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# Options for Human Capital Acquisition

Mousumi Bhattacharya
*Fairfield University*

Patrick M. Wright
*Cornell University*

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**Keywords**
human, resource, studies, ILR, management, capital, firm, worker, internship, skill, employee, option, cost, HRM

Cornell University
School of Industrial and Labor Relations
Center for Advanced Human Resource Studies

CAHRS at Cornell University
187 Ives Hall
Ithaca, NY 14853-3901 USA
Tel. 607 255-9358
www.ilr.cornell.edu/CAHRS

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**Mousumi Bhattacharya**
Charles F. Dolan School of Business
Fairfield University
Fairfield, CT 06824, USA
Phone: (203) 254-4000 ext.2893
Fax: (203) 254-4105
E-mail: mbhattac@mail.fairfield.edu

and

**Patrick M. Wright**
School of Industrial and Labor Relations
Cornell University
Ithaca, NY 14850
Phone: (607) 255-3429
Fax: (607) 255-1836
E-mail: pmw6@cornell.edu

http://www.ilr.cornell.edu/cahrs

**Abstract**

An 'options' view of human capital acquisition explains value creation through time-deferred, sequential, path-dependent investment choices and addresses gaps in the resource-based theory explanation of the relationship between human resources and competitive advantage. Firms will invest in options for human capital, using alternative employment arrangements like temporary/contractual/part-time workers and internships, or by outsourcing the work, when uncertainty associated with human capital is high and investments in human capital are largely irreversible. We discuss various options for skills and employees, two interrelated components of human capital. These are flexibility options, options to wait or defer, options to abandon, learning options, and switching options. The opportunity cost of not having options is quantifiable, which makes the real options approach valuable for strategic HRM decisions.

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# Options For Human Capital Acquisition

The field of strategic human resource management (HRM) relies heavily on the resource-based view (RBV) of the firm (Wright, Dunford, and Snell, 2001), and suggests that HRM impact firm performance by creating valuable, rare, inimitable and non-substitutable human capital (Snell, Youndt, and Wright, 1996; Wright, McMahan and McWilliams, 1994). This explanation however leads to the question: what is the process of generating valuable human capital? As Priem and Butler (2001) argue, this is a question unanswered by the RBV. Strategic HRM, with its reliance on RBV, suffers from this 'black box' issue, which is the lack of clarity of the relationship between the independent variables (HRM, human capital) and the dependent variable (competitive advantage). Real options theory, on the other hand, provides a heuristic explanation of time-deferred, sequential, path-dependent investments in resources and capabilities that, at least partly, addresses this question (Kogut and Kultilaka, 2001; Leiblien, 2003). The real options explanation is complementary to the RBV in explaining value creation. We use this logic and discuss how options for human capital acquisition generate value by creating investment flexibilities.

Real options are contingent, time-deferred investments in capabilities that provide investment and well as operational flexibility (Bowman and Hurry, 1993; Dixit and Pindyck, 1994; Kogut and Kultilaka, 2001). Options are valuable because of uncertainty of returns, demand, and supply, as well as irreversibility of investments. Financial options reduce risk of loss of value of investments, and create opportunities for future investments through preferential access. Real options allow the firm to defer investments for uncertainty resolution, and create opportunities for preferential access. In addition, real options also create flexibilities of operation (Trigeorgis, 1996), as well as growth and learning opportunities (Amram and Kulatilaka, 1999; Trigeorgis, 1996), McGrath, 1997). We apply this framework to explain how options for human capital acquisition - which are investments that create capabilities to wait, defer or abandon

investment decisions, to be operationally flexible, or to learn - can generate value. We discuss options for investments in two interrelated components of human capital - skills, and employees.

The real options view, as applied to the field of strategic HRM, provides a theoretical framework that explains how value is created in human capital. While the RBV view purports resource heterogeneity, resource immobility and causal ambiguity, as the source of value (Barney, 1991), real options focus on the process through which firms can generate these characteristics in human capital. The RBV has been criticized as tautological in the sense that 'valuable' resources explain creation of value, and that the process of value creation is ambiguous (Leiblein, 2003; Priem and Butler, 2001) and discovered 'by luck'. Real options theory addresses these concerns and explains how investments in options i.e. time-deferred choices, create value by providing investment and operational flexibility (Leiblein, 2003). It indicates that a firms' value depends on the present value of existing assets *and* the value derived from creation of discretionary future opportunities, both of which are estimable. The ability to flexibly update an investment plan upon arrival of new information is valuable, which is not accounted for in the RBV. The real options approach is specifically suitable for a 'what if' analysis of future situations and contextual changes, thereby adding a 'dynamic' component to the 'static' predictions of RBV (Priem and Butler, 2001).

Our alternative explanation based on the options framework contributes to the convergence of RBV with real options theory within the strategic HRM literature. The primary question posed by this field is: how do human resources (HR), comprising of human capital (skills and knowledge of employees) and practices that manage them, contribute to competitive advantage of the firm (Delery and Shaw, 2001; Wright, Dunford, and Snell, 2001)? The answer provided so far is that human capital can be a source of competitive advantage, HR practices have the most direct influence on the human capital of a firm, and the complex nature of HRM systems can enhance inimitability (Delery and Shaw, 2001). Most of the empirical work in this field is focused on the relationship between HR practices and firm performance. Our theoretical

model sheds light on the question of how do mangers decide to acquire skills and employees in presence of uncertainty of demand/supply and returns, so that these can be a source of competitive advantage. The real options logic provides a heuristic, sequential investment model, which explains how valuable human capital is generated.

