

INTELLECTUAL CAPITAL REPORTING: NEW ACCOUNTING FOR THE NEW ECONOMY

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ABSTRACT

In the 'new economy', ideas, practices and innovations that arise from the creation of intellectual capital have become a pre-eminent economic resource and the basis for competitive advantage. Attempts to develop cogent accounting praxis that makes intellectual capital discussable and therefore actionable, are constrained by the granular nature of existing definitions and taxonomies of intellectual capital. As a response to this lack of clarity, a model has been proposed that maps how a group of knowledge workers characterise the drivers and outcomes of their human creativity. The model indicates that accounting must break away from the traditional frame of reference that is 'the artifact', 'the entity', 'management control' and 'uniform reporting models'. At issue is whether the same set of measurement tools can provide descriptions of reality that have meaning for the decision making of individuals, and yet provide appropriate resourcing signals, evaluative information, and signs of legitimacy that are required by institutional management and other stakeholders.

INTRODUCTION

Intellectual capital represents the intangible dynamic capabilities that enable an organisation to achieve desired economic and societal outcomes. Reporting models for the acquisition and application of intellectual capital are at a nascent stage of development compared to those for physical and financial resources, and this paper investigates ways of aligning reports with the decision-usefulness criteria employed by key stakeholders.

In the so-called 'New Economy' age (Lev and Zambon, 2000), knowledge has become the pre-eminent economic resource as it forms the basis of competitive advantage (Venzin et al., 1998; Stewart, 1997; Tiwana, 2000). The knowledge embedded in individuals and organisations has been termed intellectual capital (Stewart, 1997; Sullivan, 2000), and it is replacing financial and physical capital as key strategic factors since the latter are available more or less equally in the marketplace (Drucker, 1993; Edvinsson and Malone, 1997). There is much support in the literature from governments, peak bodies, business practitioners and academics for the assertion by Petty and Guthrie (2000: 155) that "intellectual capital is instrumental in the determination of enterprise value and national economic performance" and has been accepted as a "worthy topic of boardroom discussion and serious academic investigation". Consequently a discourse has emerged about how intellectual capital should be understood, represented and managed (Guthrie, 2000).

Despite evidence that intellectual capital lies at the very heart of value in the new economy, the development of measurement models to adequately represent intellectual capital has been slow (Bontis, 1998). This has constrained the reporting of variables that are critical for stakeholder understanding of intellectual capital, and perpetuated a lack of awareness of intangibles that constrains informed decisionmaking and subsequent actions. The consequences are that employees, managers, capital markets and other stakeholders are forced to make relatively uninformed decisions about intellectual capital, which limits capacity building within public and private sector organisations, and negatively impacts on the economy and society through sub-optimal efficiency, effectiveness and growth (Cornelis et al., 2000; Grojer and Johanson, 1999; Garrick and Usher, 2000).

So while the idea of 'intellectual capital' becomes part of the working organisational vocabulary, real progress in the construction of knowledge theories and in the practical development of such knowledge assets is dependent on progress with the issue of measurement and valuation (Glazer, 1998: 175). For as Jonsson (1996: vii) puts it, "What cannot be discussed cannot be improved, at least not intentionally". So making the acquisition and application of intellectual capital 'discussable' improves prospects for informed decision making that can mobilise changes in the business agenda (Grojer and Johanson, 1999). But given the relative newness and complexity of the construct intellectual capital, the continuing development of 'new accounting' that makes it discussable (and therefore actionable) will have to be guided and framed by research into measurement models for internal and external stakeholders (Bertels and Savage, 1998).

This study investigates intellectual capital reporting through a constructionist perspective of 'what ought to be' rather than 'what is' (O'Donnell et al., 2000). A constructionist focus is on an examination of what reporting ought to be like, from the perspective of key stakeholders, in order to make intellectual capital 'discussable' and 'actionable'. In contrast, the limited research into intellectual capital reporting has been skewed towards discovery of what reporting is taking place in organisations and the metrics that are employed (see for example Johanson, 1999; Liebowitz and Suen, 2000). These 'what is' investigations provide little insight into the content and form reporting needed to service the decision making requirements of different stakeholders, thus perpetuating the situation of being "...oblivious to the need for information on intellectual capital...who are the users? what decisions would they like to make..." (Petty and Guthrie, 2000: 9). Consequently "...the biggest challenge by far is establishing a consensus about the need to report, what to report and how to report it" (Guthrie, 2001: 6). As "... more work is required that relates user-perceptions to the specific use of IC data in making decisions" (Petty and Guthrie, 2000: 8), the point of departure is an examination of the types of variables that align with 'front-line' knowledge professionals' perceptions of intellectual capital. This research proposes a model that illuminates the types of variables that the 'new accounting' needs to identify and describe in order to effectively facilitate discussion and action on intellectual capital.

