3, the firm develops its base of core-employees now (*region 1*) or grows in a staged fashion (*region 2*). Staging allows flexibility to continue or limit development, focusing on developing those employees that have the potential to become idiosyncratic human assets enhancing value (high net NPV) through cost reduction or provision of valued benefits to clients. These regions (1 & 2) host employees with specific skills and core competences enabling enhancement of competitive advantage, but involve rather low HC flexibility given the high degree of specialization of the workforce in a stable environment. The growth option value (GOV) of such specific human capital in a stable (low  $\sigma$ ) environment is rather low. The staged internal development and promotion process creates some internal flexibility value especially when the environment gets more volatile.

The lower-left region (*region 5*) in option-value space comprises select skilled employees hired from the external market to support the firm's expansion plans when the environment is predictable. When faced with sustainable growing demand in a stable environment, the firm can exercise its option to expand its base by recruiting select already-skilled flexible human assets to add to its "core" of permanent employees.<sup>11</sup> However, in dynamic (high volatility) environments, firms will be reluctant to hire permanent skilled employees until they are more confident the growth trend is sustainable as hiring is extremely costly to reverse in case of subsequent adverse developments. This leads to the implementation delays or hysteresis effects discussed earlier in Propositions 2 and 3. The reverse will hold on the downside, i.e., there will likely be a delay in letting skilled employees go (*region 6*) as they would risk destroying human capital, demoralizing other employees and relationships involving high separation costs --unless the decline is sustainable. Reference If the firm faces a dynamic environment it would prefer to first make workforce scale adjustments to its buffer of temporary or contingent employees that involves lower switching costs.

The top-right region of the growth option-value space (*region 3/3'*) hosts valuable contingent HC that has high GOV potential by providing a flexibility buffer to readily adjust workforce scale in response to temporary or unexpected environmental shocks. It provides buffer insurance or employee network portfolio flexibility valuable under diverse future landscapes. Such human capital is typically embedded in subcontracted, outsourced or contingent workers. Under conditions of high volatility and unstable demand, the firm may decide to outsource work or temporarily hire a group of contract workers to readily expand or contract workforce scale on a temporary basis. Some of these workers may later be hired as permanent employees within the firm if future circumstances warrant. Such workers are currently valuable as they can provide non-core services to the firm at lower cost (e.g., outsourcing cleaning or security services); occasionally they may provide specialist advice and support (e.g., independent contractors or consultants).<sup>12</sup> Regardless of their individual potential to add specific future value to the firm or not, these workers collectively play a strategic role as a flexibility buffer in the firm's HR portfolio management strategy in response to environmental shocks. In this way, this group of temporary or contract

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<sup>11</sup> Here the firm recognizes that the current base of core-employees is not sufficient in the face of growing demand and needs be expanded via market acquisition of select skilled professionals. The firm acquires new employees already mature due to their possession of broad-based portable or flexible customized skills. With limited internalization cost, the firm can achieve additional growth option value as these employees get internalized into new roles or get assigned to perform new tasks.

<sup>12</sup> This is a heterogenous group of workers whose skills may range from highly commoditized to highly skilled and knowledge-based, with different implications for their ability to individually add to competitive advantage. In select cases of highly specialized knowledge workers, if their skills become more in need and/or market or technological conditions turn out more favorable in the future, they can be converted into permanent workers that can potentially be exploited beyond their currently expected role.



workers incorporates high GOV readily adjusting workforce scale depending on demand fluctuations. This flexibility value is particularly valuable in more dynamic environments. In volatile environments these workers may be worth keeping “on reserve” as a temporary or contingent workforce buffer. Outsourced or subcontracted work can be readily expanded (*region 3*) or contracted (*region 3'*) next period depending on up or down realizations of demand. In the extreme, if adversity hits, their contract need not be renewed and their services can be discontinued (*region 6*) at limited cost to the organization (an implicit abandonment option).

