

INTELLECTUAL CAPITAL MODELLING FOR BUSINESS PERFORMANCE STRATEGY.

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ABSTRACT

Intellectual Capital (IC) is a potential standard strategy to measure the value of an enterprise which relies on intellectual competence, due to the fact that the existing financial statements which have been sole source for investors to develop industrial sector of technology, are considered inadequate in representing the true value of enterprises as well as their potentials. Many IC researchers agree that IC comprises three main components; namely Human Capital (HC), Structural Capital (SC) or Organizational Capital, and Customer Capital or Relational Capital (RC). Human capital deals with the knowledge possessed by the organization as the results of having knowledgeable, creative, innovative, and talented employees and managerial staffs. Structural capital involves business processes, procedures, mechanisms, and knowledge which are codified into the system. This research identifies IC variables based on proven constructs obtained from various IC literatures. Not all components identified are expected to have significant influence on the final result of IC measurement. On the other hand, there are several other factors which are possible to influence but not sufficiently covered or represented by those constructs, such as cultural and demographic background, legal status, as well as the nature of business of the organization. These identified variables are selected and validated through several stages and become the basis to formulate strategies to maximize IC in PT Telekomunikasi Indonesia (PT TELKOM). Qualitative measures in a structural equation model yielded several research implications. The resulting structural model allows the organization to gauge the effectiveness of its human capital capabilities thus more efficiently allocate strategic resources with regard to human capital management. PT TELKOM is chosen as the study case since it represents much of Indonesia's information and communication technology market, and it has declared a mission to become the Most Admired Knowledge Enterprise (MAKE), in which the fourth criteria is to maximize intellectual capital. The study will identify the attributes of human capital (HC), structural capital (SC), and relational capital (RC) to maximize overall enterprise IC.

KEYWORDS : Intellectual Capital, human capital management, structural equation modelling.

1. INTRODUCTION

Intellectual Capital (IC) is a potential standard to measure the value of an enterprise, as have been in practices for two decades and demonstrated by Skandia, Cellemi, and many other companies which rely on their intellectual competence, particularly information and communication technology (ICT) based enterprises. This is due to the fact that existing financial statements which have been sole source

for investors to develop industrial sector of technology, are considered inadequate in representing the true value of enterprises as well as their potentials.

Simply speaking, IC can be considered as the difference between market value (the value of shares or how much an organization is worth) and their book value (accounting value represented by fixed and current assets in financial reports).

It is understandable why a company of modest size can have very high value in the capital market. Investors do not merely rely on corporations' financial performances, but also on business potentials as demonstrated by their commitment to the development of IC.

In an organization, the authority to provide intellectual capital statement belongs to and is the responsibility of Knowledge Management (KM) Department. This statement/report should describe knowledge management strategies and should incorporate goals and mission statement, initiatives as well as the results, in organizational knowledge resource one composition, application, and development. Based on this presumption, knowledge management strategies can be disseminated throughout the organization and communicated to the outside. (Bontis, 2001)

Intellectual capital further be referred to as *IC* statement is a management tool to create value for the organization, and as a means of communication to employees, customers, business partners, and investors, on how organization can create value for them. Like financial statements, IC statements monitor initiatives and achievements, and provide feedback whether or not the organization develops its resources towards the right direction. In this case, IC reports can describe how good the organization is in improving and managing their knowledge resources. (Bose, 2003)

Many IC researchers agree that IC (also known as *intangible assets* or simply *intangibles*) comprises three main components; namely *human capital* (HC), *organizational capital* or *structural capital* (SC), and *customer capital* or *relational capital* (RC). *Human capital* is primarily concerned with the knowledge possessed by an organization as the results of having

knowledgeable, creative, innovative, and talented employees and managerial staffs. *Structural capital* involves business processes, procedures, mechanisms, and knowledge which are codified into the system. *Relational capitals* are intangible assets which are not in the form of knowledge, such as customer or supplier relationship, brand or corporate image, and customer base. (Bontis, 2001). Based on the literature review, there is limited research about IC attributes.

Therefore, this research aims to identify IC attributes based on proven constructs obtained and developed from various IC literatures. Not all components identified are expected to have significant influence on the final result of IC measurement. On the other hand, there will be several other factors which are possible to influence but not sufficiently covered or represented by those constructs, such as cultural and demographic background, legal status, as well as the nature of business of the organization. These identified variables will then be selected and validated through several stages and will be the basis to formulate recommendations to maximize IC in an organization.

PT Telekomunikasi Indonesia (PT TELKOM) is chosen as the case study since it represents much of Indonesia's information and communication technology market, and it has declared a mission to become the *Most Admired Knowledge Enterprise* (MAKE). The research is conducted in cooperation with PT Telkom, and the result will be a set of recommendations to be implemented in order to achieve that goal.