MOVING FORWARD FROM DEFINITIONS AND TAXONOMIES

Seminal definitions of intellectual capital (for example Stewart, 1997; Edvinsson, 1997; Sullivan, 2000) speak of intangible individual and organisational competencies and capabilities (such as experience, know-how, skills, creativity, intuition, personal and professional relationships, organisational processes, designs and intellectual property) which have value since they can be put to use to create positive outcomes (such as wealth, profit or competitive edge). These definitions all highlight two value dimensions of intellectual capital—the existence of the phenomena intellectual capital and the actual or potential consequences of its ultimate application. Definitions are expanded into competing taxonomies, which are in the main, variants on the dominant and often cited schemes proposed by Sveiby (1997), Stewart (1997) and Edvinsson (1997). Constructed in iterative steps over the last decade, this triumvirate has three key elements in common: intellectual capital residing in people; intellectual capital embedded in the organisation; and intellectual capital connected with external relationships. These three elements attract different labels, but tell much the same story (Figure 1).

Element/Author	IC embedded in the people	IC embedded in the organisation	IC embedded in relationships
Edvinsson	human capital	organisational capital	customer capital
Stewart	human capital	structural capital	customer capital
Sveiby	employee competence	internal structure	external structure

Figure 1. The three paramount elements in the classification of intellectual capital

The first element (Figure 1) represents the capabilities of people within entity formed from an amalgam of attributes such as knowledge, abilities, attitudes and relationships. This human capital resides in the mind, body and actions of the individual, and is lost to the organisation when people leave. The second element reflects the capabilities of the organisation that come from systems, processes, structure, culture, strategy, policy and innovative capacity. The third element is about capabilities that accrue from relationships with external parties, and exists through characteristics like connectedness, understanding, loyalty, and business activity. There are ongoing attempts to modify or expand the typical human, organisational and relational capital triumvirate. For example, Roos et al. (1997) and Knight (1999) advocate that the relational capital expand beyond customers and suppliers to include network partners, competitors and other stakeholders such as the community. Allee (2000: 25) proposes a taxonomy which adds elements of social citizenship, corporate identity and environmental health which fits well with the growing triple-bottom-line reporting movement for economic, social and environmental performance. The original triumvirate and these later expansions imply the prospects of a

wider range of variables to report in terms of intellectual capital, and portend a more diverse audience of information users.

The classifications in competing taxonomies have facilitated debate about the nature and grouping of elements that comprise the phenomena 'intellectual capital'. But taxonomies provide little guidance for the critical 'what to report, to whom they report and how to report' challenges faced in developing intellectual capital reporting models that are responsive to the decision needs of multiple stakeholders. The construction of generic measures based on such taxonomies may therefore lack local relevance (Shulver et al., 2000), and provide inadequate decision support for particular individuals, groups and organisations. For example, taxonomies typically include constructs such as "innovation", but do not clearly distinguish between the static and organic dimensions. The static dimension takes into account 'stocks' of knowledge existing within an organisation at a point of time (Bontis, 1998), such as current innovation artifacts like new services. The organic dimension considers renewal capability, such as the capacity to further innovate. Consequently there is a strong possibility that measurement models based on extant taxonomies would not distinguish between, nor adequately inform, decision makers concerned with the current potential of an organisation, and those with an interest in future potential.