In the low-right region of the option-value space (*region 4*) the firm preserves flexibility while containing costs in a volatile environment by forming a partnership such as an *HR alliance*. Here, residual, firm-specific human capital of low current value (NPV) but high growth option potential can be co-developed and managed. Such idiosyncratic joint human capital, when nurtured via a shared development program and synergistic knowledge sharing within the alliance, may develop valuable industry expertise that can be fruitfully utilized in pursuing joint projects or exploiting new technologies. IBM Example This potential co-development may effectively turn currently low-value human assets into value-creating employees, enabling enlargement of the core-employee base through future internalization (*region 4*). HR alliances may also be used as vehicles to reallocate core-employees that are no longer profitable in their present role and re-adapt their skills to the current needs of the industry and the organization (*region 4'*). Some employees that are no longer able to create value while having low GOV potential would eventually end up in the bottom-left “discontinue” region (*region 6*) in a downmarket. The divestment decision a firm takes with regard to these unprofitable resources is analogous to exercising an abandonment option.

MOVE THIS SECTION EARLIER?

From the above discussion, HC flexibility emerges as a strategic driver underlying the various HR actions described in the HCGO matrix of Figure 2. Each of the four employment modes represents a starting allocation that may embed in it several value-creating HC options. In its HC portfolio allocation decisions, the firm has two main leveraging options for altering the core employee base: HC expansion and extension options. Exercise of these two options enables leveraging human capital inside or across organizational boundaries via mobilizing, coordinating and deploying current or future employee capabilities (Sirmon, Hitt, and Ireland, 2007). These key HC leveraging options are depicted as arrows pointing toward (leveraging) the “core” employee base in Figure 2.

First, internally-developed “core” human capital may be leveraged and expanded via external market hiring, training and promoting of key skilled employees along the staged HC internal development cycle (Reference Flamholtz, 1971, 1972, 2003 ?). Continuous investment in

tacit knowledge of core-employees strengthens specificity and reduces the chance of imitation or alternative idiosyncratic moves. Via its option to decide when to invest in acquiring or expanding idiosyncratic human assets, depending on future market conditions, the firm enjoys valuable HR expansion flexibility. In Figure 2, leveraging actions that expand the core-employee base flexibly through market hiring are referred to as “human capital expansion”. Market acquisition of select professional employees allows for human capital expansion of the firm’s core base if their flexible customized or generic competences can be enriched via internal development and specific task assignments. This expansion of permanent employees via market acquisition involves high initial, ongoing and reversal costs and therefore is implemented cautiously on a selective basis and so may be delayed in a dynamic environment until the firm is fairly confident about future sustainability.

When market trends are not clear or when unanticipated environmental shocks occur, flexible external employment modes, such as subcontracting or outsourcing and HR alliances, can more readily be used to collectively alter the scale of the core workforce. At the individual level, these external employment modes sometimes enable leveraging select external “non-core” workers, extending their use in a new or fundamentally different manner such that their value contribution increases substantially and their internalization becomes appealing under varying contingent future circumstances. The scaling, timing or switching flexibility afforded by subcontracting or outsourcing enables the use of temporary or contingent workers in a way that allows delaying internal corporate investment in permanent employees involving related or new organizational roles until their capabilities are proven or become needed core competences. The related HC options to alter operating scale, defer or discontinue outsourced or subcontracted work provide a hedge against adverse future scenarios.