While attributes and variables need to be practical and measurable, the implementation should have realistic milestones in order to obtain an objective judgment whether or not the implementation is a success. Most importantly,

these recommendations should be in-line with the organization's long term goals. For example, a staff with 4-year university degree and 10-year hands-on experience in installing PSTN cables may not have the same value as another staff with only 3-year diploma but has 2-year experience installing wireless BTS, since the company has redirected its strategic initiative to provide more wireless service provider in five years to come.

The following MAKE criteria have been put into Telkom's agenda:

- a. creating an enterprise knowledge driven culture.
- b. developing knowledge workers through senior management leadership.
- c. delivering knowledge based products/services/solutions.
- d. maximizing enterprise intellectual capital.
- e. creating an environment for collaborative knowledge sharing.
- f. creating a learning organization.
- g. delivering value based on customer knowledge.
- h. transforming enterprise knowledge into shareholder value.

The research focuses on the fourth agenda (maximizing enterprise intellectual capital) through the identification of various human capital attributes using the findings from previous researches on enterprise IC. If human capital attributes which have significant influence on IC performance can be identified, it is therefore possible to set up a recommendation to maximize IC. Hopefully, this paper makes contribution by providing IC attributes based on the case study of PT. Telkom.

As the first step of the study, a number of scientific literatures on the methods of measuring

HC/IC quantitatively will be reviewed. On the ground of some base theories, a hypothesis on some constructs related to Intellectual Capital will be proposed. The hypothesis will then be examined through a process of data collection which will involve a perceptual survey and interviews with some key people. Even though the study will focus on human, structural factors and customer or external aspects which are thought to have significant influence on human, will also be considered.

The result of the survey data will be analysed and triangulated against the quantitative measures of business performance and will be set as an index. This index will be the basis for evaluation to measure the effectiveness and success of the IC implementation programs.

This paper consists of several sections as follows: Introduction, research methods, result and discussion, as well as conclusion.

2. LITERATURE REVIEW

There are several research regarding intellectual capital, such as Intellectual capital and financial returns of companies (Tan, Plowman and Hancock, 2007); modelling the creation of value from intellectual capital from the case study of a Portuguese banking perspective (Cabrita, de Vaz and Bontis, 2007); Intellectual capital and firm performance in Australia (Clark, Sheng and Whiting, 2011); An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance (Chen, Cheng and Hwang, 2005); Intellectual capital accounting research (Guthrie, Ricceri and Dumay, 2012); Statistical analysis on the intellectual capital (Halim, 2010); The IC Rating model by Intellectual Capital Sweden (Jacobsen and Hofman-Bang, 2005); The impact of intellectual capital on firms' market value and financial

performance (Madinios, Chatzoudes, Tsairidis and Theriou, 2011); Intellectual capital and business performance in the pharmaceutical

sector of Jordan (Sharabati, Jawad and Bontis, 2010).

Table 1. Manifest (observed) variables for Human Capital construct

Dimensions	Elements (Manifest or Observed Variables)
Managerial Leadership (Bontis, 2002)	Managers' and leaders' communication, performance feedback, supervisory and executive skills, demonstration of key organizational values, inclusiveness, efforts to instill confidence, supported by systems of transitions.
Process Execution, Workforce Optimization (Bontis, 2002)	Establishment of essential processes for getting work done, good working conditions, accountability, hiring decisions and performance evaluation system.
Education (Bontis, 2002)	Level and type of education, practical experience
Knowledge Generation, Learning & Development, Innovation (Bontis, 2002)	The organization's overall ability to learn and improvise, encouragement to innovate, and continually improve, complemented by training and recruitment programs.
Knowledge Integration (Bontis, 2002)	Transform their tacit knowledge into explicit knowledge by codifying their ideas into the systems of the organization.
Knowledge Sharing (Bontis, 2002)	Systematic accessibility, the extent of capability to collaborate and work in teams. Capacity for making knowledge and ideas widely available to employees.
Value Alignment (Bontis, 2002)	Demonstrating the value of learning behavior.
Employee Commitment (Bontis, 2002)	Organization's capacity to secure jobs, recognize accomplishment and provide opportunities for advancement.
Relationships (McBassi, 2004)	Horizontal relationship with coworkers and vertical with super/subordinates.
Work-life balance and Physical Environment (McBassi, 2004)	Work load and time, physical environment.
Employee Motivation (Bontis, 2002)	Initiatives, independence
Attitude towards work itself (McBassi, 2004)	Effective and creative job design to optimize talents and skills.
Attitude towards Products, Brands and Reputation (McBassi, 2004)	Pride and use own products, brands and reputation
Employee Satisfaction (Bontis, 2002)	Staff morale as reflected in the culture.