## The Options Framework

Options are contractual rights to buy (calls) or sell (puts) assets (stocks, commodities, foreign currency) in a predetermined price, at a future date, after which they expire. They provide a way to capitalize on the *uncertainty* of asset prices. For example, in the case of call option, if price movement works favorably (i.e. market price becomes higher than the predetermined price) then the option is exercised and positive returns are generated, if not, only the investment in option price is lost. For put options, if the market price goes down, then the option holder profits buy selling it at the higher predetermined price. Financial options, therefore, defer the decision to invest in the asset to a future point of time, which reduces the uncertainty about future prices and reduces the loss associated with unfavorable price movements. Another important function of options is to provide *flexibility* for investment decisions. The owner of the option has the choice to exercise or not to exercise the option. Therefore financial options buy time and flexibility to invest, at the cost of the option price. The distinguishing characteristic of an options approach lies in an individual making investments that confer the ability to select an outcome only if it is favorable.

Real options follow similar rationale, but the assumptions and nature of options are somewhat different. These are decisions regarding investments in assets that are similar to financial options in spirit but different in many aspects (Amram and Kulatilaka, 1999; Bowman and Hurry, 1993; Dixit and Pindyck, 1994). While financial options are created for financial assets that can easily be valued and are readily tradable in markets, real options are created for real assets (the term ‘real’ probably implies that these assets are actually used in the production of goods and services), which may not be perfectly tradable, the investments may be

*irreversible*, and difficult to put a value on. Creation of real assets may also need non-financial investments like time and effort. As a result real options are not precisely defined, neatly packaged, or traded like financial options; may be implied or exist implicitly in the resources, capabilities, and processes of the firm (Kogut and Kulatilaka, 2001); may have invisible components, which makes exact valuation of real options difficult even with passage of time; may not be perfectly tradable because of market imperfections and information asymmetries; and may involve unknown or uncertain expiration dates (McGrath, Ferrier, and Mendelow, 2004). Real options, unlike their financial counterparts, are rarely backed by legal contracts guaranteeing the holder's rights in precise terms. Most are non-proprietary investment opportunities whose terms are somewhat vague and far from guaranteed. In a few instances a legally enforceable property right such as an oil lease or patent confers a proprietary right similar to that granted by a financial option. Table 1 provides a comparison of financial and real options (as well as human capital options discussed later).

Although the primary underlying rationale for real options remains the same as financial options, i.e. time-deferred investments, emphasis is also on *growth* (Amram and Kulatilaka, 1999; Trigeorgis, 1996), *operational flexibility* (Bowman and Hurry, 1993), and *learning* (Amram and Kulatilaka, 1999; McGrath, 1997). Timing options create time-deferred investment choices for assets that have high irreversibility (e.g. oil exploration sites, power plants) so that decisions can be made as more familiarity is gained in the future while maintaining preferential access to the asset. Options to defer (Trigeorgis, 1996), options for staging (Amaram and Kulatilaka, 1999) fall in this category. Growth options (Amram and Kulatilaka, 1999; Trigeorgis, 1996) are limited investments that create future growth opportunities (e.g. projects to develop new markets). Through these options, the firm gains access to the potential upside (new business) while limiting the losses (amount invested in the project) they would otherwise incur from unfavorable outcomes. Similarly, learning options (Amram and Kulatilaka, 1999; McGrath, 1997) are limited investments to test the market or to gain more familiarity because the future returns

from these investments are uncertain. Flexibility options create choices for the scale and scope of operation. Options to alter operating scale (Trigeorgis, 1996), options to abandon (Trigeorgis, 1996) or exit options (Amram and Kulatilaka, 1999), and options to switch (Trigeorgis, 1996) belong to this category.

**Table 1**
**Comparison of Financial, Real, and Human Capital Options**

| Dimension | Financial Options | Real Options | Human Capital Options |
|---|---|---|---|
| Underlying assets | Financial securities e.g. stocks, currency, commodities | Real assets, tangible or intangible e.g. projects, products, technology, new venture | Skills, employees |
| Nature of underlying assets | Tangible, perfectly tradable | Tangible with intangible components, partly tradable | Mostly intangible, not tradable, ownership not transferable, the firm never 'owns' the asset |
| Value of underlying asset | Underlying security has value | Underlying asset has value | Employees add value through application of their skills |
| Uncertainties | Price of security varies over time | Value of assets varies over time | Demand and supply of skills vary over time, uncertainty about returns from application of skills, uncertainty about skill-matching and person-matching of employee |
| Types of options | Calls, puts | Options to defer, wait, abandon, switch, flexibility options, learning options, growth options | Options to defer, wait, abandon, switch, flexibility options, learning options |
| Use of options | Time-deferred investment choices | Time-deferred investment choices, operational flexibility, growth and learning | Time deferred investment choices, operational flexibility, learning, switching |
| Rights under the contract | Right to buy or sell securities at a set price on a future date | Right to further develop, abandon, or switch projects/operations in the future | Uncertain rights |
| Investment required | Premium to be paid at the time of the contract | Partial investment or extra investment in the current period | May entail extra cost in the current period |
| Expiration date | Fixed | Varies, can be indefinite | Can be indefinite |
| Benefits of options | Allow the investor to cover risks and benefit from volatile prices with far less investment | Allow firms to buffer against future loss of value, enables lower sunk cost, create flexibility of investment | Identify valuable human capital, reduce uncertainty of human capital |