Similarly, the option to reallocate employees internally or switch them in an HR alliance allows to convert human assets (developed internally elsewhere in the organization or externally in cooperation with other affiliated organizations) into core-employees by leveraging their know-how elsewhere under the right future circumstances. Their subsequent internal utilization may require *ad hoc* or mid-career training and integration with other current core employees. Occasionally, some of the existing core-employees that are no longer value-additive in their existing roles (or whose special skills may be better leveraged or exploited elsewhere) can be transferred elsewhere within the organization or to an HR alliance in a different role. Such leveraging actions relating to different or enhanced utilization of elsewhere-residing or external human assets (initially residing in an alliance, subcontracted or outsourced mode) are referred to as “human capital extension”. This leads to the following propositions:

*Proposition 10a: When externally developed knowledge and capabilities become valuable competences for the firm, select human capital sustained or nurtured outside the firm (whether subcontracted/outsourced or cooperatively employed) will be leveraged via its extension into flexible new uses for the firm. Firms will likely employ more temporary, contract or outsourced workers or shift employees from an HR alliance during an up market. The use of such alternative flexible workforce will decline during a downmarket, with some services being discontinued.*

*Proposition 10b: When the total value of select temporary, contracted or outsourced employees becomes greater than the costs needed for converting them into internalized key employees the extension leveraging option to internalize them will be exercised. Similarly, when the value of select external workers jointly cultivated via a cooperative relationship with other affiliated organizations (HR alliances) grows or they develop competences that become important for the firm, net of involved costs, the option to reallocate or switch them to internal workforce will be exercised.*

“HC expansion” involves the leveraging of existing or newly acquired knowledge that can be broadened, adapted, renewed or further nurtured within the organization. “HC extension” involves leveraging the wide range of specific human capital skills currently being utilized elsewhere or outside the firm in various contractual, contingent or collaborative projects to “new” idiosyncratic uses. This entails managing the scale and scope of a portfolio of external human resources, while selectively appropriating and switching some of them within the organization if and when it becomes desirable to do so. When the option to switch within an HR alliance is exercised, for example, talent that has been cooperatively developed and previously only partially owned by the firm can subsequently more fully contribute internally to firm growth and value creation. The presence and strategic impact of human capital expansion and extension leveraging options is illustrated via arrows within the HCGO matrix in Figure 2. Both human capital expansion and extension options allow leveraging the knowledge and capabilities of the organization’s human assets, regardless of their internal or external mode or locus, transforming them into strategically valuable firm-specific future employees under the right circumstances.

*Proposition 11: The exercise of HC leveraging expansion and extension options will be more effective and hence the realized benefits of HC flexibility and downside risk management will be higher the greater the managerial real option awareness and adaptive capability in place within the organization.*

Managerial real options awareness and organizational adaptive capability through appropriate flexible HR systems moderates positively the effectiveness of exercising HC leveraging

options and implementing related HR practices as well as the effectiveness of downside risk management and natural hedging via HC real options. In particular, MNCs that are more aware of their real options and have an adaptive organizational capability in place have higher flexibility benefits and lower downside risk.

Essentially, the managerial flexibility embedded in human capital allocation, management and leveraging decisions takes the form of a portfolio of HC options, such as to develop now, defer or stage, acquire, alter scale (expand or contract), reallocate/switch or abandon human capital. The problem of flexible HR management is analogous to developing and managing a real options portfolio of human resources whose worth depends on the current value and growth option/flexibility profiles of the mix of various internal and external employee groups and their potential dynamic reallocations over time under different future contingent scenarios.

## **5. Discussion and Implications**

A real options portfolio approach to HC allocation and management allows overcoming a key shortcoming of the traditional HR architecture: fine-tuning based on specificity and efficiency according to the current or expected landscape but potentially missing out the strategic picture of adapting employee pool knowledge, skills and capabilities to different future contingent landscapes. Real options theory offers a dynamic perspective and a strategic tool for managerial guidance and hypothesis development. It does so by accounting for the value creation potential of HC flexibility embedded in actions leveraging HC contributions both within and across organizational boundaries. Appropriate leveraging actions, involving expansion and extension options, are instrumental in renewing the core-employee base via staged internal development or utilizing external workers via adaptation of shared human assets through HR alliances, subcontracting, outsourcing or other contingent contracts. Real options thinking may thus help the firm dynamically reconfigure the content and makeup of its HR portfolio, processes and practices, identifying HC growth opportunities necessary for sustaining competitive advantage and flexibly managing environmental uncertainties. In this way the firm can enhance its strategic position and formulate strategic paths for leveraging its human resources in adaptable ways, taking into account both the path-dependency of their organizational mobility as well as future contingent economic scenarios.