Retention of Key People (Bontis, 2002)

Systematic ability to retain good performers, determine key drivers of productivity

Table 2. Manifest (observed) variables for Structural Capital construct

Dimensions	Elements (Manifest or Observed Variables)
Management Philosophy (Rudéz, 2005)	Employee empowerment, Customers orientation, Initiative driven staff, Inter-department cooperation
Culture (Rudéz, 2005)	Organization's atmosphere, support for knowledge growth, degree of communication formality, communication between managers and staff.
Business Process (Rudéz, 2005)	Support for innovative ideas, innovations leadership, recognition of good ideas of employees, complaint solving, QoS improvement.
Information Technology (Rudéz, 2005)	Improvement on IT solutions, significance of IT contribution to product quality, connection with environment through IT, proportion of Internet sales.

Table 3. Manifest (observed) variables for Relational Capital construct

Dimensions	Elements (Manifest or Observed Variables)
Customer satisfaction and loyalty (Rudéz, 2005)	Market share growth, overall customer satisfaction improvement, decrease in number of complaints, customer loyalty growth.
Image and brand (Rudéz, 2005)	Image improvement, product feature attraction, relative value against competitors' brand, product development.
Relationship with distribution/supply chain channels (Rudéz, 2005)	Commitment to developing distribution channels, various means of channels, relationship capital (average value)
Relationship with other groups (Rudéz, 2005)	Relationships with commercial partners (success, monitoring, bureaucracy and role for knowledge); quality of representatives; exploitation of opportunity, relationship with the media; importance of media as source of image, obstacles or supports from local community, government, investors, special interest groups, industry association, impact from competitors on supply chain.

3. METHODOLOGY

Intellectual Capital consists of three main constructs namely *Human Capital*, *Structural*

Capital, and Relational Capital. This model however suggests that human capital has the greatest influence on the overall business performance. This implies that it can be assumed that maximizing human capital will result in the

maximization of business performance. Figure 2 below describes Intellectual capital modelling

