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Has the importance of intangibles really grown? And if so, why?

Sudipta Basu and Gregory Waymire*

Abstract—Intangibles are ideas or knowledge about the natural (physical and biological) and socio-cultural worlds that enable people to better accomplish their goals, both in primitive societies and in modern economies. Intangibles include basic research and technology improvements, as well as knowledge to better organise exchange and production, and over time become inextricably embedded in improved tangible assets. Accounting intangibles are legally excludable subsets of economic intangibles, which in turn are the subsets of cultural intangibles that can be used to create tradable goods or services. Because economic intangibles are cumulative, synergistic, and frequently inseparable from other tangible assets and/or economic intangibles not owned by any single entity, it is usually futile to estimate a separate accounting value for individual intangibles. However, the income that intangibles together generate provides useful inputs for equity valuation, and voluntary non-financial disclosures could be informative for this purpose.

Key words: patent; trademark; fair value; Moka; gift exchange

1. Introduction

Some accounting experts argued in recent years that the increased economic importance of intangibles required an overhaul of corporate financial reporting.¹ The most visible academic reformer was Baruch Lev (2001: 9), who asserted that fundamental changes related to intangibles had transformed the nature of the corporation itself (see also Stewart, 1997; Teece, 2001):

‘What is new, driving the recent (since the mid-1980s) surge in intangibles, is the unique combination of two related economic forces. One is intensified business competition, brought about by the globalization of trade and deregulation in key economic sectors (for example, telecommunications, electricity, transportation, financial services). The second is the advent of information technologies, most recently exemplified by the Internet. These two fundamental developments – one economic and political, the other technological – have dramatically changed the structure of corporations and have catapulted intangibles into the role of the major value driver of business in developed economies.’

Several conferences were organised to identify

and assess the problems associated with poor disclosure and recognition of accounting intangibles.² Many practitioners, consultants and regulators argued that financial statements were inadequate because the balance sheet did not report many valuable intangible assets and concluded that accounting reports needed significant change (e.g. Edvinsson and Malone, 1997; Sveiby, 1997; ICAEW, 1998; Leadbeater, 1999; Lev, 2001; Eccles et al., 2001; Blair and Wallman, 2001; MERITUM, 2002; Low and Kalafut, 2002).

We take a contrary perspective in this essay and assert that arguments favoring the expanded reporting of intangible asset values in balance sheets are flawed for three reasons. First, recent times are not unique in terms of the importance of intangibles. Indeed, intangibles are ubiquitous to human economic interaction and are present even in seemingly simple economies. Second, intangibles are ideas that build on other ideas to generate complementarities and synergies. The consequence of this is that the value of an individual idea typically cannot be discerned independently of other

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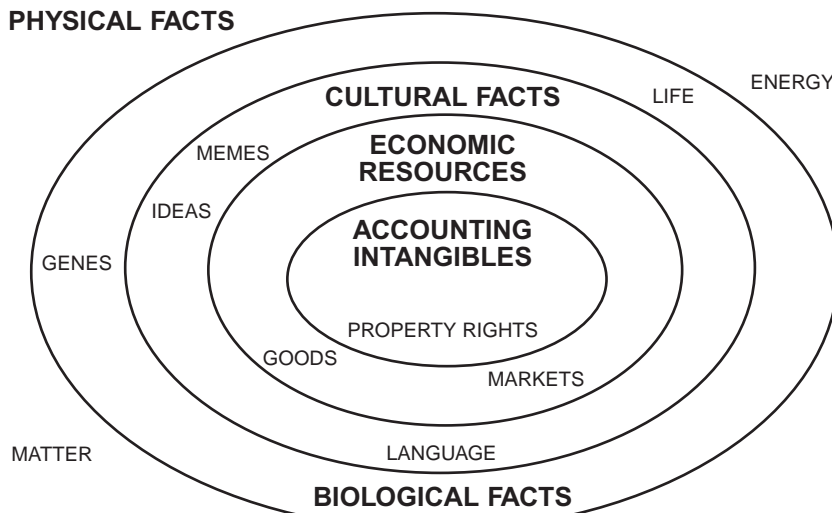
Editorial Note

The discussant for this paper was Chris Swinson, Comptroller and Auditor General of Jersey. A webcast of the session is available on the website of the ICAEW <http://www.icaew.com/>

¹ At a US Senate Committee on Banking, Housing and Urban Affairs hearing on 19 July 2000. Adapting a 1930s Financial Reporting Model to the 21st Century, five accounting experts all testified that corporate financial reports inadequately treated intangible assets, and these had recently grown considerably (Lev 2001: 7).

² The OECD has held numerous conferences on intangibles, such as the International Symposium on Measuring and Reporting Intellectual Capital: Experience, Issues and Prospects, Amsterdam, 9–11 June 1999. See http://www.oecd.org/document/15/0,3343,en_2649_201185_1943055_1_1_1_1,00.html. Litan and Wallison (2000) summarise conclusions from two conferences on intangibles at the Brookings Institution and Stanford University. The Intangibles Research Center at New York University held four conferences on intangibles from 1998–2001 (http://w4.stern.nyu.edu/ross/events.cfm?doc_id=7049).

Figure 1
An anthropological perspective on different definitions of intangibles



ideas, many of which are not owned by any given firm. Third, ideas are valuable only to the extent that they increase wealth or, in accounting parlance, give rise to income. Thus, emphasis on the balance sheet is itself misplaced, and a *return to measuring income* will likely serve financial statement users better than trying to value assets that by their fundamental nature cannot be independently valued.

The last 10,000 years have seen the human species transform from small nomadic hunter-gatherer bands not far removed from their primate cousins, chimpanzees and gorillas, to citizens living in vast cities of more than 20 million people. Many civilisations have waxed and waned over these thousands of years, and living standards have risen and fallen, often dramatically. However, the overall trend has been towards improved standards of living. We argue that human progress has *always* reflected accumulated human ingenuity and, in large part, the cultural mechanisms that people have developed to accurately store, and subsequently accurately transmit, valuable information across time and space. That is, people always and everywhere have produced and implemented ideas to increase their productivity; indeed intangibles are ubiquitous to human economic interaction.

Accounting intangibles are only a small subset of valuable economic and cultural intangibles. Figure 1 depicts the relations between different kinds of intangibles as a tiered cake viewed from above. The bottom layer is a set of physical facts

and laws that biological organisms exploit to propagate their species and genes. These natural facts are largely givens from a human viewpoint, and directly influence behaviour such as food gathering and production strategies. As people discover survival-enhancing facts and routines, they often imbue this knowledge with religious or moral significance, such as taboos or rituals (Burriss, 1929; Lepowsky, 1987). As a result, new ‘goods’ are created – for example, when a particular fruit becomes holy. People thus add a layer of cultural ideas to a subset of the pre-existing natural facts, and the structure of ideas builds upwards. Ideas later take on a life independent of their discoverers and become cultural intangibles – that is, ‘memes’ that compete with each other for survival (Dawkins, 1976).

Some innovators create wealth by exploiting natural resources to deliver new goods that people value, or invent more efficient production and distribution systems (Schumpeter, 1942; Burgelman et al., 2001). These entrepreneurs try to make their services unique and non-duplicable to increase the value their knowledge will fetch in trade (Teece, 1987). If the legal system recognises and protects private property rights over the benefits to these innovations, then a firm can report the property rights it owns or controls on the balance sheet as intangible assets. Enforceable private property rights suffice for the balance sheet reporting of accounting intangibles under current practice, although the reported values typically approximate

market values only if they were recently acquired externally.³ Thus, we define accounting intangibles as the legally excludable subset of economic intangibles, which are in turn defined as the subset of those cultural intangibles that directly or indirectly generate consumable goods or services. The broader sets of intangibles provide useful benchmarks for assessing if accounting intangibles owned by corporations have become more important recently.

The consequence of this broader perspective is that accounting intangibles must be examined holistically with a clear recognition that the value of an individual idea is not separable from the complementary ideas that enabled its creation. The accumulation of ideas means that what was once novel eventually becomes routinised and mundane. Furthermore, new knowledge provides ideas for new goods, and these new tangible assets incorporate and embody the once intangible idea. Improvements in tangible assets arise from combining new ideas with the ideas that originally gave rise to the assets, which generates synergies and complementarities that are difficult to apportion to the constituent ideas, many of which have different owners.

