

The Talent Commons: Human Capital and Collective Knowledge Creation

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“The best way to send information is to wrap it up in a person.” -- J. Robert Oppenheimer

I. Introduction

Human capital is a dynamic self-replenishing resource. Unlike other natural resources which are endangered by overuse, pollution, and free riding, human capital is endangered when it is under-used, isolated, and controlled. This article studies the evolution of our notions of human capital and how contemporary national and international policies embody the notion that not only the outputs of innovation – artistic expressions, scientific methods, and technological advances – can be controlled, but rather, the outputs of innovation – people themselves, their skills, their experience, their knowledge, their professional relationships, and their potential for innovating – are also subject to control and proprietization. Intellectual property rights pertaining to job mobility and human capital – the regimes of non-compete enforcement, post-employment restrictions including non-competition, patent and copyright assignment, and trade secrets and confidential information agreements – are a growing frontier of market battles. They are one of the primary ways in which regional and global competition is shaped. Through mechanisms that have been the blind spots of intellectual property debates – the expansion of regulatory and contractual controls over human capital – skill and knowledge have become proprietary. The collective aspects of nurturing talent remain secondary and are yet to be fully understood.

This article questions the orthodox economic assumptions about human capital controls and seeks to enrich our understanding of the human capital-innovation nexus. Traditional economic analysis understands the talent wars, the battle to claim ownership over human capital and our collective cognitive capacities for innovation, in similar terms as the patent and copyright wars. The orthodox economic view has been that human capital and intellectual property controls are necessary limitations stemming from the fact that absent such protections, employers would under-invest in employee training. The article illuminates the multiple effects of talent flows and shows how the most successful industries and regional economies rely on institutions of collective action to ensure the nurturing of the talent commons, protect mobility, and encourage the densification of knowledge networks. More than ever before, we must take seriously the mandate of nurturing our talent commons. The article calls for a recognition of talent qua talent as commons to be energized and governed by smart public policy.

The article proceeds as follows. The first part develops the argument that debates about the scope of intellectual property and the public domain have obscured the broader ways in which knowledge and potential for innovation is controlled. The section links the nature of the new economy, which relies on innovation and knowledge work to the myriad of ways in which the flow of skill, know-how, creativity and the capacity for invention are increasingly hindered by human capital controls. Turning next to new insights of economic research and empirical data about development and regional competitiveness, the article challenges the perceived tension between market innovation and human capital as a commons and illuminates the ways in which the nurturing of talent pools and knowledge flows are essential to economic growth. The article concludes with directions for future research and policy reform.

II. The Knowledge Economy and the Human Capital Puzzle

The new economic realities of twenty-first century production and competition, which have changed the patterns of work and have increased the premium on constant innovation, coincide with the accumulation of new empirics on innovation and their links to knowledge flows and job mobility. While both of these developments have been of great significance in practice, the literature on human capital and talent flows is surprisingly thin. At the same time that human capital has risen above tangible assets as a key ingredient for economic success, there remains high variation and uncertainty in how we think about human capital policy. Nobel Laureate Elinor Ostrom, who pioneered the research on the commons, described *knowledge* as “a shared resource, a complex ecosystem that is a commons—a resource shared by a group of people that is subject to social dilemmas.”¹ Ostrom defined knowledge as all intelligible ideas, information, and data. In the past two decades, scholars from a wide variety of disciplines have been struggling against the over-expansion of controls over knowledge through intellectual property controls. The debate about the effects of intellectual property laws on inventive activity and technological progress is enduring and lively. Yet, the field of human capital – at the intersection between employment policy and intellectual property rights -- has been relatively neglected and provides fertile grounds for new inquiry.

The legal protection of ideas as a form of property is a relatively recent development from a historical viewpoint. Ancient times operated with relatively little formal protection. Over the centuries, conceptions over ownership of intangible goods have evolved. The tension of controlling information is clear: in its natural state, information travels freely. Information is, by its very nature, a public good. Without effort, ideas flow freely; multiplying without running out. At the same time, information has significant (and growing) commercial value.

George Bernard Shaw mused that “if you have an apple and I have an apple and we exchange it then each of us has one apple. If you have an idea and I have an idea and we exchange it then we each have two ideas.” Going a step further, John Steinbeck compared ideas to rabbits: You get a couple, learn how to handle them, and pretty soon you have a dozen. Thomas Jefferson viewed the free spread of ideas “over the globe, for the moral and mutual

¹ Hess and Ostrom, *Understanding the Knowledge Commons* (MIT Press 2006).

instruction of man, and improvement of his conditions” as “peculiarly and benevolently designed by nature, when she made them, like fire, expandable over all space, without lessening their density in any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation.” And yet, over the last century, intellectual property rights have expanded in length of protection, subject matter, and scope. Patent eligibility has been expanded to new subject matters such as computer software, business methods, and genetically modified organisms; copyright protections have been extended and lengthened; trade secrets span new subject matters and modes of infringement. Intellectual property has been hailed “the foundation of the modern information economy: It fuels the software, life sciences, and computer industries, and pervades most of the products we consume.”² As the scope of IP protection expands, the field has also become one of the most contested areas of policy. From music file sharing to drugs for AIDS patients in the developing world, “the intellectual property wars are on.”³

The fierce battles raise questions about the costs and benefits of controlling knowledge and the distributional effects of intellectual property regime. In general, granting IP rights is a quid pro quo bargain: put in the effort to innovate and receive in return limited time exclusivity over your innovation. The prevailing consensus continues to be that IP protections themselves are largely harmful, but the incentives behind them are valuable. In other words, most scholars agree that IP is a necessary evil: it promotes innovation by creating a partial monopoly. The debates normally surround the scope of enclosure and the limits of this necessary evil. Still, recently, a growing but significant minority of commentators advocate against intellectual property more broadly, viewing it as an unnecessary evil that reduces access and slows down progress in the arts and sciences.⁴ Almost a decade ago, an open letter to the Director General of the World Intellectual Property Organization (WIPO) by a group of scholars and activist, sounded the alarm on “excessive, unbalanced, or poorly designed intellectual property protections.”⁵ The letter called for updated approaches to knowledge building and sharing. The quest to reach the right balance between public domain and intellectual property protections is ongoing and vigorous.