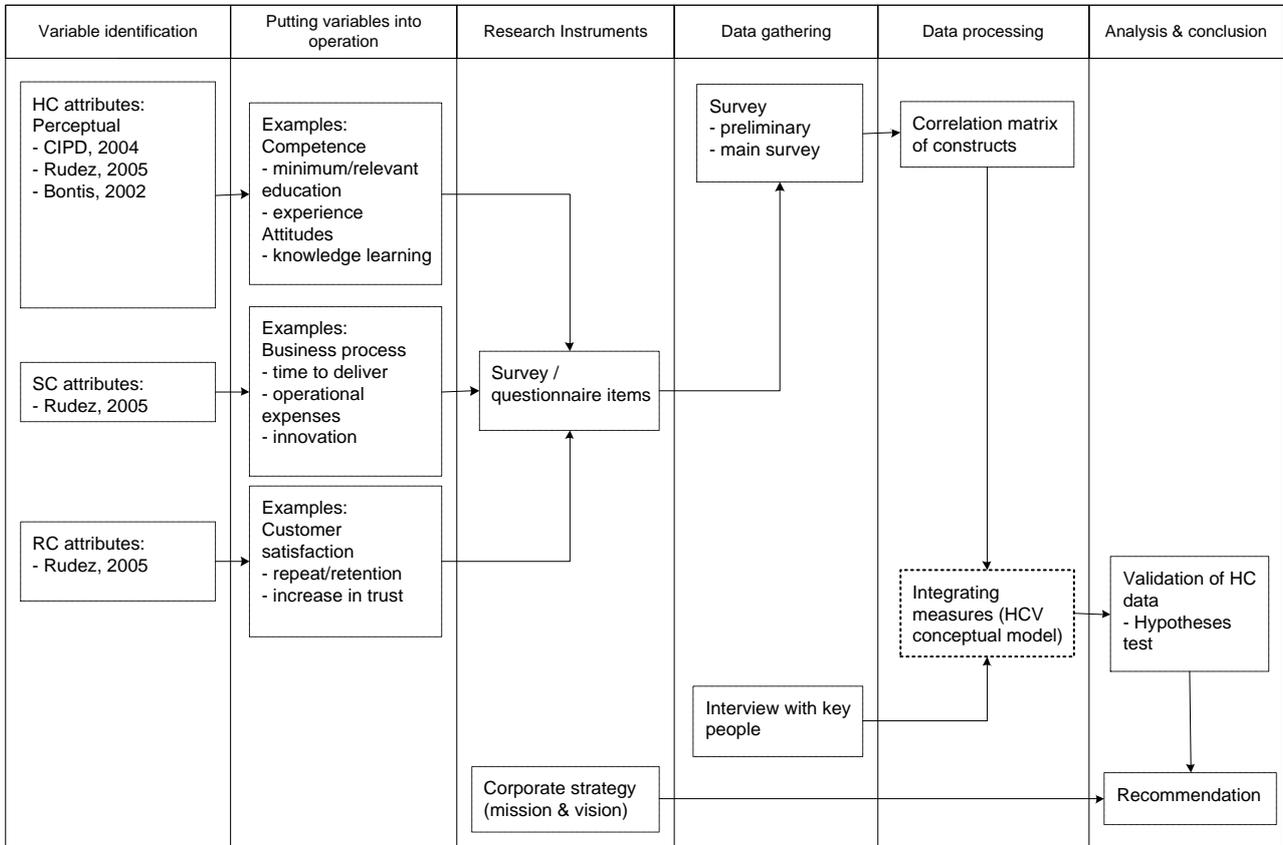


Fig. 1. Research Framework

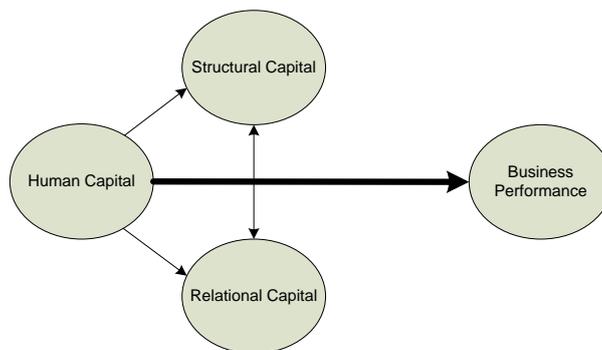


Fig. 2. Intellectual Capital Modelling

PT TELKOM has a total of around 25,000 workforces who are targeted as the subjects for

this study. These subjects can be classified into three major categories to reflect the levels of

compensation they receive from the company: *executive, strategic staff* (directly deal with external customers), and *staff* (do not have direct access to external customers, only deal with internal customers).

A questionnaire based survey is administered in the second phase to collect qualitative perceptual data. The survey consists of 48 (forty-eight) statements reflecting employee perception based on the seven Likert-scale that requires respondents to note their level of agreement with certain items.

These items are developed from scales previously published by the Institute for Intellectual Capital Research. Items for certain constructs are further edited to accommodate other important attributes as proposed by CIPD (2004) and Rudéz (2005).

The questionnaire was uploaded to corporate intranet and emailed to all employees. A brief introductory letter was attached to explain the importance of the research and options for response. As many as 6200 respondents from all levels of management and departments returned the completed questionnaire, which means that the responses should represent all levels and departments. The respondents represent their overall views of the company.

From the survey results, only 2100 responses are valid for further analysis. The identification of correlations between attributes and between attribute to constructs is done using LISREL software, and the confirmation of hypotheses is done using appropriate hypotheses test procedures.

HYPOTHESES

H1: Balance between work/life and work environment has positive influence on Human capital.

H2: Culture as reflected in the attitudes towards work has positive influence on Human capital.

H3: Interpersonal relationship has positive influence on Human capital.

H4: Education has positive influence on Human capital.

H5: Employee satisfaction has positive influence on Human capital.

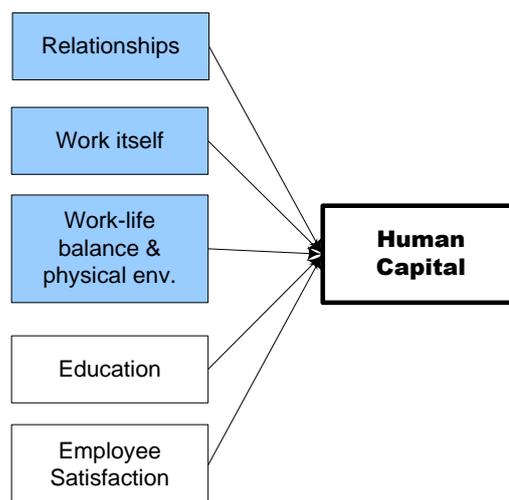


Fig. 3. HC structural model
(Bontis, 2002; CIPD; 2004)

H6: Managerial leadership has positive influence on Structural capital.

H7: Management philosophy has positive influence on Structural capital.

H8: Organizational culture has positive influence on Structural capital.

H9: Business processes has positive influence on Structural capital.

H10: Information technology has positive influence on Structural capital.

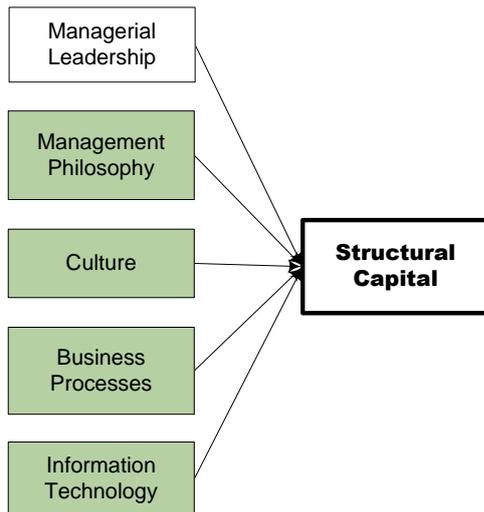


Figure 4. SC structural model
(Bontis, 2002; Rudéz, 2005)

H11: Human capital has positive influence on Relational capital.

