

# Intellectual capital in rehabilitation organizations

## Concept clarification

Nikta Hatamizadeh and Mohammad Ahmadi

*Department of Rehabilitation Management,  
University of Social Welfare and Rehabilitation Sciences, Tehran, Iran*

Roshanak Vameghi

*Pediatric Neurorehabilitation Research Center,  
University of Social Welfare and Rehabilitation Sciences, Tehran, Iran, and*

Mohammad Ali Hosseini

*Department of Rehabilitation Management,  
University of Social Welfare and Rehabilitation Sciences, Tehran, Iran*

Intellectual  
capital in  
rehabilitation

195

Received 13 April 2019  
Revised 26 June 2019  
Accepted 26 August 2019

### Abstract

**Purpose** – This paper aims to clear ambiguities regarding the definition of intellectual capital and its components in the evaluation of rehabilitation organizations.

**Design/methodology/approach** – A preliminary definition of intellectual capital and its three domains of human, relational and structural capital and separate lists of proposed components for each domain was developed based on the results of a previous study. Fourteen experts in rehabilitation, health management and management engaged in Delphi rounds to reach agreed-upon definitions. Their ideas on relevance and the measurements of each proposed component in the assessment of intellectual capital in rehabilitation organizations were gathered by a questionnaire.

**Findings** – Intellectual capital was defined as “The capital that emerges from the interaction of human resources’ ‘ability to think’ and to ‘create ideas’ with ‘a favorable internal and external organizational environment’ (including the managerial, social, structural, and physical environment, as well as communication between the inside and outside of the organization).” This capital is expected to gradually increase with further education, skills training and the gaining of experience by staff and managers. Also, the further development of intra-organizational structures and inter-relations with the market will empower the organization to adapt to continually changing circumstances, leading to competitive value and profit. Finally, a list of 101 proposed components was agreed upon in the evaluation of intellectual capital in rehabilitation organizations.

**Originality/value** – This paper may lead to the development of measurement tools and ultimately to planning effective programs to increase intellectual capital in rehabilitation organizations.

**Keywords** Intellectual capital, Rehabilitation organizations, Iran

**Paper type** Research paper

### Introduction

At present, in addition to technology and equipment, innovation and knowledge are essential for organizations to deal with any threats that they may face. Organizations should also be



© Nikta Hatamizadeh, Mohammad Ahmadi, Roshanak Vameghi and Mohammad Ali Hosseini. Published in *Journal of Health Research*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) license. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this license may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

Journal of Health Research  
Vol. 34 No. 3, 2020  
pp. 195-207  
Emerald Publishing Limited  
e-ISSN: 2586-940X  
p-ISSN: 0857-4421  
DOI 10.1108/JHR-04-2019-0077

more focused on knowledge assets [1]. Intellectual capital (IC) is the basis for the new global knowledge-based model of the economy [2] and is an important source for success, value creation [3], stability and the development of organizations [4]. IC has a major effect on market stock and organizational value, and as a consequence, the Organization for Economic Cooperation and Development has invested in this capital since 1980 [5]. Therefore, recognizing the concept and components of IC is vital for managing modern organizations [6]. There are a variety of definitions for IC in healthcare literature. According to Edvinsson and Malone [7], the intangible resources of an organization, that is the knowledge, skills and experiences of its managers and experts (human capital), combined with the value achieved from internal capabilities and external relationships, are what is called the IC of organizations. Harris [8], in comparison to his own “dynamic theory of intellectual capital,” referred to Edvinsson and Malone’s theory [7] as a static theory of IC. According to his model, IC consists of human capital and the systems theory, as he believed that in contrast to the former theory, the concept of “structural capital” emphasizes on the “walls” within the organization and the “customer capital” is not a component but actually results from IC. Most commonly, IC is defined as the total amount of knowledge that organizations use for value creation and competitive advantage [9, 10]. Others prefer the terms organizational knowledge or organizational intelligence [11, 12]. Although some differences can be seen in nomination, definitions and disciplines, authors generally accept three dimensions for IC, consisting of human capital, organizational capital and relational capital [13].