At the same time that the expansion of intellectual property has triggered such lively contestations and exchanges, under the radar, excessive, unbalanced and poorly designed (to borrow the language of the letter to WIPO) *human capital* controls have continued to expand. The impulse to control human capital is manifested in the growing use of non-competes, non-disclosure agreements, and pre-invention assignments. When we turn to the lands of the science of innovation, motivation, creativity, and growth, the tradeoffs between controls and freedoms must be reconsidered within the richer lands of human behavior, social networks, and the science of innovation.

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³ Gaia Bernstein,

⁴ *Against Intellectual Monopoly* is a recent book that calls for the complete abolishment of the system of intellectual property rights – a call to governments around the world not for tinkering and perfecting the current imperfections in the IP system but for the complete elimination of the monopolistic controls.

⁵ *Nature* 424, p. 118, 10/7/03

Several interrelated developments have coalesced in recent years, creating contemporary realities that must demand re-focusing our attention to human capital as commons: dramatic changes in labor markets; a deepening in what we know about innovation; and a rise in litigation coupled by variation and uncertainty about the laws of human capital. First, global competition, employment practices, team production, and labor market mobility have challenged the ways we think about a competitive edge in innovation. The new economic realities of the early twenty-first century, characterized by high turnover, lack of job security, fast paced global competition, and a growing reliance on knowledge work, are transforming the way we must think about our talent pools. Like all creative ventures, work has evolved dramatically through different periods, leading up to the contemporary workplace. In a broad brush, over the past century, we have witnessed a shift from an industrial era to an information economy. With the intensification of digital technology and global competition, this shift is becoming more salient all over the world. If in the past, work was characterized by narrowly defined tasks and strict managerial supervision, today workers are expected to self-direct, exercise independence of thought, and be creative and inventive. The patterns of the work-life cycle have also dramatically evolved. If in the past work relations promised certain degrees of security and stability, today employers constantly recruit new talent while workers are expected to manage their own job-hopping careers and frequently re-skill without any expectation of long-term employment.

Second, the accumulation of scientific knowledge about how innovation successfully occurs enables us more than ever to better assess different strategies and policies. As we will discuss in the next sections, the science of innovation, a field that crosses disciplines and is of rising interests to researchers, provides us with new insights about how innovation happens in creative settings and how policy can best support industrial and regional development.

Third, the heightened significance of human capital as a valuable resource has also meant record numbers of disputes and conflicts. Indeed, in some industries it is common to calculate litigation expenses as part of the costs of a new start-up. High jurisdictional variation and uncertainty raise serious concerns about the inefficiencies of current arrangements. More than ever before, contemporary markets present a central challenge for law and policy to support, rather than impede, the nourishment of human capital and knowledge networks.

Controls over human capital have become widespread in almost every industry. These controls include both contractual and regulatory constraints on the use of knowledge, skill, and information acquired during employment, and include, (1) Covenants not-to-compete; (2) Trade secrets and non-disclosure agreements; (3) Employee duties of loyalty, including prohibitions on customer and co-worker solicitation and raiding for competitive endeavors; (4) Employee ownership over inventions and creative ventures, including pre-invention patent assignment agreements and work-for-hire disputes over copyright. Each of the central mechanisms upon which employers rely to control information in the workplace are subject to legislation and litigation. As a result of the competing interests embedded in human capital regulation, around the world, policy makers and business interests are calling for reforms around these policies, signifying the discontent with outdated and misguided policies. Many countries and states are either in the process of reforming or are debating such reforms. Nevertheless, despite the consensus on the general goals of promoting entrepreneurship and development, there is little agreement on how to achieve these goals. Courts usually apply the rule of reason, or ‘reasonableness,’ to scrutinize these various controls over human capital. Inevitably, the standard

of reasonableness is an open-ended standard and its respective balancing tests, between “legitimate business interests” and the “public interest”, are applied by the courts ad hoc on a case-by-case basis, without reference to current data and without lending themselves to generalization. The reasoning often is conclusory and subjective.

Some regions have been more cautious about expanding controls over human capital. Rather, these regions govern human capital more clearly as a common resource, encouraging its flow and use. For example, under existing law, a minority of states in the United States, such as California, do not enforce non-competes in the employment relationship. Similarly, a minority of states provide statutory limits on the ability of employers to contractually pre-assign all employee inventions. While jurisdictional variation may have negative consequences, one of its advantages for research is that it provides natural experiments to uncover the effects of human capital protections on innovation and to test the models and insights. We turn in the next sections to consider innovation policy in light of contemporary the insights from the science of innovation.

III. Unpacking Spillovers

The Latin proverb, *Scire tuum nihil est, nisi te scire hoc sciat alter*, reminds us that your knowledge is nothing if no one else knows you know it. Utopist cyber thinker Stewart Brand is famous for coining the phrase “information wants to be free.” When knowledge is embodied in people, the phrase is even more powerful: “talent wants to be free”. The effects of propertizing propertizing talent pools – human capital itself –can be detrimental. New field and experimental data about talent flows and growth, along with theoretical analysis, allows us to better understand why often resisting the impulses to turn human capital to property can yield far great innovation.

