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Identify Variables to Measure Intellectual Capital in organizations: A Literature Review.

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ABSTRACT

Currently the importance and the validity of Intellectual Capital (IC) for creating and maintaining sustaining competitive advantage for organizations has been well recognised. Swiss think-tank (Gottlieb Duttweiler Foundation) research revealed that only 20 percent of knowledge available to an organization is actually used. Therefore, IC management and measuring appeals much attention from academics and practitioners. It is revealed that existing measures of human and IC are inadequate and are not developed in par with strategy processes. This desk study aims at identifying constructs and dimensions to measure IC of an organization.

A systematic literature survey was conducted to identify constructs of IC. Literature was searched in Google Scholar. Articles were searched using the string "Measuring Intellectual Capital". Time was set as "Any Time". There were 256 articles shown. Suitable and allowable articles were referred in this study. Additionally, articles referred by the authors of above articles were also taken into consideration

As accepted by many authors who interested in this subject are, the IC consist of Human Capital (HC), Structural Capital (SC) and Relational Capital (RC). As per the literature review, to measure Human Capital Employee absenteeism, Employee attitude, Capabilities, Commitment, Competencies, Creativity, Efficiency, Employee Pay, Turnover, Experience, Expertism, Intelligence, Knowledge related indices, Disputes, Leadership qualities, Learning Training and education indices, Motivation, Performance, Satisfaction, Skills Abilities and Talents and measurements of Team work can be used. In order to measure Structural Capital Working atmosphere, Controlling systems, Corporate practices and procedures, Databases, Efficiency and Effectiveness of practices, ICT usage, Information availability, Innovation rate, Intellectual Property and trade secrets, interdisciplinary projects, Internal relationships, knowledge sharing, Management philosophy, Mutual Support, Organizational Knowledge, Processes and Systems, R&D practices, Renewal and Development, Roles responsibilities and routines, Structure and Technology can be used. And to measure Relational Ccapital, indicators related to Building customer relationships, identify customer needs, Market share, Market Potential, Brand image and trademarks, Value of Supplier, Sales and Distribution channels, Stakeholder relationships, Marketing indicators, Value of Joint ventures and SCR activities has been used.

Abstract word count: 320

Keywords: Intellectual Capital, Human Capital, Structural Capital, Relational Capital, Measure Intellectual Capital.

INTRODUCTION

Studies and research on Intellectual Capital (IC) are dated back to early 1990s (Arslan and Kızıl.,2019). According to Pap et. al., (2020) the concept of IC was exposed for the first time in 1969 by Kenneth Galbraith. However according to Radjenovic and Krstic (2017) the term intellectual capital was ascribed to Machlup (1962). According to Sveiby, this concept (IC) is strictly connected with knowledge (Malinowska, 2013). According to Civi (2000) the knowledge represents 75% of a company's worth but does not represent in balance sheets. It is widely accepted that, organizations could achieve 'competitive advantage' from 'knowledge assets' inherent within or controlled by the organization (Wei, et.al, 2009). Currently the importance and the validity of IC for creating and maintaining sustaining competitive advantage for organizations has been well recognised (Radjenovic and Krstic, 2017; Arslan and Kızıl.,2019; Kontić and Čabrilo,2009; Abdelrhman et al, 2014; Babai et al.,2016; Pap et al,2020). OECD (2006) claimed that according to Kim and Kumar (2009) the IC "is a key driver of innovation and is the core value in the new economy, which enables companies to understand the value creation process (Wang, 2011).

Although there is no any common definition for IC (Roodposhti et al, 2011)., the importance of IC is widely accepted and acknowledged (Abdelrhman et al., 2014; Nazari and Herremans). According to Nazari and Herremans as quoted by Edvinsson and Malone (1997) numerous individuals and groups from diverse disciplines have put effort to agree on a standard definition for IC. As described below those definitions depend on the context. Some definitions of IC focus on measuring the value of IC, while some other definitions focused on the components of IC and some attempt to make links between the components of IC and benefits for organizations (Edvinsson and Malone, 1997). Edvinsson et al, (1997) believe IC as a set of information and applicable knowledge for value creation in an organization. According to Marr (2004) the IC is as a set of knowledge-based assets belonging to an organization which may lead towards organization competition by increasing the value for key beneficiaries of the organization. Swart (2006) believes IC as the knowledge for further values which could be converted to wealth and values for further value creation (Roodposhti et al, 2011).

