

Prioritizing Enterprise Environment Management Indicators by Intellectual Capital Perspective

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ABSTRACT

The purpose of this study is to develop enterprise environment knowledge management from the intellectual capital perspective. The content analysis and analytical hierarchy process were used to collect and analyze data. According to the results, the study divides intellectual capital into four dimensions: Human Capital, Relation Capital, Innovation Capital, and Structure Capital. This research has also developed 14 indicators for the assessment of enterprise environment management. Prioritizing the intellectual capital measures can help assess the business environment management strategy, provide a basis of evaluation for government and investors, and allocate some resources for green companies.

Keywords: *enterprise environment management, environment management, green intellectual capital, intellectual capital, content analysis, analytical hierarchy process*

INTRODUCTION

The economic benefit obtained from industrial production has been associated with costs to the environment (Andrew & Forgie, 2007). Organizations face a crisis as they attempt to sustain a competitive advantage in the face of rapid environmental change. They should adapt to the need for sustainability and develop their social responsibilities. It is these for necessary to know the measures which exist in the business environmental management system. If organizational knowledge is considered to be a strategic resource, much of the work in the knowledge-based stream has focused on delineating specific properties and dimensions of knowledge to help ensure a sustained competitive advantage (SubbaNarasimha, Ahmad, & Mallya, 2003). Organizational knowledge management can be offered as a wanted lever for enhancing performance, increasing productivity, and facilitating innovation in corporate settings (Mentzas, 2004). Based on the resource-based view of a company, performance differences amongst companies can be attributed to variances in resources and capabilities. Resources that are valuable, unique, and difficult to imitate can provide a company with its strongest competitive advantage (Hitt, Bierman, Shimizu, & Kochhar, 2001; Amit & Schoemaker, 1993). Related studies indicate that intangible resources are important to implement a company's strategies (Barney, 1991; Schoenecker & Cooper, 1998). However, companys can use tangible and intangible resources and various strategy interact combinations to produce positive returns (Pablos, 2002). The concept of intangible resources in this study is called intellectual capital. Stewart (1997) defines intellectual capital as intellectual material such as knowledge that can be applied to generate wealth. Intellectual capital provides firms with diverse organizational values such as profit generation, strategic positioning, the acquisition of innovations from other firms, customer loyalty, cost reductions and improved productivity. Successful firms are those that maximize the value of their intellectual capital (Pablos, 2002). Intellectual capital represents a combination of four factors: genetic inheritance, education, experience, and attitudes towards life and business (Choo & Bontis, 2002; Hudson, 1993). There are many researchers who use systematic methods to develop environmental management indicators, however they focus on the industry or area level. The corporate level is less discussed in related topics. The aim of this study is to explore and prioritize environmental protection management on the corporate level.

In order to attain a complete assessment of organizations, it is necessary to develop measures of sustainability (Kolsch, Saling, Kicherer, Grosse-Sommer & Schmidt, 2008).The investigation explores enterprise environmental management system indicators from intellectual capital perspective in order to identify their fields of competitive advantage. This study is organized as follows: The following section briefly reviews enterprise environmental

management by intellectual capital perspective with regard to the components. Section 3 then presents the research design and methodology. Finally, the analytical results and conclusions are presented in sections 4 and 5, respectively.

LITERATURE REVIEW

Enterprise Environment Management

Companies should develop their environmental management systems to improve their environmental management performance and corporate social responsibility (CSR). Douglas & Meltzer (2004) developed an integrative environment management system for a UK hospital trust. Khoie (2005) suggested that the evaluation method of renewable and non-renewable energy technologies should include six selection criteria: economic viability, conversion efficiency, the present level of technological development, environment impacts, the after-production clean-up cost, and the renewability and abundance of the source. Rohracher (2006) proposed that companies should provide a sufficient scope for the co-evolution of configurations of technology-services of usage by permitting users and designers to interact at the early stage of product development. Cole (2007) used the input-output economy-environment model and the system-dynamic population model to test the suitability of different modeling frameworks. Roussel, Crinquant & Bourdat (2007) adopted the Driver-Pressure-State-Impact-Response (DPSIR) framework and Principles-Criteria-Indicators (PCI) outline to evaluate the factors affecting the coastal regions. Montmollin & Scheller (2007) developed the MONET indicator system which emphasizes social solidarity, economic efficiency, and environmental responsibility. Boulanger (2007) employed three competing model: the rational-positivist model, the discursive-interpretive model, and the strategic model for developing social indicators. Antona, David & Mirault (2007) expand on two major trends in environmental indicators development: literature-based and field-based development. Karagiannis, Nemetz & Bayer (2009) proposed the Intellectual Capital Report Benchmarking (ICRB) method to develop a comprehensive framework for intellectual capital management.

