

University Intellectual Capital: Measurement Model and Application

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Abstract: There is the widespread recognition of the importance of intellectual capital (IC) as a major source of competitive advantage for any organisation operating in today's knowledge economy (KE). In particular, universities are recognised as being essential to the new economy as the prime producers and transmitters of knowledge in a society. Therefore, it is not surprising that the management and measurement of IC by universities is becoming an increasingly important issue in the knowledge management (KM) research and practice. It is argued that universities need to use the IC model as a tool to aid them in meeting new management challenges and diffuse their intangible resources and activities to their stakeholders and society at large. This study addresses this need by developing a specific model for measuring intellectual capital of universities and by applying it in the specific context of a new private university in Sarajevo, Bosnia and Herzegovina. It is hoped that the use of this model can help the university in reaching its scientific and educational goals.

Keywords: Importance of Intellectual Capital, Competitive Advantage, Knowledge Economy, Knowledge Management, Intangible Resources.

Introduction

Intellectual capital has gained the increased prominence as a business and research topic principally due to the rise of the knowledge economy. Knowledge economy is described by OECD as the economic activities and systems which are directly established by creation, circulation and application of knowledge and information (Chen, 2008). Intellectual capital (IC) has been widely recognised as a major resource of organisations in the knowledge economy (KE).

The concept of IC combines the idea of the intellect power with the economic concept of capital for the purpose of producing innovative or more efficient and effective goods and services. Typically, the term IC refers to all knowledge resources that determine the competitiveness of an organisation. It includes intellectual property such as patents and licences, as well as the skills and know-how of people, documents and information systems (Kleiner et al, 1996). Intellectual capital is synonymous with knowledge assets, intellectual assets or intangible assets (Guthrie, 2001).

In recent economic and social developments, intellectual capital is implicated as the instrumental in the determination of enterprise value and economic performance. From the IC perspective, the aim of an organisation is to create and/or extract value from knowledge assets by maximizing the interrelationship between different types of its intellectual capital (Handzic and Zhou, 2005). It has also been widely recognised that the success of the knowledge economy or society depends on the effective utilisation of its intangible assets such as knowledge, skills and innovative potential (ESRC 2007, Critical 2009).

In research, the current emphasis is on important theoretical and empirical contributions relating to the measurement and reporting of intellectual capital. Therefore, in this study, we address the issue of IC measurement by developing and applying a specific IC measurement model for universities.

The paper is structured as follows. It starts with this introductory section. In the following section, we review relevant literature on universities and their IC models of interest to this study. Next, we describe the survey research method applied in the current investigation. Then, we present results of our quantitative and qualitative data

analyses. A discussion of our findings in the light of past literature follows. Finally, conclusions and contributions to research and practice are offered in the last section.

Literature Review

This section draws from past research and practice in order to develop a more comprehensive and holistic understanding of IC frameworks as a common ground for developing a specific IC measurement model for universities. First, the section looks into the place of universities in knowledge economy. Then it presents some recent efforts at developing IC models and examines their use in measuring and reporting human, structural and relational capital categories. In the end, it states the objectives of the present study.

University and Knowledge Economy

In his recent review, Ozlen (2010) states that the central task of universities is to create new knowledge and thereby engender innovations. Innovations are based on information and knowledge processes of various kinds. Such processes cannot take place without accurate, up-to-date knowledge in the focal areas of the universities' research interests and efforts. Alliances and social network theory provide one potent perspective for the analysis of relevant relationships. Networking is based on reciprocity and the exchange of the resources, ideas, information, knowledge, and social support that mediate all relationships. The purpose of internally driven networking is to break down internal barriers and boundaries, thereby allowing members to create quick and open person-to-person and group-to-group communications for exchanging information and sharing knowledge for the improvement of organizational performance.

According to Ozlen (2010) IC is the most vital and strategic resource for universities. Actually, IC is at the core of the University's mission and reason of existence. Attracting and retaining qualified intellectual capital plays a vital role in reinforcing the University's educational standards. IC is not only an input resource for a University, but it is also a product in the sense that faculty members' IC is used to nurture that of its students. As an institution earns a reputation as a superior quality provider of education, it will be able to attract more local and foreign students which will contribute in turn to the institution's prosperous continuity. IC reports recognise that the "the efficient use of IC is essential for a university's performance"