H12: Customer satisfaction has positive influence on Relational capital.

H13: External relationship has positive influence on Relational capital.

H14: Product image & brand has positive influence on Relational capital.

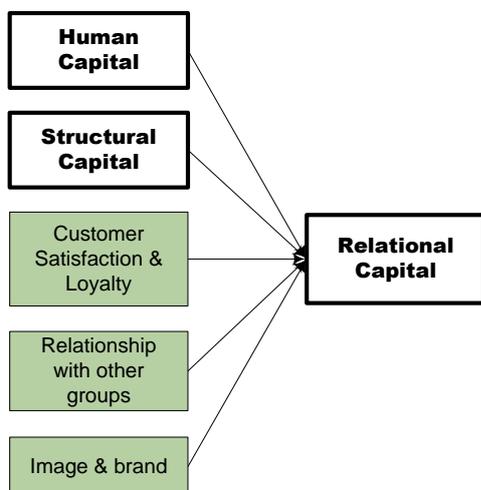


Figure 5. RC structural model
(Bontis, 2002; Rudéz, 2005)

H15: Relational capital has positive influence on Human capital effectiveness.

H16: Managerial leadership has positive influence on Retention of key people.

H17: Managerial leadership has positive influence on Value alignment.

H18: Value alignment has positive influence on Knowledge sharing.

H19: Employee satisfaction has positive influence on Employee motivation.

H20: Employee satisfaction has positive influence on Employee commitment.

H21: Employee commitment has positive influence on Employee motivation.

H22: Employee motivation has positive influence on Knowledge sharing.

H23: Employee commitment has positive influence on Knowledge generation.

H24: Knowledge generation has positive influence on Business performance.

H25: Employee commitment has positive influence on Business performance.

H26: Employee commitment has positive influence on Retention of key people.

H27: Structural capital has positive influence on Relational capital.

H28: Structural capital has positive influence on Process execution.

H29: Process execution has positive influence on Knowledge integration.

H30: Knowledge integration has positive influence on Knowledge sharing.

H31: Knowledge sharing has negative influence on Human capital depletion.

H32: Human capital depletion has negative influence on Human capital effectiveness.

H33: Business performance has negative influence on Human capital depletion.

4. RESULT AND DISCUSSION

Human Capital Model

The perceptual instruments used in this study are described in latent variables, where Human Capital, Structural Capital, and Relational

Capital are represented by 14, 5, and 3 latent variables respectively. Table 4 and 5 below show

the 14 Latent Constructs of Human Capital and 5 Latent Constructs for Structural Capital.

Table 4. 14 Latent Constructs of Human Capital

Employee Satisfaction	Employee Commitment	Education
Employee Motivation	Value Alignment	Retention of Key People
Management Leadership	Interpersonal relationship	Knowledge generation, learning & innovation
Attitudes towards work	Attitudes towards products/company	Environment & Balance between work and life
Knowledge Sharing	Knowledge Integration	

These constructs were selected based on a review of the intellectual capital, organizational learning and knowledge management literatures. Each construct and item was reviewed by a team of representatives from the Saratoga Institute and Accenture for clarity, conciseness and face validity. (Bontis, 2002)

Structural Capital Model

Structural Capital is defined as an IC component which stays in the company when a staff is no

longer stays with the organization, such as infrastructure and physical systems owned by the company to operate IC, data, and knowledge base. Structural capital is also referred to as organizational capital because it is a systematic competence or a system which maximizes innovation and organizational ability to create values coherent with knowledge assets in the process or innovation.

Table 5. 5 Latent Constructs for Structural Capital

Management philosophy
Business Process
Intellectual Property Rights
Process Execution and Optimization
Information Technology

One of the branches of *Structural Capital* is Innovation capital, or the ability to renew to sustain business in terms of intellectual property, trademarks and other intangible assets such as

certain recipe or business secrets. *Structural Capital* is also referred to as process capital due to its focus on processes or practices in the organization.

It also covers intellectual property rights such as patent, trademarks, copyright, design, and other specifications. Other intangible assets belong to this category is company culture.

Relational Capital Model

Relational capital or often referred to as customer capital or external capital is the relationship with

customer base and potential customers as well as other external parties such as distribution channels and supply chain. Table 6 below captures 3 Latent Constructs for Relational Capital. Furthermore, Figure 2 below shows the integrated model.