Intellectual Capital

Intellectual capital is essential to an organization's value and performance. Based on a systematic and critical review of current research on intellectual capital, there are two points of view, namely: resource-based view and stakeholder view (Roos, Roos, Edvisson, Dragonetti, 1998). The resource-based view of company states that companies achieve competitive advantage and superior performance through acquiring, holding and subsequently using strategic assets that are essential for achieving competitive advantage and maintaining strong financial performance (Wernerfelt, 1984). The stakeholder view maintains that companies must be accounted to stakeholders rather than just shareholders (Donaldson & Preston, 1995). Whatever the choice of the stakeholders, a consensus is growing that accounting profits are only measure the stakeholder's returns, and that value added processes is a more accurate measure created by and distributed to the stakeholders (Meek & Gray, 1998). Literature has generally identified three components of intellectual capital: human capital, relationship capital, and organizational capital (Bontis, 2002). Human capital represents the individual knowledge stock of an organization as represented by its employees (Bontis, Crossan, & Hulland, 2002). Relational capital represents relationships with internal and external stakeholders (Roos, Roos, Edvisson, Dragonetti, 1998). Organizational capital is the knowledge that remains within the company at the end of the working day. According to Bontis, Chong, & Richardson (2000), organizational capital includes databases, organizational charts, process manuals, strategies, routines and anything with value to the company exceeding its material value. Process capital is the combined value of value-creating and non-value-creating processes (Skandia, 1996). Stovel and Bontis (2002) proposed that intellectual capital is comprised of three categories: human capital, structure capital, and customer capital. Human capital is the cumulative tacit knowledge within a company. Structural capital is the support mechanism that enables employees to optimize their job performance and overall organizational performance (Bontis, 1998). Baxter & Matear (2004) adopted an intellectual capital perspective including human capital and structural capital to measure intangible value in business-to-business buyer-seller relationships. Liu (2006) explored 15 measurable indicators of intellectual capital in the e-learning platform industry. Liu (2007) developed measures of value creation at private universities with intellectual capital including human capital, relational capital, innovation capital, alumni capital,

financial capital and structural capital. A total of 27 indicators were selected. Chen (2008) proposed green intellectual capital to identify the positive relationship between green intellectual capital and competitive advantages of firms. To sum up, this study focuses on the second stream of research: measuring and reporting the ranking of enterprise environment management from the intellectual capital perspective.

METHODS

To identify the components of enterprise environmental management from the intellectual capital perspective, this study was gathered from companies. The content analysis method and the analytical hierarchy process were used for data collection and analysis.

Sample

Purposive sampling was used for data collection. A general open-ended questionnaire focusing on the long-term competitive advantages of their companies was administrated to the participants. They were asked the following questions, "What factors are important in enterprise environmental management?" Purposive and convenient sampling methods were adopted in this study. These responsible for enterprise related matters and environment protection concerns in their companies were selected. A total of 21 managers, employees, and masters students with work experience and intellectual capital knowledge interviewed, ranging from 25 to 42 years of age. 52.4 percentages of the respondents were male, while 47.6% were female.

Data Collection and Analysis

The data obtained by this qualitative study was analyzed using the content analysis method (Berelson, 1952; Budd, Thorp, & Donohew, 1967; Holsti, 1969). Content analysis techniques can be applied to study the content of any book, magazine, newspaper, individual story or article, motion picture, news-broadcast, photograph, cartoon or comic strip, or any combination of the above. Holsti (1969) defined content analysis as any technique for making inferences by objectively and systematically identifying specific characteristics of messages. Berelson (1952) proposed content analysis as a research method for the systematic, objective, and quantitative description of content of communication. April, Bosma and Deglon (2003) also used content analysis in accordance with a selected intellectual capital framework comprising of 24 indicators across the three categories of internal, external and human capital.