Ideas are economically valuable only to the extent that they lead to an increase in wealth, the accounting analogue of which is to generate income. However, in addition to complementarities among intangibles, these assets typically generate wealth indirectly through the tangible assets that embody them. Thus, their value is often inseparable from the tangible assets that incorporate them. Firms also benefit immensely from valuable intangibles, such as rule of law, that are shared by all citizens, and others, such as human capital, that firms do not own but merely rent from their employees. Thus, any attempt to report economically valuable intan-

gibles as assets on corporate balance sheets is likely to be a futile exercise for the majority of intangibles. Hence, we believe that accounting is better served by measuring the income that intangibles generate, which can provide more informative inputs for firm valuation. This view is fully consistent with more traditional views of assets as cost investments made in anticipation of future economic benefits (Littleton, 1929; 1935; 1952).

The paper is organised as follows. The ubiquity of intangibles is illustrated with an example from anthropology in Section 2. The lack of separability and the dynamics of intangible creation and storage are described in Section 3. Section 4 provides an analysis of the wealth creation role of intangibles in modern economies. We discuss evidence on whether the value and importance of intangibles has actually increased in Section 5. Some concluding remarks are provided in Section 6.

2. The ubiquity of intangibles: an example from a simple exchange economy

Adam Smith (1776) recognised exchange and division of labour as the sources of human economic progress when he wrote:

‘This division of labor, from which so many advantages are derived, is not originally the effect of any human wisdom, which foresees and intends that general opulence to which it gives occasion. It is the necessary, though very slow and gradual, consequence of a certain propensity in human nature which has in view no such extensive utility; the propensity to truck, barter, and exchange one thing for another.’

This quotation makes us think of familiar institutions: *firms* that coordinate specialised production and *markets* where the output of production is exchanged against money.

A sole focus on modern institutions is too narrow to grasp the genesis of what Smith refers to as a ‘propensity in human nature’ to exchange and the nature and magnitude of economic gains that result from such propensities. The propensity to exchange is represented in its most primitive form as a gift (Mauss, 1950). Most gifts are resource transfers where the recipient of the gift is expected to reciprocate in the future. The exchange of ceremonial gifts and their unstated but powerful expectation of reciprocity are the bases upon which human economies evolve from modest beginnings (Boulding et al., 1972; Sahlins, 1972).⁴

One example of a gift economy is the *Moka* economy of the Mount Hagen area of the Western Highlands of New Guinea, subjected to ethnographic study by Andrew Strathern (1971).⁵ The Hageners live in settlements controlled by smaller clans within several large tribes of sizes ranging from less than 100 to nearly 7,000 persons

³ See footnote 8 for a discussion of our definition, which essentially combines the notion of separability with the recognition criteria in IAS 38 (IASB, 1998) and is similar to US practice under SFAS 2 (FASB, 1975).

⁴ Modern economies contain large gift exchange sectors where reciprocation is usually expected. Gift giving in modern societies reflects deep-seated cultural norms that hark back to ancestral gift economies characterised by generalised reciprocity (Sahlins, 1972). Gift exchange in modern economies also generates both demand for and supply of innovation. Roberts (2005) argues that people give unique gifts to demonstrate how much the giver values the recipient. Some people may express this uniqueness by making their own gifts and in the process hone their hobby skills. These part-time hobbyists may eventually convert their hobbies into part-time jobs. While experimenting with new ideas and techniques to maintain uniqueness, these hobbyists may discover new artistic and/or technical skills that allow them to become full-time producers who eventually compete on artistic and technical design features with other specialist producers.

⁵ Other economies built around elaborate gift exchange customs include Kula gift exchange in the Trobriand Islands (Malinowski, 1922) and the Potlatch of Indians in the American Northwest and Siberia (Mauss, 1950; Suttles, 1960).

(Strathern, 1971: 230–231). The Hagener economy is agricultural, with the food staples being pork, sweet potatoes, and a few other vegetables, such as bananas, sugar cane, taro, yams, maize and cassava. Women do most of the work in child rearing, care and feeding of the family's pigs, and on-going care and harvesting of the gardens (Strathern, 1971: 8–10). Men clear the land for planting and build fences and ditches around the gardens. They also spend much of their time preparing for, participating in, and developing the complex social networks that sustain *Moka*.

The 'Big Man' is a prominent player in the Hagener society. A Big Man holds a position of status and leadership based on a reputation for trustworthiness and wisdom built up from past successful *Moka* exchange.⁶ Any given clan will include one (or a few) major Big Man along with, typically, several lesser Big Men (Strathern: 187–213). The status of Big Man can be lost since a Big Man faces stiff competition from others in making successful *Moka* and sustaining a network of followers.

Strathern (1971: 10–14 and 93–229) describes Hagener *Moka* exchange, which is a ceremonial gift exchange that takes place over several rounds of exchange. Preparation for a successful *Moka* exchange takes several months. An initiating gift is made to build alliances between tribes, to make payments to a bride's family or for reparations for death in warfare, and, in some cases, for more routine exchanges. An initiating gift must be reciprocated with a gift of greater value, which consists of a payment of the debt created by the initial gift and a residual. This residual above the original debt is the *Moka* provided by the gift. This series of gift exchanges is continued as long as the current gift exceeds that of the prior round. The items exchanged in a *Moka* transaction include pigs and pork meat, marsupials and their meat and furs, casowaries (a bird indigenous to New Guinea) and their meat and plumes, axes, salt, decorating oils, and various forms of attractive shells (e.g. pearl shells, cowries, etc.).⁷

Wealth in the Hagener society results from animal husbandry of pigs, as well as the hunting of other animals, cultivation of crops, and the acquisition of valuables from external trade. The social

value generated by *Moka* exchange depends on others contributing valuables to the transaction, which requires that network members defer their own consumption or work harder to produce the items that will be given away in the exchange. To secure this cooperation, the Big Man must convince others that his *Moka* will be successful and that he will be able to return something of greater value to them in the future. In other words, *Moka* becomes a positive sum game through the organisational skill and effort of the Big Man.

Turning now to the 'accounting' problem, the tangible assets of the Hagener economy include agricultural implements, seeding for sweet potatoes, a stock of pigs that can be bred, housing stock (for both pigs and humans), and other assets (e.g. guard dogs) to protect the pigs from predators and poachers. The community's most valuable asset is the stock of knowledge of community members about existing production technologies (e.g. planting and husbandry), as well as knowledge about the socioeconomic arrangements that enable coordinated production and exchange (i.e. the community's economic intangibles).

This economic intangible or knowledge asset is fundamentally different from a tangible asset in that its existence cannot be verified merely by visual inspection of the person carrying the knowledge. Rather, the asset's existence is only demonstrable by observing the economic transactions coordinated by the individual carrying the knowledge. In this sense, the important financial measure for someone evaluating the effectiveness of the *Moka* system is the economic value created through the specialised division of labour that is enabled by exchange. The measurement issue is one of identifying the value added by use of the assets (i.e. income) rather than valuing the asset per se.

Returning to the economics of the problem requires that we think seriously about how institutions develop to enable economic gains. These institutions, whether we call them markets, firms, networks, or legal systems, define the rules of competition used to secure human prosperity (Coase, 1937, 1960; Schelling, 1995; North, 2005). The main 'assets' that humans have exploited to secure this prosperity are ideas that can be translated into actions to produce consumption goods or more productive tangible assets that fulfill longer term purposes.

These ideas, and the institutions that result, have long path-dependent histories. The roots of modern economies based on reciprocity lie in the gift exchange economies of more primitive societies (Boulding et al., 1972). Modern economies evolved from primitive economies by creating, storing and diffusing human knowledge in ways that made economic interactions more fruitful, and that ultimately led to vast improvements in eco-

⁶ The sons of Big Men often become Big Men themselves, but the role of Big Man is not an inherited position. Rather, sons of Big Men are more likely to succeed by emulating those qualities in their fathers that made them successful in *Moka* and other activities, like building networks and alliances with other clans and providing leadership in making peace or instigating war.

⁷ The shells served a monetary function in that they could be traded for other commodities in routine trade outside the *Moka*. The use of shells as money is not unique to the Hageners; for example, the wampum of Native Americans were shells that served as money (Szabo, 2005).

conomic welfare (e.g. Nelson and Phelps, 1966; Kremer, 1993). Accumulated human knowledge allows us, for example, to transform sand into glass or silicon chips, thereby transforming an almost boundless supply of cheap raw materials into valuable art objects or work tools.

The main conclusion from this section is that modern economies have distant roots in the past, and one source of this connection is the ubiquity of economic intangibles. This is important because it suggests that if modern complex economies are different in their use of economic intangibles, the difference is one of degree rather than of kind.

3. Non-separability and the dynamics of intangibles creation

In this section, we discuss the dynamic processes that lead to the creation, storage, diffusion and preservation of different kinds of intangibles. This is necessary to illustrate how accounting intangibles in most cases are not separable from other assets. Before we proceed, we briefly return to Figure 1 to define accounting, economic and cultural intangibles and their interrelationships.