The importance of IC in the intensive knowledge industry of health care is so evident that it needs no further emphasis [13]. IC management and investment in IC are crucial for rehabilitation organizations, among other healthcare organizations to improve the implementation of programs that lead to better performance and long-term success [14]. Based on a practical definition in the present study, the term “rehabilitation organizations” refers to centers or settings that either directly provide rehabilitation services for people with disabilities and their families, whatever their models for rehabilitation delivery, including in-patient provision, out-patient provision, community-based rehabilitation and residential facilities, or are large organizations responsible for policymaking, implementing, supervising and managing rehabilitation provision for a larger community. The latter is named differently in different countries such as the Ministry of Health and Welfare in many Asian countries and Canada, or the State Welfare Organization in Iran.

Whichever applies, investment in IC in rehabilitation organizations will provide more effective and efficient rehabilitation services that result in client satisfaction, i.e. the satisfaction of people with disabilities and their families, as well as the satisfaction of the rehabilitation team members that will ultimately benefit the organization. It would also help rehabilitation organizations improve their ability to achieve a sustainable competitive advantage [15], as provided services would be such that people would consider rehabilitation as beneficial and a priority in their lives, would continue their rehabilitation programs until discharged and would subsequently suggest the services to others. This would lead to a positive feedback for service providers who will profit financially and experience a sense of satisfaction, which overall, will enhance their willingness to continue to work in the field of rehabilitation and at the same center.

Despite the general emphasis on IC, there are still ambiguities in terms of the nature of this concept, such as tangibility or the intangibility of its components, as well as controversies over being considered a resource or capital [16, 17]. Also, definitions used to describe the concept in current literature are generally vague, do not match with each other in different sources and do not provide a clear list of its components. According to a systematic review conducted on IC in the health sector, about 40 per cent of the documents did not provide a detailed definition for IC and only referred to it as “intangible assets” or listed some categories or examples of IC [13]. A precise definition of IC, as well as its domains and components,

would help to better understand the concept, which in turn, would serve as an essential step for measuring it in organizations and subsequently to manage it successfully [18].

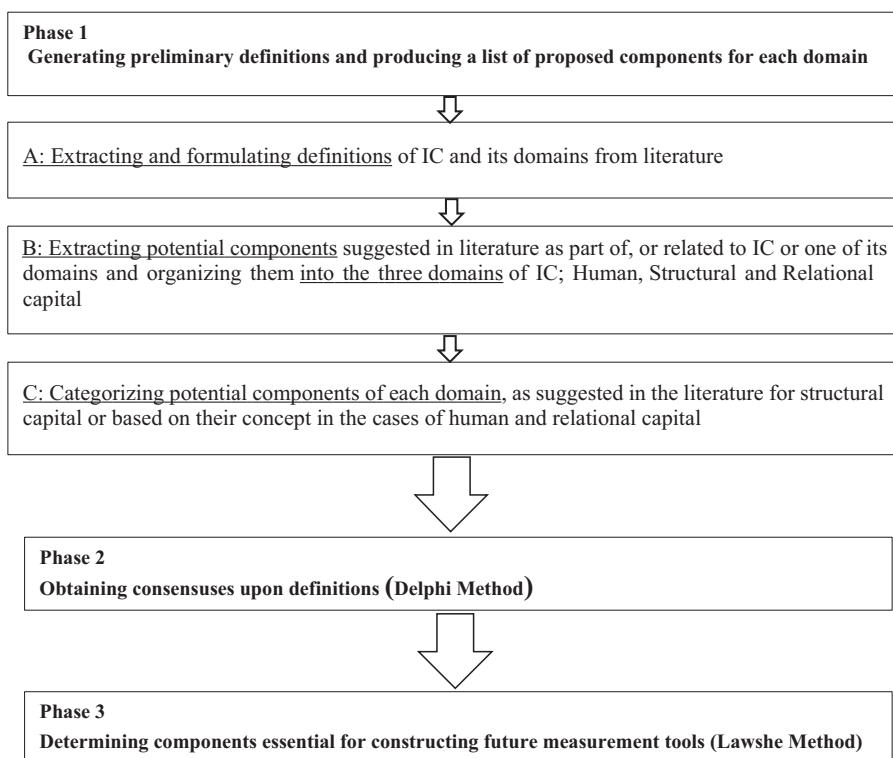
Because the provision of rehabilitation services is one of the important responsibilities of the health sector, and many people in society need rehabilitation for themselves or for family members, clarifying the concept of IC in rehabilitation organizations will improve its appreciation in the health sector, which will ultimately benefit public health. This study aimed at providing such a comprehensive definition and a list of its components, which would be applicable to rehabilitation organizations. This could ultimately provide a framework for designing tools to assess IC in rehabilitation organizations.

