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What do we know about entrepreneurship as an intangible asset?

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Abstract: The purpose of this paper is two-fold: One, to present the argument that entrepreneurship is an important, albeit difficult-to-measure intangible asset. Two, to discuss what we do know about measurement of other intangible assets at the macro as well as the firm level. Lack of an operational definition of entrepreneur continues to plague empirical research on the role of entrepreneur for innovation. Many proxy measures for entrepreneurs have very little to do with technological innovation. The innovative use of Q ratio as a measure of 'entrepreneurial fever' and the idea of *imitating entrepreneur* advanced by some scholars are promising. There has been significant progress in the measurement of other intangible capital such as R&D. Intangible assets far exceed the level of tangible assets in the US economy and the conventional accounting practice of expensing intangibles results in a distorted and misleading picture not only at the firm level, but also at the macro level.

Keywords: entrepreneurship; entrepreneur; intangible assets; new firm formation; Tobin's Q; Microsoft.

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1 Introduction

A central feature of the new economies of the developed as well as many of the emerging economies is the growing importance of intangible assets. The term ‘intangible assets’ is often used interchangeably with knowledge assets and intellectual capital or intellectual property when the claim is legally protected such as in the case of patents, trademarks, and copyrights. Lev (2001, p.5) provides definition of intangible asset as “a claim to future benefits that does not have a physical or financial (a stock or a bond) embodiment”. By this definition, R&D stocks and broadly defined human capital clearly come under the category of intangible assets. One should add to this list marketing assets that are becoming the defining feature of many firms, small and large, in the new economy. Such assets include not only investment in promotional effort to create and sustain a brand name, but also investments in channel development, a well-trained sales force, carefully developed relationships along the entire spectrum of supply chain and more – all driven by intangible assets embedded in what has come to be referred to as information and communications technology (ICT). However, it should be noted that, while the value of many of these intangible assets are measurable and indeed measured, assets related to knowledge and entrepreneurial skills are inherently difficult to measure because, often, organised and competitive markets either do not exist for them or are weak when they do exist. Thus, one way to distinguish between entrepreneurship as an intangible asset and, say, intellectual property like a patent as an intangible asset is that the latter is measurable, however imperfectly, while the former is extremely difficult to measure. As a result, academic discourse on intangible assets and entrepreneurship in particular, occurs with data that is subject to a relatively wide margin of error or no data. More important, as Baumol (1993) suggests, an intangible asset of great importance for innovation and economic growth, entrepreneurship, is not found in formal models. The growth model developed by Aghion and Howitt (2010) utilising exit and turnover data of firms and workers would be one of the few exceptions. Still, identifying the role of entrepreneur as an intangible asset has important implications for the conceptual and empirical development of ‘entrepreneurial capital’. For example, how is entrepreneurial capital different from human capital, which we measure as capitalised value of investments in education, on-the-job training, and the like? What kind of public and private investments lead to accumulation of entrepreneurial capital? These are but a few questions that arise in treating entrepreneur as an intangible asset.

The purpose of this paper is two-fold: One, to provide a historical context for the role of entrepreneur in the innovation process and present the argument that entrepreneurship is an important, albeit difficult-to-measure intangible asset, which is the subject of Section 1. Two, to discuss what we do know about measurement of intangible assets at the macro as well as the firm level, which is the subject matter of Section 2 followed by concluding remarks in Section 3.

2 Entrepreneur and entrepreneurship: Schumpeter and beyond

Baumol (1993, p.2) famously noted that “the entrepreneur is at once one of the most intriguing and one of the most elusive in the cast of characters that constitutes the subject of economic analysis”. He observes further that, although the entrepreneur has long been recognised as central for the vitality of the market economy, it was not until Joseph

Schumpeter his function was clearly defined only to disappear again from the theoretical economics literature. Schumpeter defined entrepreneur as the *innovator* – the act of bringing a novel idea into operation – not to be confused with either the inventor or the capitalist whose task it is to take risk and get rewarded for it. Note that the contemporary view of entrepreneur considers risk taking as one of her/his chief attributes. Thus, Schumpeter in *The Theory of Economic Development* wrote:

> "Although entrepreneurs of course *may* be inventors, just as they may be capitalists, they are inventors not by nature of their function but by coincidence and vice versa." [Schumpeter, (1936), pp.88–89]

Later, in *Capitalism, Socialism and Democracy* Schumpeter adds some glorified language to describe the entrepreneur and the entrepreneurial function:

> "To act with confidence beyond the range of familiar beacons and to overcome that resistance requires aptitudes that are present in only a small fraction of the population and that define the entrepreneurial type as well as the entrepreneurial function. This function…………..***consists of getting things done***". (italics added) [Schumpeter, (1942), p.132]

It is important to note that Schumpeter's entrepreneur 'gets things done' by exploiting opportunities through '*new combinations*' to produce not only innovations in terms of new products and processes, but also adaption of new and better sources of inputs as well as new forms of business organisation and marketing methods. Moreover, Schumpeter of *Capitalism, Socialism and Democracy* could not be clearer about the obsolescence of the entrepreneurial function, a phenomenon he calls 'crumbling walls'. He concludes:

> "The perfectly bureaucratized giant industrial unit not only ousts the small or medium-sized firm and 'expropriates' its owners, but in the end it also ousts the entrepreneur and expropriates the bourgeoisie as a class which in the process stand to lose not only its income but also what is infinitely more important, its function." [Schumpeter, (1942), p.134]

Galbraith takes Schumpeter's glorification of the entrepreneur and her/his eventual demise a step further:

> "The great entrepreneur must, in fact, be compared in life with the male *Apis mellifera*. He accomplishes his act of conception at the price of his own extinction." [Galbraith, (1967), pp.88–89]

Baumol (1993, p.15) questions whether it is even possible to describe what entrepreneurs do beyond generalities since an entrepreneurial act must always be different from anything that has been done before. Therefore, he suggests that "…..anyone who writes about entrepreneurship has two choices – either to deal with the past or to discuss something other than activities that today constitute entrepreneurship".

The social status of entrepreneurs was indeed high as far back as 1800 BC in Babylonia. They were members of the elite classes carrying the title of *damgar* or *tamkarum* (Hudson, 2010). Painstaking estimates by Gelderblom (2010) suggest that in 1620 about 12% of the population 15 to 64 years of age in the city of Amsterdam in the Dutch Republic – known as the country of entrepreneurs – were entrepreneurs. Note that there is no clear definition of entrepreneur underlying such estimates. The largest group of entrepreneurs in Amsterdam was shopkeepers, many of whom today would be classified as small business owners who may or may not be 'entrepreneurs'.

3 Contemporary measures of entrepreneurs and entrepreneurship

Colourful language aside, lack of an operational definition of entrepreneur continues to plague empirical research about entrepreneurs and entrepreneurship. It is easier to talk about who are not entrepreneurs. They are not just managers who manage other peoples' money taking no risk themselves, nor are they simply investors who may not have active roles in the business. To be sure, there is no dearth of proxies and indicators of entrepreneurship.

De Nardi et al. (2007, p.19) classify "entrepreneurs as those households in which the head declares being self-employed as a primary job, owning a business (or a share of one), and having an active management role in the firm". Such households are referred to as self-employed business owners or, SEBs. By this classification, households headed by entrepreneurs make up about 7 to 8% of the US population. The single largest category of SEBs is in professional practices like doctors, lawyers, and accountants followed by construction, retailing wholesaling and the like. However, note that many of the professional practices, even if they are entrepreneurial, have little to do with technological innovation Schumpeter had in mind.

