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Indra Abeysekera
University of Sydney, indraa@uow.edu.au

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Disciplines

Accounting | Business | Social and Behavioral Sciences

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Intellectual capital practices of firms and the
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Indra Abeysekera

Discipline of Accounting, The University of Sydney, Sydney, Australia

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Paper type Literature review

1. OVERVIEW

Knowledge-based firms are growing exponentially (Romer, 1998) and the demand for knowledge based products and services is growing in the global economy (King & Ranft, 2001). Sveiby (1997) points out that even traditional sectors are gradually including knowledge components in their products and services, which ultimately enhance the value of the firm. The breaking down of geographic barriers, decreasing transaction costs, and more freely available capital in the intangible economy are affecting the entire world. These phenomena have made intellectual capital (IC) more valuable, thus allowing knowledge-based firms to earn even higher profits (Daley, 2001). A substantial part of the IC and IC reporting (ICR) literature argues that the measuring and reporting of IC is primarily a means of enhancing the market value of firms. Yet research addressing the implications of the actual process and outcome of ICR has been sparse. In particular, few researchers have addressed the way in which the processes and outcomes of ICR have been constructed to present the desired financial position of a firm. This paper seeks not only to fill this gap, but also to go further by critically analysing the construction of IC and ICR from the perspective of commodification, in particular the commodification of labour. It argues that the measuring of IC and ICR is directed towards maximising the market value of firms.

Cleaver (1979, p. 72) states that the overwhelming majority of people are forced to sell their lives as commodity labour-power to survive and gain access to wealth in society. Capitalist production creates and maintains this coercive situation by achieving total control over all the means of producing wealth in the society. The notion of commodification in relation to financial management is complex. Shaumai (1997) explains that commodification is the movement of economic logic that

attempts to deal with contradictions within capitalist production, but which instead produces new contradictions. In relation to IC and ICR, commodification is about the economic logic of maximising the market value of a firm while dealing with the contradiction of use of labour for production by the firm. This is arguably achieved by measurement and reporting techniques of IC that shift human capital represented by labour into systems and processes over which the firm has greater control, and supporting the concept of expensing labour rather than treating it as an asset under the traditional accounting system.

This paper is organised as follows. Section 2 examines commodification in relation to techniques in accounting, with particular reference to outsourcing of information technology (IT) services, and activity-based costing. Section 3 reviews how the most commonly used definitions of IC have assisted the process of commodification. This section also examines ICR frameworks to highlight how these frameworks have benefited the interests of capital providers in an unregulated ICR environment. Further, it reviews indices used for ICR to demonstrate how they are also used to manipulate reporting in a way that maximises the market value of a firm. Section 4 highlights how the financial reporting framework has influenced the interests of capital providers in an unregulated ICR environment. The final section offers concluding remarks relating to how firms choose frameworks which will justify maximising market value resulting in the construction of data in ICR that hides the reality of the commodification of labour.

2. COMMODIFICATION OF ACCOUNTING TECHNIQUES

The increasing adoption of techniques and practices that replace labour in a firm as a means of maximising the firm's market value is essentially an attempt to substantiate to stakeholders that the firm has adopted efficient and effective

techniques and practices. In reality, however, their outcome is to shift the contradictions associated with long-standing practices of labour (such as absenteeism and wage negotiations) to a new set of contradictions associated with the newly adopted techniques and practices.

For instance, in analysing IT outsourcing practices, Yakhlef (2002) points out that managers, hoping to eliminate the contradictions of in-house IT-related labour, found themselves instead increasingly entangled in bureaucratic processes dedicated to documenting IT matters, entrapped in assessing the financial cost of IT requests, and being made responsible for the outcomes of IT use. Yakhlef points out that getting rid of in-house IT-related labour in firms has required managers to shift their focus to a different set of contradictions, namely, the daily monitoring of IT-related documentation and outcomes. Further, Yakhlef states that managers have lost their ability to keep up with technological advances, leading to the forfeiting of the new knowledge that firms need to foster their long-term growth. These practices provide justification for the commodification of labour.

A technique that provides commodification of labour is activity-based costing (ABC). The original concern of the ABC technique was to increase the competitiveness of manufacturing firms, by correcting the previous 'misallocation' of indirect costs (Armstrong, 2002). Armstrong contends that ABC provides a platform for arguing that support personnel are an unnecessary indirect overhead, on the basis that the volume of activity (cost drivers) should generate the cost of the product or service.