Real options theory is complementary to the resource-based view in explaining the significance of firm resources and capabilities for competitive advantage (Leiblen, 2003). Although the resource-based view highlights the how resources and capabilities contribute to firm performance, it does not address the issue of how managers may develop them. Rather it assumes that firms have (somehow) made upfront investments in the processes of creating resources whose eventual value is inherently ambiguous and uncertain (Leiblen, 2003). This gives rise to the notion of resource heterogeneity and resource immobility arising out of history-driven causal ambiguity. Real options theory, on the other hand, explicitly addresses the issue of investment choices for future resources and capabilities. It assumes that managers possess a level of foresight sufficient to enter into contracts (options) that provide implicit or explicit claims on future opportunities (Leiblen, 2003) and analyzes how firms can lay claim to future rent-generating capabilities through investment in these options. Real options theory is similar to the resource-based view in claiming that present resources and capabilities arise out of past investments. However it goes further in specifying how time-deferred choices and operational flexibilities can add value for investments in irreversible resources and processes with uncertain returns. (Leiblen, 2003). According to Bowman and Hurry (1993), the options framework offers an economic logic for incremental, path-dependent resource investment. In other words it specifically addresses the issue of finding a superior mechanism of resource allocation (McGrath, Ferrier, and Mendelow, 2004).

## Human Capital

Human capital, i.e. the knowledge, skills, and abilities embodied in the employees of a firm (Becker, 1993) exhibits many of the characteristics of real assets, as discussed by real options scholars. It provides current as well as future returns for the firm as employees generate value through their knowledge, skills, and competencies that are used for all value-added activities of the firm over a period of time. Investments, in the form of time, money, and effort, are needed to acquire, motivate and maintain human capital. Many investments in human

capital are irreversible because they cannot be taken back from employees or traded in the market. The returns from these investments are uncertain, as employees may not perform as per expectations, or may leave the firm, or the skills may lose value.

However, human capital is different from other real assets in a few ways (see Table 1). First, human capital is almost entirely intangible and is difficult to quantify (most measures are 'proxies' e.g. education, experience). The value of human capital lies mostly in its application on other assets rendering it extremely difficult to dissociate and quantify the value generated by human capital from that produced by other real assets. Second, unlike other forms of asset, a firm never fully 'owns' its human capital. The knowledge, skills, and abilities reside in the people, and are lost when people leave the firm. Therefore there is a unique risk associated with human capital, the risk of capital loss or turnover (i.e., the asset "walking away"). At the same time this also makes human capital more 'reversible' than other forms of real assets as firms can layoff employees. Third, non-financial investments like time, communication, and leadership constitute a major part of investments that generate returns from human capital through eliciting commitment and competency of employees over the long run. These combined with the fact that human capital is almost never tradable in the market, makes management of this form of asset a more difficult task.

Managers must identify and assemble a bundle of human resources that contributes to competitive advantage, a central problem for human capital management of the firm. While both RBV and real options theory address this problem, they provide different, albeit related, rationale. The resource-based view delineates the characteristics that human capital needs to be able to contribute to competitive advantage. They should be valuable enough to enable the firm to create strategies to reduce cost and/or generate greater revenues; should be rare, difficult to imitate, and non-substitutable so as to put limits for competition (Leiblen, 2003). They should generate more value than when they were acquired, in a causally ambiguous way, so that competition is imperfect in the factor market. Therefore the RBV assumes that the process

of creating valuable, rare, inimitable and non-substitutable human capital is causally ambiguous and history-driven so that it cannot be replicated.