Categories of Analysis

Some concepts were used in this study from a collection of literature including the theory of reasoned action, economic exchange theory, etc. and checked the content of the interview results from two focus groups of six people each. Four main factors were developed using the above conceptual framework:

- 1. Human capital:** the company's employees' cumulative tacit knowledge. Human capital represents a combination of these factors: genetic inheritance, education, and experience (Deol, 2009; Cehn, 2008; Liu, 2007; Liu, 2006; Choo & Bontis, 2002; Hudson, 1993); in this study human capital includes the factors of executive's support, employee's consensus, employees training, and good organizational promotion systems;
- 2. Relation Capital:** describes the relationship of an organization to outside parties, and includes customer loyalty, organizational reputation, and relationships with suppliers, partners, and/or other stakeholders (Deol, 2009; Chen, 2008; Liu, 2007; Zhou & Fink, 2003). According to the definition, relationship capital includes relationship of communities, relationship of suppliers, and relationship of customers;
- 3. Innovation Capital:** refers to the explicit, packaged result of innovation in the form of protected commercial rights and intellectual capital (Liu, 2007; Liu, 2006; Bontis, Chong, & Richardson, 2000); innovation capital thus includes design of green products, recycling techniques, and innovation of process methods;
- 4. Structural Capital:** the support mechanism and process through which employees can achieve optimal job and overall organizational performances (Deol, 2009; Chen, 2008; Liu, 2007; Liu, 2006; Bontis, 1998); in this study

structural capital includes the factors of automatic of recycling, top processing design, integrated environmental systems and certification of environmental waste disposal practices.

Table 1: Four main factors of environment management conceptual framework

Criterion	Items	Sources
Human Capital	1.Executive’s support 2.Employee’s consensus 3.Employees training 4.Well promotion organization	Achterkamp & Vos(2006); Rohracher(2006); Lee & Rhee(2007); Deol (2009)
Innovation Capital	5.Design of green products 6.Recycling techniques 7.Innovation of process method	Kara, Mazhar & Kaebernick(2004); Getzner & Ritt(2004); Khoie(2005); Guy(2006);
Relation Capital	8.Relationship of communities 9.Relationship of suppliers 10.Relationship of customers	Joia(2004); Papadogonas, Floutsakos & Mylonakis(2005); Deol(2009)
Structure Capital	11.Automation of recycling 12.Top processing design 13.Integration environmental system 14.Certification of environment protection wasting	Fobil, Carboo & Armah(2005); Lee & Xu(2005); Rao(2005); Stephenson(2005); Roper & Gomez(2005); Roper(2006); Deol (2009)

Degree of Mutual Agreement and Reliability

As mention above, the mutual degree of the researcher and coder 1 is 0.785, coder 2 is 0.714; coder 1 and coder 2 is 0.714, using a formula of reliability $[n(\text{average mutual degree}) / 1+(n-1)(\text{average mutual degree})]$ (Liu,2006; Liu,2007).

Table 2: Coding result of mutual agreement in four factors

	Researcher	Coder1	Coder2
Coder 1	11/14		
Coder 2	10/14	10/14	

*Item number from Table 1.

The average mutual degree of this study by three coders is 0.737. So, this study reached the acceptable reliability number of 0.893.The content of coding will be discussed in the following section.

Analytical Hierarchy Process

The data in this study was analyzed using a multi-criteria decision making approach called the analytical process (AHP). The Analytical Hierarchy Process was developed by Saaty (1994) and addresses many of the problems mentioned above. Governments and business organizations have used it extensively. Expert Choice, Inc, one of the vendors of AHP software, reports thousands of installations of its namesake product on PCs around the globe. Figure 1 illustrates the model’s two levels.

The AHP methodology is comprised of four steps: first, develop the hierarchical structure; second, assign different levels of relative importance to each of the selection criteria for the different elements of intellectual capital; third, rank the alternatives under each criterion; fourth, rank the contribution of each alternative to intellectual capital (Saraoglu & Detzler, 2002; Liu, 2006; Liu, 2007).

The AHP provides a highly flexible method for modeling decision hierarchies. The hierarchy for increasingly lower levels of sub-criteria can be grown. The construction of the AHP model is most likely to be the key step in the process. The second step in applying the AHP involves assigning weights to each criterion and then splitting this assigned weight among the various sub-criteria. Pair wise comparison processes increase the accuracy of these weights since they enable managers to focus on a series of relatively simple questions (Millet, 1998; Liu, 2006; Liu, 2007). The judgment inconsistency coefficient is required to be below 0.1.