University Knowledge Assets Portfolio

There are many classification schemes which attempt to categorise knowledge assets or IC in organisations. Handzic and Zhou (2010) presented a widely-accepted scheme of three sub-categories: human capital, organisational (internal) capital and customer (external) capital. In addition to this, knowledge assets can be divided into core and supporting assets. Core knowledge assets comprise a firm's core skills and competencies. They lie in the areas in which the firm has competitive strengths. In contrast, supporting knowledge assets are complementary generic and operational assets that support or enable the delivery, storage and acquisition of core knowledge assets. Every organisation possesses valuable intellectual materials in the form of data, documents, procedures, capabilities, etc. These can be found in people, organisational structures and processes, and customer relationships. To succeed, organisations need to have a clear understanding of which knowledge assets are important to their success and how these assets are distributed over different parts of the company and among different functions and workers.

The portfolio of knowledge assets is typically determined by an organisation's strategic plan. The following sections present some examples of knowledge assets of universities under human, structural and relational subtitles. Typically, key indicators of human capital of universities include the ability to attract and retain staff of good caliber, dedicated staff, implementation of effective staff and student equity measures. Indicators of structural capital (customer capital) include projecting a highly visible positive image, ability to attract good students, technological support, quality research, relevant tuition programmes, quality research, internationalization, visionary participative strategic management, adherence to mission, financial health of the institution.

Study Objectives

There is a growing evidence in support of the application of IC tools in universities and the potential benefit this would bring (Sanchez et al., 2009). Up to now, only a few universities have taken the challenge of trying to measure and report on intangible assets (Ramirez et al., 2007). In this study, we evaluate IC capital of the case university by assessing its human, structural and relational facets. Human capital was evaluated in terms of explicit

and tacit knowledge of the universities' personnel acquired through formal and informal educational and actualization processes embodied in their activities; Structural capital captured the explicit knowledge related to the internal process of dissemination, communication and management of scientific and technical knowledge in the organization; and relational capital gathered the wide set of economical, political and institutional relationships developed and maintained by the university (Ramirez et al., 2007). A mix of objective and subjective, financial and nonfinancial measures can be used to assess these IC aspects. For the purpose of this study, we adopted the subjective nonfinancial measurement approach. The approach has been described in more details in the following section.

Research Method

This section describes the design of the study, the population and sample, the operationalisation of examined variables, and the instrumentation development, procedures, and data analyses employed.

Research Design and Instrument

Our intention in this study was to produce a broad picture of intellectual capital in the higher education institution. A new private university in Sarajevo, Bosnia and Herzegovina was chosen as a study case for convenience reasons and a descriptive survey was adopted as a preferred method for this research (Judd et al. 1991). The name of the case university has been concealed for the purpose of privacy protection. The survey design was based on a range of insights from the theoretical IC literature and the review of prior related survey research. The design of the survey took into account time requirements, emotional cost, trust, nature of the relationship between respondents and researchers. Thus the survey form was compact and no personal information was required.

The questionnaire was written on a single page with 18 questions written in 10-point font. This layout was selected based on the time cost to the respondents. It was tested to take approximately 15 minutes to complete in the participants' own chosen time. The survey was also formatted for clarity. It was divided into 5 major parts, and included short starting instructions. The 5 sections of the survey comprised: (i) Demographic information (role, gender); (ii) Human capital (importance and actual status); (iii) Structural capital (importance and actual status); (iv) Relational capital (importance and actual status); and (v) Comments.

Subjects and Procedure

Participants in this survey included employees across the case university departments. Respondent demographics sought included employee role (academic or support) and gender (male or female). The names of the respondents were unknown and not required for the purpose of collecting data.

The questionnaires were distributed to the recipients by one of the authors. Given that surveys receive the low fraction of responses, we tried to lift the response rate by personally contacting colleagues at the case university, handing out the questionnaires, reminding the recipients that the survey should be completed and collecting them when done. Data collection was carried out over a period of one week. A total of 32 responses were received. The maximum response rate was achieved.

In replying to the questions and statements the respondents were required in most questions to tick appropriate responses using attitude questions in the questionnaire. This allowed respondents to rank their agreement to a statement relative to positive and negative end-points of a seven-point Likert scale. Some questions were multiple choice or required textual responses.

The questionnaire responses were encoded, entered into a computer and then analysed using Microsoft Excel spreadsheet program. The survey responses were combined into one file and the descriptive statistics were calculated for each variable from the responses to each of the items. Relevant descriptive statistics and any uncharacteristic results are described in the following results section of this paper.