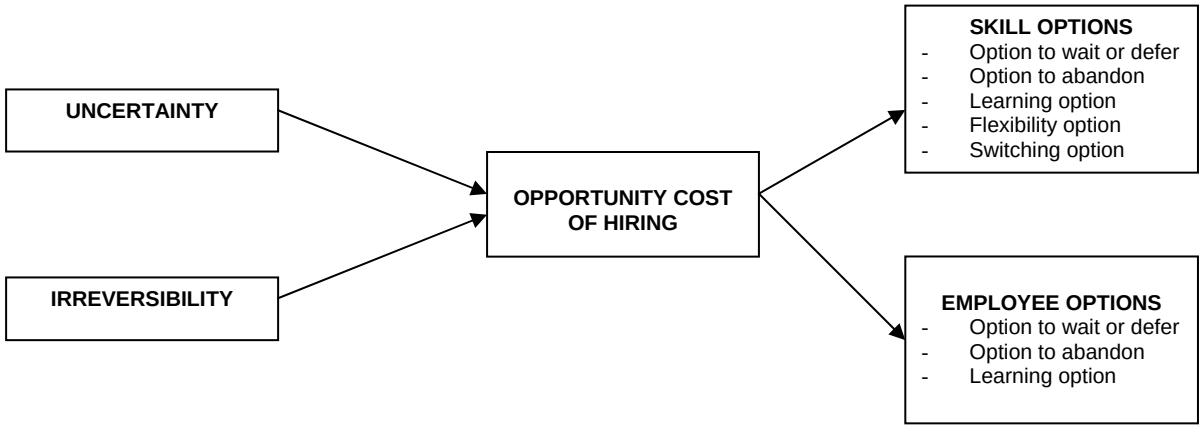
The real options theory on the other hand focuses on the creation of decision choices for uncertain and irreversible investments in human capital, so that when the uncertainty is resolved managers can invest optimally. In other words when the managers are not sure about returns, or when the investments cannot be recouped easily, it is more valuable to wait or to build in flexibilities through options. Although this may cost more initially, the opportunity cost of inflexibility is greater, making the options investment more attractive. Real options theory predicts that time-deferred or flexible investments generate valuable human capital because investments are made after the value-creating potential becomes more apparent. These also create causal path, which nevertheless is difficult to imitate because of time-dependency as well as complexity of combinations. Additionally, they make human capital rare and non-substitutable because of continued investments over a long period of time. Consequently, a salient contribution of real options theory is also to capture the value of certain investments that the traditional valuation methods cannot ascertain. For example, as we discuss below, the value of temporary and contingent workers lie not only in cutting cost and creating operational flexibilities, but also in generating valuable 'learning' and knowledge and offering the value of 'waiting' before making commitments of skill acquisition.

## Options For Human Capital

A firm invests in options to manage uncertainty through flexibility and time-deferred contingent decisions. The real options framework predicts that firms can create valuable human capital by creating options. Kogut and Kulatilaka recognize that "a real option is the investment in physical and *human assets* that provides the opportunity to respond to future contingent events" (2001:745, emphasis added). Expanding on this notion, human capital options are defined as investments in the human capital pool of an organization that provides the capability to respond to future contingent events. These options enable the firm to develop, maintain, and

deploy human capital for managing uncertainties and irreversibilities associated with them. Figure 1 provides a framework for our discussions.

**Figure 1**
**Options Model for Human Capital Acquisition**




In order to analyze human capital options, we first discuss various uncertainty and irreversibility associated with skills and employees - the two interrelated components of human capital. Skills constitute human capital and contribute towards firm capabilities. Employees possess the skills, the firm never really 'owns' them in the true sense. Therefore it is important to analyze them separately. From a real options perspective, uncertainty and irreversibility of investments in these components would increase the value of creating options and induce the firm to invest in options.

**Skill Options**

Uncertainty regarding skills has evoked quite some attention in recent years as technological, global, and demographic forces have brought about continuous changes in demand, supply, and returns of skills. Skill acquisition is a major investment decision for human capital because skills, especially highly specialized ones, can be difficult to acquire (Coff, 2002) and cost of labor is a major component of overall cost of goods produced. Although the RBV posits that the unique skills and experiences of human capital can give the firm a competitive

advantage (Lado and Wilson, 1994), it offers little towards how such skills are acquired. Real options view, on the other hand, provides a process heuristic for understanding the sequential investment choices in skills. This process is highlighted by alternate investment decision choices for skill acquisition, which are, to hire employees and internalize the skills, to use temporary or contractual employees, or to outsource.

Hiring is upfront investment in human capital with associated costs of recruitment, subsequent training and benefits, as well as responsibilities for maintaining human capital and obtaining results from them. Most of these investments are irreversible and are lost if the employee is terminated or if the employee leaves. Along with the costs associated with recruitment, the investments made in developing human capital are lost. There may also be substantial exit costs in the form of severance payments to laid off employees, declining reputation as a good employer, and/or reduced morale among remaining employees (Matusik and Hill, 1998). The primary uncertainty in hiring is whether the skills acquired can lead to firm capabilities that are valuable, especially for capabilities that require complex or higher level skills. As Quinn and Hilmer (1994) point out, these skills need intensity and dedication that is difficult to achieve if many activities in the value chain are integrated. In other words, efforts to develop too many capabilities may dilute the skill set, especially for high skill categories. If the skills do not produce the desired results then not only the investment is lost, but additional costs of layoffs may be incurred (Brockner, 1988). McElroy, Morrow, and Rude (2001) find that layoffs and turnover can have adverse effects on firm performance. Therefore for skills where uncertainty and irreversibility of hiring is high, options for alternative employment arrangements are valuable.