Several key implications result from our dynamic view of the HR architecture from a real options perspective. In dynamic environments firms should develop flexible firm specific or generic skills while managing HC flexibility around their key employees. This internal adaptive capability should be enhanced and supplemented by utilizing and exploiting flexible strategies involving a mix of external workers of various types across organizational boundaries. These additional HC options

across organizational boundaries, arising in any of the four quadrants of the HCGO matrix, can increase the likelihood of firms adapting to their changing environment, thus achieving and maintaining competitive advantage over time. Many firms already attempt to do so, as the repeated reinvention of IBM exemplifies. As noted by Mangum, Mayall and Nelson (1985, p. 599): “Many employers carefully select a core group of employees, invest in them, and take elaborate measures to reduce their turnover and maintain their attachment to the firm. Many of these same employers, however, also maintain a peripheral group of employees from whom they prefer to remain relatively detached.” Our real options portfolio framework helps rationalize this intuitive dynamic HC portfolio strategy and provides more precise guidelines how to operationalize it. The allocation between internal key employees and external contingent workers (including HR alliances) and the management of the overall portfolio of diverse employee groups should be steadily monitored and periodically adjusted over time to changing internal needs or future contingent external landscapes so as to maintain an optimum balance among immediate value and future HR flexibility. The inter-temporal portfolio implications of our framework are novel and significant, as suggested by the numerous propositions we developed –summarized in the last column of Table 1. They even affect the initial portfolio allocation in an uncertain environment. Firms first employ more flexible external employment modes to adjust employment scale to environmental shocks before making more costly adjustments in permanent employment. This is what we observe currently in the macroeconomy.

In addition, real options theory provides further guidance regarding the additivity of the two key drivers of value, representing the present and potential future value contribution of human capital. The corresponding metrics of the traditional HR architecture (value and uniqueness) are not necessarily additive, so it is not readily apparent how they should be balanced when in conflict, as they often are. As concluded by Lepak and Snell (1999), “researchers need to focus on how firms simultaneously develop and utilize both *current* as well as *future* forms of human capital for competitive advantage.” Our immediate value (NPV) vs. HR flexibility or HC Growth Option Value (GOV) metrics are suited to address this challenge.

Conceptually, additivity of the current and future HC value components is the result of simple, intuitive logic. HR flexibility to adapt potential leveraging actions in response to altered future market conditions expands the value of an investment opportunity in internal or external human capital by enhancing its upside potential while reducing downside risk –compared to what is expected from managing employees in a traditional, passive HR manner. The resulting asymmetry caused by HC flexibility calls for an *expanded* criterion for HC that reflects the two value components: the static NPV of existing employees’ expected contributions to the committed

corporate plans, plus the value of the portfolio of HC options represented by HC flexibility. Total human capital value is the sum of the immediate value (or NPV of expected benefits deriving from internally-developed core-employees in place) plus the human capital growth option value (HC GOV) representing the value potential of HC flexibility as a dynamically-adjusted portfolio of human capital growth opportunities, i.e., *Expanded Human Capital Value = Immediate-value (Static NPV) + HC Growth Option Value.*

HC GOV reflects the combined value of the firm's portfolio of all HC expansion and extension leveraging options across the four employment modes. This expanded HC valuation criterion is better suited to assess the value of the portfolio of HC options, helping protect management from pitfalls resulting from prematurely committing human resources based on expectations, before knowing which future landscape will actually occur. The HCGO matrix can lead to superior decisions as it integrates the most recent advances in SHRM with key principles of valuation under uncertainty based on real options theory.