Table 6. 3 Latent Constructs for Relational Capital

Customer Satisfaction & Loyalty
Product & Brand Image
Relationship with business partner and other groups

Due to the complexity of the model and the limitations in the processing software (LISREL 8.80 Student Edition) which only allows for a maximum number of observed variables of 15, then the model is divided into several parts:

Model 1 consists of the following, mostly representing Structural Capital: Managerial Leadership, Management Philosophy, Culture,

Business Process, Information Technology, and Intellectual Property Rights.

Furthermore, since Business Process construct only has one observed variable, it can be combined with Management Philosophy. According to Bontis (2002) those two constructs are considered closely related.

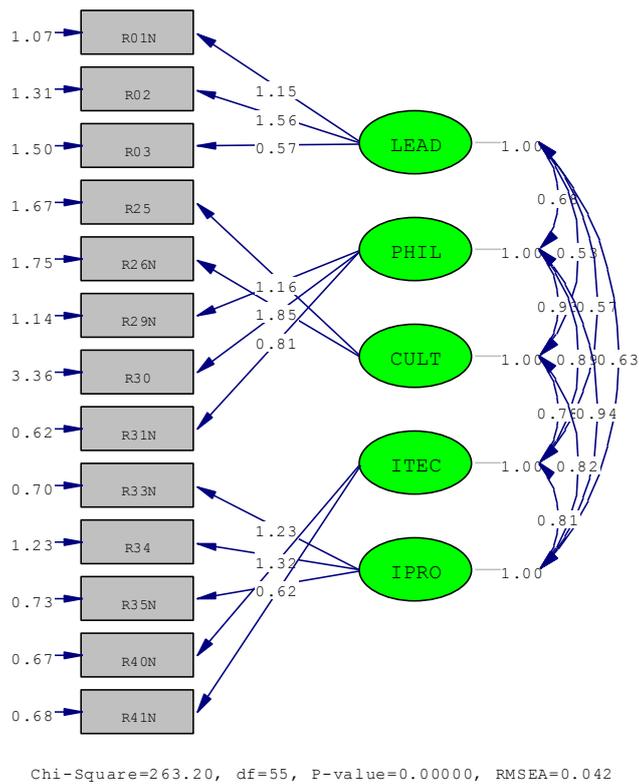


Fig. 6. LISREL Output for Model 1

Model 2 consists of the following constructs, mostly representing Human capital and Structural Capital: Work-life Balance and Physical Environment, Culture as reflected in the attitude towards work itself, Interpersonal Relationships, Education (Human Capital), Customer Satisfaction and Loyalty, Relationships with other groups, and Product Image and Brand.

Following the same reason as Model 1, the construct Culture as reflected in the attitude towards work itself only has one observed variable and therefore should be combined with one of the other constructs.