From a real options perspective, use of temporary or contractual employees may have options value. Although temporary or contractual employees can be employed to cut costs or to avoid liability associated with permanent employees they are also used to meet demand fluctuations (Hippel et al., 1997). Firms can easily alter their scale and scope, and the mix of

human capital through alternative work arrangements (Davis-Blake and Uzzi, 1993; Kochan et al., 1994; Matusik and Hill, 1998) because through these work arrangements the firm makes employees a loosely coupled component of the system, thus increasing their recombinability and its own flexibility (Lepak and Snell, 1999). In essence these are flexibility options i.e. options to change scale and scope of operation (Bowman and Hurry, 1993). If there is uncertainty about whether a skill requirement will continue in the future, hiring temporary employees creates an 'option to defer' or 'option to wait' till demand is more certain (Foote and Folta, 2002). The option to 'abandon' the skills also exists (Matusik and Hill, 1998) because as future requirements unveil, the firm may or may not choose to internalize these skills. If the firm employs contingent work for accumulating and creating knowledge or to get access to specialized skills (Matusik and Hill, 1998), then 'learning' options (Amram and Kulatilaka, 1999; McGrath, 1997) are created. These options have value because of the gain of knowledge in uncertain skill application areas. As McGrath, Ferrier, and Mendelow note, "…exploration in uncertain new areas is strongly associated with heterogeneity in resource accumulation, creating the potential for preferential access" (2004:90). This implies that learning options are the first stepping stones for creating rare, path-dependent, and inimitable human capital through incremental investments.

Although the underlying rationale of human capital options is similar to real options, there are some important differences (see Table 1). First, the firm may or may not get preferential access to the underlying asset, which is the new set of skills. As the firm gets familiar with the skills through interaction with temporary workers, they may become more knowledgeable about it, but this is not preferential access in the true sense because the firm cannot lay a claim on the human capital (although in many cases of 'contract to hire,' the contractual employee joins the company). Second, it is difficult to determine when these options will expire. The firm may continue to get the work done through temporary employees even if the uncertainties are resolved. Nevertheless, the options perspective helps us understand the

value of using temporary or contractual workers better (Foote and Folta, 2002). Accordingly we propose:

> *Proposition 1a*: Alternate employment modes like temporary and contractual workers, provide value for human capital by creating flexibility options, options to wait or defer investments in human capital, options to abandon, as well as options to learn.

However the question of when to invest in options instead of upfront hiring is much more complex and belies a simple explanation. Scholars have argued that temporary or contractual workers may have less commitment towards the firm (Dyne, and Ang, 1998; Hippel et al., 1997), may affect quality of work (Hippel et al., 1997; Kochan et al., 1994; Mallon and Duberlay, 2000; Rousseau, and Libuser, 1997), may be more difficult to control and coordinate (Mallon and Duberlay, 2000), may result in less innovation (Zahra, and Nielsen, 2002), and may cause dissemination of knowledge outside which lead to decay of competencies (Matusik and Hill, 1998). Moreover, the firm may have to pay premium wages to contractual workers and the agency providing the workers may charge extra fees. For example wages for temporary or contractual workers is higher than permanent workers in IT (Kunda, Barley, and Evans, 2002). Therefore the opportunity costs of hiring vis-à-vis that of options, play a role in these decisions. Opportunity costs are investments that will not be made from a given set of scarce resources because they were invested in something else. In other words opportunity costs are returns lost because of foregone investments. Typically they are calculated as the difference between the returns from the investment and its alternatives. Opportunity costs of human capital investment choices are difficult to isolate, verify, and validate mathematically. At the same time, they are critical for our discussion of options.

*Opportunity costs of hiring* depend on the value of flexibility options, options to wait or defer, options to abandon, learning options, and switching options (see Appendix). As Foote and Folta (2002) contend, the value of the options created by temporary and contractual employees depends on the uncertainty and irreversibility of investments associated with hiring

permanent employees. In other words options will be more valuable if uncertainty and irreversibility associated with hiring are high. For example, value of flexibility option (i.e. expand or contract the skill set) is high if uncertainty of demand and supply of skills is high and hiring permanent employees involve high irreversible investments in psychological contract of providing stable employment (Rousseau and Wade-Benzoni, 1994). Options to wait or defer investments in human capital are valuable when there is high uncertainty about continuation of demand for the skill and hiring permanent employees involve irreversible investments in recruitment costs and human capital development (e.g. extensive orientation training). Options to abandon are valuable when uncertainty about abandonment of skills is high (e.g. due to escalation of commitment, Adner and Levinthal, 2004) and there are high irreversible investments in employment contracts with permanent employees (e.g. due to unionization). Learning options (through limited investments) are valuable when uncertainty about returns to skill applications is high (e.g. for very specialized skills) and irreversible investments for developing skills are high. Finally value of switching options (i.e. substituting one set of skills with another) is high when uncertainty of returns from specific skills application is high and irreversible investments in in-house resources and processes is high.

We have noted that psychological contract of providing stable employment is one of the irreversible investments in human capital. We feel that this concept merits some discussion. Schein (1980) defines the psychological contract as an unwritten set of expectations operating between every member of an organization and various managers and others in that organization. Robinson, Kratz, and Rousseau, (1994) have gone further and argued that the psychological contract involves something stronger than just "expectations," what is involved are "promissory and reciprocal obligations" that are not included in the formal contract of employment. Recent research indicates that breach or non-fulfillment of such contracts affect employee performance and induce turnover (Turnley and Feldman, 1999). Psychological contracts maybe difficult to change (Stiles et al., 1997), especially if they are ‘relational

contracts' (Rousseau and Wade-Benzoni, 1994) characterized as having considerable investment by both employees (company-specific skills, long-term career development) and employers (extensive training). These make them partly irreversible; however the degree of irreversibility will depend on the organization and nature of work.