As described earlier, IC management and measuring, appeals much attention from academics and practitioners (Chen et al., 2004). Many studies have developed yardsticks to measure organizational intellectual capital (Abdelrhman et al, 2014) owing to the importance in surviving, competing with existing and potential competitors of organizations (Akyüz, 2013). However, IC is "not easily identified or captured to represent in the financial statements" (Mohammad et al, 2018). According to Chaminade and Roberts (2003) many of studies on IC have discovered that the application and adaptation of guidelines and models depend on the individual characteristics of each company as well as their cultural and geographic context (Zebec et al,2007; Calvo, 2016).

Purpose of the Study:

Though there are broad area of research on measuring intellectual capital (Roodposhti et al, 2011), methods of measuring and evaluating IC have been slow to develop (Chen, et. al., 2004). According to Boudreau and Ramstad (1997) Human Resource (HR) managers and line managers claim that the existing measures of human and IC are inadequate and are not developed in par with strategy processes of organizations. As highlighted by Lancaster (1995), the statement "people are our most important asset" is a lie and many managers treat people like raw material without investing on them (Boudreau and Ramstad, 1997). According to Harvey and Lusch (1999), although some companies have begun to monitor, value and develop means to protect their IC, still the regular business managers are not prepared to take advantage of this knowledge. For example, according to Brooking (1996), a Swiss think-tank (Gottlieb Duttweiler

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Foundation) revealed that only 20 percent of knowledge available to an organization is actually used (Chen et alw, 2004). Therefore, it is important to identify how to improve the utilization of organizational IC to improve the performance. Therefore, authors identified a literature and empirical gap in defining constructs to measure IC. In that line it is required to identify the constructs to measure IC. This desk study aims at identifying constructs and dimensions to measure IC of an organization.

METHODOLOGY:

A systematic literature survey was conducted to identify constructs of IC. Literature was searched in Google Scholar. Articles were searched using the string "Measuring Intellectual Capital". Time was set as "Any Time". There were 256 articles shown. Suitable and allowable articles were referred in this study. Additionally, articles referred by the authors of above articles were also taken into consideration.

Importance of IC

Modern businesses require workers with diverse 'intellectual agility' and critical thinking (Krstić & Vukadinović, 2009). Peter F. Drucker stated that "knowledge is now fast becoming the sole factor of production side-lining both capital and labour (Boudreau and Ramstad, 1997). According to Barney (1991) the IC is recognized as a prime resource that is capable of generating sustainable competitive development and high levels of financial performance (Singh et al, 2016). Further, Rakić & Rađenović (2016) said that even the macro level competitive advantage is no longer based on comparative advantages they have, but on competitive advantages they create. In today's context the capital is not the most constrained resource (Boudreau and Ramstad, 1997) and firms tend to rely on non-financial measures such as reputation, know-how, information systems, databases, and corporate culture which play an important role in the firm performance (Abeysekera,2003). According to Abeysekara(2003) non-financial assets are the key to business success in the future. Accordingly, managers should understand the talents they have in their organization and their importance to achieve their organization's mission and strategy (Ahmadi et al, 2016). IC has direct effect in the firm's value and performance (Babai et al,2016). As mentioned by Waterhouse and Svendsen (1998) it is accepted that traditional financial measurement lacks in guiding strategic policy making (Chen et al, 2004) and the ability to utilise intangible resources is becoming important (Malinowska, 2013).

According to Sullivan & Sullivan (2000) in 1978's the 80% of the value of corporations was ascribed to the tangible assets, while 20% was attributed to intangible assets. In contrast the contemporary situation, this has changed (Tomo, 2015) such 87% attributed to intangible assets and 13% in favour of tangible assets (Radjenovic and Krstic, 2017). Nowadays the gap between the value of financial statements of the and market value of a company has increased so much (Morady, 2013). "According to Lev (1997), the average proportion of market value to book value in the late 1970s was 2:1, in the mid-1990s it was 3:1, and in 1997 the market value is more than six times the book value" (Chen et al, 2004). There is significant evidence that IC constraints are increasingly critical to organizational performance. Traditionally, managers should focus on maximization of earnings. The recent studies many authors (Edvinsson, 1997; Bontis, 2001; Ordonez de Pablos, 2002) suggest that managers should pay more attention on internal knowledge accumulation and development in their organizations (Wang, 2011). According to Calvo (2016) and Ansoff (1958) capabilities and comparative advantage of businesses resides in their organizational and management skills among others. The importance of knowledge and information is broadly accepted in the business management. They are interchangeably identified as 'know-how, 'intangible assets' or 'intellectual capital, (Calvo, 2016).