Armstrong (2002) points out that the ABC's stated claim that profitability can be boosted through the dismantling of 'support personnel' is problematic and far from

convincing, as the correct allocation of indirect cost is unachievable. If the premise that the definition of indirect costs can be traced directly to cost objects is just an assumption, then it makes no sense to claim that ABC is more accurate than single-based absorption costing. If the correct allocation of indirect costs (such as ‘support personnel’) is unachievable, then, in principle, no standard can be set by which to judge the correct allocation of those costs amongst products and services. Hence, ABC’s stated claim of boosting profitability through correct allocation of indirect overheads among products and services is questionable.

The question then arises as to what it is that firms intend to achieve by adopting ABC, if ABC has not achieved its stated aim of boosting the profitability of firms by accurately costing their products and services. It appears that firms are simply using ABC as an attempt to control service personnel, seen as an indirect cost, by designing a methodology to measure their activities. In this way, firms are able to prove that these activities have no implications for profitability, or even that they have a negative impact on profitability (Armstrong, 2002).

These techniques (e.g. ABC) and practices (IT outsourcing) provide justification for the commodification of labour, disregarding the consequences of such commodification on the community. It could be argued that the retrenchment of workers shifts the problem from the firm to the community, which is compelled to support them through the taxation system. Similarly, the restriction on employees’ ability to obtain increases in wages in turn puts pressure on the standard of living of the community.

3. INTELLECTUAL CAPITAL AND INTELLECTUAL CAPITAL REPORTING

Yakhlef's critical analysis of the use of IT outsourcing practices to eliminate in-house IT-related labour in firms and Armstrong's critical analysis of the claim that ABC increases the profitability of firms are relevant to our discussion of IC and ICR. The commodification of labour with IC and ICR techniques is characterised here in three ways: the absence of uniformity of definitions of IC; a trend to privilege embedding of knowledge in systems and processes; and a trend that claims using indices can accurately measure IC of firms. These are discussed below.

a) The absence of uniformity of definitions of IC

In the past, the term 'capital' was used to represent all tangible and intangible assets and liabilities. However, the growing inability to offer a satisfactory explanation for the difference between the accounting book value and sale value of firms led to the creation of a subgroup of intangibles. This category required treatment in financial reporting as voluntary disclosure, and eventually came to be known as IC.

Since the 1990s, the emerging global economy has led to an increased emphasis on the importance of IC and on a firm's ability to create economic value through managing IC (Lev, 2001; Sveiby, 2001). Contemporary forces such as globalisation, new technology and the demand for innovation, the relatively free flow of capital, increased competition, changes in customer demand, changes in economic and political structures, and the role of the state in supporting knowledge economies have reshaped the way business is carried out (Buckley & Carter, 2000; Guthrie & Petty, 2000; Thorne & Smith, 2000; Volberda, Baden-Fuller & van den Bosch, 2001).

In response to this special treatment given to IC reporting, a plethora of definitions of IC have emerged (Yakhlef & Salzer-Morling, 2000), which differ significantly

from one another (Abeysekera, 2003a, 2003b; ASCPA & CMA, 1999, p. 4; Brooking, 1997; CMA, 1998; Edvinsson & Malone, 1998; Edvinsson & Sullivan, 1996; Klein, 1998; Knight, 1999; Stewart, 1997; Ulrich, 1998).

For instance, Edvinsson and Sullivan (1996, p. 357) define IC as “knowledge that can be converted into value”. The definition offered by Edvinsson and Sullivan (1996, p. 357) recognises knowledge that can only create economic value. According to this definition, labour can be classified into two classes: labour that creates IC and labour that does not. Knight (1999, p. 23) defines IC as “the sum of a company’s intangible assets”. That definition makes no reference to treatment of labour as an asset or an expense in the composition of IC. Ulrich (1998, p. 17) defines IC as equal to “competence X commitment”. This implies that labour that is not or is less committed to the firm creates less IC.