*Opportunity cost of options* represents lost value when temporary or contractual employees are hired instead of permanent employees (see Appendix). Although there is contradictory evidence in this area (Pearce, 1993; Porter, 1995), some findings indicate that temporary or contractual workers may have less commitment towards the firm (Dyne, and Ang, 1998; Hippel et al., 1997). Scholars have also cautioned that use of temporary workers may affect quality of work and have the risk of safety violations (Hippel et al., 1997; Kochan et al., 1994; Mallon and Duberlay, 2000; Rousseau, and Libuser, 1997). Others contend that temporary and contractual workers may be more difficult to control and coordinate (Mallon and Duberlay, 2000), may result in less innovation (Zahra, and Nielsen, 2002), and may cause dissemination of knowledge outside which lead to decay of competencies (Matusik and Hill, 1998). All these reduce the value of options and increase their opportunity cost. A firm has to assess these before evaluating the opportunity cost of temporary and contractual workers.

As options become more valuable, opportunity costs of hiring becomes higher than that of options i.e. investments in options become more valuable than investments in hiring permanent employees. Therefore firms will invest in flexibility options, options to wait or defer, options to abandon, and learning options through temporary or contractual employees, when the opportunity cost of hiring permanent employees is more than the opportunity cost of hiring temporary or contractual employees - which implies that the firm may lose more in hiring than in creating options (see Appendix).

> *Proposition 1b:* Firms will employ temporary and contractual workers if the opportunity cost of hiring is more than the opportunity cost of options.

Outsourcing, which involves contracting the job to an external agency on a recurring basis, is done primarily to offload non-core activities in order to cut costs and improve strategic focus. The skill itself is taken out of the firm and given to another firm (which probably specializes in that area). This is different from employing temporary or contractual employee in two ways: a) the outsourcing firm is not responsible for getting the work done; and b) the contracts are often long term and recurring. Outsourcing for cutting costs is explained by the transactions cost perspective, which prescribes efficiency as the criteria for contracting. However, in recent years, firms are outsourcing for other reasons like to facilitate rapid organizational change, to launch new strategies and to reshape company boundaries (Linder, 2004). Many of these represent options. For example the capability to switch among various choices and adjust quickly to a changing environment is essentially a 'flexibility' option or 'switching' option (Trigeorgis, 1996). The outsourcing firm can achieve this because of less commitment to in-house resources and the ability to switch between firms providing various choices for outsourcing. This capability also allows them to heuristically search for valuable skills and capabilities, although through external agencies. Additionally option to abandon is inherent in the decision to outsource, as the firm may choose not to renew contract. This may be due to non-continuation of the skill, or to search for a better provider.

Therefore we propose,

*Proposition 2a*: Outsourcing provides value for human capital by creating flexibility and switching options as well as through options to abandon.

However, outsourcing may also have opportunity costs (see Appendix). For example, contracting is a critical issue in outsourcing; if the contract is not flexible there may be little scope for modifying it within the contract period. Managing the vendor is another issue where inefficiencies and inflexibilities may creep in. In fact managing the vendor may become more difficult than managing own employees because there is little control over vendor's employees. A third issue is switching vendors. Although this represents flexibility, the switching costs may

be high, making the contract or flexibility option inefficient (Barthelemy and Adsit, 2003). Loss of customer satisfaction is another risk associated with outsourced work. Although Gainey, and Klaas (2003) did not find support that outsourcing of training would lower client satisfaction, in some cases customer satisfaction has been a concern (Wall Street Journal, 2003). Finally, perhaps the most important concern is the risk of knowledge dissemination outside and decay of competencies because of the minimal skill involvement of the outsourcing firm (Earl, 1996; Lei and Hitt, 1995). Presence of one or more of these factors increases the opportunity cost of outsourcing vis-à-vis hiring and influences decision to outsource the skill.

Therefore, we propose,

*Proposition 2b:* Firms will outsource skills if the opportunity cost of hiring is more than the opportunity cost of options.

**Employee Options**

We have argued earlier that human capital is different from other real assets in one aspect - a firm never owns human capital in the true sense, it resides in employees. In other words there is dual claim of ownership on human capital. Therefore the employee as an individual plays a significant role in human capital investment decisions and it is critical that we discuss the uncertainty and irreversibility associated with employees.

The uncertainties related to an employee are skill matching (person-job fit) and person matching (person-organization fit). Skill matching is a critical requirement for generating maximum return on investment from recruitment of employees. Although skill tests can determine, to some extent, the proficiency of a candidate, the actual match of skills is revealed only over time as the person works on the job. A mismatch can cost the firm in terms of lost productivity. To avoid this many firms hire interns or part-time employees so that skill levels can be better judged. Especially for highly skilled jobs as in law firms (Hitt et al., 2001; Malos and Campion, 1995) interns work for several years before getting permanent status. Similar

practices are followed for faculty jobs in top research universities where tenure is granted only after evidence of skill in research and publishing. Firms requiring creative talent, like advertising agencies, entertainment companies, hire part-time or on test projects before committing work. In essence these are learning options to provide more information on the employee.