A dynamic interpretation (Spender, 1996) of intellectual capital calls for the articulation of static and organic dimensions since "...to treat knowledge as a mere asset, a static entity like any other of the firm's constituting elements of factors of production, is to miss the opportunity to shift our theorizing into a genuinely dynamic framework...(and expand the)...analytical focus from the firm's intangible knowledge assets onto the processes that generate, distribute and apply them" (O'Donnell et al., 2000: 6). Reporting models that support this analytical focus must be constructed around relevant static and organic information, since "...recognizing not only a firm's intellectual output, but its *capacity to produce* (original italics) such output as a valuable intangible in its own right, is wholly appropriate in a world where survival has everything to do with a firm's capacity to sustainably out-learn and out-innovate competitors" (McElroy, 2001: 3). Consequently, the Erhvervsudviklingsradet Report (1997) calls for intellectual capital research projects based on knowledge-intensive organisations to be accorded a high priority. Such research aims to support the development of intellectual capital theory and practice through the development of "experience-based" models. The technique advocated is to investigate various types of information considered important by actors, and adjust reporting strategies to concrete situations. As a response to this research challenge, this paper examines the variables in the acquisition and application of intellectual capital that are critical to the key stakeholder group of front-line knowledge workers, and develops a model that may inform the development of relevant reporting in a less granular way than offered by current taxonomies.

METHODOLOGY

This exploratory research utilises qualitative research through interviews at multiple sites. Youndt (1998) suggests that future research should "...use more qualitative in-depth case studies to gain a better understanding of the idiosyncrasies in managing intellectual capital in specific industries and organisations" (p. 93). Qualitative case research can capture the richness of the variables and context involved with intellectual capital (Petty and Guthrie, 2000). Qualitative research is appropriate for exploring such a formative area as "...data with their emphasis on peoples' life experiences, are fundamentally well suited for locating the meanings people place on events, processes and the structures of their lives" (Miles and Huberman, 1994), and multiple organisational case studies can examine and account for the processes at work in a rich and detailed way (Hakim, 2000).

To base the research on knowledge-intensive enterprises (Erhvervsudviklingsradet Report, 1997) require the selection of an industry characterised by advanced communication technologies, network organisational forms, blurred and porous institutional boundaries, continuous innovation and the pre-eminence of human and relational factors (Lev and Zambon, 2000). Scientific research institutes were chosen as the research sites as they reflect the characteristics that typify knowledge-intensive enterprises (Powell et al., 1996). This case selection places limitations on the generalisability of findings, since such publicly funded scientific research institutes are very different entities to the typical production and service providers of the private sector, and research institutes as an 'industry' are not homogeneous in structure, culture and operations. However business and science share the need for a more systematic environment and structure to optimise intellectual capital (Hofbauer et al., 2000), and an examination in scientific research institutes of 'how we know what we know' illuminates variables about the organisation, the structures, the dynamism of knowledge systems that "brings into focus the question of knowing in other areas of expertise" (Knorr-Cenina, 2000: 1).

The primary aim of this research project is to determine what kind of variables should be reported in order to inform the intellectual capital decision models of key stakeholders. A multitude of stakeholder groups exist within biomedical research, such as front-line research scientists, laboratory leaders, scientific managers, institute bureaucrats, funders, collaborators, and interest or user-groups. In selecting a stakeholder group to focus on, research scientists were chosen since front-line knowledge workers are the wellspring of intellectual capital (Sveiby, 1997). Four biomedical research institutes in the Asia-Pacific region and the United States of America have been chosen as research sites on the basis of professional network referral by senior scientific managers. Each is a non-profit institute with close university relationships and heavy reliance on government and philanthropic funding, and each comprises multiple laboratories. Semi-structured interviews utilising open-ended questions have been conducted with twenty five laboratory scientists during 2000 and 2001. Interviews ranged from one hour to one and a half hours, and were taped for subsequent transcription and analysis of themes.

Interview questions were designed to avoid jargon and employed words that describe the reality of people's lives (Silverman 2000) such as "things", "ideas", "practices" and "innovation". Ideas and practices of individuals and groups leads to organisational innovations through complex processes of diffusion, implementation and utilisation. Here, ideas and practices are the intellectual capital products of people, and their take-up represents innovations that become available to the organisation for execution, sale or other applications (Dunkin, 2001; Botkin, 1999; Swan and Newell, 2000). Here "things" speak of any factors which impact on acquisition or application. Using these concepts, interviewees were asked the following five open-ended questions to establish perceptions about the critical variables that shaped the acquisition and application of ideas, practices and innovations in the context of their current or recent scientific research projects:

- What is the project about and what are you doing in it?
- What things shaped the ideas and practices you and others had?
- What things shaped the conversion of ideas and practices into innovations that could be utilised by the laboratory, institute or other stakeholders?
- What do better performing laboratories do differently? If you had a magic wand, what would you change?
- What do you want a reporting system to tell you about the shaping of ideas, practices or innovations?