A key caveat is in order in implementing these ideas in practice. Although the two key dimensions of HC value creation are both intuitive (as they represent the present and future HC value contribution) and additive, assessing the value of the second component (HC Growth Option Value) is neither straightforward nor does it obey the rules of value additivity. HC GOV basically represents the value of a portfolio of interacting HC real options. Although the value of each stand-alone HC option might be readily assessed (e.g., see reference to training article in OS), determining the value of the entire portfolio of HC options is a challenge due to potential interactions and synergies among these options (Trigeorgis, 1996).

By its very nature, human capital is a "pervasive" corporate intangible asset whereby key employees contribute to building an infrastructure that permeates the whole organization. The resulting interconnected network of diverse employee groups and relationships, working together towards a common goal, makes their interaction crucial and value-relevant. The value of the firm is significantly affected by the composition of its human capital portfolio, taking into account the inter-employee group and intra-industry interaction effects over time within and across organizational boundaries. Reference Typically, HC flexibility does not take the form of a single HC option in isolation but manifests itself as a portfolio of potentially synergistic or interacting HC options. An options approach to strategically managing human capital should recognize the multiple options embedded in human capital and their potential interactions.<sup>13</sup>

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<sup>13</sup> Human capital as a portfolio of real options allows three types of option interactions (Trigeorgis, 1993). First, the presence of subsequent HC options increases the value of the underlying asset for earlier HC options. If internal development of key employees is the underlying base for an HR management system based on staged (compound) option development, a sequence of follow-on HC options (e.g., to later switch employees to an HR alliance) effectively

## MERGE BLUE PARTS

Assessing the value of the portfolio of human assets and HC options to an organization is a challenging task. The value of human capital to a firm is more than just the sum of individual human resources, as the firm can exploit synergies and complementary skills and leverage various HC options and HR practices in ways that may interact and reinforce each other. Human capital valuation, management and leveraging must also take into account corporate strategic fit and culture, environmental, firm and individual employee uncertainties, as well as complementarity and interaction effects among different employee groups in a portfolio context. Reference Investments in human assets and other forms of organizational capital are thus better thought of as platforms for the development, management and leveraging of HC option portfolios.

Managing the firm's portfolio of diverse employ modes (internal/base and external/flexible) and its associated portfolio of HC real options and related HR practices and balancing the dynamics of the extended HR architecture across time is a challenging task, as acknowledged by Lepak and Snell (1999). At the same time, the ability to manage the dynamic HR portfolio may in itself be a core adaptive capability that other firms find difficult to replicate (Becker and Gerhart, 1996). Therein lies a genuine source of sustainable competitive advantage, having at its core a strategic capability to adapt the firm's portfolio of human resources to better match changing internal needs, resources and contingent future external landscapes. As such, strategic HRM should play a more active role in dynamic strategy formulation in its "constant search for ways in which the firm's unique resources can be redeployed in changing circumstances" (Rumelt, 1984: 569).

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increases the value of the underlying asset for such earlier options (being the sum of the gross value of human capital and the value of any future related HC leveraging options). Second, exercise of prior HC options may alter the underlying asset itself and hence the value of subsequent HC options on it. This may cause a second-order interaction effect. For example, exercise of the option to expand the firm's core-employee base by hiring new professionals from the market in a stable market affects the value of a potential, subsequent deferral option on temporary workers. The reverse may also occur in a dynamic environment. The value of the latter option to hire temporary work is contingent on the resulting cumulated human capital of the entire organization. Moreover, the conditional probability of exercising a later option on human capital, in the presence of an earlier HC option, is higher or lower than the marginal probability of its exercise in isolation depending on whether the prior option is of the same or the opposite type, respectively. An abandonment option to fire certain non-profitable main employees is less likely to be exercised (relative to its existence as a stand-alone option) if another put-like option has been put in place, such as reallocation or switching such non-profitable employees to an HR alliance where they might be put to a different or more-suitable use. In the presence of multiple HC option interactions, as when leveraging human assets, estimation of value creation in a portfolio context under uncertainty is not straightforward and a thorough real options analysis is warranted.