The debate about human capital policy tracks many of the same concerns and tradeoffs as the general IP debate. As a point of departure, we can consider the trade-off both between knowledge development and dissemination, and between individual and corporate incentives to invent and absorb new ideas in workplace settings. We want talent to be nurtured, but we also want talent to thrive. We want firms to invest in human capital but we want fierce competition and optimal employment of human capital in the market. A default tendency for overprotection of human capital as firm-bound property undervalues the role of public domain knowledge in stimulating market growth and igniting the sparks of innovation. More often than not, despite the salience of loss from talent flows, even when companies do not fully maximize their returns from each individual investment, they benefit more from the information being known by competitors. In classic economic analysis, externalities, whether positive or negative, are a type of market failure. Just as tort liability aims to internalize negative externalities – the cost of harm to another, for example by pollution – we accept intellectual property controls as necessary to internalize positive externalities – the benefits to another from developing a new idea, for example a new medical procedure. Human capital spillovers should not be understood as simply a side effect, nor a failure, but a constitutive part of the market itself. But human capital policy also has unique features and is an under-investigated area of research and practice. Human capital regimes shape the relationships between individuals, groups, organizations. They determine in significant ways the pace of growth and development in regions and countries. The ways we configure human capital policy impact the ability of people to pursue their passions and

livelihood and to establish the professional and social connections needed for the advancement of their careers.

Innovation depends on the flow of knowledge and people in a competitive market. Almost half a century ago, Nobel laureate Kenneth Arrow argued that competition, not central control, is what fuels innovation. Writing specifically about human capital, Arrow observed that “mobility of personnel among firms provides a way of spreading information.” In other words, Arrow believed that ideas will travel with workers between companies, thereby creating more useful knowledge and strengthening competition in the market. Job mobility, Arrow understood intuitively, would be the primary way of spreading information. Contemporary markets and new scientific studies provide empirical bases for Arrow’s assertion. More than ever, we know today that human knowledge is a collective endeavor. Excessive intellectual property controls threaten to become enclosures of knowledge. These concerns apply even more strongly to human capital controls. Unlike other areas of intellectual property, policies and norms that constrain the flow of talent control cognitive capital; the use of people themselves. The tragedy of the anti-commons is that of the underuse of scarce resources caused by over-controls and strong private property rights (Heller 1998). To use the terms of the commons / anti-commons literature, the underuse of people – the depletion of cognitive resources – is perhaps the greatest tragedy of all. In blunt economic terms, the deadweight loss from controls and restrictions over human capital is the person herself who is prevented from using her talent, skill, and passion. When talent is made to take detours; when minds are made to suppress ideas; when knowledge is cut up to small fragments and is deemed confidential proprietary information – society as a whole loses.

Despite their prominence, until recently, there was a lack of rigorous study of the effects of human capital controls. The following subsections unpack the positive spillovers effects and provide a richer perspective of the ways in which knowledge inhabits our talent pools and the benefits that flow from governing human capital as a common resource.

1. Tacit knowledge

Hess and Ostrom (2006) suggested that “an infinite amount of knowledge is waiting to be unearthed. The discovery of future knowledge is a common good and a treasure we owe to future generations. The challenge of today’s generation is to keep the pathways to discovery open.” Knowledge however is not merely a good that can be unearthed and passed on, like a tangible gift, to future generations. In its dual meaning, knowledge simply cannot be captured by merely examining the codified items we consider intellectual property – ownership in patent, copyright, trade secrets. Knowledge is also the human skills, communications, and know-how that exist within people. The direct interactions between people are the primary vehicle of transmitting these aspects of knowledge.

There are multiple reasons why even in the age of information, when the digital sphere provides abundant access to knowledge, knowledge flows still rely on direct human communication. Knowledge is frequently difficult to transmit simply by reading a patent document or a scientific journal. A primary reason for the continuing need for human interaction is that knowledge is often not codified. Knowledge remains tacit both because of the nature of certain types of knowing and because, even when knowledge is amenable to codification, those holding the knowledge often lack incentive to codify it (Agrawal 2006). Machlup (1983) called it

brainwork, emphasizing that beyond “*knowing that*” exists a “*knowing how*”. Polanyi similarly distinguished between connoisseurship, or the art of knowing versus skills, the art of doing. Indeed, a related way to understand the complexity of knowledge and its relation to the talent commons is that knowledge embodies a “dual function”: it exists as a thing external to the human mind but it is also constitutive of the thing itself – to be human is to know. In broader terms, knowledge is both a resource society possesses and the very essence that constitutes as a society. (Reichman and Franklin 1999; Braman 1989). Given that information that exists externally to human capital does not capture the fullness of human knowledge, one of the central ways knowledge in its depths and multiplicities flows in the market is through employee mobility. The loss that stems from controlling human interactions and flow is different therefore, and indeed great, than the formal knowledge that any single individual may possess.

2. Relational Knowledge

Beyond the flow of tacit knowledge, mobility and interaction of people creates opportunities for connecting between distinct types of knowledge and ideas. Isolation impedes knowledge. Conversely, social and professional relationships facilitate the flow of knowledge (Agrawal, Kapur & McHale 2006). Relationships persist after people move, forming professional networks where past colleagues remain acquaintances and potential collaborators. As research and development have become the core activities of many industries, businesses recognize the significance of best practices for team work, collaboration, and high-commitment organizational behavior. Work has largely shifted from individuated to collaborative and coordinated production, raising the significance of institutional design. Organizational environments shape a company’s culture of innovation. Organizational environments can promote -- or hinder -- a culture of innovation. In the aftermath of Enron, Security and Exchange Commission Chair William Donaldson suggested that the single most important asset of a corporation is its “organizational DNA.” Donaldson argued that a company must continually devote efforts to “the evaluation and understanding of their own group dynamic and the way that affects their decision-making process.” The idea of organizational DNA finds support in social psychology and management studies. In contrast to the industrial era’s emphasis on isolated work, the current consensus is that, on average, groups outperform individuals in decision-making and problem-solving. For business strategists, the promotion of “organizational DNA” involves creating a culture of constant improvement where enhanced commitment by creative individuals and group interactions support team innovation. For both managers and regulators, the term connotes the promotion of openness, learning, transparency, the challenging of beliefs, and institutional disentanglement. An environment that supports innovation includes an atmosphere of trust and idea sharing, the promotion of risk taking, dedicated structured time for idea development and collaborative facilities.