Analysis of the interview notes and transcripts for each subject utilised a matrix approach (Miles and Huberman 1994) with three columns representing "ideas and practices", "innovations", and "end results", and rows described as "factor #1" and so on. A number of convergent and competing themes emerged from the data.

VALUE CREATION AND KNOWLEDGE STOCKS, FLOWS AND RENEWAL MECHANISMS

For some scientists, key decision-model considerations centered on information about existing levels of competence that could spark ideas: "I needed a collaborator for this proposal, one, especially for reasons of funding politics, not from our institution. I would have liked someone strong in quite a few areas, but looked at my own skills and said well, it had better be someone good with zebra fish, someone who has seen projects out...and it took a lot of calls, a lot of talk to find the right one ...not just who does the fish, but who is the sort who does not hold back in how they think about ways of using them". This illustrates that an individual's decision model may require information about one's own knowledge and skills and about those of other scientists. That information might focus on evaluation of knowledge stocks in terms of certain tacit and explicit knowledge, and utilise reporting to at least narrow the field for closer examination: "...you have to listen for who is being talked about in our research community or who has the track record in

conferences and with papers". In such instances some reporting through personal profiles or achievement tracking propagated through organisations or associations was seen as a useful strategy.

When collaboration of knowledge sharing and acquisition are key elements of a project, strategic decisions need to be made about who to include and who to exclude. Issues in those decisions include trust, a sharing of minds, personal compatibility, the reciprocity of knowledge, the sharing of credit, but also the dynamics and potential of a group surrounding a key individual, or in place of a key individual: "...if I am trying to link up with someone I want to try to get more than that person...(and)...determining who they know and what they can access that way is as important as what they know. I really am on the fringe of that area and it would just take too long on my own to really break in". Where linking with key individuals promised some access to groups, the missing information worth having was often that about the group, both in terms of what they have to contribute to intellectual capital capacity building, and the likelihood of that contribution being freely made.

Some scientists placed the onus on decision-relevant formal initiatives in reporting and retrieval by the organisation: "...there is one place in Heidelberg in Germany in particular that does great profile pieces on its scientists...they are detailed, creatively written...look at who they work with, who funds them, those profiles have helped build collaborations and keep them...". Two respondents from different institutions mentioned this German institute as a reporting model, and one was firmly convinced that, that institute has been able to clearly articulate less technical capability artifacts like drive, creativity and sharing. That same organisation was also viewed as strongly resourcing the profiling of external scientists where specific requests were made from within its own labs. In other instances, scientists saw little role for what one termed "...organisational propaganda or otherwise..." and suggested that personal connections and not formal reporting systems are the relevant source of disseminating or drawing in information on knowledge stocks: "...personal relationships and referrals have done the job for me for 30 years...I am not interested in the institute doing reporting on this beyond the normal annual reports and PR ...it is my choice, my decision, my autonomy for me to sell myself and select others...there are already too many marketing types and spin doctors getting involved with research institutes and their funding".

Scientists were by no means of one mind about formal reporting of capability artifacts. Where there was support for formal reporting relevant to the scientist's own decision models, the idea proposed was not to build a raft of simplified metrics on qualifications, experience or publications, but on production of carefully elaborated case studies about individuals, their work and their achievements. It was this sort of reporting that was seen as potentially useful for individual scientists to make some informed judgments about themselves and others, and a vehicle for other stakeholders to judge and target them for collaboration, funding or information exchange. So even where reporting was done at the

macro-level, it seemed prudent that it was picked up and advanced, detail intact, from the micro level. Often scientists acknowledged attempts by their own organisations at formal reporting of capability artifacts, but these were described much in the way of necessary legitimisation for political, government funding, and formal institutional relationship reasons: "...what goes in the big report is an art, we can't look too successful...if there is much great financial value that looks like coming from our work, it could lead them...(government funding agencies and potential private donors)...to cut what they might have given us...look too unsuccessful and see the funding drop as well".