Results

This part presents the results of the analysis of the collected survey data. The first section examines the respondents' demographic information. The next three sections present respondents' views about the case university's human, structural and relational capital. The final section presents the most notable comments on all three IC facets.

Respondent Demographics

The profile of the sample is examined in terms of the respondents' role at the case university (academic staff, support staff) and gender (male, female). Of the total of 32 survey respondents, 72% were academics and 28% were support staff. Furthermore, 81% of the respondents were male and 19% female. This distribution suggests that the survey responses generated may reflect more closely the views of male academics (Table 1).

Role	Male	Female
Academic staff	56%	16%
Support staff	25%	3%

Table 1: Respondent Demographics

Human Capital

This section examines the respondents' opinions about the importance and actual status of human capital at the case university. When asked about their opinion about the importance of human capital, 92% of the respondents agreed (rates > 4) and only 3% disagreed (rates < 4) with the given statements on a variety of aspects of human capital.

The next table (Table 2) shows the distribution of respondents' opinions about existent human capital at the case university. Opinions were separated into those that agree (rates > 4) and those that disagree (rates < 4) with given statements. Thus, it was possible to identify more clearly positive and negative feelings about various evaluated aspects. Each statement was rated separately by the respondents.

There was a shared view by 65% of the respondents that the case university provides high quality teaching in small groups (statement 5). Furthermore, 50% of the respondents held the view that the case university offered full administrative support for teaching and research (statement 4). In addition, 47% of the respondents recognised that the university had strong and visionary leadership (statement 1) and that academic staff were motivated to do research (statement 6). Finally, 45% respondents felt that the university hired high quality academic staff (statement 2) and 44% believed that academic staff were dedicated researchers and instructors (statement 3).

Statements	Agree	Disagree
1. The university has strong and visionary leadership	47%	28%
2. The university hires high quality academic staff	45%	23%
3. Academic staff are dedicated full time researchers/instructors	44%	19%
4. The university provides full admin support for academics	50%	28%
5. Academic staff work with small groups of students	65%	26%
6. Academic staff are motivated to do research	47%	34%

Table 2: Human Capital

To eliminate any possibility of academic bias, the responses for human capital were cross-tabulated against the roles of the respondents. No major differences were found in ratings between respondents from academic and support staff. (Table 3).

Role	Agree	Disagree
Academic staff	70%	30%
Support staff	55%	45%

Table 3: Opinions about Human Capital by Role

Structural Capital

This section examines the respondents' opinions about the importance and actual status of structural capital of the case university. With respect to respondent opinions about the importance of structural capital, 87% agreed (rates > 4) and 3% disagreed (rates < 4) with given statements on a variety of the structural capital aspects.

Statements	Agree	Disagree
1. Wide variety of disciplines are taught at the university	38%	28%
2. The university has several specialty domains	34%	44%
3. The university has contributed to many scholarly outlets	16%	56%
4. Own research outlets have been started by the university	53%	19%
5. The university offers necessary library and info-services	38%	47%
6. IT provides reliable infrastructural support for teach/research	25%	38%

Table 4. Structural Capital

With respect to the existent structural capital at the case university, the respondents' opinions were divided. (Table 4). There was appreciation by 53% of the respondents that the university started own research outlets (statement 4) and agreement by 38% with the observation that a wide variety of disciplines were taught at the university (statement 1). However, 56% respondents disagreed with the assertion that the university contributed to many scholarly outlets (statement 3). Similarly, 44% respondents disagreed with the proposition that the university had specialty domains (statement 2). Furthermore, 47% and 38% of the respondents opposed the claim that the university offered necessary library/information services (statement 5) and IT support for teaching and research (statement 6).

Relational Capital

This section examines the respondents' opinions about the importance and actual status of relational capital at the case university. Regarding the importance of relational capital, 91% of the respondents agreed (rates > 4) and 4% disagreed (rates < 4) with the view that relational capital was important to the case university. The remaining respondents were unsure or provided no answers.

Statements	Agree	Disagree
1. High quality students are being attracted to the university	56%	31%
2. University offers expertise to external stakeholders	16%	41%
3. There is close partnership established with other universities	25%	28%
4. The university is a member of scientific/professional assoc.	19%	44%
5. The university encourages academic networking	56%	28%
6. The university promotes positive public image	41%	19%

Table 5: Relational Capital

Respondents' opinions concerning the existent relational capital at the case university were divided. (Table 5). There was agreement by 56% of the respondents that the university encouraged networking (statement 5) and attracted high quality students (statement 1). There was also agreement by 41% of the respondents with the view that the university promoted positive public image (statement 6). However, 44% and 41% of the respondents opposed the claim that the university was a member of scientific and professional associations (statement 4) or established close

partnership with other universities (statement 3). Finally, 28% rejected the proposition that it offered expertise to external stakeholders (statement 2).