Recent empirical studies similarly consistently teach us that social interaction spurs creativity. A series of new studies test the importance of collaboration of professionals over time and the relationship between networks and entrepreneurship. For example, Nanda & Sørensen 2009 examine whether the likelihood of entrepreneurial activity depends on the prior career experiences of an individual's co-workers. The study shows that peers increase an individual's likelihood of becoming an entrepreneur through two channels: by increasing the likelihood that

an individual will perceive entrepreneurial opportunities and by increasing his or her motivation to pursue those opportunities. Such effects are strongest for those without exposure to entrepreneurship in their family, suggesting that market ties can serve as substitutes for community ties. Wuchty, Jones and Uzzi (Science 2007) use 19.9 million papers over 5 decades and 2.1 million patents to demonstrate that teams increasingly dominate solo authors in the production of knowledge across nearly all fields. They show that much more than in the past, patents and articles of teams are typically more frequently cited and produce the exceptionally high-impact knowledge, suggesting that the modes of production of knowledge have changed.

Other recent studies underscore the fundamental importance, in both artistic and scientific ventures, of networks, friendships and prior ties. The more collaborators an individual has, the higher the more likely she is to participate again in a collaborative venture. For example, Singh (2005 Management Science) finds that when comparing “veterans,” that is, professionals who have already participated in the past in collaborative networks, and “rookies,” teams that place their research in high impact journals have a high percentage of incumbents. At the same time, working with too many former collaborators reduces the placement ranks. To wit, forming the next winning team is a matter of getting highly networked and experienced collaborators, but not necessarily the same ones you have worked with last time.

3. Networked Knowledge

Related to the effect of increasing collaboration, the flow of human capital increases the density of professional networks. The density of a network is highly correlated with the number of inventions in that network. In other words, the greater the number of people in contact, the more creative each member of the network becomes. Connections between innovators increase the overall numbers of patents in an area, as well as the number of co-authored patents. Other empirical findings similarly and consistently show that social interaction is necessary to seed the first ideas for groundbreaking inventions. (Hansen 1999). These findings hold true for networks across technical fields, where interdisciplinary collaborations can similarly stimulate new product development. Interdisciplinary interaction and cross-pollination efforts serve as pathways and pattern the flow of knowledge. In both artistic and scientific networks, friendships and prior ties are of fundamental importance.

Science offers us new tools to test the connections amongst individuals and their relations to productive endeavors. Network imaging has developed significantly in the past several years, exploring the patterns of links formed over time through professional ties, friendships, communication, or commerce.⁶⁷ These days, network theory can demonstrate the connections

⁶ Dorogovstev, Mendes, Evolution of Networks: From Biological to the Internet and WWW (Oxford Univ. Press 2003); Albert-Laszlo Barabasi, Linked: The New Science of Networks (2002); Models and Methods in Social Network Analysis (Peter J. Carrington, John Scott & Stanley Wasserman eds., 2005); Romualdo Pastor-Satorras & Alessandro Vespignani, Evolution and Structure of the Internet: A Statistical Physics Approach (2004); Reka Albert & Albert-Laszlo Barabasi, Statistical Mechanics of Complex Networks, 74 Revs. Mod. Phys. 47 (2002); M.E.J. Newman, The Structure and Function of Complex Networks, 45 SIAM Rev. 167 (2003).

⁷ Duncan J. Watts, Six Degrees: The Science of a Connected Age (2002).

between millions of individuals in their communications over the web, their professional interactions, search patterns, and consumption habits. In the context of human capital flows and their significance to innovation, contemporary researchers have devised, for example, inventor-matching algorithms that assess the rates of collaboration between inventors and map the data about patent and copyright authorships. These applications not only provide clues about the past connections among individuals in particular endeavors, but also enable computer simulations to predict future flows.

One general consensus that emerges from the literature is that the effects of knowledge flows are very much geographically localized (Agrawal & Cockburn 2003; Thompson & Fox-Kean 2005). Network theory has developed significantly in the past several years, enabling the observation of contemporary connections among individuals as well as computer simulations that predict future connections and information flows.

The spread of ideas is always patterned by the density of the network, the geographic proximity of the transmission and the complexity of information being diffused.⁸ Proximity to other companies drives innovation.⁹ Connected industries and networks experience growth and fruitful development. For example, one study indicates that in a dense metropolitan area, the number of patents per person is about 20 percent greater than another metropolitan area half as dense.¹⁰ Another influential study finds that innovative companies are more likely to quote research from a local university than from a more distant university in patent applications.¹¹ High density research environments contribute to the growth of local economies and communities in many obvious and less obvious ways. From the start, a concentrated influx of economic investment can fuel a local economy with new jobs, residents, and consumers.¹² Moreover, geographic density of creative ventures allows talented workers to attend professional meetings, to meet face to face, and to form social connections with other like-minded innovators in one's field. Spatially connected industries also facilitate the exchange of personnel for work on certain projects even as each employee remains employed at the original company.¹³

Drawing on interjurisdictional variation, new research challenges the conventional account traditionally adopted by most state laws – the view that more protections and boundaries

⁸ Mardsen and Friedkin, *Network Studies of Social Influence*, *Sociological Methods and Research* 22, 127 (1993).

⁹ Annalee Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* (1994); Bruce Fallick et al., *Job-Hopping in Silicon Valley: Some Evidence Concerning the Microfoundations of a High-Technology Cluster*, 88 *Rev. Econ. & Stat.* 472 (2006).

¹⁰ Gerald Carlino et al., *Matching and Learning in Cities: Urban Density and the Rate of Invention* 17-23.

¹¹ Jaffe, Trajtenberg, Henderson, *Geographic Localisation of Knowledge Spillovers as evidenced by Patent Citations*, 108 *Quarterly Journal of Economics* 577 (1993). See also Almeida and Kogut, *The Exploration of Technological Diversity and the Geographic Localization of Innovation* 9 *Small Business Economics* 21 (1997) (finding similar results in the context of semiconductor related patent citations).

¹² Almeida, P. and Kogut, B., *Localization of knowledge and the mobility of engineers*

in regional networks, *Manage. Sci.* 45(7) (1999) 905–917; Breschi, S. and Lissoni, F., *Mobility and social networks: Localised knowledge spillovers revisited*, CESPRI Working Paper 142 (2003), <http://www.cespri.it>.