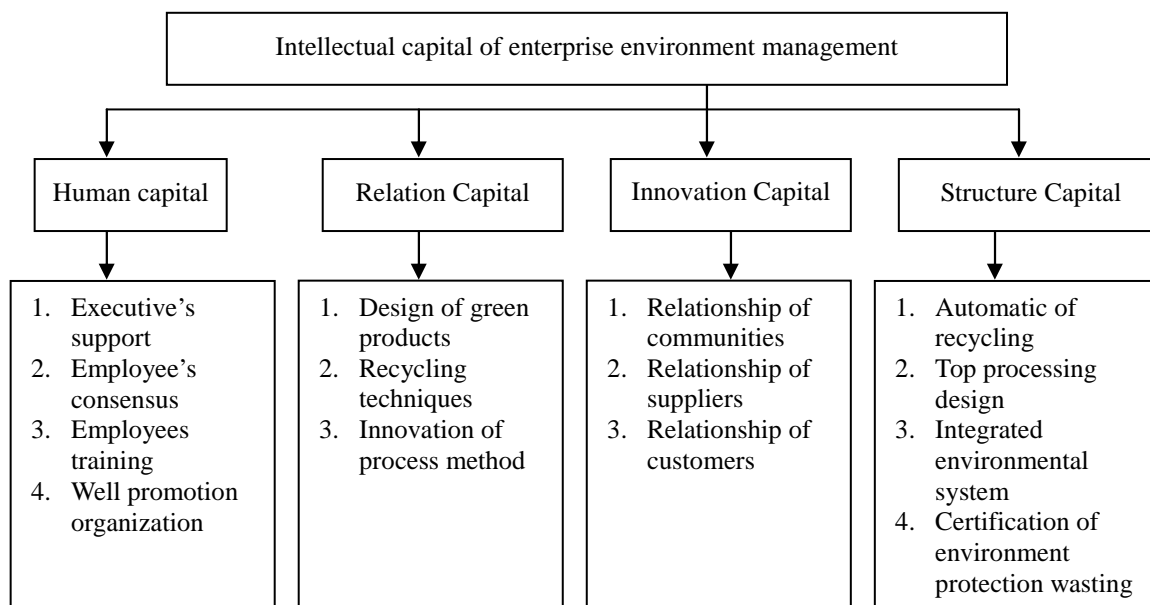


Figure 1: Hierarchical structure of the model in intellectual capital

RESULTS

The result gained from this study is shown below:

Table 3: Priority and ranking for level 1 and 2 criteria for intellectual capital

Criterion	Item	Weighting	Ranking	
Intellectual Capital	Human Capital	0.230	3	
	Innovation Capital	0.339	1	
	Relation Capital	0.244	2	
	Structure Capital	0.187	4	
	Human Capital	Executive's support	0.200	2
	Human Capital	Employee's consensus	0.475	1
	Human Capital	Employees training	0.149	4
	Human Capital	Well promotion organization	0.176	3
	Innovation Capital	Design of green products	0.207	2
	Innovation Capital	Recycling techniques	0.182	3
	Innovation Capital	Innovation of process method	0.611	1
	Relation Capital	Relationship of communities	0.144	3
	Relation Capital	Relationship of suppliers	0.272	2
Relation Capital	Relationship of customers	0.584	1	
Structure Capital	Automation of recycling	0.074	4	
Structure Capital	Top processing design	0.399	1	
Structure Capital	Integrated environmental system	0.369	2	
Structure Capital	Certification of environment protection wasting	0.158	3	

With regards to the indicators: First, the innovation capital element is the most important because new environmental protection knowledge has become a crucial competitive advantage (Grant, 1996). Yang (2004) proposed that knowledge acquisition speed and the availability of knowledge dissemination facilities influence the cycle time and new product development, and thus help to improve financial performance. Innovation-technology significantly moderates the negative aspects of a slow workflow resulting in weak performance.