Comments

Respondents were asked to give textual comments about the three facets of intellectual capital. From the responses obtained, the most notable comments were: (1) barriers to research created due to teaching overload and lack of time and opportunity to attend conferences; (2) inadequate study space provided in the library; and (3) deeply felt belief that the case university would attain a position among top 100 universities in Europe.

Discussion

This section analyses and interprets empirical data from the survey of IC importance and actual status at the case university. It seeks to establish whether IC has developed adequately and whether and how it differs from the desired ideal state. Responses to survey questions and comments about human, structural and relational assets expose the following current IC status at the case university.

Analysis of Key Findings

In summary, the study findings for human capital indicate a positive overall picture. These findings reveal that there is the universal recognition of the importance, as well as the positive collective view of the existent human capital at the case university. This implies that human capital is the major strength of the case university. Such contention is reinforced further by deeply felt belief that the case university has the potential to attain a position among the 100 best universities in Europe. This is an important and encouraging finding.

In contrast, the findings for structural capital are divided. Although there is a widespread acknowledgement of its importance, the distribution of current results implies a rather negative overall judgement of the case university's structural capital at present. Major shortcomings have been identified in the areas of (i) specialty research domains and scholarly contributions; and (ii) supporting information technology and library infrastructure and services. The first problem is reinforced by comments of teaching overload and the lack of necessary time and opportunity to do and present research. This suggests the need for the case university's leadership to find a way to eliminate current barriers to research by rebalancing teaching and research activities at the case university. The second (infrastructural) problem is currently being addressed through major construction work. With a new building construction well underway, it is expected that the sophisticated teaching and research infrastructure will be available to students and employees at the beginning of the next academic year.

The findings with respect to relational capital are similarly divided. While they show a common understanding of the importance of relational capital at the case university, its actual status suggests the need for building closer institutional relationships with educational, professional and industrial segments. It appears that the case university's promotion of positive public image and networking enables it to attract high quality students. However, its institutional presence and involvement in academic and professional associations, government and industry sectors, as well as the society at large is lacking, the case university's leadership should take a closer look at the issue and find a way to contribute to national (BiH and/or Turkey) and regional (Balkan and/or Europe) development.

The overall tone of this application case is mixed. The visualisation and analysis of key elements indicate some aspects of IC that are fairly well aligned with educational strategy and successful in the context of the case university. However, there is room for further improvement in a number of IC issues. There is also an opportunity for further development. The greatest challenge for the case university is to move in the direction of its mission of advancing learning and transforming life by consciously and deliberately addressing its strategic IC.

Implications and Limitations

The results of this IC model development and application have a number of important implications for university in continuing its education and research journey. The high number of unsure and no responses indicate the need for raising awareness of IC throughout the university. The proposed IC model may be helpful in this regard by creating a common understanding of the IC phenomena including basic components and indicators. It should also help to avoid any danger of misconception and misunderstanding by promoting the use of a common terminology.

It is obvious that the results of this research are limited by a specific higher education context and a group of academic and support staff participants in which the evaluation of intellectual capital was investigated. In order to generalise the findings, further research is required involving other contexts and subject groups. Future research is also required to study the impact of various tasks, environment and people related contingencies on IC, and how they relate to performance outcomes. Only by systematically investigating fundamental aspects of IC, by cultivating better measures and by critically examining alternative theoretical models, can the IC field continue to progress.

Conclusions

This analysis provides some insights into Intellectual Capital (IC) at a specific case within the higher education sector: a new private university in Sarajevo, Bosnia and Herzegovina. The study applied a subjective IC measurement approach to explore the importance and actual state of IC at the case university. From the conceptual point of view, the applied measurement model and terminology were adapted from a general IC framework. The assessment was performed subjectively, taking into account the employees' perspectives on importance and actual state of human, structural and relational capital at the case university. The findings reveal some interesting IC dynamics and identify current shortcomings. Most importantly, they point to human capital as the case university's major strength. They also identify several weaknesses in structural and relational capital. These points may define the agenda for future research in the field for the benefit of both theory and practice of IC reporting and management in universities.

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