The strategic orientation and Globalization have differentiated the IC as a source for competitiveness of organizations. It is accepted that the Knowledge and IC are the only lasting resources to maintain firm's competitive advantage (Janeska et al,2012). This argument was strengthened by DeWan (2009) who argued that the knowledge is Expandable and self-generating with use and also Transportable and shareable as well. Benefits that can be realized to the company through IC it to gain competitive position, increased the wealth and created value (Abdelrhman et al, 2014). According to many authors (Johnson and Kaplan, 1987; Kaplan and Norton, 1992) financial measurements leads to short-term results on the other hand non-financial performance measures are better predictors of long-term performance and thus should be used to help refocus managers on the long-term aspects of their decisions (Nazari and Herremans). According to Pap et al, (2020) although IC plays an important role in a company's final success in a period of crisis and financial shocks, it permits greater labour market instability (Lopez and Olivella, 2018). It is worth noting the important and critical statement by Edvinsson and Malone (1997) which highlight that IC has little value unless it can be linked to the organisation's strategy (Edvinsson and Malone, 1997).

Measuring IC

Managing IC is progressively important for future-oriented organisations (Mertins et al,2006). Measuring intellectual capital contributes to organisational success and brings managerial, cultural and organisational changes (Kontić and Čabrilo, 2009. There are difficulties to conduct a measurement and evaluate the innovative capability of an organization due to lack of academically funded models that examine and describe the individual's intellectual capital. Therefore, it is required to develop measuring models so that IC can be recorded as a company asset as part of the relationship capital (Vladova and Sabina, 2011). In other words, there is no generally accepted theoretical model for measuring intellectual capital for an organizations (Gogan,2014)

According to Andriessen (2004) and Babai et al, (2016) firms measure IC for different goals. These include the betterment of internal management, for the purpose of reporting to the outside of organization and other stakeholders (Holmen, 2005; Konti? and ?abrilo, 2009), for the betterment of accounting purposes (Roodposhti et al, 2011), to guide the formulating of business strategy (Marr et al,2003; Edvinsson and Malone, 1997), for the development of key performance indicators, to evaluate mergers and acquisitions and to link to the organization's incentive and compensation plans (Babai et. al., 2016). Further the literature on IC shows that benefits of IC measuring and reporting have been linked to the organizational value creation as well (Konti? and ?abrilo, 2009). However, it is accepted that benefits of IC cannot easily be quantified in Annual financial reports directly. But it is obvious that IC increase the competitive advantage of the firm and improve the performance, and importantly may satisfy stakeholders. (Wang, 2011).

What is IC

Defining IC:

Edvinsson and Malone (1997) has defined IC as the "knowledge that can be converted into value". According to Şamiloğlu's (2002) IC is the "intellectual capital, knowledge which is converted to a value"(Akyüz, 2013). Stewart (1997) has broadened the definition as "intellectual material, knowledge, information, intellectual property, experience that can be put to use to create wealth" (Nazari and Herremans). According to Brooking "Intellectual capital is the term given to the combined intangible assets which enable the company to function" (Gogan,2014). Thomas Stewart defined IC as "the talents and skills of individuals and groups; technological and social networks and the software and culture that connect them; and intellectual property such as patents, copyrights, methods, procedures, archives, etc" (Arslan and Kızıl,2019). "According to Sullivan, intellectual capital and intangibles are the knowledge which can be turned to profits" (Arslan and Kızıl,2019). "Intellectual Assets (IAs) are described as knowledge and learning capability of a social organism like an organization, intellectual community or professional practice" (Nahapiet and Ghoshal, 1998). As per Kong (2007:725) "IC can be defined in terms of organisational resources, relating to wealth creation through investment in knowledge, information, intellectual property, and experience" (Kontić and Čabrilo, 2009). Referencing Studies by may authors (Edvinsson et al, 2001) and Malinowska (2013) has concluded that the most often cited definition of IC is the definition of Edvinsson and Malone who claim that IC is knowledge, experience, organisational technology, relations with clients and personal skills, which contribute to the success of the organization. Abeysekera (2003) said, IC represents all intangibles that are not recognised in the financial statements. Wang (2011) came up with a different view and mentioned that non-accounting researchers has defined "Intellectual Capital" as "the difference between the firm's market value and its book value". However according to accounting researchers, "the difference between the market value of an entity and the book value of the entity's identifiable assets is defined as goodwill" (Wang, 2011).