A key finding is that the idea of presenting capability artifacts as a simple list of metrics on an individual, laboratory, or on an aggregate organisational basis was not proposed by interviewees as a useful reporting strategy to meet their decision needs. Where formal reporting initiatives at the organisational level were seen as relevant, these were compilations of scientific research storytelling and numbers. A small number of respondents enthusiastically promoted the value of organisations resourcing appropriate reports about its own constituents, and accessing or compiling reports on external constituents with whom beneficial relationships might be struck.

In discussions about ideas and innovations the emphasis on personal relationships and peer-network communication continued unabated throughout the interviews. Descriptions of the genesis or procurement of ideas were firmly attached to people—those 'in the know'. As one scientist observed "In this field you run into a lot of conflicting and confusing information that is hard to get, hard to re-interpret, hard to use unless you know the people....those things that are explained in detail, the ones published, if one can get the right details from them without any interaction with the authors then perhaps it is too late anyway".

The relational implications concern both first-hand access to knowledge through personal relationships, but also the passing-on of knowledge through networks. Scientists within a laboratory typically work on their own individual projects, where ideas may bounce off-the bench, arrive through serendipity, or as one scientist explained, develop from knowledge gained through contacts. "... with some (other scientists in the field) there is a trading exercise, and with others where it is like, well more like what friends would do. What I can get this way has its highs and lows, but I know what is happening with all that...whether those contacts are going well. But what I need to know is that (the laboratory leader) is getting access to information that I can't get alone...ah, things that are really new from the latest meeting or something that needs a better trade than I can give. I know that (the laboratory leader) will bring me the right information if he gets it...what I need to know is if he is talking to those that matter for my project rather than about other things done in this lab...(and it is) not just about the science part, it is about the money part and where we go with what we find...this is what matters to me. If I can understand how (the laboratory leader) is acting, then I have a chance of doing something about it". Scientists expressed concern that their more senior colleagues with less fettered access to

international arenas were attracting and passing-on the right sort of information to their colleagues.

As well as reports to verify the role of senior staff as knowledge conduits, some scientists wanted reporting that outlined how much of their own research the organisation had traded or appropriated in some form or other, and what benefits would flow back to them: "I get diverted from my research to help others. It might be to help out a new post-doc with a technique for genes or something else which they say is for the good of the lab. It could end up with my name on the paper, I can learn something by doing it or it can distract. It would be good to see what ideas the labs have grown, who has helped and how it happened... (and) perhaps we will get more recognition and more ready cooperation and a better result, or at least understand the risk better...I mean if I help others and the amount is more one-way... the lab ends up with better successes and I could fail with my own project..(and) that is no way to a future with my own lab some day".

It appears advantageous therefore to have a reporting regime that is framed around learning environments in which actors create their own understanding out of direct and indirect social relations of the people involved. Whether relationships are based on friendships or reputation, sharing or exchange, intra or inter-organisational contexts, most emphasise on idea generation and the ability to mould these into innovations revolved around informal relations rather than ones tied to formal relations set up by the organisation at intra, or inter-organisational levels. Consequently many descriptions of critical exchanges of knowledge that lead to ideas depended on things that happen at the boundary of organisations through personal, informal initiatives (of scientists or lab leaders) rather than at the behest of, or under the 'control' of, management. So rather than an isolationist or organizationally directed pursuit, ideas come through knowledge acquired in a markedly informal social process. As such, attempts to report on intellectual capital requires the exploration of the social processes and networks that facilitate the creation and exchange of knowledge across intra- and inter-organisational boundaries. The pervasiveness of this informal relational-based knowledge challenges reporting schemas which focus on concepts of the organisation as the focal point, the formal work-group, the entity boundary and formal structure, and static capability artifacts. In the interviews, discussion about ideas and resultant innovations emphasised 'the project', often talked of 'the lab', and rarely focused on the 'the institution' or its bureaucracy or command and control management. In a context where, by the description of 'front-line' participants, the influence of organisations on value discovery seems to be diminished, the network of relationships becomes an object for reporting.

This existence of multiple overlapping networks and the blurring of traditional boundaries creates an issue in framing the unit of analysis of intellectual capital reporting models. In such a context can, and should, an IC reporting model align with one laboratory within an organisation; the research organisation as a whole; a consortium collaborating labs/ organisations; the discipline research community; or the community which requires the

application; or society in general? Regardless of how an organisation wishes to report for its own decision making (or to signal some particular legitimacy to stakeholders), from the perspective of scientists, the primacy of informal practice and person-based networks that span organisational and geographical boundaries requires reporting that aligns to their own actions, initiatives and achievements in the micro-discipline, rather than with the actions of management.