Second, relation capital is the second important factor in intellectual capital content. Companies should build good relationships with the government, customers, unions, its communities as well as solve citizen complaints and

seek to satisfy stakeholders' needs. Third, a company's' performances can be enhanced by the manner in which they use human resources for strategy development and implementation (Wright, Smart, & McMahan, 1995; McDevitt, 2003). They need to offer further training programs in environmental protection and management. Following this, managers and employees could give more support and help to their environmental management system. For, structural capital, companies should establish internal and external standard operating procedures to enhance their efficiency. Finally, innovation capital: due to external challenges requiring considerable innovation and customization without sacrificing budget requirements and quality, numerous industrial firms must transform their entire approach into product development (Drejer, 2003).

CONCLUSION AND SUGGESTIONS

Sustainable development has become an important and useful topic for companies to attain their goals (Rey-Valette, Laloe & Fur, 2007). This study examines valuation in the industry using a managerial perspective "Intellectual Capital". This research suggests that companies use their resources to develop their competitive advantage. This research has some potential limitations. Intellectual capital is a complex, intangible subject and undoubtedly needed to more explore. This study used only a small sample, and the first step for any future study should be to use a larger sample to enable the inclusion of the analytical hierarchy process model. Additionally, the analysis should be extended longitudinally to monitor the progress and development of intellectual capital reporting practices for enterprise environmental management. Measurement of enterprise environmental management from the intellectual capital perspective also offers a means of helping in the designing of corporate environmental management strategies (Banerjee & Chau, 2004; Wani, Garg, & Sharma, 2003; Ptochos, Panopolulos, Metaxiotis, Askounis, Psarras, 2004). These indicators also provide a basis for evaluation by investors, and enable resource allocation for companies who emphasize on environmental protection management. Thus, the findings regarding the content of intellectual capital are very useful for enterprises to improve their environment management performance.

REFERENCES

- Achterkamp, M. C. & Vos, J. F. J. (2006). A framework for making sense of sustainable innovation through stakeholder involvement. *International Journal of Environmental Technology and Management*, 6(6), 525-538.
- Amit, R. & Schoemaker, P. J. H. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, 14, 33-46.
- Andrew, R. & Forgie, V. (2007). Investigating the direct and indirect environmental pressures of New Zealand's food and fibre industries. *International Journal of Sustainable Development*, 10(4), 319-344.
- Antona, M., David, G. & Mirault, E. (2007). Scientists dealing with stakeholders' demand for coral reef management indicators: methodological approach and issues *International Journal of Sustainable Development*, 10(1/2), 46-60.
- April, K. A., Bosma, P. & Deglon, D. A. (2003). IC measurement and reporting: establishing a practice in SA mining. *Journal of Intellectual Capital*, 4(2), 165-180.
- Banerjee, P. & Chau, P. Y. K. (2004). An evaluation framework for analyzing e-government convergence capability in developing countries", *Electronic Government*, 1(1), 29-48.
- Baxter, R. & Matear, S. (2004). Measuring intangible value in business-to-business buyer-seller relationships: an intellectual capital perspective. *Industrial Marketing Management*, 33, 491-500.
- Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17, 99-129.
- Berelson, B. (1952). Content analysis in communication research. New York: Free Press.
- Boulanger, P. M. (2007). Political uses of social indicators: overview and application to sustainable development indicators. *International Journal of Sustainable Development*, 10(1/2), 14-32.
- Bontis, N. (1998). Intellectual capital: an exploratory study that develops measures and models. *Management Decision*, 36(2), 63-76.
- Bontis, N. (2002). The rising star of the chief knowledge office. *Ivey Business Journal*, 66, (4), 20-25.
- Bontis, N., Chong, W.C. & Richardson, S. (2000). Intellectual capital and business performance in Malaysian industries. *Journal of Intellectual Capital*, 1(1), 11-15.