Some scholars look at entry and exit data of firms as indicators of entrepreneurial fever. For example, the data presented by Hathaway and Litan (2014) that business dynamism measured in terms of entry and exit in which entrepreneurs play a critical role has been on the decline in the firm entry rate – firms less than one-year old as a percent of all firms – has been on a steady decline since 1978 while the exit rate has held steady, notwithstanding the rise during the Great Recession. Births and deaths of business *establishments* are also considered as indicators of business dynamism. Data on births and deaths – in contrast to data on entry and exit data – are not affected by events such as mergers, takeovers, and reclassification. Birth at the establishment level is considered by some researchers as an especially good indicator of entrepreneurial activity. Establishment birth rate, like the entry rate, has been on a declining trend since 1993, while the death rate has been declining since 2001 (Sadeghi, 2008). The data reported by Hathaway (2013) on percent change in new firm formation relative to 1980 base for high-tech (defined by the presence of high share of workers in science, technology, engineering and mathematics occupations), ICT high-tech, and total private sector is more relevant to the measurement of entrepreneurial activity related to technological innovation (Figure 1). However, the conclusion from this data that the sharp drop in new firm formation in high-tech and ICT-high-tech since 2002 – from their respective peaks of about 400% and 200% relative to 1980 – portends bad news for future productivity and economic growth is a bit premature. Schumpeter understood better than anyone that a burst of entrepreneurial activity will be followed by a sharp decline, which he argued causes business cycles.

The trouble with most proxies of entrepreneurship is they seem to be far removed from indicators of technological innovation. For example, the rather sharp decline in entry observed by Hathaway and Litan (2014) is not reflected in the data on productivity, at least not yet. For example, average annual growth in multifactor productivity over the 1987 to 2007 period had shown no signs of decline. In fact, the growth rate has increased from 0.5% in 1990–1995 to 1.4% between 2000 and 2007. Not surprisingly, the rate of growth declined to 0.4% between 2007–2011, the period which included the Great Recession followed by 1% growth during 2010–2011 (USDL, 2013). Nor does it show up in venture capital financing – sometimes known as angel investment – of high-tech projects (Figure 2). On the other hand, the sharp decline in the share of US patents granted to independent inventors – from about 21% in 1978 to 7% in 2011 – is, consistent with Schumpeter's 'crumbling walls' prediction that innovation will increasingly become the stuff of the large corporation or 'corporate entrepreneurship'. This is not withstanding the contribution of individuals who started out as entrepreneurs like Bill Gates, Steve Jobs, Jeff Bezos, Larry Page and Sergey Brin, Narayana Murthy and scores of other lesser known personalities, but still fit Schumpeter's definition of an entrepreneur. None of them started out as inventors or capitalists but all of them were innovators who exploited ideas through 'new combinations' and got things done. It should be noted also that the distinction between invention and innovation becomes very blurred in the present day context of science-based entrepreneurial firms in the bio-tech and software sectors, for example.

Figure 1 New firm (<1 yr.) formation-change versus 1980 (%) (see online version for colours)

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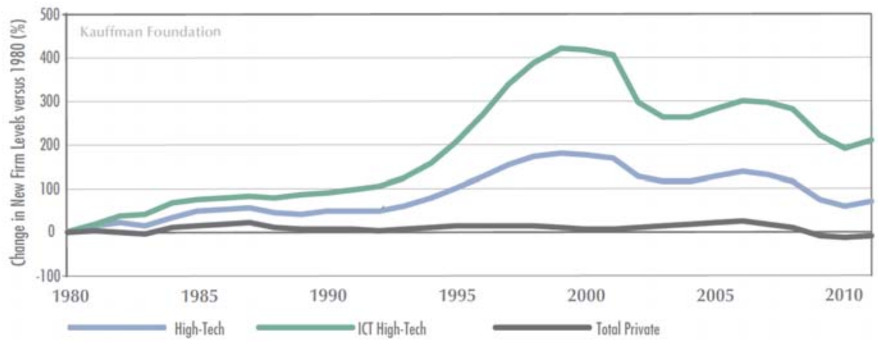

Note: Special tabulation; author's calculation

Source: Hathaway (2013)

Figure 2 Estimated us angel investment: 2001–2010 (see online version for colours)