¹³ Gilson 1999.

among firms will ultimately increase incentives to innovate. When comparing the magnitude of positive and negative spillovers, recent research provides evidence that positive spillovers of knowledge exceed the negative spillover for firms (Schankerman and Van Reenen). A growing body of evidence demonstrates that high employee turnover, regional talent concentration, and strong professional networks all contribute to economic growth, which in turn creates more wealth and investment by drawing entrepreneurial energy. These effects help explain how certain companies and localities are magnets for creative people. A recent article (Marx, Strumsky and Fleming management science 2009) exploits Michigan's inadvertent reversal of its non-compete enforcement legislation as a natural experiment to investigate the impact of non-competes on mobility. Using the U.S. patent database and a differences-in-differences approach between inventors in states that did not enforce and did not change enforcement of non-compete laws, the article finds that relative mobility decreased by 34% in Michigan after the state reversed its policies. Moreover, this effect was amplified 14% for "star" inventors and 17% for "specialist" inventors. In their recent study on investment and non-competes, Samila and Sorenson conclude that "not only does the enforcement of non-compete agreements limit entrepreneurship . . . but also it appears to impede innovation."

Institutionally, some business environments are more likely to trigger breakthroughs than others. Geographically and socially, some places and communities are known to form network nodes, even 'Meccas,' of invention and creation. The importance of place and space is linked to variations in legal regimes between states. In regions like the Silicon Valley, where talent mobility has long been supported by public policy – employee non-compete contracts are void by law - small isolated networks transition more quickly into one giant component (Fleming and Frenken Journal of Advances in Complex Systems 2007; He and Fallah Journal of Technological Forecasting and Social Change 2009). In the Silicon Valley, a familiar story has been entire teams of software developers defect from a large company like IBM or Microsoft to form their own start up/spin off. A virtuous circle can be put into motion geographically where labor mobility supports networks, which in turn enhance regional innovation.¹⁴ Localities with dense connections and flow of information and human capital enjoy more innovation than regimes in which human capital is more subject to propertization.

4. Motivational Knowledge

Human capital, or the knowledge embedded within us, is not a static resource the way real-estate or the building blocks of a construction company serve the goal of a completed building. Human capital is simultaneously a resource and the subject that decides its quality and outputs. In other words, it is a resource with motivation. Non-competes and other controls over human capital, may, under certain conditions, discourage employees to invest in their work performance. Empirically, the motivational effects help explain recent field data. In recent behavioral studies designed to identify the effect of human capital controls and contractual arrangements on performance and motivation, participants more bound by non-compete agreements performed less well and were less motivated to stay on task than those who were unbound (Amir and Lobel

¹⁴ Almedia, P. and Kogut, B., Localization of knowledge and the mobility of engineers

in regional networks, *Manage. Sci.* 45(7) (1999) 905–917.

2012). These experimental findings are also supported by recent field data. Relying on state-by-state codification of the strength of non-compete enforcement, Mark Garmaise shows that tougher non-compete enforcement strongly reduces executive mobility, reduces R&D spending and capital expenditures per employee, lowers executive salaries, and shifts compensation from bonuses and performance based pay to a heavy reliance on a base or fixed salary. The study concludes that “non-competes do bind human capital to firms, but in doing so they change the quality of that capital.” One of the study’s important findings is that companies invest less in R&D when non-competes are strongly enforced, providing further evidence that investment decisions are affected by workers themselves in their assessments on their ability to move to, or to be recruited by, a different company. For an employee, restrictions may discourage investment in her own skills, because interfirm competition for her human capital is less likely to occur. Motivational knowledge is also indicated in a different set of empirical studies about correlations between job security and patenting behavior. Acharya et al. (2009, 2010), using state-by-state variance of legal protections against dismissal and data on patent filings and citations, suggest that stronger employee protections result in more and better patenting activity. The intuitive explanation is that protective laws have the countervailing effect of providing firms a commitment device to avoid punishing short-run failures, which in turn spurs employees to undertake risky but innovative activities.

Departing employees are motivated by their beliefs both as to what is moral and what their new employer would consider legitimate. People consider what is just and fair when deciding how to compete and whether to comply with intellectual property restrictions.¹⁵

5. Disruptive Knowledge

In the 1990, Proctor and Gamble was stagnating. The company for years had been operating as a controlling autarkic organization and like many other companies, suffered from myopia. Asking people to receive and generate ideas is no small feat and often entails a psychological shift. *Not Invented Here* (NIH) is an institutional pathology. P&G functioned this way for years, only appreciating ideas that came from within. Early on, NIH was linked to nationalism – American companies and consumers often refused to adopt innovation developed outside national borders. There are dozens of examples throughout the 20th century of advanced technologies that were slow to be adopted because the technologies were produced elsewhere. For example, Japanese and American markets largely ignored home computers produced by British companies. Japanese cars, now some of the most popular automobiles in the world, were at first slow to reach beyond the domestic market because dealers and consumers preferred national products.

However, with the globalized market that exists today, nationalism in innovation is almost nonexistent. Fast-paced markets require companies to adopt external innovations and must purchase and exchange valuable research, knowledge, and ideas from everyone everywhere. And yet, even in the face of successful advancement by other companies, old habits die hard.

¹⁵ Yuval Feldman, The Expressive Function of the Trade Secret Law: Legality, Cost, Intrinsic Motivation and Consensus, *Journal of Empirical Legal Studies* (2009); Yuval Feldman, The Behavioral Foundations of Trade Secrets: Tangibility, Authorship, and Legality, 3 *J. Empirical Legal Stud.* 197 (2006).

Evidence still suggests that firms, often to their detriment, overlook outside ideas and solutions simply because of their not-invented-here quality.