According to Webster and Jensen (2006:82) Ideas, skills, and creative potential are the essence of intellectual capital (Kontić and Čabrilo, 2009). But it is not a sole thing, where as described by Corrado et al, (2012) it is composed of many interrelated elements that have been continuously cooperated and supported together as a whole (Pap et al, 2020; Chen et al, 2004). However, although numerous attempts have been taken to re-structure or re-define IC (Nazari and Herremans) the "concept of IC is not well understood and rarely clearly defined" (Marr and Chatzkel, 2004; Abdelrhman et al, 2014; Malinowska, 2013).

Constructs and Dimensions of IC

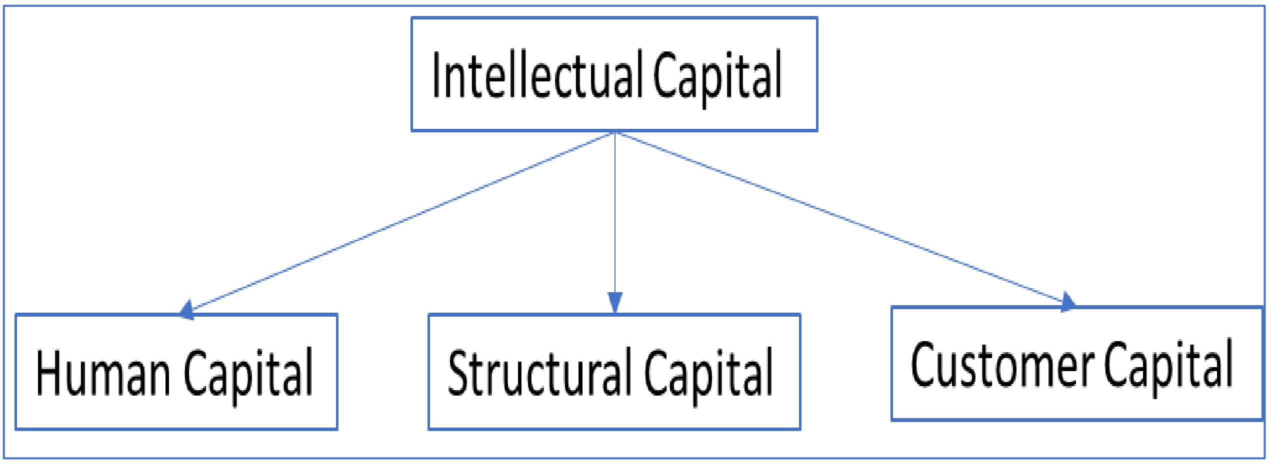
When analysing literature thoroughly, most definitions decompose IC into three primary dimensions. Those are Human Capital (HC), Structural Capital (SC), and Relationship Capital (RC) (Abdelrhman et al, 2014; Bontis, 1996, 1998; Bontis et al, 2000; Edvinsson and Malone, 1997; Edvinsson and Sullivan, 1996; Roos et al, 1998; Saint-Onge, 1996; Stewart, 1991, 1997; Sveiby, 1997; Martínez-Torres, 2006; Nazari and Herremans; Pap et al, 2020; Wang, 2011). How ever as per Nazari and Herremans these terms can be varied according to the users.

Skandia was the first company (1994) that presented the IC of the organization in a systematic manner. According to Pasher & Shachar (2005, p. 142) in Skandia Model, the core competences, key success factors and indicators were clustered, into four categories. They are Renewal and Development Capital, Human Capital, Market Capital, and Process Capital (Radjenovic and Krstic, 2017). The Skandia value scheme divides IC in to HC, Customer Capital (CC), Intellectual Property (IP), Intangible Assets (IA) and Process Capital (PC) (Naslmosavi et. al., 2012).

Janeska et al, (2012) proposed measurements of IC for the Banking Sector in The Republic of Macedonia grouped IC into three categories, HC, SC and RC. Johnson (1999) has used HC, SC and RC. Kim et al, (2011) developed a measurement scale for the hotel industry for HC, Organizational Capital and Customer Capital. The Organizational Capital is similar to structural Capital and Customer Capital is similar to RC. Konti? and ?abrilo, (2009) identified HC, SC and RC as components of IC. Longo and Mura identified four dimensions, HC, SC, RC and Human Resource Practices. According to Alwert (2006) the IC of an organisation can be divided into three categories HC, SC, RC (Mertins et al,2006). Patthirasinsiri and Winboonrat (2019) identified SC, HC, RC and IC as the main constructs of IC.