This is not to say management is without significant influence with policies on knowledge transfer and sourcing for things like conferencing, scientific equipment and communication technology. Important as these may be, their existence seemed transparent enough without comprehensive reporting: "We know what technology we have got, what we need, and what others have got...we can make do, mount a case for something new, or trade for what we cannot make...". Even resources for conferencing were often a function of a scientist's professional judgement about the amount of a grant that is prudent to be spent that way, and in the institute most subject to the tyranny of distance and with a relatively difficult local and national computing and communications infrastructure, the drivers for creation and realization of intellectual capital were described in terms of the relationships and personal drive and determination rather than the technical. An implication for intellectual capital reporting is that a focus on the technologies (part of organisational capital) for objectification, search and retrieval of knowledge making up the capability of individuals is of secondary importance to a reporting of relationships and organisational culture.

In talk of ideas and innovation there was strong indication of new pressures for more rapid outcomes and commercialization of research, increasing funding by collaborative research grants which link researchers from different institutions, the need to obtain funding from non-government sources, the expanding power of lobbyists, and scientific discoveries which have import across fields. In these environments traditional notions of the role of biomedical research scientists are challenged by 'buzzwords' like 'discover', 'capture', 'intellectual property', 'work with business' and 'commercialise'. The further along this list one travels the less the context involves the people, projects and informal relationships that govern much of the 'discover' and 'capture' part of research. The knowledge networks of many scientists expand (with or without their desire) beyond traditional colleagues to include stakeholders such as fellow scientists in previously disconnected fields, industrialists, biotechnology companies, investors, marketers, medical practitioners, lawyers, politicians, the media, government agencies, illness and disability associations, and the individual. Often these relationships are dictated by formal intra- and inter-organisational relationships outside the control the scientist who, in the past, may not have had to be concerned with progressing whatever findings past the publication stage. Yet these new knowledge networks, whether voluntarily entered into, or imposed, still control the viscosity of knowledge flows. So the strength of relationships, issues of trust, expectations of reciprocity and perceptions of the value of knowledge artifacts are all things that many scientists could see as priorities for reporting.

MAPPING THE REPORTING TERRAIN

Given the emphasis of interviewees on the dynamics and flows of knowledge, and the focus on projects and external and internal colleagues, there is a danger in formulating reporting models that emphasise cognitive assessment of stocks of knowledge in a way that is too systematic or mechanical to recognise the complexities of intellectual capital's social construction, or too organisation-centric or macro-level to be useful for decision making of, or about, front-line professionals. The reporting priorities of scientists warn against treating intellectual capital in a static sense, to be approached with tools that are largely extensions of traditional accounting practice where knowledge is an asset in the form of documents, competencies or artifacts. Reporting in such a constrained way may mean that new ways of thinking, new conversations, new alternatives, new processes about the bigger picture of enabling knowledge flows may be overlooked.

Consequently, in drawing on the themes uncovered in this research, a model (Figure 2) has been developed in this paper to illustrate the scope of variables which need to be considered in intellectual capital reporting. As with all models, 'Accounting for value in intellectual capital acquisition and application' is a simplification of reality, and omits many real-world complexities. The purpose of the model is primarily to sharpen the focus and highlight areas for debate concerning variables acknowledged in extant and new reporting models.

In conversations with the scientists, nine main clusters of variables became evident. In terms of information about knowledge acquisition by individuals and groups, of interest was how new knowledge was created, how that knowledge flowed, and the resultant individual and group competences acquired. For information concerning knowledge acquisition by organisations, interest also centered on how new knowledge was created, how that knowledge flowed, and the resultant organisational competences. As far as the application of intellectual capital is concerned, of interest were the processes and activities that facilitate the application of innovations, the flow of activated innovations within and beyond the organisation, and the stakeholder outcomes. These nine clusters have been built into the model using a number of descriptive labels.

'Value creation' covers the dynamic capabilities of intellectual capital. 'Value discovery' is that part of 'value creation' where "ideas and practices" flow from "things" that "shape" the knowledge which is embedded in individuals or groups, and is analogous to the 'capabilities of people' element from Figure 1. "Value extraction" is that part of "value creation" where "innovations" flow from "things" that "shape" the knowledge which is embedded in the organisation, and represents 'organisational capability' element and the 'relational capability' element from Figure 1. 'Value realisation' covers the value in outcomes achieved through leveraging intellectual capital.