Not surprisingly, NIH Syndrome happens more often in settings where there is little employee turnover. Pathologies of *groupthink* – where cohesive groups overlook important alternatives because of the desire for consensus and conformity - and NIH mentalities are exaggerated when companies are overly stable. In one study, teams with little turnover became progressively less productive.¹⁶ Another study, which data-mined almost one million patents (and controlled for other positive effects of being in a diverse place) shows that NIH mentalities are more pronounced in small towns. Firms in remote locations where one firm is the dominant company of the local economy (in other words, *the company town*) are more likely to draw upon the inventions of their own firm and to draw upon the same set of prior inventions year after year compared to firms in more diverse location.¹⁷ What is perhaps most surprising is that the same research finds that this behavior is exhibited only amongst the employees of the largest company in the company town, not among the smaller firms in the same location, who are just as willing as their small firm counter-parts in more diverse locations to build upon external sources of innovation.

Good ideas are out there, but only companies with a structure of openness will be able to increase their absorptive capacities for innovation. Companies who close themselves off, sinking into the depths of secrecy measures, are limiting their capacity to recognize and make use of external valuable information. New hiring triggers changes in strategic directions of businesses. It introduces “new blood” into the system and mitigates groupthink effects.

High employee turnover is shown to be positive for productivity in certain types of industries, particularly those in which research and development is a core activity. As for firm investment in reaction to mobility and knowledge flows, there is growing empirical evidence that companies, particularly in high-tech industries, are in fact more likely to increase their research and development efforts and expenditures when there is increased information spillovers between firms in the industry.

IV. Endogenous Growth, Development, and the Talent Commons

1. Global Flatteners and Brain Drain

In light of the vast advantages spurred by governing the talent commons in ways that best enhance the talent commons and its overall use, the design of human capital policy must be understood as central to any development effort. Talent and skill remain vital by operating in competitive environments. For knowledge to spillover, for networks to remain dense, for face-to-face interaction to succeed in transmitting tacit knowledge, for motivation to innovate to remain

¹⁶ Katz and Allen, Investigating the Not Invented Here (NIH) Syndrome, R&D Management 12(1) 7-19.

¹⁷ Agrawal et al, Not Invented Here? Innovation in Company Towns NBER Working Paper 15437 (2009).

high, for new blood to disrupt stagnated paths, mobility must be encouraged. Talent and ideas breathe life to the competitive spirit.

As the world has “flattened”, to borrow Thomas Freeman’s terminology, competition occurs on a larger geographical scale. Gone are walls and borders. Enter a world that is flat, networked and connected. The image of a flatworld captures our collective imagination of a brave new world in which distance becomes meaningless. In his bestseller *The World Is Flat: A Brief History of the Twenty-First Century*, journalist Thomas Friedman concludes that early twenty-first century globalization has leveled out commerce and competition across the world. Friedman describes the foundations of a “whole new global platform for collaboration.” Several flatteners contribute to these new realities. Perhaps first and foremost, communication systems, particularly the World Wide Web, have made ideas and new information instantly available and broadly accessible. Digitization allows information to travel rapidly, cheaply and largely indiscriminately once it has reached open access. Search engines are now used over one billion times per day, allowing people to manage their own learning and networking. In Friedman’s words, “never before in the history of the planet have so many people-on their own-had the ability to find so much information about so many things and about so many other people.” The image of a flat world where walls and borders are replaced by networks and inter-connected webs of information is capturing the attention of many thinkers. Our collective imagination has already sprung to life, applying flat world to the evolving relationships between countries, borders, trade, and the global economy. But the notion of flattening markets and knocking down barriers to create fluidity and heightened connectivity applies with equal force to the flow of information and human capital. The world has become smaller and the narrowing of distances has had profound effects on innovation and the ways we understand the governance of human capital. Companies send their employees to professional conferences around the world; the internet provides easy access to trade and academic journals, even before articles are published; patent filings require disclosure of the invention to publicly accessible data bases; even the job market has gone global and head hunters search internationally.

People are moving more than ever. In her provocatively titled book, *The Death of Distance*, Frances Cairncross describes a rapidly shrinking world - a world in which technologies, in particular the phone, TV, and network computers, make physical distance irrelevant. Workers will be able to move and work anywhere. Although the world may be flatter, geography still matters a great deal. Place and local interaction continue to make a tremendous difference for companies. Despite the image of a globalized market, the majority of our interactions are still local. Around 90 percent of phone calls, financial investments, and even web communications, are local. A 2007 Foreign Policy magazine article, entitled “Why the World Isn’t Flat” argues that “despite talk of a new, wired world where information, ideas, money, and people can move around the planet faster than ever before, just a fraction of what we consider globalization actually exists.” Innovation still happens locally. Place matters.

Understanding the way knowledge networks operate challenges the conventional alarming reports about “brain drain”. Close to 200 million people are living outside of their home countries, with remittances estimated at over US\$200 billion.¹⁸ The statistics on brain drain from

¹⁸ Massive Brain Drain From Some of the World’s Poorest Countries,
<http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:20694521~pagePK:64257043~piPK:4373>

developing countries seem alarming. A recent report indicates for example that eight out of ten Haitians and Jamaicans who have college degrees live outside their country.¹⁹ More broadly, over fifty percent of the university educated professionals from many developing countries live abroad. A recent World Bank initiative examines how expatriate talent can contribute to the development of their countries of origin. The focus is on self-organized groups of expatriates, Diaspora networks, and the critical importance of the institutions in the home country. The World Bank Institute has recently stated that “actors in Diaspora networks can be crucial bridges between global state-of-the-art in policy, technological, and managerial expertise and local conditions in their home countries.” As talent moves around the globe, we are witnessing what Saxenian (2006) has termed “brain circulation” (as opposed to “brain drain”). Knowledge flows through the travels of immigrant engineers from high-tech regions like the Silicon Valley to emerging regions. High-tech employees now circulate regularly between countries like the United States, Japan, China, Israel, and India, enhancing the knowledge networks of both the receiving and sending countries.