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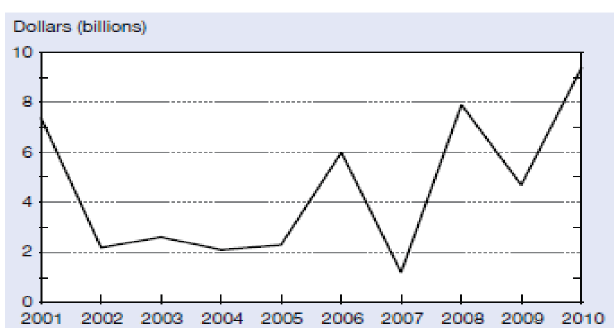


Source: Global Entrepreneurship Monitors [online] http://www.gemconsortium.org/default.aspx; US Census Bureau, Population Estimates [online] http://www.census.gov.popest/estbygeo.html (accessed 15 May 2011) cited in National Science Board (2012)

A recent study by Decke et al. (2014) examined the role of entrepreneurship in US job creation and economic dynamism at length utilising the data on US job creation and destruction, share of activity from young firms – age five years or less – and share of employment from young firms and provided at least two possible reasons for the decline in US entrepreneurial activity. One of the reasons is consistent with the Schumpeter's large-firm hypothesis noted above. The authors suggest that information and communications technology has provided greater advantage to large multinational firms by facilitating the coordination of production and distribution networks in multiple locations. A second explanation has to do with the possibility that regulation of the economy has increased the costs of labour market reallocation with adverse effects on job destruction as well as job creation. Both of these explanations are consistent with the finding of a study by Audretsch , which suggests that "high employment growth firms are not necessarily newly founded entrepreneurial start-ups, but rather tend to be larger and more mature firms" [Audretsch, (2012), p.1]. Audretsch's finding is grounded in the knowledge spillover theory of entrepreneurship, which suggests that new knowledge spills over from incumbent firms where it is created to new high-technology high growth start-ups, which are associated with the well-known market failures such as uncertainty and knowledge externalities. For a detailed discussion of market failures associated with the production of knowledge, see Audretsch and Keilbach (2007), and Rao and Klein (2013).

In contrast to Schumpeter's *innovative entrepreneurship*, Baumol (1993) introduced the term *imitative entrepreneurship*, which involves transfer of technology from one firm or one geographic location to another. Baumol and other economists (see Keller, 2004, for example) suggest that the *mere imitator* Schumpeter refers to plays a central role in the rapid diffusion of technology within and across countries. This is particularly important for the economic growth of the developing countries that depend on the developed world's technologies. One need only consider how Indian imitative entrepreneurs have become major players in the generic drug segment of the global pharmaceutical industry and ultimately helped create the beginnings of a fully integrated world class pharmaceutical sector in India (Rao and Klein, 2013).

Another source of entrepreneurship measurement is the global entrepreneurship monitor (GEM) sponsored by Babson College (USA), Universidad del Desarrollo (Chile), and Universiti TunAbdulrazak (Malaysia). London Business School (UK) founded the GEM. The sponsorship by the three educational institutions culminated in annual reports containing entrepreneurship-related data on participating countries. GEM's adult population survey (APS) is based on a random sample of 2000 adults between 18 to 64 years of age in the participating countries. The GEM 2012 report authored by Xavier, Kelly, Kew, Herrington, and Vorderwulbecke (Xavier et al., 2013) published survey data on early-stage total entrepreneurial activity (TEA) – the central measure of GEM – among other data. The TEA rate consists of the percentage of individuals aged 18–64 in a country/economy who are in the process of starting or are already running new businesses. By this measure, the US with 13% ranks highest among the 30 countries including EU (22) and non-EU countries (7). Note, however, TEA rates tend to be high in economies with low GDP per capita and low in high GDP per capita economies. The highest rates were found in Sub-Saharan Africa (28%) and Latin America/Caribbean (17%) regions indicating necessity-motivated entrepreneurship and perhaps relatively low corporate presence. By contrast, lower rates in high GDP per capita economies suggest opportunity-motivated entrepreneurship and high level of corporate entrepreneurship. Again, these findings leave us with the *presumption* of a positive relationship between start-up rates and innovation without much empirical support.