For each of the value domains described in the interviews (value discovery, value extraction, and value realization), three dimensions present identification and reporting challenges for accounting. The 'Location' dimension refers to existing individual and organisational knowledge stocks of intellectual capital and currently leveraged outcomes. The 'Journey' dimension refers to the existence of feed-forward and feedback knowledge flows between individuals, groups and the organisation, and across inter-organisational boundaries that replenish the intellectual capital stocks and outcomes that exist at any point of time. The 'Pathway' dimension denotes value in the mechanisms of intellectual capital renewal.

The model provides a sketch with which to visualise stakeholder information needs along domains indicating intellectual capital existence (value discovery and value exploitation) or outcomes (value realization), and across static (Location) or dynamic (Journey and Pathway) dimensions. With three dimensions across three domains the model indicates nine 'value' zones that are potentially relevant to the decision models of the key front-line knowledge workers.

Each of the nine value zone 'boxes' contains a generic list of items typically found in interviewees responses. To provide descriptions of the value of intellectual capital, reports could articulate the nine value zone boxes and their contents using techniques ranging from provision of 'hard' transactionally-based historical financial information that typifies GAAP (generally accepted accounting principles) to numerical indicators to narratives. But for relevant and reliable reporting, the question of which accounting measurement techniques are appropriate must be preceded by an understanding of what information in each of the nine zones is relevant to particular stakeholders.

The multiple entity representation (Entity 1 and 2+) indicates formal and informal knowledge flows across organisational boundaries. For example, an idea developed by individuals in Entity 2 through questions raised via personal networks with individuals in Entity 1 may in fact end up as innovations of Entity 3 due to factors such as context suitability or Entity 3's willingness to change or experiment. As ideas, innovations and even subsequent results criss-cross organisational boundaries, the tasks of describing the value of sharing networks and the setting of boundaries for reporting of intellectual capital become increasingly problematic.

This model is a small step forward in conceptualizing what the terrain of the new accounting might look like, and provides a vehicle for debate. The model could be subjected to further research using a wider range of stakeholders and industry contexts. However, some tentative conclusions can be advanced from the model and general research findings thus far.