### Materials and methods

This study was conducted in three phases (Figure 1):

Phase 1 consisted of generating preliminary integrated definitions of IC and its widely accepted domains of human, structural and relational capital, based on reviewing literature from 2000 to 2015 in the databases of “PubMed,” “Science Direct,” “Google Scholar,” “SID,” “Irandoc” and “Magiran” using the keywords rehabilitation, health, intellectual capital, human capital, structural capital, relational capital, components, factors, concept and organization [19] and by integrating the descriptions extracted from those sources.

Thereafter, a list of proposed components indicated in the literature as part of or related to IC or to one of its domains was prepared and categorized into the three domains of human, structural and relational capital according to the suggestions in literature or based on their



**Figure 1.**  
Flow diagram of research

concepts. Next, potential components in each domain were further organized into categories. In the case of structural capital, they were organized into two groups of software and hardware infrastructures, as suggested by Cabrita and Bontis [20]. The research team then organized the proposed components of human capital into six categories (talent, knowledge, ability, humanity, desire and managerial leadership) and the relational domain into five categories (information exchange, relationship with the supplier, relationship with the customer, relationship with peers and distribution channels).

In the second phase, which was a qualitative phase, a group of 14 experts was selected by purposive sampling and invited for participation.

Selection criteria included having 10 years or more of academic or practical experience in the fields of rehabilitation management, healthcare management or management and having experiences in managing public, private or NGO rehabilitation centers or at a policy-making level. A modified Delphi process [21, 22] was used to reach consensus on definitions for IC and its domains applicable to the field of rehabilitation. Also, using a closed-answer questionnaire, the experts were asked about the relevance and clarity of each proposed component, as well as the accuracy of their categorization and whether each proposed component should be considered in the measurement of IC in rehabilitation organizations. They were also encouraged to provide any comments to improve the definitions. Four rounds of Delphi took place. The first round was carried out in person and at the experts' workplaces. Thereafter, the feedback was collected within two to three weeks, by e-mail.

### Data analysis

After each round, the research team discussed the experts' comments and decided upon how to apply them, after which the new corrected version of the definitions was provided for the next round, along with a short note regarding the reasons for including or not including each comment. Each factor was considered as a component of the proposed domain of IC if more than 50 per cent of the participants agreed that it was warranted.

The Lawshe method was used to determine the components considered necessary for developing future measurement tools for the evaluation of IC in rehabilitation organizations [23]. This is a widely used method to quantify content validity in a variety of fields, including health care [24]. In this method, a group of experts is asked to rate the importance of individual items within an instrument (questionnaire, checklist) as "essential," "useful, but not essential" or "not necessary." Then the content validity ratio (CVR) is calculated. CVR would be equal to one when all the participants agree that an item is essential. Lawshe has provided a table in which the minimum acceptable levels for CVR in different group sizes is presented. Items with CVR equal to or more than that cutoff are included in the final instrument and the others are excluded [23, 24]. For the group size of 14 experts in this research exercise, the cutoff point was 0.51.

### Ethical consideration

This study was approved by the ethical committee with the ethical code IR.USWR.REC0.1394.70

### Results

Comments from the first Delphi round on this preliminary definition pointed to the necessity of differentiating between "definition" and "description" of IC because many important details of the concept would be missed in a short definition. The finalized consensus-based definition and description of IC are presented in [Table I](#).

The final definitions of the domains of IC are presented in [Table II](#).

IC definition	Capital that emerges from the interaction of “human resources” ability to think and to create ideas [25-28] with “favorable internal and external organizational environment” (including the managerial, social, structural and physical environment, as well as communication between the inside and the outside of the organization) [25, 29]. This capital will gradually increase with education, skills training and through staff and managers gaining more experience and also with structure development and with building inter-relations within the market [30-32] and will empower the organization to adapt to continually changing circumstances and will lead to competitive value [25-27, 31] and profit [26, 31, 33, 34]
IC description	Intellectual resource consists of thinking and idea-generating abilities that emerge from creativity, innate talents, capacities and competencies of employees. It is non-material and intangible and is not directly measurable or recorded as an asset [25, 29, 31] Although a portion of intellectual resource could develop to become IC even in seemingly non-favorable environments, a great portion of IC emerges from the interaction between the ability of human resource to think and create ideas [25, 29-31] and a favorable internal and external organizational environment (managerial, social, structural, physical and communication within and outside of the organization) [29, 32], and it creates added value in the organization. IC would gradually increase along with education, training and the increasing experience of personnel and also with further development of structures and inter-relations with the market [26-28]. IC would lead to better dynamism and innovation and the creation of new products and services. IC makes organizations capable of continuous adaptation in changing conditions that ultimately lead to competitive value and profit. This capital clearly shows its value in the health market and is vital for organizations [25, 26, 29, 30, 33, 34]