The availability of several definitions and the consequent lack of a uniform definition of IC and ICR (Abeysekera, 2006; Abeysekera & Guthrie, 2002) allow firms to define these terms in an experimental fashion. Rather than helping solve a set of problems relating to the measuring, managing and reporting of IC, the diverse definitions can only give rise to the commodification of labour. As noted above, the definition offered by Edvinsson and Sullivan (1996) justifies the retention and fostering by firms of certain types of labour while dispensing with other types of labour, citing their relevance to IC creation. Ulrich’s (1998) definition justifies the retention and fostering by firms of labour considered as committed and competent for the creation of IC while dispensing with other types of labour.

b) IC and ICR characterised by a trend to privilege embedding knowledge in systems and processes

The authoritative definitions offered by CMA Canada and CPA Australia (previously ASCPA) define IC as assisting a firm to codify the knowledge embedded in labour in the processes and systems of the firm (ASCPA & CMA 1999, p. 53). The CMA Canada and CPA Australia definitions encourage the perception of labour as a means of knowledge embedded in labour in processes and systems. As Yakhlef (2002) has pointed out, in the outsourcing of IT services, shifting the knowledge embedded in labour into processes and systems also gives rise to new contradictions; firms become increasingly entangled in bureaucratic processes dedicated to documenting matters, entrapped in assessing the financial cost of these systems and processes, and assuming responsibility for the outcomes of use of the knowledge embedded in systems and processes.

Labour is referred to it as part of capital – human capital in a firm in the intellectual capital literature (Abeysekera, 2006; Abeysekera & Guthrie 2004, 2005; Edvinsson, 1997; Fitz-enz, 2000; Roos & Roos, 1997). Human capital refers to a combination of factors possessed by individuals and by the collective workforce of a firm. It can encompass knowledge, skills and technical ability; personal traits such as intelligence, energy, attitude, reliability, commitment; ability to learn, including aptitude, imagination and creativity; desire to share information, participate in a team and focus on the goals of the organisation (Fitz-enz, 2000). Several authors in the IC literature have cited human capital as important because it is a type of capital, the value of which can be extracted to be embedded in systems and processes (Backhuijs, Holterman, Oudman, Overgoor & Zijlstra, 1999; Edvinsson & Sullivan, 1996; Graham & Pizzo, 1998, p. 25).

IC frameworks for ICR identified in the literature identify IC comprising various categories of assets (Brooking, 1996, pp. 13-15, 129; Dzinkowski, 2000; IFAC,

1998, p. 7; SMAC, 1998, p. 14; Sveiby, 1997) or various categories of capital (Abeyssekera & Guthrie, 2004, 2005; Edvinsson & Malone, 1998; Meritum, 2004), the latter being the more prevalent form of IC frameworks. This diversity of reporting approaches means that each firm can set its own reporting agenda as a way of addressing contradictions arising from the attempt to maximise market value.

Catusus (2004) considers that the labelling of IC categories as ‘capital’ in the various frameworks promotes capital maximisation, providing clear evidence that IC frameworks are primarily aimed at ensuring that capital providers maximise the return of firms through the maximisation of their market value. Use of the term ‘capital’ implies that IC can and should be transformed into a stock of capital during the production of goods and services. It also implies that the knowledge of staff is treated as part of a firm’s capital, regardless of whether an employee stays with the firm. As Mouritsen, Larsen and Hansen (2002) point out, the adoption of ICR has encouraged managers to codify the knowledge of their staff as a way of exercising greater control over events and transactions, regardless of the mobility of their employees. This codification is achieved through the conversion of human capital into structural capital, that is, the conversion of employees’ knowledge into systems, databases, artificial intelligence, expert systems and other replicable programs.

c) IC and ICR characterised by a trend that using indices could accurately measure IC of firms

More recently, ICR has entered into a stage of its development in which the process of measuring and reporting IC has been reduced to a series of numerical calculations in an attempt to provide more ‘tangible’ support for the narrative data. Support for IC indices is partly driven by the empirical evidence that investors consider IC as an economic asset, and reporting such information shows a strong association with

subsequent share returns, with a simultaneous augmentation between the market value and book value of firms (Amir, Lev & Sougiannis, 2003; Ballester, Garcia-Ayuso & Livnat, 2003).

Power (2001), reviewing IC statements as a technique of ICR, states that IC presented as a loose integration of narratives, story lines, visualisation devices and indicators is an ambitious attempt to support an economic logic aimed at maximising capital production, rather than providing an accurate representation of activities within a firm. Thus, in this phase of ICR, IC has taken on the form of a quantitative symbolism through the use of measures such as indices. The literature has more recently attempted to characterise this link as a way of explaining the logic of the market value maximisation of firms.