3.1. Defining different sets of intangibles

Accountants typically distinguish intangible assets from other assets based on them not having physical substance and not representing purely financial contracts (investments). In addition, accountants typically describe intangible assets as having highly uncertain and ambiguous future benefits. This rationalises the common practice of expensing the costs of most internally developed intangibles as they are incurred rather than deferring the expenditures as assets to match against future revenues, for example, IAS 38 (IASB, 1998). We define an *accounting intangible* as the legally recognised right to exclusively exploit an idea for a defined time period to generate cash inflows.⁸ Some innovators prefer to use informal mechanisms rather than the legal system to protect the fruits of their ideas. For example, Coca-Cola has not patented its formula and relies on trade secre-

cy, while magicians (Loshin, 2007) and French chefs (Fauchart and von Hippel, 2006) rely on social norms to protect their valuable intellectual property. As such, these economically valuable ideas were not reported as assets on balance sheets, and even following recent changes in accounting for intangibles (SFAS 141 and IAS 38), are likely to be recognised only as part of purchase accounting for a business combination.

Growth economists like Solow (1956) and Lucas (2002) identify ideas and knowledge as having the largest impact on human economic progress. Romer (1990) identifies several features of knowledge intangibles that distinguish them from physical assets as well as public goods. One important feature is that economic intangibles tend to be *non-rival*: consumption by one person does not preclude consumption by another because there is no physical feature that is transformed by consumption. For example, many cooks can use instructions such as recipes simultaneously, but only one cook at a time can use a particular knife or utensil (Warsh, 2006). Importantly, economic intangibles create value by better use of complementary tangible and intangible assets. Because they can be expressed as digital bits that are cheap to copy, economic intangibles tend to have high fixed costs and low marginal costs of production. Economic intangibles tend to be unique almost by definition, making it relatively difficult to set up organised markets for transacting in them. Network effects sometimes characterise economic intangibles in that their value increases with the number of users, such as a standard like uniform bar codes. For present purposes, we define an *economic intangible* as an idea that ultimately helps produce valuable goods and services for consumption either directly or indirectly. A representative example of an economic intangible is the design of a new good or service. While both economic intangibles and public goods are non-rival, public goods are non-excludable whereas economic intangibles can be made (partially) excludable by legal protections or by encryption, secrecy or social norms (Romer, 1990).

Ideas that contribute to the survival and development of a society are also valuable even though they may not directly yield tradable goods and services. For instance, personal hygiene norms slow the spread of communicable diseases and increase the viability of a culture. We define a *cultural intangible* as an idea or mental construct that is preserved and transmitted across time, and enhances the survival fitness of persons within the culture. Accounting intangibles are a legally protected subset of economic intangibles, which are in turn a subset of those cultural ideas that directly or indirectly generate consumable goods and services. These broader sets of intangibles are useful benchmarks for assessing whether the accounting

⁸ This definition is consistent with US practice (SFAS 2: FASB, 1975) as well as the narrower concept of separability in IAS 38 (IASB 1998). Under purchase accounting for business combinations (e.g. IFRS 3: IASB 2004; SFAS 141: FASB 2001), residual values needed to balance journal entries are labelled goodwill, which are then categorised as intangible assets. Because these residual values have unidentifiable sources and indefinite lives and could be mere accounting artefacts, we exclude them from our theoretical analysis. Both SFAS 141 and IAS 38 require that firms allocate purchase accounting residual values to several asset categories and subcategories (at a reporting segment level) that were previously not recognised on balance sheets, such as customer relations and unpatented trade secrets. These allocations and estimates are almost surely very noisy partitions of the residual value, so we discuss them no further.

subset owned by corporations has increased in importance recently.

3.2. *Creation of accounting intangibles*

Accounting intangibles result from a dynamic process where facts about the natural world are discovered (cultural intangibles or basic research), converted into economic goods and services (applied research or invention) and commercially exploited (innovation), and eventually monopolised as exclusive legal rights to benefit from an idea. Thus, increases in the quantity or value of accounting intangibles can arise from increases in the total set of cultural intangibles holding conversion rates constant, or increases in the fraction of cultural intangibles that inventors convert into consumable goods and services, or changes in the legal and enforcement system that make formal legal protection preferable to informal protection of valuable economic ideas.

To begin our analysis of accounting intangibles creation, consider a well-known accounting intangible – Edison's patent for the electric light bulb. Light was created as a physical fact at the Big Bang nearly 14 billion years ago (Spergel et al., 2003). Animals began using light when they developed sight about 530 million years ago (Parker, 2003). About 1.4 million years ago, our hominid ancestors learned to control fire to ward off predators, cook food and create cave paintings (Uhlir, 2001: 11). Humans developed fuel lamps about 70,000 years ago, and candles were invented 5,000 years ago to provide brighter and better-controlled illumination (Uhlir, 2001: 20). Gas streetlights replaced candles in 1820 (in Pall Mall, London) and electric light bulbs provided light after Swann and Edison's 1879 invention of the carbon-filament incandescent lamp. Nordhaus (1997) estimates that the labour hours needed to buy 1,000 lumens of light in 2000 was about 1/10,000 of its price in 1800, which in turn was 1/10 its price in 2000 B.C. Babylon, indicating that light technology has improved dramatically over the past 200 years.

The discovery of fire control, and basic research more generally, was probably motivated by intrinsic curiosity. Galenson (2005) argues that the careers of great artists follow two different paths. Experimental innovators, such as Michelangelo, work gradually by trial and error, and arrive at their major contributions later in life. By contrast, conceptual innovators, such as Picasso, make sudden breakthroughs by formulating new ideas, usually at an early age. Jones (2007a) analyses the careers of great inventors and Nobel Prize winners and finds that the mean age at which great breakthroughs were made has increased by six years over the 20th century. This is a consequence of an increased 'burden of knowledge' that new innovators must master before they reach the frontiers of their research

areas (Jones, 2007b). This is reflected in increased times to earn Ph.D.s, greater specialisation within subject areas, and increased reliance on teamwork for innovation (Wuchty et al., 2007).⁹

Important scientific discoveries are not distributed uniformly across societies or through time, but rather appear in clusters in a non-monotonic and punctuated evolutionary process. A more-populated society likely has a larger knowledge store of physical facts and observed regularities, which discoverers can seek to better understand (Simon, 2000). In this sense, human population (or more accurately, their combined knowledge) is the ultimate resource (Simon, 1981). A society possessing more people with the health, education and leisure to devote purely to research is likely to have better chances of discovering basic ideas, since specialised division of labour is generally more efficient (Smith, 1776). Societies where more discoverers work in close physical proximity are more likely to reap the benefits of complementarities and synergies in the generation and refinement of ideas (e.g. Kelley, 1972). This is why cities have historically been hubs of discovery and innovation (Jacobs, 1969, 1984; Bairoch, 1988). Basic research is more likely to flourish in societies that value knowledge and reward new discoveries, and large civilisations are likely to have a greater diversity of rewards that appeal to different explorers. Finally, more peaceful and stable societies are better able to reduce the economic uncertainty associated with exploring the frontiers of knowledge (North, 2005).

Inventors and especially innovators tend to be more motivated by monetary rewards. The entrepreneur seeks to exploit his local or specific knowledge of demand and supply to generate economic profits (Hayek, 1945). Risk-tolerant entrepreneurs tend to experiment with their products and processes to develop the proverbial better mousetrap. Entrepreneurs monitor and learn from their environments, and are generally quick to imitate successful competitors.¹⁰ The entrepreneurial

⁹ Gurven et al. (2006) document that while adult physical size is necessary for basic hunting ability in hunter-gatherer societies, developing sufficient skill to track and capture important prey items generally takes 10 or 20 years after achieving adult body size, indicating that mastering a large body of specialised knowledge is very valuable even in primitive societies.

¹⁰ Schumpeter (1939: 100) provides a similar account to ours, 'Considerations of this type [the difficulty of coping with new things] entail the consequence that whenever a new production function has been set up successfully and the trade beholds the new things done and its major problems solved, it becomes easier for people to do the same thing and even improve upon it. In fact, they are driven to copying it if they can, and some people will do so forthwith. [Hence, it follows that] innovations do not remain isolated events, and are not evenly distributed in time, but that on the contrary they tend to cluster, to come about in bunches, simply because first some, and then most, firms follow in the wake of successful innovation.'

risk-taker is usually more interested in knowing how well something works rather than understanding precisely why it works. Competition between entrepreneurs provides the incentives for discovery of new economic goods and services (Hayek, 1968).