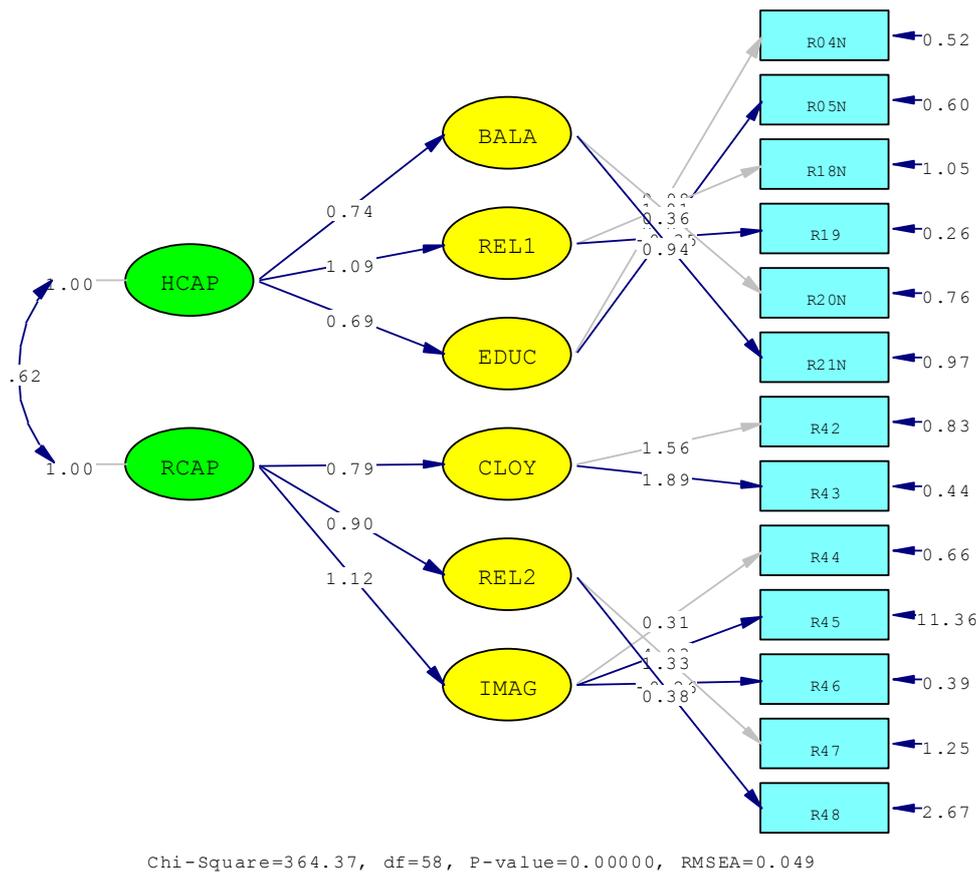


Fig. 7. LISREL Output for Model 2

Model 3 concerns with employee sentiments consisting of Employee Satisfaction, Employee Commitment, Employee Motivation; structural capital attributes such as Process Execution,

Knowledge Integration and Knowledge Sharing; and one human capital construct namely Value Alignment. However, the only relationship possible from the model is the following:

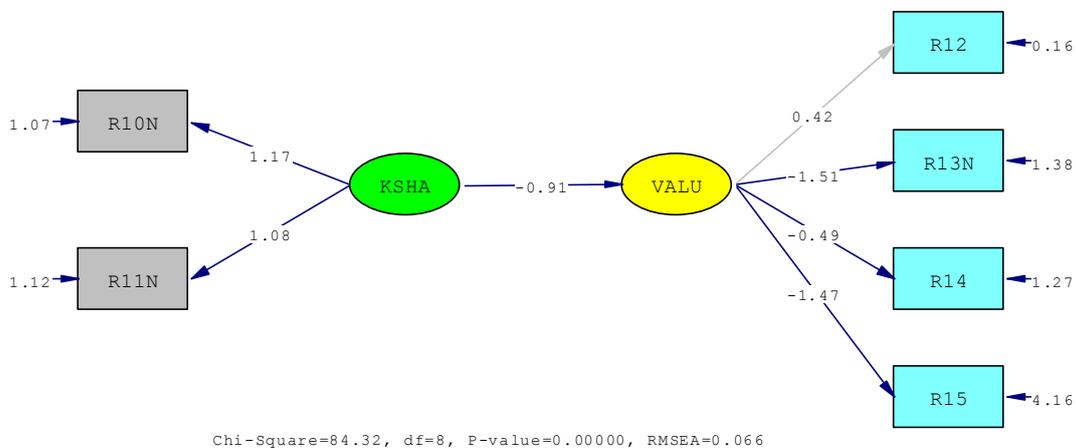


Fig. 8. LISREL output for Model 3

Model 4 is trying to combine several structural capital attributes such as Knowledge Generation,

Knowledge Sharing, Process Execution,
Knowledge Integration and human capital

construct of Value Alignment.