In an attempt to make the link between numerical calculations and narratives, the literature on ICR suggests five broad indicators for measuring and reporting IC at a macro level, all of which are derived from traditional financial statements: the market to net book value (Brennan, 2001; Daley, 2001; Dzinkowski, 2000; Knight, 1999; Sveiby, 1997); Tobin's q ratio (Chung & Pruitt, 1994; Flamholtz & Main, 1999); calculated intangible value (CIV) (Dzinkowski, 2000; Stewart, 1997); Lev's knowledge capital valuation (Lev, 2001); and Strassmann's knowledge capital valuation (Strassmann, 1999).

The market to net book value (Brennan, 2001; Daley, 2001; Dzinkowski, 2000; Knight, 1999; Sveiby, 1997) is the most popular and widely known indicator for measuring and reporting IC (Knight, 1999). With this indicator, IC value is defined as the difference between the market value and financial capital (net book value) of a firm (Dzinkowski, 2000; Knight, 1999). Intangible value can vary widely from one

industry sector to another. Industry sectors with a higher intangible value are supposed to possess greater IC because there is a wider gap between their market and net book value (Sveiby, 1997).

However, other theorists contest the accuracy of market to net book value as a measurement of IC value. First, it is pointed out that investors have not perfected the valuation of intangible assets in the market (Lev, Sarath & Sougiannis, 1999), with the result that firms are often bought at prices far exceeding market capitalisation (Guthrie & Petty, 2000). Second, the market value of a firm is influenced by the economic, social and political environment of a country. For instance, the market value of a firm in an emerging economy may be different from that of a similar firm in a developed economy. Research demonstrates that among stock markets in developed economies that have strong public investor property rights there is a higher firm-specific market value (Morck, Yeung & Yu, 2000). Third, differences in market value between firms are influenced by the psychology of the share market and by a company's economic potential outside and above its regular business forecasts (Tissen, Andriessen & Deprez, 2000).

The explanation provided for the measurement of IC as the difference between the market value and book value of a firm is also problematic. According to Mouritsen, Bukh, Larsen and Johansen (2002), the value of IC increases with the increase in difference between market value and book value of a firm. The authors argue that this increase in value of IC is attributable to transforming or improving corporate routines and practices. This explanation is problematic because the difference between market value and book value of a firm can diminish due to a fall in market value of a firm. The market value of a listed firm represented by share price could diminish due to factors which are outside the control of the firm. If the argument of

Mouritsen et al. is extended, the value of IC (created via transformation or improvement of routines and practices) should diminish when the firm's share market value falls. It becomes obvious that the difference between the market value and book value of a firm cannot be completely explained by the value of IC. Hence, IC and ICR are constructions to justify value creation in the firm. The construction of ICR is clearly documented in the literature. Bukh, Nielson, Gormsen and Mouritsen (2003) have found that firms fabricate their ICR to convince capital market participants to invest in them. Further, Bukh *et al.* (2003) have found that industry type, and the extent of managerial ownership prior to the initial public offering, affect the extent and nature of ICR. For instance, they point out that intangible-intensive firms need to report more IC information to lower their risk premium perceived by investors, indicating that ICR does not represent the value of IC. Rather, IC is reported to create a favourable perception among investors about the firm.

Tobin's q ratio is the ratio of the market value of a firm to the replacement cost of its assets (Chung & Pruitt, 1994; Flamholtz & Main, 1999). The strength of this measure is that it addresses a significant weakness in the traditional accounting framework, namely, the measuring of assets using historical costs (Chung, Wright & Charoewong, 1998; Dzinkowski, 2000; Stewart, 1997, pp. 225-226). However, since the assumptions underlying Tobin's q indicator are anachronistic (as they relate to the industrial era) and are more relevant to tangible than to intangible assets, its use is likely to result in a false indication of the value of the IC of firms (Flamholtz & Main 1999).

Dzinkowski (2000) and Stewart (1997) argue for the use of the calculated intangible value (CIV) as a tool for comparing IC value between industries. The CIV

calculates average pre-tax earnings and tangible assets over a three-year period, in order to calculate a firm's return on assets. The CIV can then be compared with the industry average (Dzinkowski, 2000; Stewart, 1997). However, the difficulty in accurately calculating a firm's average return on assets, and the cost of capital (in order to calculate the net present value of intangibles), limits the CIV's predictive accuracy (IFAC, 1998).