Because entrepreneurs constantly borrow and incorporate the ideas of others, ideas are continuously reshuffled and recombined, often in far-removed locales. As risk-taking entrepreneurs are tested by competition, weak ideas are weeded out by business failures in a process similar to natural selection acting on genes (Alchian, 1950). Ideas become adapted to their environment, but they may also 'exapt', whereby a response to one problem turns out sometimes by accident to solve a different problem (Dawkins, 1976). For example, frozen popsicles were invented by accident in 1905 after a soda maker accidentally left a batch of drink outdoors overnight and it froze (Ng, 2007). Environmental changes, whether natural or cultural, also likely play a major role in knowledge creation. For instance, many archaeologists believe that an Ice Age about 40,000 years ago provided the stimulus for art and spoken language (Appenzeller, 1998; Holden, 1998), while the most recent Ice Age, ending about 12,000 years ago, sparked agriculture (Pringle, 1998; Mithen, 2004). Since environmental changes are infrequent and unpredictable, this could in part explain why idea creation is not uniformly distributed over time.

3.3. Storage, diffusion, and preservation of intangibles

The strong complementarity inherent to intangibles implies that their creation will be most pronounced when ideas are widely known and shared among the developers of new ideas. The economic value of ideas depends on the ultimate consumer surplus they generate, which is increasing in the total number of consumers served now and into the future. Effective storage, diffusion, and preservation of intangibles are thus necessary for current knowledge to be leveraged to develop new ideas and exploit their potential within and between societies (Kuznets, 1966: 290).

Historically, geographical barriers such as mountains, rivers and oceans have restricted movement of people and hence have slowed the spread of ideas from one society to another. To the extent that neighboring areas had very different climates and natural resources, ideas that were

useful in one area might not be valuable in another.¹¹ Historically separated human populations frequently have different languages and cultures, which can inhibit diffusion even when contact between societies occurs. At the same time, traders such as Marco Polo, missionaries like David Livingstone, adventurers like Christopher Columbus, and warriors like Alexander the Great have left home to seek their fortunes, taking their customs and ideas with them to new lands (Chanda, 2007). While such ventures have been episodic, they have been part of human history since modern man migrated out of Africa about 100,000 years ago.

Ideas can be communicated more accurately by cultures with a more developed spoken and written language, which promotes preservation and transmission across generations (Donald, 1991; Pinker, 2003). Standardised weights, measures, and numerals make it possible to develop recipes and formulas as shorthand for storing successful combinations of ideas. Improved representation of abstract ideas ensures near-exact duplication of successful processes, and the improved organisation of production increases efficiency (Kuznets, 1966). An effective legal system protects both tangible and intangible assets, and can increase the expected returns to innovation (Spar, 2001; North, 2005). Likewise, governments that are open to trade with other societies increase their citizens' exposure to new ideas.

The ideas that underlie intangibles may not last forever. Accounting intangibles can get destroyed if their legal protection is removed by private litigation, a law that changes the terms of patent or copyright protection, government nationalisation, and so on. Economic intangibles can be destroyed by state regulation, taxes or tariffs, as well as by lax governmental protection of property, which makes piracy of ideas more attractive than production for exchange.¹² Cultural intangibles can be destroyed by external conquest, the rise of new religions, or environmental changes that lead to widespread disease or natural disasters. Rapid technological change could also result in over-consumption of natural resources and environmental collapse, forcing a society to resettle (Tainter, 1988; Diamond, 2004).

More generally, extensive government power enables rent-seekers who prefer to expropriate others' wealth rather than create their own through personal initiative (Olson, 1965). Corrupt government officials utilise bureaucratic red tape to extract bribes that reduce economic efficiency and the value of intangibles (de Soto, 1989, 2000; Buchanan and Yoon, 2000). Predatory or ideological governments are especially dangerous in that they usually target the successful entrepreneurs for expropriation to protect entrenched interest groups

¹¹ Diamond (1997) argues that agricultural and animal husbandry technologies were more likely to spread along the same latitudes in Eurasia with similar climates than along the same longitudes in Africa and South America.

¹² Technological obsolescence may constitute a net gain in intangibles and is an indispensable part in the process of 'creative destruction' (Schumpeter, 1942).

(Rajan and Zingales, 2003).

The main point from our discussion in Section 3 is that societies that possess large numbers of talented, educated, and risk-tolerant people best foster the creation of intangibles. This is leveraged by networks that promote the development and diffusion of ideas that build on past knowledge and survive the selection pressures of competition. The most notable feature of settings conducive to intangibles is the extensive complementarities and synergies between new ideas, concurrent developments, and accumulated knowledge from the past. The practical accounting implication of these complementarities and synergies is that the value of a specific accounting intangible is not in general separable from the culture, economy, and organisation within which it will be employed. Thus, even if intangibles have grown in importance, it is not obvious that they can be valued accurately as independent assets.

4. The economic role of intangibles in modern economies: wealth creation

In this section we discuss the implications of intangibles for wealth creation within modern economies. We begin by discussing the role of government and developed markets for exchange, since both are precursors to large-scale corporate organisations. We then describe the wealth creation role of intangibles in the modern corporation.

4.1. Government and the emergence of market exchange

Productive efficiency implies that individuals produce more than they can consume. Surplus production also generates incentives for other individuals to expropriate others' output rather than producing it themselves. Effective political organisations like governments essentially monopolise coercion. Olson (1993) argues that a roving bandit in an anarchical stage has an incentive to take whatever his victims have. However, a bandit leader can also choose to seize and hold a given area, by which he would benefit from voluntarily limiting his thefts and providing a peaceful order so that others within his sphere of control have an incentive to invest and produce. In this conception, a short-horizon roving bandit has an incentive to make himself a long-horizon public-good-providing monarch (McGuire and Olson, 1996). This 'public choice' conception of government (Buchanan and Tullock, 1962) has led to metaphors such as a 'visible boot' or 'grabbing hand' for rent-seeking individuals who use the power of government to expropriate wealth (Frye and Shleifer, 1997).

While dictatorships are not the only form of government, Olson (1965) shows that rent-seeking individuals will always try to cartelise valuable

goods and services. For instance, occupational groups lobby for licensing or certification to create an oligopsony for their services and raise their average group incomes without providing any higher quality of service (Stigler, 1971; Kleiner, 2006). In countries with powerful governments, it is important to have access to political power that can enable beneficial private action. When government agencies compete with each other, we frequently observe an 'anti-commons' problem where profitable actions will not be taken because of excessive bureaucratic obstacles to overcome, even with bribes or lobbying (De Soto, 1989, 2000; Buchanan and Yoon, 2000). The result is that people choose to conduct economic exchanges in black markets, typically paying local gangs for protection (Frye and Shleifer, 1997).

North et al. (2006) provide an integrated view of political and economic organisation wherein the natural state of government is a limited access social order that restricts competition to create rents, which in turn provide the foundation for stable political organisations. By contrast, they suggest that more recent periods have seen the emergence of open access orders, where political stability and economic growth are achieved through economic and political competition. North et al. argue that the emergence of open access orders involves a lengthy developmental process where co-evolution of political and economic institutions incrementally leads to wider access to potential economic gains and increased competition for such gains among various actors within an economy. For present purposes, it is sufficient to note that open access orders with governments that promote competition and protect property rights are essential for the value of intangible assets within an economy to be realised.

Modern economies contain large, developed market-exchange sectors that could plausibly be viewed as natural extensions of gift economies (Roberts, 2005) and are more likely to flourish under open access orders. As the number of group members grows within a society, repeated interaction with familiar partners occurs less often (Dunbar, 2001). In addition, individual cooperation with members of other groups cannot rely on familiarity or repeated interaction. At some point in the recent human past, a new form of economic interaction arose in the form of bilateral exchange or barter (Seabright, 2004) with an associated norm of balanced reciprocity (Sahlins, 1972). Put differently, in a market-exchange economy, reciprocity and sharing is expected only between trading partners, and no claims are made upon the community at large, unlike the norm in a gift economy.

A market economy is more likely to develop with more extensive division of labour and specialised production of goods and services because

members of the society need to interact with more individuals to procure everything they demand for their daily living. Like many important human institutions, the market economy was never designed by individuals but, rather, emerged spontaneously. As Friedrich Hayek (1979: 164) notes, 'We have never designed our economic system. We were not intelligent enough for that.' In other words, markets are 'grown' institutions that emerge and develop as conditions change to permit mutually advantageous exchange. Further, the emergence and development of markets is inexorably tied to opportunities and incentives that encourage innovation through economic competition.