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**Table 1**  
**Common Human Capital Real Options, Key References and Propositions**

Category	Description/Context	Important in	References	Propositions <b>UPDATE FROM TEXT</b>
Option to defer (or invest)	By utilizing external contingent, contractual or temporary workers, HR management holds the option to delay their permanent hiring/internalization under market or technological uncertainty until some contingent future landscape warrants it.	Contracting/outsourcing	Foote & Folta (2002) McGrath (1997)	If (when) the total value of temporary, contracted or outsourced employees becomes greater than the costs needed for converting them into internalized core employees under contingent future scenarios, the extension leveraging option to internalize them will be exercised.
Option to stage investment	Hiring part-time employees enables their staged future internalization. Individual human capital development can be viewed as a multi-stage process embedding a series of options whose exercise allows core employees to progress along the organizational hierarchy. Each stage in the cycle (e.g. selection/recruitment, training, promotion, etc) is an option on the value of subsequent stages.	Contracting/outsourcing  Internal development	Flamholtz (1971, 1972, 2003)  Malos & Campion (1995)	Under high market or internal (firm, individual employee) uncertainty, staging the internal development or the external HC allocation process (e.g., via temporary, contract or outsourced work) provides valuable flexibility to continue or abandon current operations as developments warrant.
Option to alter operating scale (e.g., to expand or contract)	If market or technological conditions are more favourable than expected, the firm can expand its core-employee base via market acquisition of select valuable professionals. This corresponds to the exercise of an expansion option. Similarly, employing contingent workers or outsourcing allows HR management to easily expand or contract the core-employee base depending upon demand fluctuations. Conversely, if conditions turn unexpectedly unfavourable, it can reduce contractual or temporary	Market acquisition  Contracting/outsourcing  Internal development	Lepak & Snell (1999) Trigeorgis (1996)	A firm facing higher product demand uncertainty needs more HC flexibility in the form of options to alter operating scale (e.g., expand, contract) and should engage more external contingent (e.g., subcontract and outsourced) workers; it also needs to build in delay, staging or abandonment HC options (e.g., through temporary or part-time workers that may later be internalized under favourable future landscapes or abandoned at low cost under adverse scenarios).  A firm that needs to expand its employee base should hire a flexibly or generically-skilled professional (exercising an expansion option through market

	workforce by not renewing the related agreement with the service agency. This corresponds to the exercise of a contraction option. Within the individual HC development cycle, selection/hiring and promotion or firing of new/existing employees reflect the exercise of expansion or contraction options.			acquisition and limited internalization) if her total value added (immediate NPV plus HC Growth Option) – not just immediate value – exceeds the costs. The value of such flexibly-skilled employee would be higher (and hence employment is more justified, even at higher cost) in a more uncertain future environment. This is more evident for top management (CEO) hires.
Option to switch/re(a)locate	Setting up a HR alliance or operating in a multinational network enables switching employees within the alliance or across the network depending on their best alternative future use (e.g., transfer of cooperatively-developed, “new” core-employees from the alliance to the organization or shift no longer value-additive, “old” core-employees to the external partnership) according to their value-enhancement potential. Staged development of core-employees may also involve a reallocation/switch option in form of re(a)location at the staff or middle-management level via job rotation or project-based work.	HR alliance/partnership or MNCs  Internal development	Kogut & Kulatilaka (1994)  Mangum, Mayall & Nelson (1985)  ALLIANCES ref	A firm facing higher uncertainty regarding reallocation needs (e.g., geographic client work uncertainty) needs more HC flexibility in the form of switching options and should utilize more HR alliance relationships and related internal HR practices (e.g., project-based assignments and job rotation).  As the value of external workers whose human capital is jointly cultivated via a cooperative relationship with other organizations (HR alliances) grows or they develop competences that may become important for the firm under future contingent landscapes, the option to reallocate or switch them to the internal development mode will more likely be exercised.
Option to abandon	If conditions deteriorate severely, the firm can dismiss current contingent workers permanently. In implementing massive outsourcing decisions, existing operations may need to relocate or close down. When internally developing human capital through the staged cycle, the firm may dismiss unneeded or non-performing employees at any stage of the cycle.	Contracting/outsourcing  Internal development	Foote & Folta (2002)  McGrath (1999)	Under higher market or internal (firm, individual employee) uncertainty, staging the internal development or the external HC allocation process (e.g., via temporary, contract or outsourced work) provides valuable flexibility to continue or abandon current operations as developments warrant.
Growth & learning options	Training and development stages within the individual human capital	Internal development	Bhattacharya &	A firm facing higher uncertainties regarding demand for future skills and skill obsolescence needs more HC