As mentioned above However, we can conclude that IC could be classified into three primary dimensions; Human Capital (HC), Structural Capital (SC), and Relationship Capital (RC) (Nazari and Herremans). The broad classification of IC is shown in Figure 1.

Figure 1: The composition of the Construct IC.



According to Chen et al, (2004) the innovation capital should be considered as a separate entity. Webster and Jensen (2006) have linked the Innovation Capital to organizational relationships. It is widely accepted that human, structural and customer capital overlap each other (Stewart, 1997; Bontis, 1998). The interaction between three main components of intellectual capital, human capital, structural capital and customer capital generates benefits to a company (Pap et al, 2020; Malinowska, 2013; To´th and Jo´na´s, 2012).

As per Andreou et al, (2007), most organizations still seem to be unclear and unsure about the exact contents of intellectual capital (Gogan,2014). Following section describes the main components of IC.

Human Capital (HC)

The HC is an important factor because employees' competences and human capital are the main drivers of an organization's competitiveness in the modern economy (Pap et al, 2020). It can be either individualistic or in combination with the knowledge of others (Singh et al, 2016).

Human capital (HC) includes individual educators' and employees' training, knowledge, education, competence and experience (Niqab et al, 2020, Pap et al, 2020). It represents the individual tacit knowledge embedded in the mind of the employees (Chen et al, 2004). Similarly, "Human capital is the tacit knowledge that individual employees accumulate via their education, experience, attitudes, and other personal traits that they take with them into the organization" (Singh et al, 2016; McGregor et al, 2004). As per Chen et al, (2004), HC is important as the "foundational source of innovation, strategic renewal of a company and the company can thus realize and create value in the knowledge-based economy". It consists of knowledge, abilities, experiences, skills, commitments, capabilities, talents and attitudes possess by the organizational members which are difficult to imitate, copy, rare and nonreplaceable (Arafat and Shahimi, 2013). According to Singh et al, (2016) HC consist of employee attitudes, commitment, satisfaction, educational qualifications, skills, and capabilities.

Table 1: Constructs of Intellectual Capital as identified by different authors

Author	Human Capital	Structural Capital	Relational Capital	Customer Capital	Financial Capital	Process Capital	Innovation Capital	Renewal Capital	Organizational Capital
Abdelrhman et al., 2014	X	X	X						
Abeysekera, 2003	X	X		X					
Abeysekera, 2004	X			X	X	X		X	
Chen, et. al., 2004	X	X		X			X		
Chiucchi, 2008	X		X						X
Roos and Roos, 1997	X		X	X					X
Arafat and Shahimi, 2013	X	X		X					
To´th and Jo´na´s, 2017	X	X		X					
Longo and Mura	X	X		X					
Guthrie and Petty, 2000	X	X		X					
Lee and Guthrie, 2007	X	X		X					
Edvinsson & Malone, 1998	X			X	X	X		X	
Konti? and ?abrilo, 2009	X	X		X					
Kim, et. al.,2011	X	X		X					
Johnson, 1999	X	X		X					
Janeska, et. al., 2012	X	X		X					
Bontis, 2010	X	X	X						
Occurrences	17	13	4	14	2	2	1	2	2

Source: Composed by Authors 2022

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Table 2: Variables used to measure HC by Different authors