Similar concerns exist for person matching i.e. whether or not the employee fits as a 'person' with the organization. Person-organization (P-O) fit, or the compatibility between people and the organizations in which they work, is a key to maintaining a flexible and committed workforce that is necessary in a competitive business environment (Kristof, 1996). Several firms place more emphasis on person-organization fit than a job fit (Bowen, Ledford, and Nathan, 1991). Internships and part time employment create learning options for these uncertainties too. The firm can 'judge' the fit of an employee with the organization during the period of pre-employment. Clearly, the option to abandon i.e. terminate the employee in case of mismatch is available for such work arrangements. Therefore we propose that,

> *Proposition 3a*: Pre-employment appointments such as internships and part-time employment provide value by creating learning options and options to abandon with respect to employees.

However these options may also involve some opportunity costs. Although the cost for internships may be minimal (another reason why firms employ them), cost of part timers may not be so. Firm investments in development of such employees (e.g. training) or firm-specific human capital generated on-the-job (e.g. specific knowledge about a project), can be lost at termination. Additionally, there are long-standing concerns about the performance of such employees (Feldman, 1990), although a recent meta-analysis has shown little difference between full-time and part-time workers on organizational commitment and intention to leave (Thorsteinson, 2003). Taken together these costs may affect the decision to use such employment arrangements or not.

We propose that firms will create these options when they are more valuable than hiring upfront.

> *Proposition 3b:* Firms will use pre-employment appointments such as internships and part-time employment, if the opportunity cost of hiring is more than the opportunity cost of options.

## Discussion

The real options approach provides alternative rationale for value creation in human capital, and is complementary to the RBV explanation. According to the logic of real options, firms faced with high uncertainty and irreversibility should invest in time-deferred, contingent 'options,' until major uncertainties are resolved. This approach recommends capability development in stages, through sequential path-dependent investments, as well as through pursuit of opportunities with significant upside potential (McGrath, Ferrier, and Mendelow, 2004). Therefore this view provides a heuristics guidance on how to create valuable, rare, inimitable and non-substitutable resources, as prescribed by the RBV.

We investigate human capital acquisition decisions using the real options framework. We propose that when uncertainty over skills is high, and investments in hiring are significantly irreversible, options to wait, defer or abandon skills, as well as to learn new skills and operate flexibly become more valuable. Greater value of options increase the opportunity cost of hiring upfront, i.e. the cost of not investing in options becomes high. In that case a firm would invest in these options through use of temporary or contractual employees, or by outsourcing the skill altogether. We also discuss how employees, as owners of skills, need to be considered separately for investment decisions in human capital because there may be uncertainty and irreversibility associated with employees as well. In case of high uncertainty over person-job and person-organization 'fit' we propose that firms would use pre-employment arrangements like internships or part-time employment as long as the opportunity cost of doing so is lower than that of hiring.

Our theoretical model, as presented in Figure 1 and mathematically represented in the Appendix, throws some light on the 'black box' issue in strategic HRM i.e. what is the process through which HRM impact human resources so that valuable, rare, inimitable, and non-substitutable human capital is generated. This question assumes enhanced significance when uncertainty about the returns from the human capital is high, uncertainty about the demand and supply of skills is high, as well as uncertainty about person-job and person-organization 'fit' has major implications for the firm. If irreversibility of investments in human capital through hiring is also high, then the real options logic suggests that alternative work arrangement like temporary/contractual/part-time workers, interns, or outsourcing of the work may provide managers with the time to let uncertainties reduce and the flexibility to continue or abandon the skills/employee. Additionally, these work arrangements may provide preferential access through learning and generate growth potential. Uncertainty resolution helps managers identify skills and employees that are more valuable to the firm, and create a sequential investment path which is rare and difficult for competitors to imitate. Therefore options are the stepping stones for valuable, rare, inimitable human capital.

In presenting our model we use the notion of 'opportunity cost' of hiring vis-à-vis that of options and assert that these will affect the decision to invest in options. Opportunity cost of hiring is the returns forgone by *not* investing in options, which we identified as the option value to 1) operate flexibly, 2) wait or defer, 3) abandon, 4) learn, and 5) switch, reduced by the premium to buy the options and the switching costs. Opportunity cost of options consists of returns not generated because work is not done by permanent employees. These are concerns about quality of work, commitment of employees, rate of innovation, loss of control, increased effort in managing alternate employees/contracts, lower customer satisfaction, and decay of competencies through knowledge dissemination outside. We propose that a firm would invest in options only if the opportunity cost of hiring is more than that of options.

One must also consider the interdependence of the options in terms of upside and downside effects. On the upside, we have argued that several options may be present simultaneously in an investment decision like employing temporary workers or outsourcing. The expectation is that these options would complement each others' effects and create synergies that may override the costs. For example, option to wait on skill acquisition and option to abandon may together make the opportunity cost of not using temporary employees high, even though such workers may be costlier in terms of remuneration (Kunda, Barley, and Evans, 2002). Similarly, flexibility options as well as options to abandon may be present in outsourcing, which makes the opportunity cost of not doing so greater. Therefore 'bundles' of options may provide synergistic benefits to override their costs (Trigeorgis, 1996). However, on the downside, one must recognize that some options may run counter to others. For instance, while the use of contingent workers allows the firm to adjust to changing volumes, contingent workers may not be emotionally bound to the firm in ways that result in the same positive behavioral effects (Dyne, and Ang, 1998; Hippel et al., 1997).