**Table I.** Final definitions and description of IC

The experts’ points of view on assigning different proposed components to each of the three domains of human capital, structural capital or relational capital and also on the importance of including each component in the measurement of IC in the rehabilitation organizations are presented in [Tables III, IV and V](#), respectively.

As can be seen in [Table III](#), all participants agreed that intelligence, thinking and problem-solving as a team, creativity, learning, experience, knowledge, capability, expertise, organizational commitment, attitudes and motivation were components of the human capital domain. Also, although more than 50 per cent of the participants agreed on all 53 proposed components, only 41 were considered essential to be measured in rehabilitation organizations, based on a CVR 0/51 or more.

As can be seen in [Table IV](#), more than 50 per cent of the participants agreed on all 29 proposed components of structural capital. However, the measurement of only 25 components was considered essential in evaluating IC in rehabilitation organizations.

[Table V](#) demonstrates that in the relational domain, more than 50 per cent of the participants agreed to consider all 18 proposed factors as components of relational capital, and for 17 out of 18 factors more than 70 per cent agreed that their measurements were necessary for the assessment of IC in rehabilitation organizations.

### Discussion

This study resulted in agreed-upon comprehensive definitions of IC and its domains. The present definition of IC covers the definitions of all of its domains so that the phrase “ability to think and to create ideas” refers to the human capital domain and the terms “structuring” and “communicating with the market,” cover the structural and relational capitals domains, respectively.

IC has many important features, but all previous definitions had addressed only a few of them. The present study tried to describe the concept more clearly and more comprehensively. Based on experts’ suggestions and to avoid a lengthy definition and to maintain clarity at the same time, it was decided to provide a “definition” as well as a “description” of the concept.

Term	Definition
1 Human capital	This is a combination of capabilities [25, 31], information [35], knowledge [25, 30, 36, 37], experiences [25, 30, 34, 37], skills [30, 36, 37] (including technical-professional [26, 36, 37] interpersonal [36], managerial, team thinking and problem-solving [36] and also, humanity [21, 38, 39], attitudes [30], desires [31, 38-41] and initiatives in human resources for thinking and solving problems). Although this asset is not owned by the organization, in the hours that it is available to the organization, it can be activated and used [25, 30, 36]. This capital results in solving organizational problems, the creation of strategic innovations [42], ingenuity and inventions [35], which in turn, improve the performance of the organization, attract customers, increase profits [30] and finally, increase the market value [30, 37]
2 Structural capital	These are infrastructure assets [43] that provide a suitable environment [44] for activation of human capital to create ideas [25] and also to help for better and faster idea actualization [20] to enter the market and create more value. These assets, which are in the ownership and under the control of organizations, include software infrastructures [20] such as “systems [30], organizational structures [20, 30, 45], strategies [25], policies [25], processes [43, 45], procedures [43] and instructions [25, 46]” and also hardware infrastructures [20] such as “information technology [47], databases [20,46], registered trademarks [43, 47], projects [47], inventions [20,43,47] patented products and copyrights [43],” within each of which a great deal of knowledge [25, 43, 44-47] and skill [45] is embedded
3 Relational capital	Is a combination of formal and informal communication channels [16, 25] and development of positive interaction [32] between organizations and members of the business community (such as resource suppliers, current and future customers, competitors, trade associations and government) [16, 25, 47, 48]. These relations would shape the community’s perception of the organization. Also, through the exchange of information [16] between the organization and the business community, the organization will acquire market information that would be useful for attracting and retaining customers [47]; in these ways, organizations can run their business [49] and create market value. Signs of the existence of relational capital are the positive reputation of the organization and customers’ loyalty [42]. A great deal of knowledge and skill is embedded within these communication channels or “marketing channels” [25, 47]