Variable Group	**Authors who used Similar Variables**
Absenteeism	Kontić and Čabrilo (2009)
Attitude	Arafat and Shahimi, (2013);Kim, et. al., (2011);Longo and Mura
Capabilities	To´th and Jo´na´s, (2012)
Commitment	Arafat and Shahimi, (2013).
Competency	Johnson (1999); Kim, et. al., (2011);To´th and Jo´na´s, (2012)
Creativity/Innovative	Chen, et. al., (2004);Johnson (1999);Kim, et. al., (2011);Guthrie and Petty, (2000);To´th and Jo´na´s, (2012);Bontis, (2010)
Efficiency	Chen, et. al., (2004);Janeska, et. al., (2012);Kontić and Čabrilo (2009);Lee and Guthrie, (2007).
Employee Pay	Lee and Guthrie, (2007).
Employee Turnover	Chen, et. al., (2004);Kontić and Čabrilo (2009);Longo and Mura
Experience	Bontis, (2010);Janeska, et. al., (2012);Kontić and Čabrilo (2009);To´th and Jo´na´s, (2012);Arafat and Shahimi, (2013).
Expertism/Specialization	Janeska, et. al., (2012); Johnson (1999);Guthrie and Petty, (2000);Abdelrhman et al., (2014);Bontis, (2010)
Intelligence	To´th and Jo´na´s, (2012)
Knowledge base	Bontis, (2010);Janeska, et. al., (2012);Kontić and Čabrilo (2009);To´th and Jo´na´s, (2012);Arafat and Shahimi, (2013);Roos and Roos, (1997)
Knowledge transfer	Janeska, et. al., (2012)
Labor Disputes	Lee and Guthrie, (2007)
Leadership	Chen, et. al., (2004)
Learning/Training/Education	Chen, et. al., (2004); Guthrie and Petty, (2000);Abdelrhman et al., (2014);Bontis, (2010)
Motivation	Kim, et. al., (2011);Kontić and Čabrilo (2009);Roos and Roos, (1997)
Performance	Kim, et. al., (2011)
Satisfaction	Chen, et. al., (2004)
Skills/Abilities/Talents	To´th and Jo´na´s, (2012); Arafat and Shahimi, (2013).
Teamwork	Janeska, et. al., (2012)

Source: Composed by Authors 2022

A significant consideration of HC is that it is movable and does not belong to a specific organization because employees are considered to be the owners of human capital (Roos et al., 1998). According to Stewart (1997) human capital is the place where all the ladders start. Research literature reports human and social capital have an interactive relationship that is a predictor of student achievement Therefore, it is most important for educational leaders to have skills in employee development and for promoting their willingness to participate in personal and professional development (Niqab et al, 2020).

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Table 3: Variables used to measure SC by Different authors

Variable Group	**Authors who used Similar Variables**
Atmosphere	Kim, et. al., (2011)
Controlling Systems	Chen, et. al., (2004);Kontić and Čabrilo (2009);Bontis, (2010)
Corporate Practices/Procedures	Arafat and Shahimi, (2013);Johnson (1999);Kim, et. al., (2011);Kontić and Čabrilo (2009);Lee and Guthrie, (2007);Roos and Roos, (1997)
Culture	Chen, et. al., (2004);Kim, et. al., (2011);Guthrie and Petty, (2000);To´th and Jo´na´s, (2012);Abdelrhman et al., (2014);Arafat and Shahimi, (2013)
Data Bases	Janeska, et. al., (2012);To´th and Jo´na´s, (2012);Roos and Roos, (1997);
Efficiency and Effectiveness	Chen, et. al., (2004);Kim, et. al., (2011);Kontić and Čabrilo (2009)
ICT/Programs	Bontis, (2010);Janeska, et. al., (2012);Kim, et. al., (2011);Lee and Guthrie, (2007);Arafat and Shahimi, (2013)
Information availability	Chen, et. al., (2004);Kontić and Čabrilo (2009);Bontis, (2010);Roos and Roos, (1997)
Innovation Rate	Kontić and Čabrilo (2009);Roos and Roos, (1997)
Intellectual Property and Trade Secrets	Bontis, (2010);Johnson (1999)
Interdisciplinary Projects	Kontić and Čabrilo (2009)
Internal Relationships	Guthrie and Petty, (2000);Johnson (1999);Longo and Mura
Knowledge Sharing	Kontić and Čabrilo (2009);Chen, et. al., (2004);Kontić and Čabrilo (2009)
Management Philosophy	Kim, et. al., (2011)
Mutual Support	Chen, et. al., (2004)
Organizational Knowledge	Arafat and Shahimi, (2013);Guthrie and Petty, (2000);Lee and Guthrie, (2007);To´th and Jo´na´s, (2012)
Processes/Systems	Chen, et. al., (2004);Janeska, et. al., (2012);Kim, et. al., (2011);Lee and Guthrie, (2007);Guthrie and Petty, (2000);To´th and Jo´na´s, (2012);Roos and Roos, (2003)
R&D	Bontis, (2010)
Renewal and Development	Kim, et. al., (2011);Lee and Guthrie, (2007)
Roles/Responsibilities	Chen, et. al., (2004);Longo and Mura;Arafat and Shahimi, (2013)
Routines	To´th and Jo´na´s, (2013)
Structure	Janeska, et. al., (2012);To´th and Jo´na´s, (2012);Roos and Roos, (1997);
Technology	Abdelrhman et al., (2014)

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Structural Capital (SC)

According to Edvinsson and Malone (1997) the “Structural capital is everything that is left behind at the office when employees go home” (To´th and Jo´na´s, 2012) where company is the residual owner of structural capital (Chen et al, (2004) and it exists objectively and independent of human capital (Nazari and Herremans). Organizational structure is both static and dynamic (Chen et al, 2004). The power and responsibility structure are formed for managing processes which deals with systems is the structure of an organization (Chen et al, 2004). A strong structure creates lucrative environment to boost the Innovation Capital and Customer Capital (Chen et al, 2004). Another idea concerns that “a company exists because of a combination of employees’ competences and internal structure and organization” (Hashim et al, 2015). The SC refers to internal knowledge that is accrued via the processes and procedures that the organization adopts (Sveiby, 1997).