- Bontis, N., Crossan, M. & Hulland, J.(2002). Managing an organizational learning system by aligning stocks and flows. *Journal of Management Studies*, 39(4), 437-469.
- Budd, R.W., Thorp, R. K. & Donohew, L.(1967). *Content analysis of communication*, The Macmillan Company, New York.
- Chen, Y. S. (2008). The positive effect of green intellectual capital on competitive advantages of firms, *Journal of Business Ethics*, 77, 271-286.
- Choo, C.W. & Bontis, N. (2002). *The strategic management of intellectual capital and organizational knowledge*, Oxford University Press, New York, NY.
- Cole, A. (2007). Mediating modeling, strong transdisciplinarity and sustainable resource management in the Motueka Catchment on New Zealand. *International Journal of Sustainable Development*, 10(4), 345-364.
- Deol, H. S. (2009). Strategic environment and intellectual capital of Indian banks. *Journal of Intellectual Capital*,10(1), 109-120.
- Donaldson, T. & Preston, L. E. (1995). The stakeholder theory of the corporation: concepts, evidence and implications. *Academy of Management Review*, 20(1), 65-91
- Douglas, C. H. & Meltzer, M. A. (2004). Developing an environment management system for a UK hospital trust. *International Journal of Environmental Technology and Management*, 4(4), 273-290.
- Drejer, A. (2003). Innovation and learning. *International Journal of Innovation and Learning*, 1(1), 9-23.
- Fobil, J. N., Carboo, D. & Armah, N. A. (2005). Evaluation of municipal solid waste (MSW) for utilization in energy production in developing countries. *International Journal of Environmental Technology and Management*, 5(1), 76-86.
- Getzner, M. & Ritt, T. (2004). Quantitative and qualitative employment impacts of environmental innovations. *International Journal of Environmental Technology and Management*, 4(4), 375-399.
- Grant, R. M.(1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17 (Special issue), 109-122.
- Guy, B. (2006). Green demolition certification. *International Journal of Environmental Technology and Management*, 6(3/4), 292-312.
- Hitt, M. A., Bierman, L., Shimizu, K. & Kochhar, R. (2001). Direct and moderating effects of human capital on strategy and performance in professional service firms: a resource-based perspective. *Academy of Management Journal*, 44(1), 13-28.
- Holsti, O. R. (1969). *Intent analysis for the social sciences and humanities*, Reading , Mass: Addison-Wesley.
- Hudson, W. (1993). *Intellectual capital*, John Wiley & Sons, New York, NY.
- Joia, L. A. (2004). Are frequent customers always a company's intangible assess? Some findings drawn from an exploratory case study. *Journal of Intellectual Capital*, 5(4), 586-601.
- Kara, S., Mazhar, M. I. & Kaebernick, H. (2004). Lifetime prediction of components for reuse: an overview. *International Journal of Environmental Technology and Management*, 4(4), 323-348.
- Karagiannis, D., Nemetz, M. & Bayer, F. (2009). A method for comprehensive intellectual capital management and reporting. *Journal of Intellectual Capital*, 10(1), 93-108.
- Khoie, R. (2005). A method for evaluating and selecting renewable and non-renewable energy technologies. *International Journal of Environmental Technology and Management*, 5(2/3), 203-229.
- Kolsch, D., Saling,P., Kicherer, A., Grosse-Sommer, A. & Schmidt, I. (2008). How to measure social impacts? A socio-eco-efficiency analysis by the SEEBALANCE method. *International Journal of Sustainable Development*, 11(1), 1-23.
- Lee, S. G. & Xu, X. (2005). Design for the environment: life cycle assessment and sustainable packaging issues. *International Journal of Environmental Technology and Management*,5(1), 14-41.
- Lee, S. Y. & Rhee, S. K. (2007). The change in corporate environmental strategies: a longitudinal empirical study. *Management Decision*, 45(2), 196-216.
- Liberatore, M.J. & Miller, A. (1995). A decision support approach for transport carrier and mode selection. *Journal of Business Logistics*,16(2), 85-115.
- Liu, C. C. (2006). Developing measurements of intellectual capital in the e-learning platform industry by the analytic hierarchy process. *International Journal of Innovation and Learning*, 3(4), 374-386.
- Liu, C. C. (2007). Developing measures of value creation at private universities. *International Journal of Management in Education*, 1(1/2), 86-99.
- McDevitt, C. A. (2003). Framework for a developing process-based technologies at a very early stage. *International Journal of Management and Enterprise Development*, 1(1), 11-27.
- Meek, G. K. & Gray, S. J.(1998). The value added statements: an innovation for the US companies. *Accounting Horizons*, 12(2), 73-81.
- Mentzas, G. (2004). A strategic management framework for leveraging knowledge assets. *International Journal of Innovation and Learning*, 1(2), 115-142.