4.2. *Intangibles and wealth creation by corporate organisations*

Human societies increase in size because of increased economic efficiency associated with division of labour that makes more effective use of knowledge held by group members. Modern economies have a wide range of business organisations, ranging from the individual entrepreneur through the mom-and-pop grocery store, small family business, partnerships, private companies and publicly traded multinationals. Within these organisations, production is planned and implemented by the owner(s) and/or their managers (Coase, 1937). That is, a business organisation is guided by management's 'visible hand' (Chandler, 1977) rather than the 'invisible hand' envisioned by Adam Smith (1776).

Business organisations compete for resources in a constantly changing business environment, and the organisations that survive are those that have best adapted to their environment, whether consciously or unconsciously (Alchian, 1950). While these organisations trade with others for goods and services on markets, they also internalise production through horizontal or vertical integration. Coase (1937) argues that the reason we don't all work and live in a single firm is that the transactions costs of organisation increase with firm size and eventually overwhelm even the most efficient managers.

In a Coasean world firms exist because they exploit opportunities to organise production and final exchange with customers in a more cost effective fashion than would be the case for a series of transactions between sub-contractors on a market. Whether a firm survives and prospers depends on whether it can locate customers and convince them to transact for a price that covers the firm's costs. In this sense, the entrepreneurial function is one of combining ideas, knowledge and information to efficiently coordinate production and deliver goods and services. Accounting plays a central role in supporting management decisions that try to guide the firm towards greater profitability

(Sombart, 1919; Littleton, 1928; Alchian, 1950). In short, the entrepreneurial role is to discover ways to exploit economic intangibles in combination with other assets to generate profits.

The main point here is that the value of intangibles to the firm is to enable wealth creation by exploiting previously unknown opportunities. Economist Thomas Schelling (1995) states this idea clearly as:

'It has become fashionable in the last two decades, not only among economists but among those who like to quote economics, to advert to an incontestable absolute truth colloquially expressed as: there is no free lunch ... I prefer the alternative truth, that there are free lunches all over waiting to be discovered or created. What I have in mind is what we call Pareto improvements, or the gains from trade. There are non-zero sum games that permeate the economy that have settled into, or have been forced into inefficient equilibria.'

Stated differently, the essential notion here is that economic benefits are best discovered by innovative organisations that exploit better ideas to create wealth. Intangibles are the basic ideas that fuel this discovery process, and their economic value is not independent of the economic setting in which these ideas will be used. Thus, a major point of relevance for accountants is: The truly important feature of intangibles is the wealth they generate, not their estimated economic value in exchange on asset markets that likely do not exist because of asset uniqueness and non-separability.

5. Recent changes in the value and importance of intangibles

We have developed a priori arguments in the three prior sections about why the exclusion of accounting intangibles from financial reporting is not likely a cause for major concern. We now shift to an empirical focus to discuss evidence on whether the role of accounting intangibles in modern economies is greater than it has been previously.

As discussed previously in Section 3, increases in accounting intangibles can result from increases in cultural intangibles that are converted into valuable economic goods and services through new ideas. Accordingly, we first discuss changes in the importance of cultural and economic intangibles. We then consider empirical evidence on the importance of accounting intangibles.

5.1. *Changes in cultural intangibles*

Cultural intangibles help a society survive and thrive, and result in higher measures of population success. An obvious measure of cultural intangibles is population growth, measured by taking a census, as it speaks directly to the ability of a so-

ciety to extend its members' lifespan. More broadly, it reflects a society's ability to exercise control over its environment, which allows it to extract gains from cooperation that arise through the coordination provided by organisations and market exchange (North, 2005).

Average life spans differ across human populations primarily because of large differences in death rates during childbirth and infancy rather than the small differences in the proportion of persons that live to an advanced age. Obviously, better health care increases disease survival rates at all ages and increases average life spans. Childhood and adolescent nutrition affects physical development and affects mental and physical capabilities in adulthood (Fogel, 2004). Since both physical and mental abilities are crucial to mastering even basic food-gathering technologies such as hunting, even a simple society can easily be disadvantaged by poor nutrition (Gurven et al., 2006).

Life expectancies vary considerably around the world.¹³ The most developed regions, such as North America, Western Europe, Australia and Japan have the longest average life spans of 75 and higher. The developing countries of Asia, Eastern Europe and South America have average life spans in the 60s and 70s, while the underdeveloped countries of Africa lag behind, with average life spans in the 50s or less. These disparities are remarkable given expanded access to modern medical technology, and at least partially reflect political barriers to the diffusion of the fruits of such knowledge.¹⁴

Average life spans have evolved differently around the world during the last half century. In 1950, mean life span was nearly 70 in North America, about 65 in Europe and Oceania, in the low 50s in South and Central America, in the low 40s in Asia and North Africa, and the high 30s in Sub-Saharan Africa. Endemic tropical diseases like malaria and sleeping sickness and unfavorable climates account at least partially for Africa lagging behind the rest of the world (Diamond, 1997). Over the last 55 years, there has been considerable global convergence in average life spans with the sole exception of Sub-Saharan Africa. Average life spans grew monotonically all over the world except for a decline in Sub-Saharan Africa since the late 1980s, primarily due to the spread of AIDS. By 2005, Asia and North Africa had added more than 20 years to average life spans and had surpassed the mean life span of Europe and Oceania in 1950.

Thus, diffusion of cultural intangibles has occurred at a tremendous speed around the world, with the notable exception of Sub-Saharan Africa. Kenny (2005) reviews data on a number of other cultural intangibles, such as literacy and gender inequality, and finds that most indicators around the

world have converged throughout the 20th century.¹⁵ Rosling (2006, 2007) demonstrates, using UN data, how closely measures of cultural innovation, such as child survival rates, correlate with measures of economic innovation, such as per capita GDP both over time and around the world. Rosling also demonstrates that socio-cultural indicators have converged more rapidly than economic indicators, suggesting that economic innovation tends to lag cultural diffusion.¹⁶

The growth in cultural intangibles can be quantified in economic values. Murphy and Topel (2006) estimate that the cumulative gains in longevity over the 20th century were worth about \$1.2 million per person for both men and women (based on US individuals' willingness to pay). Between 1970 and 2000, increased longevity added about \$3.2 trillion per year to US national wealth, equal to about half of average annual GDP over the period. Thus, the evidence suggests that considerable improvements in cultural intangibles have occurred over the course of the past century.

5.2. Changes in economic intangibles

Economic intangibles are ideas that can be converted into valuable goods and services for consumption either directly or indirectly. The World Bank (2006) recently published a millennium capital assessment with monetary estimates of the

¹³ The discussion in the next two paragraphs is based on life expectancy data for 1950–2005 in *World Population Prospects: The 2006 Revision, Highlights*, available online at: <http://esa.un.org/unpp/index.asp?panel=2>.

A map of life expectancies for different countries in 2005–2010 is available in United Nations, Department of Economic and Social Affairs, Population Division (2007: Figure 7), and a map of life expectancies in 2005 using the same data is available at: <http://www.worldpolicy.org/projects/globalrights/econrights/maps-life.html>.

United Nations, Department of Economic and Social Affairs, Population Division (2007: Figure 5) presents a graph displaying the evolution of life expectancies for different geographic regions from 1950–2005.

¹⁴ Until a few years ago, Western countries propagandized against the spraying of DDT to prevent endemic malaria in Africa (Sidley, 2000; World Health Organisation, 2006); and even today, the European Union threatens economic sanctions against developing African countries that import genetically modified grains (Clapp, 2005; Paarlberg, 2008) that would improve nutrition (Trewavas, 2001; Miller and Conko, 2004). South African President Thabo Mbeki long resisted the scientific link between HIV and AIDS, and withheld retroviral AIDS drugs from the populace even though they were provided free or cheaply by the major international drug companies (Schneider and Fassin, 2002; Power, 2003).

¹⁵ Kenny (2005) also examines data on life expectancy for England and India going back to the 13th century, and finds that divergence in this measure started as early as the 15th century and continued through the 19th century before reversing near the start of the 20th century.

¹⁶ Our reviewer pointed out that the demographic transition to smaller family sizes occurs after a population reaches high per capita GDP, indicating that economic intangibles can lead to at least some cultural intangibles.

types of assets – natural, produced and intangible – for 120 countries as of 2000. Because many of these assets were not traded, the World Bank developed estimates of asset values by capitalising the income being generated by these assets. The World Bank's (2006: 5–6) methodology is:

'Total wealth, in line with economic theory, is estimated as the present value of future consumption. Produced capital stocks are derived from historical investment data using a perpetual inventory model (PIM). Natural resource stock values are based upon country-level data on physical stocks, and estimates of natural resource rents are based on world prices and local costs. Intangible capital then is measured as the difference between total wealth and the other produced and natural stocks.'