Lev's (2001) valuation employs both past and future earnings projections. Lev calculates knowledge capital (i.e. IC) as the difference between normalised earnings and earnings from tangible and financial assets. The IC value is calculated by dividing IC by the IC discount rate. Therefore, IC valuation can vary depending on the discount rate chosen and on earning projections (Osterland, 2001). The absence of a widely accepted rate of return on IC for a given industry sector diminishes the accuracy of Lev's calculation of IC value (Osterland, 2001).

Finally, Strassmann (1999) suggests that IC be calculated as 'financial capital rental'. In other words, the difference between economic profits and profits from tangible assets provides the key to the difference between the market value and net book value of a firm. Strassmann describes IC as the interest earned from the accumulation of knowledge residing within the firm. However, since this method measures IC as the difference between market and the net book value, it suffers from the same weaknesses as those outlined earlier with regard to the market to net book value method.

Each of these measurement models reporting IC is flawed at a basic level: they all assume that IC can and should be measured, despite a range of problems associated with the identification of IC value. The result is the creation of indices that can be

manipulated by firms for the purpose of presenting their economic wealth in a way that maximises the firm's market value.

A problem common to all ICR measurement models is that they entail the assumption that indicators can accurately predict IC performance, an assumption that is not supported by empirical evidence. Since none of the ICR measurement models is proven to accurately predict IC performance, using these IC indicators may not serve their stated purpose, and firms can choose the IC indicator that best serves their goal of maximising their market value. Therefore, IC indicators are problematic in the same way as activity-based costing (Armstrong, 2002), in that their claim to increase the accuracy of IC measurement cannot be substantiated.

Instead, the main benefit of these indicators is their capacity to maximise the market value of the firm in support of the objective of capital maximisation for capital providers. This is a useful outcome for firms: the capitalist model of production relies on investor capital to operationalise and expand capital growth in a firm, and investor capital tends to move to firms that can maximise their market value so that investors can gain the highest value from their investment.

4. THE INFLUENCE OF FINANCIAL REPORTING ON IC REPORTING

The extent to which future ICR will impact on the commodification of labour will depend on the type or types of IC classification adopted by regulators, and on the kinds of IC attributes that regulators are willing to incorporate into their framework. If the framework is narrowly defined in a way that views managers as agents appointed to manage firms on behalf of capital providers, ICR may communicate only a limited aspect of the efficiency of a firm. However, ignoring the social and

political stakeholders of a firm may sooner or later threaten the credibility of the accounting profession itself.

The emphasis of ICR on the market value maximisation of firms can be explained by agency theory. According to agency theory, human action is driven by owners of capital who have delegated their rights to managers to maximise the wealth of firms on their behalf. The term 'agency' refers to delegated decision-making rights. In the case of firms, investors delegate their power – namely, decision-making rights over resources and the right to control the labour associated with those resources – to the management of firms (Armstrong 1991).

In its focus on the functional analysis of accounting monitoring and incentive systems, agency theory perfectly describes the nature of ICR frameworks and indices. Developments in ICR have created a generation of managers who regard themselves as agents of capital providers and who, as a result, are motivated to monitor and report IC on behalf of investors. In return, investors reward managers through a system of monetary incentives for increasing the market value of the firm. Decisions about who should be trusted, in these instance managers, and who should not be trusted, in this instance support staff, are implied through the IC frameworks and indices by their emphasis on the maximisation of market value.

Grojer (2001) states that the purpose of categorising accounting elements (i.e. assets, liabilities, equity, revenue, and expenses) in financial statements is to create social order, by controlling the interpretation of events and phenomena through their recognition in financial statements. A parallel situation can be observed in relation to IC. For instance, knowledge can be classified under the human capital category of IC, or in one of the organisational capital categories such as processes and systems.

The choice of classification implies a particular interpretation of the meaning and value of knowledge. The definitions of IC and accounting elements therefore precede classification, since without defining their meaning it is difficult for IC elements to be classified under IC categories. At the same time, the absence of a uniform definition of IC means that IC classifications can be constructed. The result is that financial reports can be constructed in such a way as to direct stakeholders to view the world from the eyes of the reporting firm on the one hand, and of regulators on the other.