Compared with human resources capital and physical capital, structural capital is the supportive infrastructure for innovation in organizations (Wang, 2011). Structural capital (SC) provides the environment suitable to developing an organization’s human capital leading to IC (Liu, 2010) and IC (Chen, 2009) and is improve enterprise performance (F-Jardón & Martos, 2009). Accordingly, Kong (2009, 2010) argued that structural capital can assist companies to create organizational value that facilitates organizational learning and knowledge creation, leading to innovation for the pursuit of social and commercial activities (Wang, 2011).

According to Chen et al, (2004) the structural capital can be classified into company culture, organizational structure, organizational learning, operational process, and information system (Chen et al, 2004). As per Arafat and Shahimi (2013) the “structural Capital is the collection of knowledge in an organization embedded in systems, databases, programs, work flow, work culture, rules and procedures (Arafat and Shahimi, 2013), routines, strategies, process handbooks, and databases (Nazari and Herremans) in a firm which guide the HC. According to Pap et al, (2020) SC consist of organizational systems, culture, practices, processes and business routines. Another study described SC as all the non-human storehouses of knowledge (Khalique et al, 2011). SC also appears in the form of data, shared technology, inventions, publications, culture, structure, strategy, system, and organizational procedures and it is the repository of knowledge that is accessible through various sources that allow for knowledge sharing and knowledge creation between the members within the organization (Chang & Birkett, 2004). It also includes habits, practices, processes, routines, information systems, working cultures, and databases (Singh et al, 2016).

When an employee leaves the corporation, the corporation loses his skills, expertise, reputation and his hidden potentials. The loss can be eliminated when they embedded in structural capital (To´th and Jo´na´s, 2012). As identified by Kamukama et al,(2010) SC varies from organization to organization because it is context dependent (Niqab et al, 2020). Without structural capital, IC would just be human capital, so it is the critical link that allows intellectual capital to be measured at organizational level (Bontis, 1998; To´th and Jo´na´s, 2012)

Table 4: Variables used to measure RC by Different authors

Variable Group	Authors who used Similar Variables
Building Customer Relationships	Chen, et. al., (2004); Janeska, et. al., (2012);Johnson (1999);Kim, et. al., (2011);Konti? and ?abrilo (2009);Arafat and Shahimi, 2013);Roos and Roos, (1997)
Identify Customer Needs	Chen, et. al., (2004); Janeska, et. al., (2012);Johnson (1999);Kim, et. al., (2011);Konti? and ?abrilo (2009);Arafat and Shahimi (2013)
Market Share	Chen, et. al., (2004);Kim, et. al., (2011).
Market Potential	Chen, et. al., (2004)
Brand Image Trademarks	Chen, et. al., (2004);Janeska, et. al., (2012);Kim, et. al., (2011).

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Value of Distribution/Supplier Channels and Management	Chen, et. al., (2004);Kim, et. al., (2011);Konti? and ?abrilo (2009);Arafat and Shahimi, 2013)
Relation with Competitors	Janeska, et. al., (2012);Lee and Guthrie, (2007)
Stake holder relations	Lee and Guthrie, (2007);Arafat and Shahimi, (2013);Janeska, et. al., (2012);Johnson (1999);Kim, et. al., (2011);Lee and Guthrie, (2007);Arafat and Shahimi, (2013);Roos and Roos, (1997).
Marketing	Lee and Guthrie, (2007)
Joint Ventures	Lee and Guthrie, (2007).
CSR	Lee and Guthrie, (2007).