**Table II.**  
Definitions of IC domains

Category	Component	Experts who considered components as part of human capital		Components whose measurements are considered essential
		Number of experts	%	CVR
Talent	1 Wisdom [31]	13	92	0.57
	2 Intelligence [38]	14	100	0.57
	3 Sharpness [50]	12	85	0.57
	4 Problem-solving [51]	14	100	0.85
	5 Capacity [52]	9	64	-0.28
	6 Intellectual agility [53]	12	85	0
	7 Creativity [7, 38, 40]	14	100	1
	8 Innovation [38, 39]	13	92	0.85
	9 Idea [54]	12	85	0.57
	10 Self-confidence [38]	13	92	0.57
	11 Spirit [55]	9	64	0.57
	12 Entrepreneurial spirit [53]	12	85	0.57

**Table III.**  
Components of human capital and the importance of their measurement in rehabilitation organizations

(continued)

Category	Component	Experts who considered components as part of human capital		Components whose measurements are considered essential	
		Number of experts	%	CVR	
Knowledge	13	Training [18, 53]	13	92	0.71
	14	Level of education [18, 39]	12	85	0.57
	15	Learning [39]	14	100	0.85
	16	Experience [21, 39, 40, 52]	14	100	1
	17	Knowledge [18, 40, 52]	14	100	1
	18	Tacit knowledge [56]	12	85	0
	19	Mixed knowledge [7]	12	85	0
	20	Trade, trade knowledge [18]	8	57	-0.14
	Ability	21	Individual ability [18, 39, 41]	13	92
22		Capability [39, 40]	14	100	0.85
23		Expertise [51, 53]	14	100	1
24		Skill [38, 51-53]	13	92	0.57
25		Professional skills [39]	13	92	0.85
26		Competencies [31, 53, 56]	13	92	0.57
27		Compatibility [53]	9	64	0.57
28		Team work [38]	12	85	0.57
29		Organizing skills [38]	10	71	0.57
30		Leadership skills [38]	12	85	0.57
31		Employability [57]	9	64	-0.14
32		Knowledge-sharing [38]	12	85	0.57
33		Communication skills [38]	13	92	0.71
34		Problem-solving skills [38]	12	85	0.85
35		Quick decision-making [54]	13	92	0.57
36		Good interpersonal relationships [54]	11	78	0.57
Humanity		37	Morality [55]	13	92
	38	Honesty [55]	13	92	0.57
	39	Faith [55]	13	92	0.57
	40	Fervor [55]	9	64	-0.14
	41	Sincerity [55]	10	71	0
	42	Lifestyle [58]	8	57	-0.14
	43	Satisfaction [38, 53, 57]	9	64	0.57
	44	Values [38-39]	13	92	0.57
	45	Organizational commitment [38, 39]	14	100	0.85
Desire	46	Attitudes [38, 41, 56]	14	100	0.57
	47	Stimulus [38]	11	78	0.57
	48	Demands [38]	12	85	-0.14
	49	Motivation [39, 40, 53]	14	100	0.71
	50	Wishes [55]	9	64	-0.28
	51	Knowledge-sharing [38]	13	92	0.57
Organization managerial activators	52	Leadership styles [51]	11	78	0.42
	53	Work method [50]	11	78	0.42
	54	Quality of leadership [53]	13	92	0.57

**Note(s):** \*Content validity ratio. Components of IC obtaining the consensus of experts to be measured in rehabilitation organizations are not highlighted

Table III.

Category	Row	Component	Experts who considered component as part of structural capital		Components whose measurements were considered essential
			Number of experts	%	
Software infrastructure	1	Missions [59]	14	100	0/71
	2	Management philosophy [53, 59]	11	78	0/57
	3	Policies [60]	13	92	0/85
	4	Business development programs [31]	12	85	0/57
	5	Organizational strategy [59, 61]	14	100	0/85
	6	Development and improvement [53]	8	57	0
	7	Organizational charts [60]	8	57	0/42
	8	Processes [31, 53, 57, 59, 61]	14	100	1
	9	Operational processes [30]	10	71	0/57
	10	Workflow [31]	14	100	0/57
	11	Instructions [60]	12	85	0/57
	12	Procedures [62]	13	92	0/71
	13	Functions [61]	13	92	0/57
	14	Organizational culture [30, 53, 57, 59, 61]	14	100	0/57
	15	Culture of cooperation [31]	12	85	0/57
	Hardware infrastructure	16	Organizational learning [30]	11	78
17		Information [53]	12	85	0/57
18		Information technology [31, 53, 59]	13	92	0/85
19		Documentations [53]	13	92	0/71
20		Publications [61]	12	85	0/57
21		Computer network [54]	14	100	1
22		Databases [53, 59, 61]	14	100	1
23		Information systems [30, 53, 57, 61, 63]	14	100	1
24		Equipment [54]	14	100	0/85
25		Agreements [53, 59]	12	85	0/57
26		Patent [53, 59]	11	78	0.57
27		Brands [53, 59]	11	78	0
28		Copyright [27, 59, 61]	11	78	0
29		Logos [59]	10	71	0