Our world is one that flourishes on fluid movement. A new Carnegie Mellon University report entitled *Renewing Globalization and Economic Growth in a Post-Crisis World* warns that limits on worker mobility have damaging effects on regions. Besides our employment IP controls and non-compete enforcement, other leading examples of such limitations on mobility are visa restrictions, health care and other benefits that are tied to single workplaces, and social pressures against movement. Indeed, a good analogy to post-employment restrictions from a global perspective is immigration policy. Does the way a country disseminates its visas and immigration rights contribute or curtail regional brain gain? Under a large student visa category, for example, talented students applying for a United States visa must promise that they will not seek employment later on in the U.S. At the same time there is a shortage in technical high skilled employees. And yet, studies show that increasing the number of work visas granted to high skilled employees strongly correlates with an increase in the number of patent applications in filed in the U.S. and a rise of entrepreneurial activity and job creation. The value of hiring goes beyond the value to the recruiting firm (Oettl & Agrawal 2008; Nelson and Rosenberg 1993).

2. Human Capital and Development

76~theSitePK:4607,00.htmlCiting a Bank report, *Global Economic Prospects 2006*. World Bank publication, entitled *International Migration, Remittances and the Brain Drain*. The volume is a product of the International Migration and Development Research Program of the Development Research Group, the Bank's research department.

¹⁹ Massive Brain Drain From Some of the World's Poorest Countries, <http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:20694521~pagePK:64257043~piPK:437376~theSitePK:4607,00.html>

On a global scale, differences between the quality of human capital have become key to understanding the challenges of developments. New models of economic growth, often referred to the theory of endogenous growth, help in linking between human capital flows and regional success (Romer, 1986; Lucas, 1988; Lucas 1990; Jones 1996). Under these new theories, economic growth relies not simply on competitive win-lose production but on processes of positive spillovers, in which knowledge is transferred within industries and regions. Under endogenous growth theory, investment in human capital is understood as a central ingredient for economic success. An enduring puzzle for development economics has been the fact that similarly situated countries diverge so significantly in their rates of growth. Paul Romer developed a model to explain these differences, suggesting that it is not only the raw access of companies to capital and labor that determines success, but also the availability of local knowledge and its dynamics. According to Romer, economies of specialization, where a region chooses to focus for example on electronics (Japan) or Haute Couture (Italy) are efficient and lead to regional success. Because knowledge is predominantly industry-specific, geographic concentration will create positive growth for the entire specialized economy. Differences between the quality of human and social capital have become key to understanding the challenges of development. Paul Krugman in his book, *Geography and Trade*, similarly explains how nations have important economic advantages depending on their regional location and industrial positioning. Michael Porter in *The Competitive Advantage of Nations* also investigates how regional industrial clusters give nations a global competitive edge. Porter views better enforcement of antitrust laws to end monopolies and lessen the impediments on competitive entries as essential for development.

Among the three acclaimed economists, Porter was the one to most explicitly focus on how legal regimes can limit clustering and productive competition. Porter concludes his book with recommendations about better enforcement of antitrust laws to end monopolies and lessen the impediments on competitive entries. Monopolies as we shall soon see are not simply about goods and services. Talent and skill remain vital by operating in competitive environments. For knowledge to spillover, for networks to remain dense, for face-to-face interaction to succeed in transmitting tacit knowledge, mobility must be encouraged. Following Porter's focus on the harms of monopolies, we can conceptualize human capital controls as a form of systemic antitrust in cognitive resources, skills and knowledge. As a recent Carnegie Mellon University report entitled *Renewing Globalization and Economic Growth in a Post-Crisis World* describes, limiting talent mobility has damaging effects on regions and these limits go beyond formal controls over intellectual property and human capital. Immigration policies, social benefits and underlying social norms, such as the unwelcoming of others and xenophobia all contribute to the patterns of talent flow. Studies show that increasing the number of work visas granted to high skilled employees strongly correlates with an increase in the number of patent applications in filed in the U.S. and a rise of entrepreneurial activity and job creation.

3. Investing in the Commons

For thousands of years, civilizations have made momentous advances by solving collective action problems. In the twenty-first century, human capital is our most acute collective action challenge and building the talent commons is our shared goal. In our quest to preserve it, we must recognize its exceptional features. Talent, along with the knowledge it carries, are unique resources. They are at once finite and infinite, they naturally flow without boundaries or

limits and they are easily copied and multiplied unless the law decides otherwise. Collectively, they construct the most cherished commons of society. MIT economist Daron Acemoglu describes investments and re-investments in workers as the key ingredients of production and growth. Acemoglu reminds us that people invest in their own human capital without knowing the type of work they will eventually do, just as companies must make investment decisions in technology and capital funds without knowing whom they will end up hiring. Acemoglu describes a magic circle in these conditions of uncertainty: When workers invest more in their human capital, businesses will invest more because of the prospects of acquiring good talent. In turn, workers will invest more in their human capital as they may end up in one (or more) of these companies. In other words, in Acemoglu's model, the likelihood of finding good employers creates incentives for overall investments in human capital. Acemoglu describes these investments as positive externalities, or benefits that go beyond any one firm; good spillovers that cannot (and should not) be contained. In his study of the economics of labor markets, Acemoglu believes that, typically, investment in human capital is too low. Our research can explain why this is true: despite the potential virtuous cycle of continuous investment, the overuse of controls to prevent talent and knowledge slows down the flow and reduces the positive effects of market uncertainty. It in turn lowers the incentives to invest in human capital because the prospects of acquiring good talent are greatly reduced.

The prisoner's dilemma illustrates how people, and by extension rival firms, can be caught in sub-optimal equilibrium. Everyone is better off by cooperating but without coordination of actions, each will act opportunistically. For many years, the image of opportunistic behavior has prevailed as the predominant feature of market actors. In 1968 Garrett Hardin published, *The Tragedy of the Commons*, an essay in *Science* that has since become deeply influential in Western thought about property, economics, and ownership. Hardin, a biologist, explained that when a group shares a resource such as a water sources or green herding pastures, there are a range of problems that do not occur when these resources are privately owned: free riding, conflict, and overuse. Because of its shared nature, no single person has a great enough incentive to preserve and sustain the commons. Hardin described vividly how herdsman sharing the common resource of a pasture would each overuse, letting more and more cattle graze. This was his tragic story: "Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons." Hardin continues and seals off his harsh words with, "Freedom in a commons brings ruin to all."