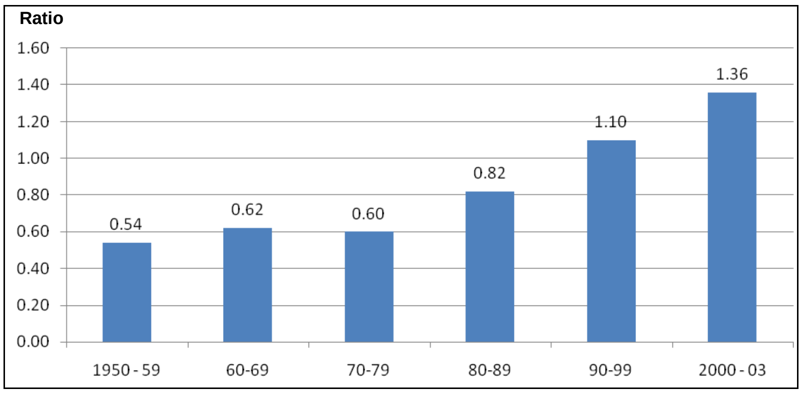
Anokhin and Wincent (2012), utilising data for 35 countries over the 1996–2002 period, attempted to do just that. They operationalise a country's innovation with two measurements of the dependent variable – patent applications and total factor productivity (TFP) – and relate them to the GEM's measure of TEA (independent variable) and several other control variables. The authors conclude "that on balance, there is a weak relationship between start-up rates and innovation" [Anokhin and Wincent, (2012), p.41]. The relationship is not uniformly positive across countries. The relationship is positive in the high GDP per capita countries, but negative in the low GDP per capita countries, a finding consistent with the pattern of TEA in rich vs. poor countries noted above. Another earlier study by Bowen and De Clercq (2008) – based on data for 40 countries over the 2002–2004 period – used the GEM's TEA measure (i.e. a country's start-up rate) as the *dependent* variable and related it to independent variables such as financial capital targeted at entrepreneurship, educational capital targeted at entrepreneurship, government regulation, and the level of corruption and found that the allocation of entrepreneurial effort is positively related to a country's *targeted* financial and educational activities toward entrepreneurship, and negatively related to a country's level of corruption. An important implication of this study is policies to promote entrepreneurship need to be targeted.

4 Estimates of intangible capital for the US economy

It has long been recognised in the economics literature that unaccounted intangible assets in the economy may be so large that the traditional practice of excluding most intangible investment such as R&D would result in a distorted picture of the level of GDP as well as its sources of growth. Pioneering estimates of intangible capital for the US economy by Corrado et al. (2009) suggest that intangible capital in 2003 was $3.6 trillion, an amount that exceeded the level of tangible capital by 36% (Figure 3 and Table 1). Almost half of the intangible capital is in the form of capitalised scientific and non-scientific R&D (an example of the latter is development of new motion pictures and other forms of entertainment), which the authors labelled as innovation property. Investments in on-the-job training by firms and computerised information accounted for 29% and 14% respectively, followed by capitalised value of advertising to build brand equity at 7%.

The methodology underlying estimates of the components of intangible capital involves painstakingly estimating constant dollar stocks of investments in R&D, computerised information, on-the-job training, and advertising with appropriate depreciation rates. More likely than not Corrado et al. (hereafter CHS) estimates of intangible capital are understated. To cite just one example, capitalised value of advertising, which the authors call brand equity is vastly understated, considering advertising is but a small fraction – perhaps no more than a third – of total promotion mix which includes personal selling, public relations, and sales promotion that are also aimed at building brand equity (Rao and Klein, 2013). Moreover, depreciation rates applied to stocks of advertising (60% per year), firm-specific resources (40%) and R&D (20%) are quite conservative. More important, in a just-published study, Eisfeldt and Papanikolaou (2014) claim to be the first to emphasise that a large part of the most quantitatively important category of intangible capital – essential talent – is not accounted for because it is not possible for firms to fully own the cash flows generated by inputs from key talent. Put differently, key talent, not the firm, owns the cash flows associated with the intangible capital to the extent such capital is portable. The authors call this the missing capital, estimated to be 50% of the measured market value of capital, which does not show up anywhere in the conventional accounting of intangible capital.