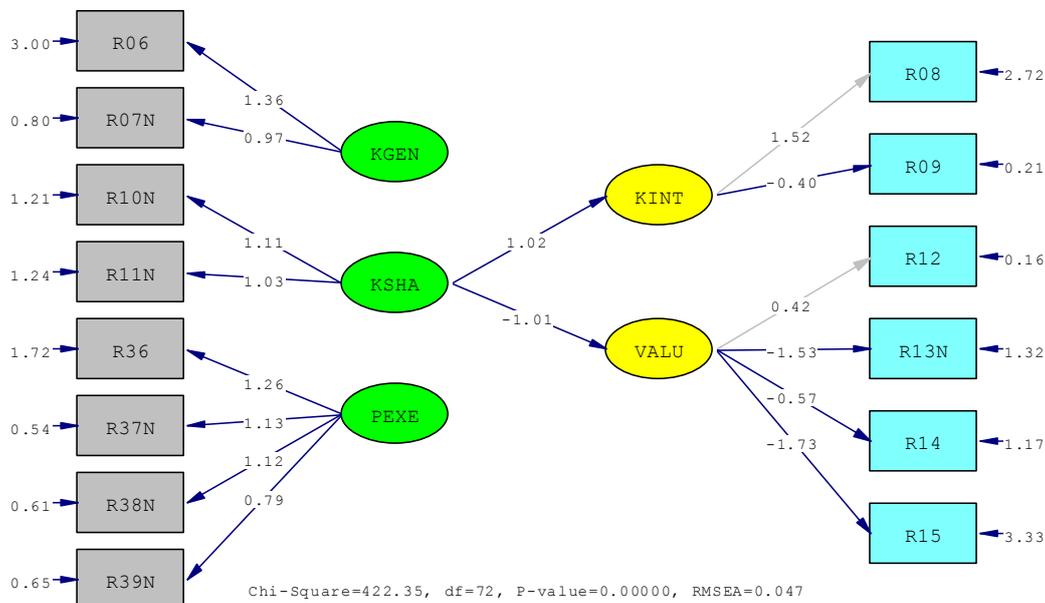


Fig. 9. LISREL output for Correlation of Constructs

HYPOTHESES TEST RESULT

- H1: Balance between work/life and work environment has positive influence on Human capital. (Hypothesis accepted; with a significant correlation).
- H2: Culture as reflected in the attitudes towards work has positive influence on Human capital. (Hypothesis rejected; no identifiable correlation).
- H3: Interpersonal relationship has positive influence on Human capital. (Hypothesis accepted; with a significant correlation).
- H4: Education has positive influence on Human capital. (Hypothesis accepted; with a significant correlation).
- H5: Employee satisfaction has positive influence on Human capital. (Hypothesis rejected; no identifiable correlation).

- H6: Managerial leadership has positive influence on Structural capital. (Not tested).
- H7: Management philosophy has positive influence on Structural capital. (Not tested).
- H8: Organizational culture has positive influence on Structural capital. (Not tested).
- H9: Business processes have positive influence on Structural capital. (Not tested).
- H10: Information technology has positive influence on Structural capital. (Not tested).
- H11: Human capital has positive influence on Relational capital. (Not tested).
- H12: Customer satisfaction has positive influence on Relational capital. (Hypothesis accepted; with a significant correlation).

- H13:** External relationship has positive influence on Relational capital. (Hypothesis accepted; with a significant correlation).
- H14:** Product image & brand has positive influence on Relational capital. (Hypothesis accepted; with a significant correlation).
- H15: Relational capital has positive influence on Human capital effectiveness. (Not tested).
- H16: Managerial leadership has positive influence on Retention of key people. (Not tested).
- H17: Managerial leadership has positive influence on Value alignment. (Not tested).
- H18:** Value alignment has positive influence on Knowledge sharing. (Hypothesis accepted; with a significant correlation).
- H19: Employee satisfaction has positive influence on Employee motivation. (Not tested).
- H20: Employee satisfaction has positive influence on Employee commitment.
- H21: Employee commitment has positive influence on Employee motivation. (Not tested).
- H22: Employee motivation has positive influence on Knowledge sharing. (Not tested).
- H23: Employee commitment has positive influence on Knowledge generation. (Not tested).
- H24: Knowledge generation has positive influence on Business performance. (Not tested).
- H25: Employee commitment has positive influence on Business performance. (Not tested).
- H26: Employee commitment has positive influence on Retention of key people. (Not tested).
- H27: Structural capital has positive influence on Relational capital. (Not tested).
- H28: Structural capital has positive influence on Process execution. (Not tested).
- H29: Process execution has positive influence on Knowledge integration. (Hypothesis rejected; no identifiable correlation).
- H30:** Knowledge integration has positive influence on Knowledge sharing. (Hypothesis accepted; with a significant correlation).
- H31: Knowledge sharing has negative influence on Human capital depletion. (Not tested).
- H32: Human capital depletion has negative influence on Human capital effectiveness. (Not tested).
- H33: Business performance has negative influence on Human capital depletion. (Not tested).

5. CONCLUSION

Human capital management both builds and maintains a valuable resource for the organization. It is capable of turning human resources into actual actions and products for the organization. Finally, human capital must be combined with overall intellectual capital strategy to create a more balanced management policy, which can readily assist the business in achieving its objectives.

Stocks of qualifications may hide poor usage and over-qualifications. Qualifications, however, are only a proxy for one part of the skills spectrum. Measurement of generic skill formation and usage are therefore very important. Comparisons need to look at demand for skills. The production of masses of graduates, for example, may be a waste of resource if their skills are not actually needed in the labor market.

Comparisons also need to consider usage of skill. This, in combination with a range of other

factors, is important to gauging how well the skills being produced aid economic performance. Supply and demand might be in balance, but if usage is inefficient, or the other drivers of productivity (e.g. R&D) are missing, the economic impact may be small.

All in all, these results suggest that the measuring and modeling of human capital are critical. This view can be attributed to the growing strategic importance of intellectual capital management and the need for HR managers to establish their credibility. The difficulties of human resource managers in achieving this should not be underestimated. It is perceived that they do not have the necessary expertise to carry out appropriate measurement and that many of the measures used lack precision and are too difficult.

Nevertheless, different measurement approaches are used. Whether they are actually providing information that establishes the importance of human capital in its credibility is a moot point. The difficulties are made more difficult by the attitudes of others in the organization. Additionally, it does not speak to human capital issues. To see the future, we need leading indicators. These indicators tell us the state of our human capital, as we prepare for the future. The benefit of establishing a causal map of human capital management is clear.

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