The central finding, anticipated by Adam Smith, is that intangible assets are the most important category, averaging 78% of worldwide assets.¹⁷ Intangible capital comprises 59% of assets in low-income countries, 68% in middle-income countries and 80% of assets in high-income OECD countries.¹⁸ Produced capital comprises 18% of worldwide assets, and has a similar share across income levels, ranging from 16% in low-income countries to 19% in high-income countries. Natural capital comprises 26% of assets in low-income countries (even excluding the oil states of the Middle East), 13% in middle-income countries, and a meager 2% in high-income OECD countries. While natural capital is only 2% of wealth in high-income OECD countries, natural capital per capita in high-income countries (\$9,531) is still five times that in low-income countries (\$1,925). The per capita disparity in intangible assets is even greater: high-income country citizens (\$353,339) have 80 times the intangible assets of low-income country citizens (\$4,434). Thus, high-income countries have considerably more assets of all types, generating much greater gross national income.

The World Bank (2006) breaks down the estimated intangible capital into human capital (raw

labour and unskilled labour), formal and informal institutions (governance and social capital), foreign financial assets, and measurement error (for total, produced or natural capital). The World Bank (2006: Table 1.3) measures several proxies for each of these components, and finds that three proxies, years of schooling (human capital), rule of law index (institutions) and foreign remittances per capita (foreign assets), together explain 89% of the cross-country variation in intangible assets per capita. With an elasticity of 0.83, the rule of law is the single most important component of intangible capital variation.¹⁹ Hall and Jones (1999) also conclude that social capital is the most important source of cross-country productivity differences. Education is the second most important component of intangible capital, with an elasticity of 0.53, while foreign remittances have an elasticity of 0.12. These estimates are important because they reveal that the most important intangible assets across countries are either not owned (rule of law) or owned by workers (human capital) and not by firms. Thus, business organisations in high-income countries have higher valuations largely because their tangible assets enjoy the complementarities and synergies of these more valuable intangibles.

The World Bank (2006: Table 1.4) also estimates marginal returns to each of these intangible asset components in different countries. It finds that individual components of intangible capital have much larger returns in rich countries than poor countries (seven- to eight-fold impact in high- vs. middle-income countries), which results from both higher levels of each of these assets and higher complementarities between these assets. Thus, the same level of investment can have vastly different economic values across countries. For example, a computer programmer from India (high human capital) has vastly different value added in the US vs. India, even holding direct investment in education or cost constant.

The World Bank (2006) likely underestimates the proportion of wealth attributable to intangibles. The World Bank estimates the current net present value (NPV) of natural and produced capital, but does not recognise that absent prior intangibles these would be much less valuable. The value of natural resources depends on demand for them, which in turn depends on uses that have been invented for them. Until recently, natural gas emerging from oil wells used to be flared off as waste until liquefaction technology enabled easier use and created economic wealth. Natural resources can also lack value because they cannot be brought to market – North Sea oil was valueless until deep-sea oil production technology was developed. Thus, as Adam Smith long ago argued, even the value of tangible assets emanates largely from

¹⁷ Smith (1776) starts his Introduction by saying: 'The annual labour of every nation is the fund which originally supplies it with all the necessaries and conveniences of life which it annually consumes.' Smith recognised 'the skill, dexterity, and judgment with which [. . .] labour is generally applied' as a precondition for generating supply 'whatever be the soil, climate, or extent of territory of any particular nation.'

¹⁸ The point estimate of 80% for OECD countries is quite similar to Solow's (1957) estimate that seven-eighths of US productivity growth in the first half of 20th century was due to technological change.

¹⁹ The elasticity measures the percentage change in intangible assets for a 1% change in a given proxy. Thus, a 1% change in rule of law index between countries is associated with a 0.83% change in intangible assets per capita.

ideas (i.e. *tangible assets embed intangibles*).

While the World Bank emphasises political and economic institutions, we note that social norms and conventions also affect the growth of economic intangibles. For instance, social constraints and occupational restrictions at birth, for example, in the historical Indian caste system, can discourage the pursuit of individual interests. North et al. (2006) argue that open-access societies encourage the flow of human capital between occupations, and all else being equal, are more likely to reward the young geniuses and master craftsmen whose innovations increase societal wealth. This surplus wealth in turn allows for the development of science and seemingly irrelevant products, like artwork, that emerge initially from hobbies (Jardine, 1996; Roberts, 2005; Szabo, 2005). To summarise this subsection, the production of valuable economic intangibles depends heavily on a host of cultural, social, political, and economic institutions, few of which are owned or controlled by individual firms.

5.3. *Changes in accounting intangibles*

Accounting intangibles are legal rights to exclusively exploit an idea to generate cash inflows, and include patents, trademarks and copyrights. Accounting intangibles that are purchased in arm's length transactions are reported at acquisition values. However, most intangibles are internally developed, and because firms frequently use informal mechanisms such as trade secrets and marketing to protect their ideas, they cannot report these assets on the balance sheet.²⁰ Even if legally protected, firms frequently report these assets on their balance sheets at historical costs or nominal amounts rather than at their market values. While US accounting academics usually attribute this conservative accounting to the expensing of R&D

expenditures mandated by SFAS 2 (FASB, 1975), the US practice of reporting valuable intangibles at conservative nominal values such as \$1 goes back at least as far as General Electric's balance sheet of 1907 (Ely and Waymire, 1999b; Waymire and Basu, 2008). In addition, intangibles are potentially more susceptible to obsolescence or legal challenge, and their market values are more likely to be state-dependent. Reported balance sheet values thus can be unreliable guides to the value or importance of accounting intangibles.²¹

An obvious alternative to balance sheet measurements is to value intangibles based on the accounting income they produce. Graham and Meredith (1937: 23) state this view as:

'In general, it may be said that little if any weight should be given to the figures at which intangibles assets appear on the balance sheet. Such intangibles may have a very large value indeed, but it is the income account and not the balance sheet that offers the clue to this value. In other words, it is the earning power of these intangibles, rather than their balance sheet valuation, that really counts.'

Intangibles usually generate income indirectly through other assets and jointly with other intangibles. Nordhaus (2004) estimates that on average inventors capture less than 3% of the societal benefits of their inventions. Customers, imitators and other industry participants usually capture the remaining benefits. Teece (1987) argues that under a 'weak appropriability regime', most profits go to the owners of specialised complementary assets needed to commercialise an invention. The strength of the appropriability regime is a function of the strength of legal protections such as patents, trademarks and copyrights (Teece, 1987); as well as innovation characteristics – whether the knowledge is tacit or codified, observable or non-observable in use, and whether it requires tangible assets or not (Teece, 2003).

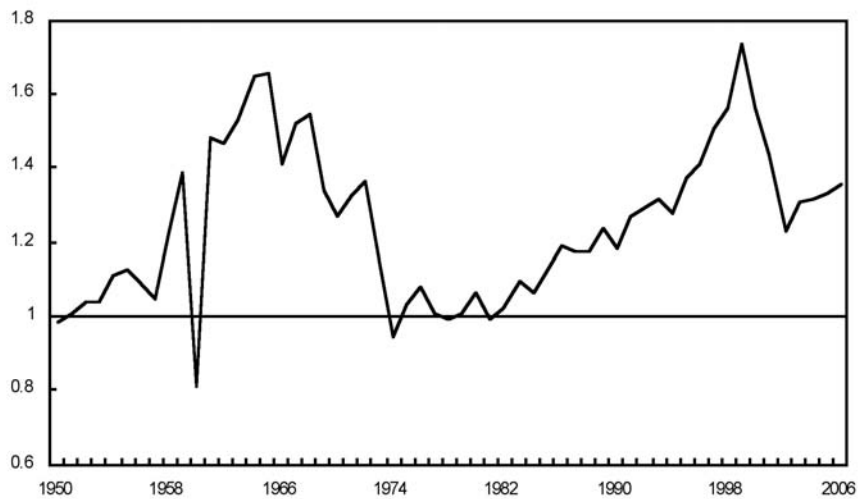
As discussed in the previous section, many valuable intangibles, such as rule of law, are not owned by individual firms but instead are shared by all citizens, and others, such as human capital, are owned by employees and only rented by firms.²² Valuing accounting intangibles on a stand-alone basis requires heroic assumptions about separability, highly uncertain estimates of ambiguous future benefits, and arbitrary allocations of jointly produced income. We question whether the often expressed need to value and report intangibles on balance sheets is inherently a mirage that leads down a path involving high measurement costs for something that is not the focus of economic activity. In other words, since intangibles are usually generated and used internally, and their complementarity with other firm intangibles implies that

²⁰ In a few special cases, such as well-recognised brands, internally developed intangibles can be reported at appraised values (IAS 38: IASC, 1998), although this is not permitted in the US.