Figure 3 Ratio of US business investment in intangibles to tangibles, selected periods* (see online version for colours)



Note: *Annual averages for periods shown

Source: Data for the figure from Corrado et al. (2009, Table 1, p.671)

Table 1 Estimated value of intangible capital, by type, 2003

Type	*Amount*	*Percent**
Computerised information (includes software)	$511.9	14.1%
Innovation property		
Scientific	922.3	25.4
Non-scientific	864.4	23.8
Economic competencies		
Brand equity	271.8	7.5
Firm-specific resources	1,065.6	29.3
Total	$3,636.1	100.0

Notes: *Percentages may not add up to 100 because of rounding; amounts are in billions of current dollars.

Source: Corrado et al. (2009, Table 2, p.676)

A different approach to measuring the value of intangible capital at the macro level comes from Tobin's Q, which is the ratio of market value of firms to replacement cost of *tangible* assets. Under competitive markets and no measurement errors, the Q ratio is expected to be 1.0. A ratio greater than 1.0 indicates, among other things, monopoly profits (which show up in the market value, the numerator) created in part by intangible assets such as capitalised value of R&D, brand equity, and the like, which are not counted in the denominator, the replacement cost of tangible assets. The Q ratio also reflects measurement errors in the calculation of replacement cost of tangible assets. Consistent with the rapid growth of *measured* intangible assets in the economy estimated by CHS, the Q ratio has risen rapidly from 0.28 in the early1980s to 1.64, reaching a peak in 2000 at 1.64 and dropping to 0.57 during the 2007–2009 financial crisis before rising again to current level of 1.10 (Short, 2015). Tobin's Q has been interpreted as an index of 'speculative fever', which predicts the fluctuations in the economy's investment activity.

More recently, Phelps (2013), winner of the 2006 Nobel Prize in economics, reinterpreted the Q ratio as an indicator of economy's dynamism in terms of prospective new ideas. Phelps plotted a hybrid measure of Tobin's Q in 1988 against labour productivity in 1996 for nine European countries plus US, Canada and Australia and a strong positive relationship between the two variables [Phelps, (2013), Figure 7.3, p.188]. He suggests that the current Q ratio is a good predictor of future productivity and hence 'entrepreneurial fever' and innovation as well.

Note that the observed positive relationship between the Q ratio and measured labour productivity could be due to rapid growth of intangible capital during the same period experienced by 12 countries in the sample. A question arises whether entrepreneurial fever and speculative fever are one and the same.

5 The case of 'missing' intangible capital at Microsoft

Hulten (2010) provided an estimate of missing intangible capital for Microsoft that is 96% ($67 billion) of its conventional balance sheet assets at $70 billion in 2006. (If one were to apply the same ratio to Microsoft's 2013 balance sheet assets, the missing intangible capital of the firm would be $138 billion). Hulten's estimate of intangible capital comprised of 52% R&D stock; 41% related to sales and marketing; and 7% related to general and administrative stock in 2006. The addition of intangible capital causes shareholder equity to jump from $40 billion to $106 billion and return on equity to drop by 50%, from the conventional rate of 31.4% to intangibles-adjusted rate of 15.7%.

Employing macro-level growth accounting methodology, Hulten (2010) was also able to provide estimates of the sources of Microsoft's growth in real output between 1988 and 2006. Intangible capital accounted for 44% of growth in output, while tangible capital a mere 7%. The second largest source of growth was TFP – residual after the contribution of all inputs are accounted for – which contributed 21%. Contribution of labour input to Microsoft's growth, like the contribution of tangible capital, was a mere 10% and the remaining 18% was attributed to intermediate input (Table 2).