The difficulty in quantitatively verifying IC processes for financial reporting purposes has been acknowledged by the IAS 38 (IAS 38), which is the accounting standard of intangible assets, as a reason for not classifying IC as assets in financial reports. According to Catusus (2004), the IAS 38 revisited traditional accounting classification-related concepts such as identifiability, control and future economic benefit. However, the effect of the use of traditional accounting standards is to produce a classification model whose financial statements provide limited information about the affairs of firms. The prudent approach adopted by International Financial Reporting Standards (IFRS) has increased the ‘unexplained’ gap between the fair price and the reported value (net book value) of the firm. An asset meets the identifiability criterion when it meets one or the other of the following two criteria: (i) it is separable; that is, it is capable of being separated or divided from the entity and sold, transferred, licensed, rented or exchanged, either individually or together with a related contract, asset or liability; (ii) it arises from contractual or other legal rights, regardless of whether those rights are transferable or separable from the entity or from other rights and obligations (Picker & Hicks, 2003). These changes to the IFRS to redefine recognition of intangibles have both financial reporting and taxation implications (Koch, 2003). Since stakeholders are

not fully aware of the gap between the fair value and reported value of the firm (Lev, Sarath & Sougiannis, 1999), this increase in the 'unexplained gap' may tend to support the function of ICR as bridging the 'unexplained gap' so that stakeholders can make more informed economic decisions.

Grojer (2001) also argues that the interpretation of phenomena and events ascribed to accounting elements (in this instance, IC elements) is determined by the firm's choice of IC elements that are to be reported. In this sense, ICR results in a less holistic presentation of IC, since the classifications included in ICR are based on one or few select reporting attributes of IC. Naturally, the choice of attributes that are reported has an impact on how stakeholders view a firm. For example, reporting attributes such as cash flow and market value, whether in a regulated reporting environment or an unregulated one that favours capital providers, could direct line managers to institute management control measures to maximise cash flow and market value, regardless of their effect on labour or on society at large. The effect is that firms replace old practices that are based on social equity of labour with practices that enable them to maximise market value.

5. CONCLUDING REMARKS

The plethora of definitions of IC allows firms to define these concepts in a manner that suits them and for the purpose of maximising their market value, regardless of the consequences for the firm's labour. Furthermore, the existence of numerous IC indices whose relationships with market value have not been proven allows firms to manipulate their figures by selectively using those IC indices that maximise the market value of the firm.

The result is the commodification of labour through IC-related practices and ICR that are intended to win over capital providers, whose focus is the maximisation of economic wealth. These techniques also provide line managers with a way of justifying shifting aspects of human capital, such as know-how and expertise, into structural capital, thus embedding this human capital into systems and processes owned and controlled by the firm. The transfer of employees' knowledge into systems enables line managers to gain more control over 'knowledge' as a resource, which would previously have been lost as a result of employees leaving the firm. Overall, current ICR practice provides firms with a way of justifying to stakeholders, such as the government and community, their view of labour as a commodity and a liability rather than as an asset. This justification is further supported by the classification of labour as an expense rather than an asset in current accounting practice, as a result of which managers are driven to minimise the cost of labour rather than viewing expenditure on labour as an investment. As Clegg and Dunkerley (1980, p. 5) point out, capital is more than a mere collection of transferable resources. Capital is an institutional system through which technology and organisational structures are progressively developed, and the organisational processes are differentiated and legitimated for rationalisation. Russell (2002) adds that in a deregulated economic environment, productive capital is privately owned by the investors and they hold the right to decide and discriminate on the preferred type of labour required for capital reproduction in the firm. This means that the recognition of IC in financial statements may not necessarily eliminate the commodification of labour and may, in fact, encourage it.

Since at present financial accounting standards do not require IC items to be reported, stakeholders can only rely on the voluntary reporting of IC by firms. As demonstrated in this paper, the wide range of IC definitions, frameworks, and

indices allow firms to choose ICR which will justify maximising their market value, resulting in the construction of data in ICR that hides the reality of the commodification of labour. Hence, further research is encouraged in exploring definitions, frameworks, and indices of IC and ICR that takes a broader view of value creation rather than economic value creation only. Although there are multiple definitions of IC exist, the definitions of ICR are limited. Exploring the extent of intellectual capital in determining the gap between market value and book value of firms can help in exploring the validity of the definition of intellectual capital as the difference between market value and book value of firms.

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