²¹ Neither Adobe nor Microsoft has ever capitalised any software development costs under SFAS 86 (FASB, 1985). Similarly, large US oil and gas companies prefer to expense rather than capitalise exploration costs, unlike their smaller competitors, when firms could choose between the successful efforts and full cost methods. This suggests that successful companies report nominal balance sheet values for intangibles to signal their financial strength, and statistical analyses including these companies are likely to find a low or even negative correlation between reported intangible amounts and their market values.

²² Advocates of capitalising human capital often point to the \$2.2 billion increase in Kodak's market capitalisation after it hired Christopher J. Steffen as Chief Financial Officer in 1993. Unfortunately for Kodak, he resigned after 11 weeks, at which point the market value quickly shrank by over \$2 billion (Merchant, 2006: 898–899). This example reinforces the point that human capital is not owned by the firm but merely rented.

Figure 2
Tobin's q for the US stock market 1950–2006



The graph shows the market-wide Tobin's q statistic for the US stock market for the years 1950 to 2006. The market-wide Tobin's q is calculated from data available on Compustat. Following Gompers, Ishii and Metrick (2003), each firm's q is the market value of assets divided by the book value of assets (Compustat data item 6), where the market value of assets is computed as book value of assets plus the market value of common stock less the sum of the book value of common stock (Compustat data item 60) and balance sheet deferred taxes (Compustat item 74). The market value of common stock is computed as the Common Shares Outstanding (Compustat item 25) multiplied by Price – Fiscal Year – Close (Compustat item 199). These firm-specific values were then averaged for a given year based on fiscal year data. We used a weighted average based on market values.

going concern values are likely quite different from liquidation values, most valuations will necessarily be highly subjective and inaccurate, and ignored by market participants. In this sense, World Bank estimates of the wealth of different nations are merely adaptations of the longstanding view that accurate valuations of business organisations are based on the income they produce rather than 'values' attributed to their unique use of a combination of assets.

Given the balance sheet measurement problems, academic researchers have resorted to indirect measures to illustrate the importance of accounting intangibles. Baruch Lev (2001: 8), for example, pointed to the S&P 500 market-to-book ratio of equity of 6 in March 2001 as evidence that accounting intangibles were both highly important and poorly accounted for, assuming that the missing book values were all due to unrecorded accounting intangibles. Figure 2 shows the time series of Tobin's q for US firms from 1950 to 2006. In this graph, the market-to-book ratio of assets peaks at over 1.7 in the late 1990s, having risen dramatically from about 1.2 in the early 1990s. However, the graph also indicates that the market-to-book ratio exceeded one for some time in the 1960s, indicating that the 1990s values were

not unique. Furthermore, even though the market-to-book ratio was near one for much of the 1970s, following the 1973 oil crisis, it is difficult to believe that firms such as Coca-Cola or Kodak did not have valuable accounting intangibles in that era.

In retrospect, an alternative interpretation of Figure 2 is that the high market-to-book values of the 1990s resulted from a market bubble in Internet stocks, and in high-technology firms more generally. Warren Buffett pointed out at the time that the 1990s were reminiscent of the 1920s electricity, automobile and chemicals boom. Studying the US automobile industry, Carroll and Hannan (2000: 347) found 'that an astonishing number of hopeful producers populated the early industry' and that 'much selection occurred prior to actual production'. They identify 3,485 preproduction organising attempts in the automobile industry. Of these, only 11% succeeded in making the transition to the production stage. This evidence is similar to the low success rates for pharmaceutical initial public offerings in the late 20th century.

Jovanovic and MacDonald (1994) describe the evolution of the US automobile tyre industry during the first half of the 20th century. Similar to the automobile industry, there was a rapid increase in the number of automobile tyre manufacturers be-

tween 1910 and 1920 that followed the rising industry share price relative to the market index. However, the number of tyre manufacturers fell precipitously after the mid-1920s, lagging a few years after the industry share prices. Over time, the number of manufacturers continued to drop even as total sales climbed. Their Figure 1 illustrates a 'winner takes all' pattern that often characterises the advent of new technologies. The extreme positive skewness of returns to tyre manufacturing was similar to the returns realised by information technology firms in the 1990s. Gort and Klepper (1982) show that the introduction of many major new technologies generated similar industry patterns. In winner-take-all situations where most firms are likely to entirely lose their investments, it is arguably more informative to report these intangible investments at their most likely value of zero rather than an unrepresentative mean or average value.

But even ignoring the issue of technological change, we suggest that a more plausible reason for the variation in market-to-book ratios over time is changes in the value of non-accounting economic intangibles, such as improvements in government functioning and the impact of deregulation. Market valuations reflect the income expected to be generated by the firm's owned assets in conjunction with those assets that they share with other firms in the industry or the economy (e.g. government protection from competition via tariffs or selective regulation). In other words, it may not even be the firm's own assets that generate the added value.

Another piece of evidence that Lev (2001: 100) presents is a graph from Lev and Zarowin (1999) showing a declining earnings-return correlation from 1980–1995 as measured by R^2 s. Lev and Zarowin (1999), among others, argue that this R^2

decline indicates the increased importance of intangibles because current GAAP requires the immediate expensing of valuable investments. Ely and Waymire (1999a: Figure 1) show the earnings-return R^2 for a randomly chosen sample of 100 NYSE-listed firms for each year from 1927 to 1993. Consistent with Lev and Zarowin, Ely and Waymire (1999a) document that earnings and change in earnings explain about 20% of variation in stock returns across firms in the mid-1980s but close to zero by the early 1990s.

However, Ely and Waymire (1999a) also demonstrate that the decreasing trend during the 1990s was part of a broader FASB era decline, and the FASB era decline resembles an earlier decline under CAP during the 1940s and 1950s, again suggesting that the 1990s were not an aberration in relation to a longer time series. A subsequent study by Ryan and Zarowin (2003) finds that virtually all of the post-1950 decline in R^2 is due to (1) the stock market becoming more efficient (lower trading costs, etc.) and (2) increased accounting conservatism (a more non-linear relation between earnings and returns), and that increasing intangibles do not explain these trends. In sum, academic accounting research provides little evidence to support the argument that the average value of accounting intangibles has increased disproportionately in recent years.

There is evidence to suggest that the *number* of accounting intangibles has increased over time, but it is unclear whether this translates into more valuable accounting intangibles. The World Intellectual Property Organisation (WIPO, 2007) has recently collated and published data on patent and trademark filings and grants from patent offices around the world.²³ WIPO (2007: 11) shows the time series of worldwide patent filings for nine patent offices starting in 1883 and ending in 2005. Worldwide patent filings grew at a 1.99% rate from 1883 to 1959, with growth being most pronounced for the US, Germany, the UK and France. From 1960 to 2005, worldwide patent filings grew by 3.35% annually, largely because of increases in Japan and Russia. Growth during 1995–2005 was even greater, at 4.7% per year, with the most rapid growth occurring in South Korea and China.²⁴ As of 2005, patents are still highly concentrated, with 77% of filings and 74% of grants accounted for by five patent offices (China, Japan, European Patent Office, the Republic of Korea and the US). Thus, patent activity is concentrated in industrialised countries, similar to the pattern for economic and cultural intangibles described in Sections 5.1 and 5.2.²⁵

Data trends for trademark application filings worldwide from 1883–2005 are similar to those described above for patents.²⁶ Trademark applications worldwide grew at 4% per year from 1883 to

²³ Nard and Morriss (2006) use a public choice perspective to analyse the history of patent law from its beginnings in the Venetian patent statute of 1474 through the English 1624 Statute of Monopolies to the Intellectual Property clause of the US Constitution and the US Patent Act of 1790. Nicita and Ramello (2007) review the history of copyright law beginning with the English Statute of Queen Anne of 1710.

²⁴ While some of this growth is due to multiple patent applications in different jurisdictions, the European Patent Convention in 1977 and the International Patent Cooperating Treaty in 1978 have reduced some duplication. Patent counts are also affected by legal and administrative differences between national and regional patent systems, although these systems are converging due to international treaties and agreements. Alternatives to standard patent applications, such as provisional applications, utility models or industrial designs, may result in fewer standard patent applications in some countries.

²⁵ Of the estimated 5.6 million patents in force at the end of 2005, Japanese and US entities owned 49%. Japan and South Korea have far and away the highest number of patent filings per capita or per unit of GDP (measured in constant year 2000 US dollars at purchasing power parity).

²⁶ <http://www.wipo.int/ipstats/en/statistics/marks/applications/office.html>.