**Table IV.** Components of structural capital and the importance of their measurement in rehabilitation organizations

**Note(s):** \*Content validity ratio. Components of IC obtaining the consensus of experts to be measured in rehabilitation organizations are not highlighted

**Table V.** Components of relational capital and the importance of their measurement in rehabilitation centers

Category	#	Component	Experts who considered component as part of relational capital		Components whose measurements were considered essential
			Number of experts	%	
Information exchange	1	Market recognition and insight [53]	11	78	0/57
	2	Customer information [25]	13	92	0/71
	3	Customer feedback systems [64]	14	100	0/85
Relationship with customers	4	Accessible customer centers [25]	11	78	0/57
	5	Relationship with community [65]	14	100	0/57
	6	Relationship with customer [18, 66, 67]	14	100	0/85

(continued)



Category	#	Component	Experts who considered component as part of relational capital		Components whose measurements were considered essential
			Number of experts	%	CVR*
Relationship with suppliers	7	Relationship with supplier [18, 25, 53, 57, 66]	14	100	0/57
	8	Relationship with government [67]	14	100	0/57
	9	Relationship with investors [67]	11	78	0/57
Relationship with peers	10	Relationship with shareholders [65]	13	92	0/57
	11	Relationship with competitors [65]	13	92	0/57
	12	Relationship with partners [57, 66, 67]	13	92	0/57
Distribution channels	13	Relationship with public institutions [65]	13	92	0/57
	14	Relationship with wholesalers [68]	12	85	0/57
	15	Relationship with distributors [67]	13	92	0/71
	16	Sales channels [53]	13	92	0/57
	17	Distribution channels [53, 66, 67, 69]	13	92	0/57
	18	Relationship with retailers [68]	12	85	0/42

**Note(s):** \*Content validity ratio. Components of IC obtaining the consensus of experts to be measured in rehabilitation organizations are not highlighted

Table V.

Furthermore, previous definitions of IC from earlier sources did not match each other, which resulted in a number of ambiguities. For example, although IC had been referred to as “intangible” by many researchers [5, 17, 43], some tangible elements of IC had been named by others, examples being information technology, databases and structures [20, 46, 47]. Another mismatch in the available literature was using the terms “intellectual resource” and “intellectual capital” interchangeably. For example, Vasterling *et al.* and Tanaka *et al.* have used the phrase “intellectual resource” [17, 70], whereas Mouritsen *et al.* and Bontis *et al.* have used the phrase “intellectual capital” [16, 71] to refer to the same concept. In the present definition, the term “resource” is used to name “*intellectual reserve/intellectual capital to be*” and “capital” refers to “*extracted intellect, which has been put into action and resulted in profit!*”

Intellectual human beings have the “ability to think and create ideas” [25] and add values, and these abilities are different from one individual to another. We call this “*reserves of intellect*,” which form “intellectual resources” of organization. However, “*the advantages and profits of having this ability*” (i.e. “intellectual capital”) vary depending on different environments and various organizational structures.

The relationship between an intellectual resource and intellectual capital was another issue that needed clarification. Although the importance of a favorable environment in putting potentials to work and in promoting activation of human capital has been mentioned previously in the literature [25, 26-28], the present definition clarified that even if the environment is unfavorable or if there are no appropriate structures, still some portion of the potentials would actualize anyway. The dynamism and interaction between the three domains (human, structural and relational capital) in forming IC are stated clearly in the present description, which helps to better understand the nature of IC and overcome the mismatch regarding tangibility or intangibility. The intellectual human being within an organization (intellectual capital) makes structures (structural capital), shapes the social environment within the organization and communication channels with the market (relational capital), which further facilitates the conversion of intellectual resources to IC. It

is difficult to separate the intellectual content (intangibles) of an organization and its products (intangibles and tangibles) because they have synergies in creating more IC. The present definition also notes the importance of “appropriate and dynamic infrastructure” and “up-to-date services” in the concept of IC. It is emphasized that the intellectual content of an organization is seen as IC only if it results in “competitive value and profit generation.” Actually, in today’s competitive environment, without these two factors, it is impossible for organizations to continue to survive [26, 27, 31].