- Millet, I. (1998). Ethical decision making using the analytic hierarchy process. *Journal of Business Ethics*, 17, 1197-1204.
- Montmollin, A.D. & Scheller, A. (2007). MONET indicator system: the Swiss road to measuring sustainable development. *International Journal of Sustainable Development*, 10(1/2), 61-72.
- Pablos, P. O. D. (2002). Evidence of intellectual capital measurement from Asia, Europe and the Middle East. *Journal of Intellectual Capital*, 3(3), 267-302.
- Papadogonas, T.A., Floutsakos, M. G. & Mylonakis, J. (2005). Firm size and national environmental policies, evidence from Greece. *International Journal of Environmental Technology and Management*, 5(4), 426-431.
- Ptochos, D., Panopolulos, D., Metaxiotis, K., Askounis, D., & Psarras, J. (2004). Using internet GIS technology for early warning, response and controlling the quality of the public health sector. *International Journal of Electronic Healthcare*, 1(1), 78-102.
- Rao, R. J.(2005). Participatory watershed management (PWM): an approach for integrated development of rural India: a case study from Karnataka, southern India. *International Journal of Environmental Technology and Management*, 5(1), 107-115.
- Rey-Valette, H., Laloe, F. & Fur, J. L. (2007). Introduction to the key issue concerning the use of sustainable development indicators. *International Journal of Sustainable Development*, 10(1/2), 4-13.
- Rohracher, H. (2006). Sustainability as a matter of social context: information technologies and the environment. *International Journal of Environmental Technology and Management*, 6(6), 539-552.
- Roos, G, Roos, J., Edvisson, L. & Dragonetti, N.C.(1998). *Intellectual Capital- Navigating in the New Business Landscape*, New York University Press. New York, NY.
- Roper, W. E. & Gomez, J. (2005). Environmental assessment process for the AES parana power plant development project in Argentina. *International Journal of Environmental Technology and Management*, 5(2/3), 300-317.
- Roper, W. E. (2006). Strategies for building material reuse and recycle. *International Journal of Environmental Technology and Management*, 6(3/4), 313-345.
- Roussel, S., Crinquant, N. & Bourdat, E. (2007). In search of coastal zone sustainability by means of social carrying capacity indicators construction: lessons learned from the Thau lagoon case study. *International Journal of Sustainable Development*, 10(1/2), 175-194.
- Saaty, T. L. (1994). How to make a decision: The analytic hierarchy process. *Interfaces*, 24(6), 19-43.
- Saraoglu, H. & Detzler, M. L. (2002). A sensible mutual fund selection model, *Financial Analysts Journal*, May/June, 60-71.
- Schoenecker, T.S. & Cooper, A.C.(1998). The role of firm resources and organizational attributes in determining entry timing: a cross-industry study. *Strategic Management Journal*, 19, 1127-1143.
- Stephenson, F. (2005). Emerging technologies, integration with proven processes, and the challenges they represent. *International Journal of Environmental Technology and Management*, 5(2/3), 120-134.
- Stewart, T. A. (1997). *Intellectual capital: The New Wealth of Organizations*. Doubleday, New York, N. Y.
- Stovel, M. & Bontis, N. (2002). Voluntary turnover: knowledge management- friend or foe?. *Journal of Intellectual Capital*, 3(3), 303-322.
- SubbaNarasimha, P.N., Ahmad, S. & Mallya, S.N. (2003). Technological knowledge and firm performance of pharmaceutical firms. *Journal of Intellectual Capital*, 4(1), 20-33.
- Wani, V. P., Garg, T. K. & Sharma, S. K. (2003). The role of technical institutions in developing a techno-entrepreneurial workforce for sustainable development of EMS in India. *International Journal of Management and Enterprise Development*, 1(1), 71-88.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Managerial Journal*, 5, 171-180.
- Wright, P. M., Smart, D.L., & McMahan, G.C. (1995). Matches between human resources and strategy among NCAA basketball teams. *Academy of Management Journal*, 38, 1052-1074.
- Yang, J. (2004). Knowledge management opportunities for cycle time reduction. *International Journal of Innovation and Learning*, 1(2), 192-207.
- Zhou, A.Z. & Fink, D. (2003). The intellectual capital wed- a systematic linking of intellectual capital and knowledge management. *Journal of Intellectual Capital*, 4(1), 34-48.