1959, and at 5.4% per year from 1960 to 2005. As with patents, trademark applications were concentrated in Europe, Japan and the US up to 1960. South Korea and China began trademark filings in 1963 and 1982, respectively, and quickly moved up the international rankings, with China in recent years having more than twice as many trademark applications as any other country. Both the trademark and patent filings data indicate that the number of accounting intangibles is trending up through time.²⁷

At the same time, an increase in the frequency of patent and trademark filings does not automatically translate into valuable intangibles, especially for developing country filings. Moser (2004) finds that countries with patent systems (and those with longer patent terms) were no more innovative than countries without patent systems in the mid-19th century, as measured by the number of innovations per country judged important by experts at World Fairs during 1851–1876. The WIPO data clearly suggests that patents, trademarks and other accounting intangibles tend to accompany industrialisation and economic development, and may in large part reflect improved legal institutions rather than acceleration in the number or value of economic or cultural intangibles. As a result, accounting intangibles may not have become dramatically more important *relative* to economic or cultural intangibles, although there is considerable regional variation.

Moreover, there are reasons to believe that overly broad patent law can hinder innovation (Jaffe and Lerner, 2006). Jaffe and Lerner (2006: 2) argue that the new US Court of Appeals for the Federal Circuit (CAFC) ‘interpreted patent law to

make it easier to get patents, easier to enforce patents against others, easier to get large financial awards from such infringements, and harder for those accused of infringing patents to challenge the patents’ validity.’²⁸ As a result, US patents have been granted for obvious or long-existing ideas such as ‘Method for Swinging on a Swing’ to a five-year-old, ‘one-click shopping’ to Amazon.com, and an ‘expirationless option’ to MBA Virgil Daugherty for Paul Samuelson’s research two decades earlier (Jaffe and Lerner, 2006). These US developments are important because of an international convergence effort starting with the 1994 international agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which is strongly influenced by the US system.²⁹

Many of the new patent filings may actually overlap with existing patents. Heller and Eisenberg (1998) argue that the large number of overlapping patent grants creates an ‘anticommons’ problem that will slow down biomedical research because innovators are increasingly wary of being asked for onerous royalty payments or facing costly patent litigation. Jaffe and Lerner (2006: Figure 2) show that patent litigation has increased dramatically since 1982. Bessen and Meurer (2008) estimate that except for the pharmaceutical and chemical industries, US publicly traded firms in the last decade on average experienced a net wealth reduction if they filed patents because of patent litigation. US accounting standard-setters should develop standards for patent liabilities (similar to asset retirement obligations) if they want to stay true to their favoured balance sheet approach! Non-meritorious product litigation is, of course, a much broader danger to product innovation in the US (Jaffe and Lerner, 2006).³⁰

Even if valuable economic intangibles are more prevalent today, accounting intangibles may not have similarly increased because of changes in social norms regarding sharing of ideas and intangibles. Large parts of the software industry are organised under a communitarian ‘open source’ or ‘free software’ or ‘copyleft’ model that has produced major software innovations such as Netscape, Linux and Apache. These innovations are deliberately unprotected under intellectual property law and compete with copyrighted or patented software. From an economic perspective, these arrangements would reduce the value of accounting intangibles actually reported on balance sheets. The illegal sharing of music and videos using Napster and YouTube makes it more difficult to collect royalties but also facilitates viral marketing, making their net impact on the value of intangibles difficult to predict (Liebowitz, 2005; Varian, 2005).

A final perspective on the importance of intangibles is that despite rapid growth after World War II

²⁷ WIPO also compiles worldwide data on utility models, petty patents, industrial designs, plant varieties and microorganisms, but the patent and trademark data is likely to capture the most important accounting intangibles.

²⁸ The Bayh-Dole Act of 1980 encouraging universities to patent federally funded research and then license the patents (Rai and Eisenberg, 2003). In the early 1990s, Congress made the US Patent and Trademark Office (PTO) self-financing, creating incentives to loosen patenting standards to increase application fees.

²⁹ Contrary to popular opinion and the business press, US movie producers lose far more to piracy per capita in developed countries like the US, Canada and the European Union than they do in developing countries like China, Russia and India (Schwabach, 2007). It is ironic that the US is so militantly pursuing intellectual property piracy when it was itself one of the biggest offenders until very recently.

³⁰ Onerous government regulation can also have negative consequences for the rate of innovation in an economy. For example, Peltzman (1973) argues that restrictive FDA regulation has overly slowed the introduction of new drugs in the US and imposed large welfare losses as a result. Gieringer (1985: 188) estimates, ‘At this rate, it follows that a one-year delay in new drug benefits would cost 37,000 to 76,000 lives per decade in the US population ... By comparison, FDA delays in approving new drugs have often been estimated at two years or more.’

in education and R&D investments, economic growth has not increased in the US or the OECD countries (Jones, 1995). In cross-country regressions, intellectual property rights have little impact on economic growth even though general property rights institutions have a substantial impact (Bessen and Meurer, 2008). These observations are consistent with the 'burden of knowledge' argument that innovation is becoming more difficult as the body of knowledge requiring mastery continues to expand (Jones, 2007b), with new innovations being narrower and providing smaller advances than before (Andolfatto and MacDonald, 1998). This evidence is consistent with the view that all factors of production, even knowledge, are subject eventually to the law of diminishing marginal returns.

6. Conclusions

We analyse accounting intangibles from a broad historical and international perspective, arguing that a narrow focus on particular time periods or regions often leads to a woefully incomplete view of intangibles. Our analysis indicates that human societies have produced useful ideas for thousands of years all around the world, and that the knowledge assets labelled as intangibles are ubiquitous to human economic interaction. Thus, analysing whether accounting intangibles have become more important recently requires examining a broad set of benchmarks for comparison.

We analyse the process by which cultural ideas become converted into valuable economic goods and services and eventually into legally protected property rights that can be reported as accounting intangibles. We find that few ideas attain the status of private property rights, even in developed countries, which reflects social norms for sharing as well as slowly developing property-rights technology. In addition, companies may prefer to ostentatiously undervalue intangible assets on their balance sheets to signal their economic soundness. As a result, the importance of reported accounting intangibles might not track the importance of the broader sets of cultural and economic intangibles.

Accounting intangibles, because they usually improve pre-existing tangible goods and services, are also not separable from the other concurrent intangibles incorporated into these tangible assets, or even the past innovations that led to the creation of these assets. Similarly, many intangibles will be incorporated into many as yet undeveloped future

tangible assets.

Ideas are economically valuable if they increase the wealth of those using them, which implies that the value of intangibles derives from the income they produce. However, intangibles usually generate income indirectly through other tangible assets, or jointly with other intangibles that are often owned by others, and are often rendered obsolete by unpredictable technological advances. Many complementary intangibles, such as rule of law, are not owned by any single entity but instead are shared, and others, such as human capital, are owned by employees and only rented by firms. Stand-alone valuations of accounting intangibles thus require heroic assumptions about separability, highly uncertain estimates of ambiguous future benefits, and arbitrary allocations of jointly produced income both within and across firms.

Our analysis implies that accounting practice has evolved well-functioning norms and practices for reporting intangibles. The few ideas that are securely protected by property rights and have values authenticated by market exchange are reported at acquisition values. In a few other cases, such as well-recognised brands, they can be reported at appraised values, but the more usual practice is to report intangibles at historical cost with the tacit understanding that these are lower bounds on their market values. Because the income statement ultimately captures all wealth generation regardless of source, reported income provides the single most important input to forecasting future income and estimating a firm's intrinsic value (Liu et al., 2007).

While standard-setters may be tempted to leave their mark upon posterity by altering accounting practice for intangibles, our analysis suggests that they, like Don Quixote, are likely tilting at windmills. Ferguson (1767) pointed out that many human institutions such as the market economy are 'the result of human action, but not the execution of any human design', and that frequently the former are superior. Because accounting practice like language and the market system has evolved along with the human mind, it incorporates far more information and evolves in a more complex manner than any single regulator, or even a committee of regulators, could begin to possibly comprehend (Hayek, 1979). Businesses that follow accounting rules that have been filtered through successive generations tend to survive and prosper, even though their managers and owners may not realise why (Byrne, 1937). Just as valuable innovation in science or technology is best accomplished by individual trial and error rather than by regimented lock-step dogma, so accounting standard-setters could likely better serve the public interest by letting market processes select appropriate accounting for intangibles.³¹ Using simplistic and naïve

³¹ Two days after our presentation at the Information for Better Markets conference on 17 December, 2007, the FASB decided not to add a project on intangible assets to its agenda. See: <http://www.fasb.org/action/aa122807.shtml>. The IASB also decided not to add a project on intangible assets to its agenda in December 2007. See: <http://www.iasplus.com/agenda/agenda.htm>.

conceptual frameworks to regulate complex adaptive systems, like financial markets and accounting practices, is likely a recipe for negative unintended consequences.

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