The traditional type of commons is a finite natural resource: a fishery is a classic example. Overuse can cause its extinction – too many fishermen, too few fish. The dire predictions of a tragedy have been, however, repeatedly refuted. Study after study, looking at real-life cases of commons, show that Hardin's model mistakenly assumes that people will act only in their immediate self-interest. Case after case demonstrates that often, even without law or private controls, common resources will be wisely managed, sustained and made to flourish. And as the years have progressed, we have become more aware of the converse tragedy, that of the anti-commons. The anti-commons, private controls and boundaries, becomes tragic when it signifies underuse of vital resources. Commons examples focus on infrastructure such as education, communication networks, roads, bridges, parks, and oceans. In modern times, a culture of sharing and cultivating common resources has brought us the World Wide Web, Wikipedia, Linux and Open Source programming and the Human Genome Project.

The goal of human capital protections has traditionally been to protect freedom of contract as well as to encourage businesses' initial incentives to invest in innovation. Changing practices and new evidence about the significance of knowledge spillovers for overall economic growth and development require the rethinking of our approach to human capital regimes. The complexities of the talent commons require fine tuning and delicate balancing. The adjudicatory lines drawn between protectable and non-protectable interests in intellectual property and human capital remain unclear and inconsistent among jurisdictions, with each state applying its own laws about trade secrets, invention ownership, and non-competes. Neither can be certain about how various terms, such as "reasonableness" and "legitimate business interests" will be interpreted. The current state of EIP thus impedes accurate negotiations and assessments of contract value. In practice, it encourages overreaching by employers, who are generally better situated than the employee to impose strict requirements at the beginning of the relationship. The problem of legal uncertainty is exacerbated by the fact that there is almost always economic uncertainty about the value of future innovation to the company and in the market at large. In the end, when the rule of reason meets the rule of science the evidence is near universal. Overall, excessive controls over mobility and inventiveness are harmful to careers, regions and innovation. The harm is not simply caused by the aggregate reduction in mobility, knowledge flow, and network richness, but also generated by the motivational and behavioral aspects of creative individuals as they interact with their environment.

V. Conclusion

Rapid changes in the current economy have uprooted traditional notions about work, economic growth, and innovation. The transition to a knowledge-based economy means that we must rethink the ways law and policy shape the market for skills. We must ask whether the innovation ecosystem supports information sharing, and successful scientific and creative pursuits. New empirical studies indicate that the more information flows freely, the more innovation we will witness. This suggests that we have too much, not too little, protections against dissemination of information – too many walls around knowledge and creative resources – instead of flatter, more dynamic architectures of innovation. By relying on traditional models, we risk distortion that dangerously impedes dissemination and entrepreneurial dynamism. Boyle (2003) warns of the *Second Enclosure Movement*, the enclosure of the "intangible commons of the mind" through rapidly expanding intellectual property rights. When we understand the breadth of the under-the-radar ways in which intangible goods are enclosed, not through core IP rights but through regulatory and contractual enclosure on the inputs of knowledge, on the minds themselves, pre-assigning ideas, skills, know-how and energy to firms, the *Third Enclosure Movement* becomes salient.

IP and human capital are often wrongly collapsed in court analyses and there is little knowledge on how to interpret the standard of reasonableness which is employed by most courts to define the scope of enforceable limitations on employee mobility. Understanding the likely public policy effects on information control and dissemination in the context of employment relations is critical for market innovation and development.

As Ostrom and her collaborators have delineated, the central threats to a commons are commodification, enclosure, degradation, and nonsustainability. Our talent pools are the type of resource that is threatened by such over-commodification and enclosure. These days, companies

rely on knowledge transmission, constant talent renewal, and dynamic innovation for economic success and growth. In many instances, corporations recognize that part of a successful business model is the production of knowledge, even when such knowledge cannot immediately be captured in monetary gains. Yet, when everyone benefits from positive knowledge spillovers ex-post but all are able to prevent their own information and talent from leaking to the outside world, we face a collective action problem -- a prisoner's dilemma where everyone is better off with the optimal free flow of information but single players instead maintain secrecy and create high walls. Laws restricting the range of restraints of knowledge and human capital flows can be viewed as addressing this collective action problem. Moreover, they address the fact that societal demand is not always reflected in actual individual deals. Conversely, overly protectionist regimes are fundamentally misguided and largely outdated.

The modern ingredients of innovation, knowledge, intellectual property and human capital, are all central to our new economic ecosystem.²⁰ These three global currencies of economic competition are each non-tangible, non-exclusive currencies that can be widely replicated, consumed and transformed. Absent physical or legal protections, information is porous to the outside world. In other words, companies can use information simultaneously if the company that generated it is unable to exclude others. Consequentially, the generation of knowledge entails substantial investment while its use once available costs very little. It is for this reason that disputes over intellectual property are so heated prompting great debate and enduring controversy over the scope and extent of legal protection. While some emphasize the societal benefits of spillovers, others warn that without protection, returns on innovation are eroded, thereby discouraging business investment. Often courts proclaim that, "the future of the nation depends in no small part on the efficiency of industry, and the efficiency of industry depends in no small part on the protection intellectual property."²¹ Yet, at the same time that IP protections benefit their owners, such controls create great costs in policing usage, detecting infringement, litigation, and most importantly, the impediment of further innovation which builds on the protected knowledge. The attempted compromise has been to grant IP rights only to the extent necessary to incentivize innovation and always limited in scope and time. The difficult aim of law and policy is to grant as little protection as needed to ensure continued investment in research and development. This article set out to introduce a new way of looking at human capital as a commons. An updated set of practices and policies must follow.

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²¹ *Rockwell Graphic Systems, Inc. v. DEV Indus.*, 925 F.2d 174, 180 (7th Cir. 1991)

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