It is necessary to recognize the significance of the 'exercise' and 'expiration' of options, which is use of the capabilities generated through options. Financial options, if not exercised within the stipulated date, becomes non-usable; real options like joint ventures or RandD investments may also loose their value after certain period if their potential is not realized. Human capital options may also lose their value, which means the capabilities may become less useful, if the level or sources of uncertainty changes. However these options maybe more durable than either financial options or real options because capabilities like growth, learning, and flexibilities are fairly generic and not specific to a particular job or skill. For example, in many instances firms keep on employing temporary or contractual workers even though the uncertainty is resolved (Kunda, Barley, and Evans, 2002). Therefore, human capital options, in general, can be more sustainable than other types of options. However, we also recognize that

some options, like flexibility or switching options, if not exercised, may become non-usable or lose significance due to escalation of commitments (Adner, and Levinthal, 2004).

One could argue what we propose in this paper are certainly not new to the strategic HRM literature. Firms have implemented a variety of the practices we note for arguably, if at least implicitly, the goals of managing uncertainties. However, past explications of these relationships have usually focused on cost, revenue, or productivity considerations. While decision makers may have implemented practices as piecemeal responses to experienced uncertainty, this has been done without an overall framework for thinking about uncertainty and irreversibility facing the firm's human capital. For the field of HRM to ignore these would result in far less than optimal strategic decision-making. Therefore the real options approach is an appropriate "way of thinking" (Amram and Kulatilaka, 1999) that provides three components, which are of great use to managers: creation of capabilities even if they may not be used; contingent decisions based upon unfolding of events; and managing human capital investments proactively.

**Future Directions and Practical Implications**

We believe that the emphasis on options in human capital raises a number of issues that need further investigation. First, this theoretical framework sets the stage for empirically investigating the relationship between options, uncertainty, and irreversibility associated with human capital. Second, we believe that HR options would have synergistic effects when they act in a 'bundle' as multiple interacting options. Research is needed to analyze the different 'bundles' of options in human capital based on the purpose they serve together. Third, we contend that HR options may manage more than one type of uncertainty. Further research could examine the ways in which these options impact the various forms of uncertainty we have identified.

From the practical point of view, in this fast changing world, managers are increasingly looking for ways to rationalize their investment decisions in human capital. Our framework

assists them in choosing appropriate skill and employee acquisition practices that address particular needs of the organization. This way they would be able to justify the work arrangements they adopt. Our fine-grained analysis of various options goes a step further in explaining how these arrangements may be helpful to them. For example outsourcing is universally thought of as a cost-reduction practice leading to productivity gains. However, in recent years other benefits from outsourcing, namely rapid change and growth, have highlighted (Linder, 2004). We discuss these in terms of 'options value' and 'opportunity costs,' which maybe quantified and therefore of use to managers in making investment choices. By articulating a comprehensive schema for evaluating each option in terms of uncertainty and irreversibility, we provide a viable way to do a judicial cost-benefit analysis for investments in human capital.

In conclusion, we propose that presence of options enables the firm to reduce uncertainty associated with its investments in human capital, which in turn allows managers to generate valuable human capital. We have discussed how firms would evaluate uncertainty of human capital and irreversibility of investments in hiring to arrive at decisions to invest in options. In doing so we assert that the real options framework addresses the question unresolved in the RBV of value creation, which is, how do firms recognize which resources will be valuable? The options view provides a heuristics process approach of sequential investments through uncertainty resolution to explain value-creation in firms.

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## APPENDIX

**I. Opportunity cost of hiring = *x + w +a + l + s – p - sc***

'*x*' is option value of *flexibility = f* (uncertainty of demand for and supply of skill, irreversible investments in psychological contracts with permanent employees)

'*w*' is option value to *wait or defer = f* (uncertainty of continued demand for skills, irreversible investments in hiring and developing human capital)

'*a*' is option value to *abandon = f* (uncertainty of skill abandonment, irreversible investments in employment contracts with permanent employees)

'*l*' is option value to *learn = f* (uncertainty of returns from skills application, irreversible investments in developing skills)

'*s*' is option value to *switch = f* (uncertainty of returns from specific skills application, irreversible investments in in-house resources and processes)

'*p*' is *premium* for options = cost of temporary/contractual/outsource vendor workers – cost of permanent workers

'*sc*' is *switching* cost of flexibility options = cost of switching temporary/contractual/outsource vendor workers

**II. Opportunity cost of options = *q + m + i + n + e + cs + k***

'*q*' is the difference in *quality* of work between permanent and temporary/contractual/outsource vendor workers

'*m*' is the difference in *commitment* between permanent and temporary/contractual/outsource vendor workers

'*i*' is the difference in *innovation* between permanent and temporary/contractual/outsource vendor workers

'*n*' is the difference in *control* between permanent and temporary/contractual/outsource vendor workers

'*e*' is the difference in *effort* in managing permanent employees and temporary/contractual/ outsource vendor workers

'*cs*' is the difference in *customer satisfaction* between permanent and temporary/contractual/ outsource vendor workers

'*k*' is the risk of *knowledge dissemination* outside through permanent and temporary/contractual/ outsource vendor workers