	<p>development cycle can be viewed as providing growth (compound-like) and learning options.</p> <p>At the strategic level, HR alliances and joint ventures or partnerships open up strategic growth (and learning) options in new markets.</p>	HR alliances and JVs	<p>Wright (2005)</p> <p>Berk &amp; Kase (2009)?</p> <p>Kogut (1991)</p> <p>ALLIANCES ref</p>	<p>flexibility in its staged internal development process (e.g., in the form of growth and learning options in future skills capabilities) supported by appropriate HR practices (e.g., training and skill-based pay).</p>
Multiple interacting options in a portfolio	<p>Human capital involves a portfolio of interacting HC (expansion and extension) options. Their combined value (reflected in the HC GOV) differs from the sum of their separate values as the firm may exploit synergies and complementary skills among different employee groups, HC options and HR practices interact among themselves and reinforce each other (e.g., selectivity for broad-based skills in recruitment interacts with relocation/switch adaptability, skill-based pay, etc).</p>	Portfolio approach to human resource management (HR architecture)	<p>Trigeorgis (1993)</p> <p>Lepak &amp; Snell (1999)</p>	<p>A firm facing higher uncertainties regarding demand for future skills needs more HC flexibility in its external employment modes (e.g., market hiring, reallocation and switch options within an HR alliance, subcontract and outsourcing options and relationships).</p> <p>When externally developed knowledge and capabilities become valuable core competences for the firm, human capital sustained or nurtured outside the firm (whether subcontracted/outsourced or cooperatively employed) will likely be leveraged via its extension into flexible idiosyncratic new uses for the firm.</p>