Table 2 Sources of Microsoft's growth, 1988–2006

Sources	*Percent*
Intangible capital input	44.3%
TFP	20.7
Intermediate input	18.3
Labour input	10.0
Tangible capital input	7.0
Total	100.0

Source: Calculated from Hulten (2010, Table 6, p.35)

One thing is clear from Hulten's work. That is, intangible capital is an important and growing component of corporate assets – as it is in the economy – but not accounted for in the conventional balance sheets, thus resulting in a misleading analysis of the firm's performance. That said, there are serious theoretical and empirical issues, some noted by the author himself in Hulten's Microsoft study. For example, the macro-level sources-of-growth model used by Hulten to analyze Microsoft assumes perfectly competitive markets, constant returns to scale, exogenous technological change, and little uncertainty about the outcome of investments. None of these assumptions hold for Microsoft as Hulten himself notes. Moreover, it may be said that Microsoft was founded and run, at least initially, by a Schumpeterian entrepreneur, whose large and obvious contribution to its growth shows up nowhere in the sources-of-growth model.

6 Concluding remarks

Among the 20th century economists, Schumpeter was the first to assign central role for the entrepreneur and the entrepreneurship in the innovation process. Even Picketty (2014), who believes that the entrepreneurial argument does not justify vast inequalities in wealth, concedes the importance of entrepreneurs for innovation. Although the entrepreneur of Schumpeter's *The Theory of Economic Development* (Schumpeter, 1934) who seeks to upset the existing equilibrium and move the economy to the new equilibrium has been greatly supplanted by the large corporation as Schumpeter predicted in his *Capitalism, Socialism and Democracy* (Schumpeter, 1942), she/he is hardly out of the picture. One need only consider the entrepreneurship of Bill Gates, Steve Jobs, Jeff Bezos, and scores of other individuals like them who successfully challenged the very corporate giants who are supposed to leave no room for them. It is a safe bet that the world will continue to produce such entrepreneurs, albeit to a different degree in different societies reflecting their institutional structure. This is despite the fact that, in the US non-farm business economy, producers of technological innovation (individuals and firms) are able to capture only a tiny fraction – little over 2% – of the super-normal or the 'Schumpeterian profits' as Nordhaus (2004) refers to them in his pioneering study. Still, measurement of entrepreneurs and entrepreneurship, much less their contribution to the economic wellbeing of the society has been challenging. Many of the available measures such as entry and exit rates and counts of self-employed businesses, for the most part, have very little to do with innovative entrepreneurship Schumpeter had in mind. This is not withstanding recent work by Hathaway (2013) and others who began looking at new firm formation of high-tech firms. Moreover, recent cross-country studies found only a weak relationship between start-up rates and innovation. This is one reason why entrepreneurial effort as an input into the production process has not found its way explicitly into many empirical models of economic growth.

However, much progress has been made in the measurement of *other* intangible assets. There is little doubt about the importance of the value of measurable intangible assets in the form of capitalised values of R&D, software, brand names and the like in terms of their level as well as growth in the economy. Estimates of intangible capital for the US economy by Corrado et al. (2009) exceed the value of tangible capital by 36% and almost half of it is in the form of scientific and non-scientific R&D. More likely than not, the value of intangible capital is vastly understated, not least because a large part of the most quantitatively important category of intangible capital – essential talent – is not accounted for because it is not possible for firms to fully own the cash flows generated by inputs from key talent. One of the implications of the growing importance of intangible capital is capital deepening and its contribution to growth in labour productivity is greater and TFP growth lower than would be the case otherwise.

Not surprisingly, firm level estimate of missing intangible capital for Microsoft by Hulten (2010) was 96% of the value of conventional balance sheet assets in 2006. Hulten describes the picture of Microsoft that emerges from his study is a story about the successful use of knowledge inputs to produce knowledge outputs. Note that accounting for intangible capital reduces return on equity and narrows the gap between market-to-book ratios significantly. Thus, the conventional accounting practice of expensing intangibles results in a distorted and even misleading picture of performance not only at the firm level, but also at the macro level.

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