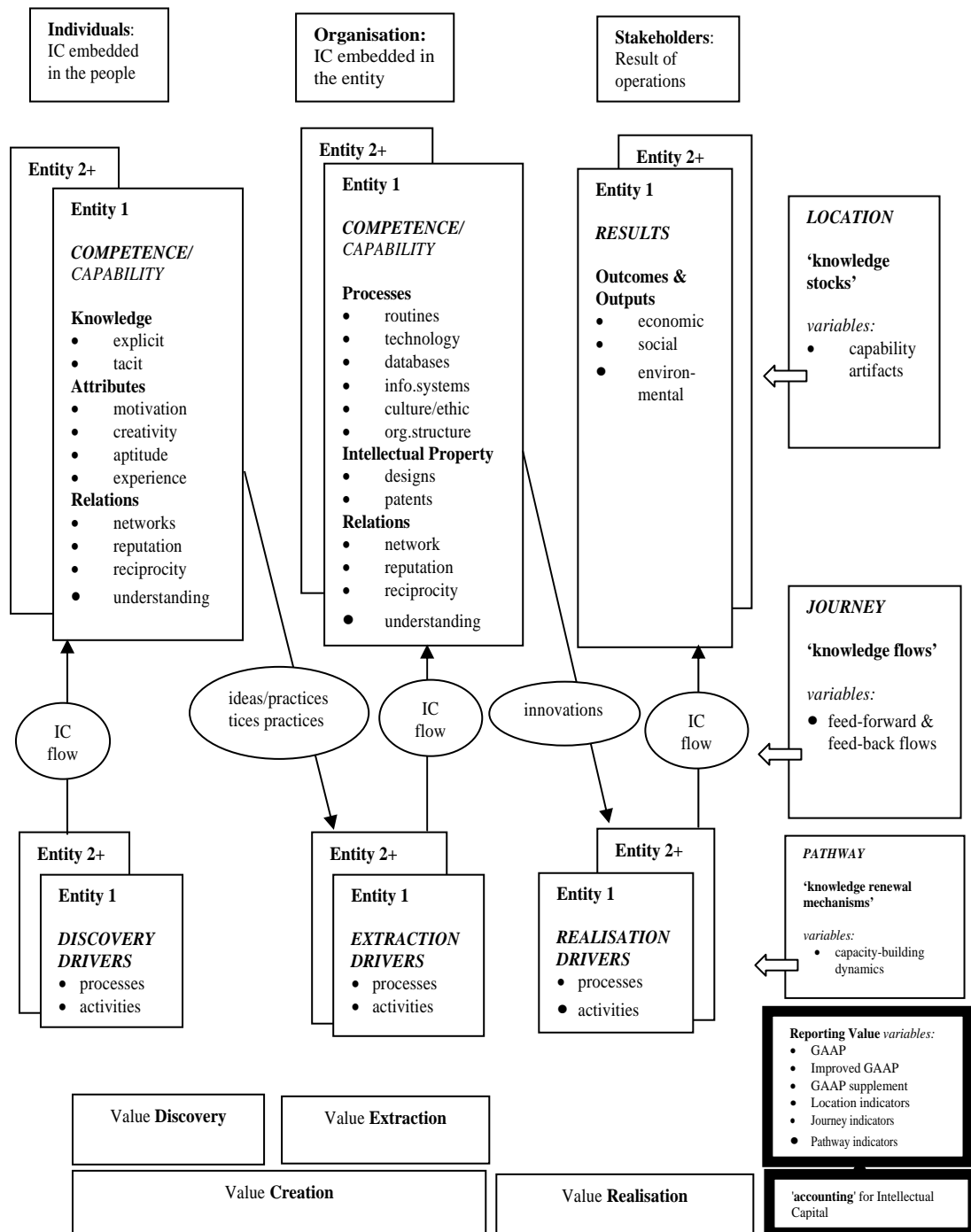


Figure 2. 'Accounting' for value in intellectual capital acquisition and application

CONCLUSION

Existing definitions and taxonomies of intellectual capital provide little illumination of how the 'new accounting' should look in order to be relevant and reliable for stakeholder decision making. An overview of the perceptions of front-line knowledge workers about the acquisition and application of intellectual capital has provided the basis for a model that more clearly articulates the static and organic dimensions of personal and organisational knowledge assets. Here the knowledge workers are not so much interested in formal reporting systems that assess levels of intellectual capital, but on information about flows of knowledge and the actions and processes that are the machineries of knowledge creation. Those machineries may also be argued to be particles of the construct intellectual capital, but even if they are not defined as such, they are ultimately what drives value creation, extraction and realization and need to be targeted by the 'new accounting' for the 'new economy'. This indicates that the 'new accounting' will have to move beyond the quantification of knowledge artifacts and apply a frame of reference and measurement techniques that identify and describe the variables which are critical to the dynamics of capacity building. The fact that interviewees had varying informational priorities in different 'value zones' suggests that macro-level or uniform general purpose reporting may not provide the information needed to guide discussion and action by those who are at the forefront of ideas, practices and innovations.

A number of implications for accounting practice, theory and future research arise from the model:

1. Institutional boundaries form a poor perspective from which to view the locus of intellectual capital acquisition or the resultant value-added through application;
2. The creation of human capital is fuelled by individual decisions, actions and motivation rather than through formal organisational initiatives and traditional management control;
3. Scientists described highly individualistic perceptions of the drivers and outcomes of intellectual capital, the essence of which could be captured by relatively few—but different—measures for each individual's decision model;
4. Reporting systems should include robust descriptions of supportive conditions for, and results of, learning and application;
5. Such reporting must be orientated at the micro-level of collaborating individuals and projects, rather than being macro-level and institutionally focused; and
6. Reporting tools must be flexible enough to be individually tailored yet simply constructed.

Given these implications, at issue is whether the same set of reporting and measurement tools can provide descriptions of reality that have meaning for the decision making of individuals, and yet provide appropriate resourcing signals, evaluative information, and signs of legitimacy that are required by institutional management. The development of more relevant and reliable systems to identify and describe intellectual capital is a multi-disciplinary task that needs to move forward beyond the traditional accounting frame of reference that is 'the artifact', 'the entity', 'management control' and 'uniform reporting models'.

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