Figure 2

The Human Capital Growth Options (HCGO) Matrix and HC Leveraging Options

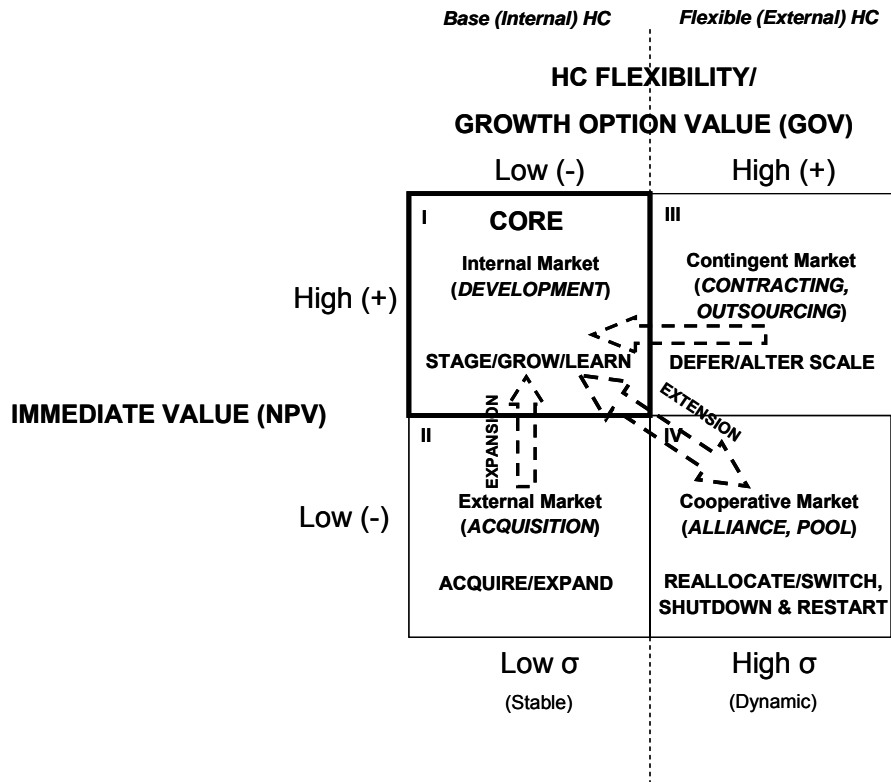
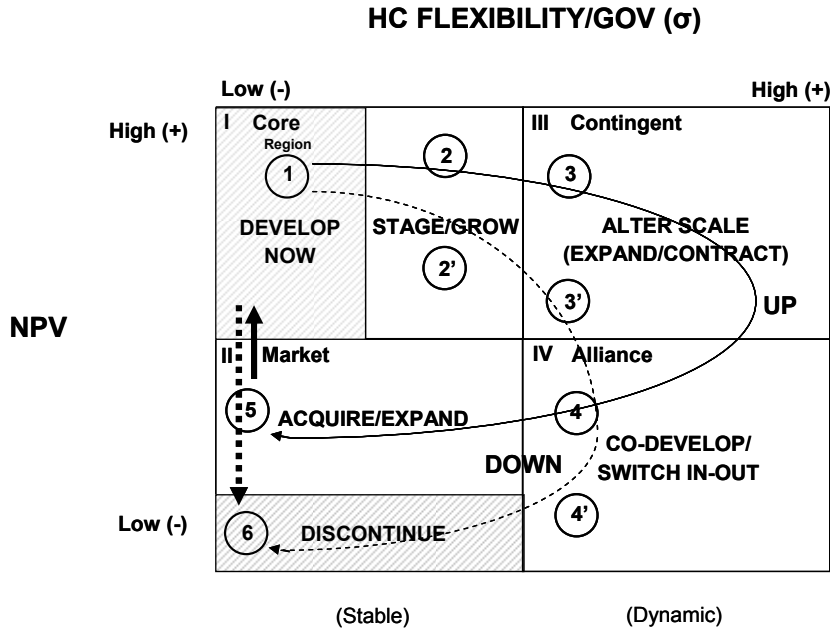
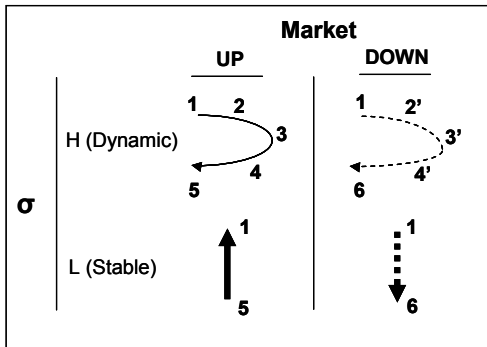


Figure 3

Strategies for implementing HC Options in dynamic vs. stable environments



Legend A:



Legend B:

- | <u>Region</u> | <u>Contingent Strategy</u>  |
|---------------|---|
| ①             | Currently profitable core employees that should be developed now  |
| ②             | Profitable internal HC with low growth potential in a staged career path process                                  |
| ③             | Currently high net value HC with high flexibility to expand or contract via contracting or outsourcing            |
| ④             | HC with low current profitability and high flexibility to co-develop and re-allocate or switch within an alliance |
| ⑤             | Expensive (lower NPV) skilled HC to be acquired from external markets, internalized and developed                 |
| ⑥             | Unprofitable (low NPV) HC with low growth potential in stable environment that should be discontinued             |