Source: Composed by Authors

Relational Capital (RC)/ Social Capital (SC) /External Capital (EC) or Customer Capital(CC)

Some IC literature use the terms Social, Relational and Consumer capital interchangeably (Niqab et al, 2020). Tossing a different name, Singh et al, (2016) names it 'External Capital'. RC is the knowledge embedded in the relationships with external parties. These include alliances, customers, investors, distribution networks, partners and suppliers (Arafat and Shahimi, 2013). However, referring many authors (Still, Huhtamäki, & Russell, 2013; Niqab et. al., (2020) noted that the RC is different to Social Capital. Accordingly, RC often refers to external relationships between organizations, or between an organization and its stakeholders where SC is the internal.

RC is both internal and external members of an organisation, who share their ideas and build positive networks that contribute value to the organization (Niqab et al, 2020; Pap et al, 2020). This directly affects in realizing company's value compared to human capital and structure capital, and is increasingly becoming the critical factor (Chen et al, 2004). According to Marti (2001), it is the ability of a firm to interact positively with business community to gain a wealth creation by enhancing human and structural capital (Nazari and Herremans).

As described by Bontis (1999) RC comprises the knowledge embedded in all the relationships with customers, competitors, suppliers, trade associations or government bodies (Nazari and Herremans; Singh et al, 2016). Khalique et al,'s (2011 and 2015) integrated model described a similar construct of customer capital as the informal behaviours and relationships between the leader, fellow teachers, community, parents, and students (Niqab et al, 2020).

Innovation Capital

Authors put forward different ideas on Innovation Capital. "Innovation refers to the introduction of a new combination of the essential factors of production into the production system" (Chen et al, 2004). It is the creating of new product, using the new technology, seek new markets, new material and new blends (Chen et al, 2004). "The company's innovative capability does not just depend on the knowledge and potential of individuals, but specifically on their interdisciplinary and interactive thinking and action" (Vladova and Sabina, 2011). Further Vladova and Sabina (2011) claim that innovation could be also thought as the synergic effect of relationships among distinct individuals.

DISCUSSION AND CONCLUSION

It is seen that many authors accept that IC consist of mainly three constructs. Those are HC, SC and RC.

Variables to measure HC are as follows; Employee absenteeism, Employee attitude, Capabilities, Commitment, Competencies, Creativity, Efficiency, Employee Pay, Turnover, Experience, Expertism, Intelligence, Knowledge related indices, Disputes, Leadership qualities, Learning Training and education indices, Motivation, Performance, Satisfaction, Skills Abilities and Talents and measurements of Team work.

To measure SC following variables can be identified; Working atmosphere, Controlling systems, Corporate practices and procedures, Databases, Efficiency and Effectiveness of practices, ICT usage, Information availability, Innovation rate, Intellectual Property and trade secrets, interdisciplinary projects, Internal relationships, knowledge sharing, Management philosophy, Mutual Support, Organizational Knowledge, Processes and Systems, R&D practices, Renewal and Development, Roles responsibilities and routines, Structure and Technology.

To measure RC, indicators related to Building customer relationships, identify customer needs, Market share, Market Potential, Brand image and trademarks, Value of Supplier, Sales and Distribution channels, Stakeholder relationships, Marketing indicators, Value of Joint ventures and SCR activities can be considered.

Limitations/Hindrances of measuring IC

According to Sveiby (1997) some organizations do not want to measure intangible assets certain concerns. These are, managers themselves do not understand the importance, those can give information to competitors, there is no rigorous theoretical model for such reporting (Abeysekera,2003; Arafat and Shahimi, 2013; Malinowska, 2013). Marr and Chatzkel (2004) raised the concern on the taxonomy issue in measuring IC. That is what means when we use the term "measure". Is it "indicating" a performance tendency, is it from a scientific measurement point of view or is it to express measures in percentage or trying to assign financial value to our IC?. Siege (2004) has identified two mishaps in attempting to measure IC. First, the underestimation of the magnitude of the task and secondly, their efforts often do not result in meaningful data for managers and practitioners to use (Siege, 2004). Attempting to assign a financial value to IC assets either from market indicators or internal accounting techniques face serious limitations due to the troublesome nature of intangible assets (Siege, 2004). Roodposhti, et. al. (2011) in his study revealed that there is no meaningful relation between IC and economic value added (Roodposhti, et. al., 2011).

Way Forward to measure IC

It should be note that the IC assets (Kontić and Čabrilo, 2009) are intangible and not easily appropriated to financial measures as benchmark (Johnson, 1999; Weqar et al, 2020). It is interesting to note that a group of studies (Dzinkowski, 2000; Litschka, Markom, & Schunder, 2006) has proposed surveys to assess the perception of executive managers about the importance of the intellectual capital (Abdelrhman et al, 2014).

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