Finally, each and every component presented in each of the three domains of IC can provide the basis for constructing new tools or using existing tools for evaluating different aspects of IC in rehabilitation organizations and to monitor the process of changes that may have occurred as the result of interventions. For example, when considering creativity as one of the components of the talent category of human capital, we need to either construct a tool or use an existing tool for assessment of creativity of personnel in a rehabilitation organization.

### Conclusion

In rehabilitation organizations, a major portion of capital consists of IC. Prior to this study, most definitions of IC were provided in fields in which products were immediately tradable in the market and so, definitions focused on the financial aspects of IC. Articles on IC in the health sector were mainly found in the nursing discipline and were generally limited to knowledge, structures and relations needed to provide nursing care, documentation and the transfer of this knowledge [72, 73].

This study led to the formulation of precise and clear definitions of IC and its domains along with a list of essential components required to be measured in the evaluation of IC in rehabilitation organizations. We believe these descriptions may facilitate the emergence of new ideas and pave the way toward extensive research in this field and to the development of valid tools to measure IC in rehabilitation organizations, as well as in other fields of health care, as many of the ideas and concepts found here are applicable to a range of healthcare situations and organizations.

They may also cause rehabilitation organization managers to aim not only for increasing their intellectual “resources” but also to improve the capacity to change “resources” to “capitals” more efficiently and to achieve a sustainable competitive advantage by promoting their IC.

As participants in the present research were experienced in rehabilitation management of the public as well as private centers, and in different settings, the components considered essential in the assessment of IC in rehabilitation organizations may be generalized in a variety of situations and settings.

Like all qualitative studies, the limitation of the present study was that of integrating different ideas to form a comprehensive definition for the concept of IC having been influenced by perspectives and points of view of the research team and the experts who participated in this research.

### References

1. Backer TE. Research utilization and managing innovation in rehabilitation organizations. *J Rehabil.* 1988; 54(2): 18.
2. Sumedrea S. Intellectual capital and firm performance: a dynamic relationship in crisis time. *Procedia Economics and Finance.* 2013; 6: 137-44.
3. Hermansson K, Holberg N, Ringquist A. *Intellectual Capital Reporting in Health Care Centers-the Development of a Prototype.* Sweden: Lunds University; 2004.
4. Brazen L. The ROI of human capital: measuring the economic value of employee performance. *AORN J.* 2004; 80(6): 1146-7.

5. Yılmaz A. Methods for measuring of intellectual capital: an application of ceramics sector companies listed in bursa istanbul (BIST). *Int J Bus Soc sci.* 2013; 4(11): 151-60.
6. Sundać D, Fatur Krmpotić I. Measurement and management of intellectual capital. *Tour Hosp Manag.* 2009; 15(2): 279-90.
7. Edvinsson L, Malone M. *Intellectual capital: Realizing your company's true value by finding its hidden brain power.* NY: Harper Collins; 1997.
8. Harris L. A theory of intellectual capital. *Adv Develop Hum Resour.* 2000; 2(1): 22-37.
9. Bontis N. Managing organizational knowledge by diagnosing intellectual capital: framing and advancing the state of the field. Choo C, Bontis N, editors. *The strategic Management of Intellectual Capital & Organizational Knowledge.* Oxford: Oxford University Press; 2002.
10. Subramanian M, Youndt M. The influence of intellectual capital on the types of innovative capabilities. *Acad Manag Rev J.* 2005; 48(3): 450-63.
11. King A, Zeithaml C. Measuring organizational knowledge: a conceptual and methodological framework. *Strateg Manag J.* 2003; 24: 763-72.
12. Santos-Rodrigues H, Faria J, Cranfield D, Morais C. Intellectual capital and innovation: a case study of a public healthcare organization in Europe. *Electron J Knowl Manag.* 2012; 11(4): 361-72.
13. Evans JM, Brown A, Baker GR. Intellectual capital in the healthcare sector: a systematic review and critique of the literature. *BMC Health Serv Res.* 2015; 15(556): 2-14.
14. Walsh K, Enz C, Canina L. The impact of strategic orientation on the intellectual capital investments in customer service firms. *J Serv Res.* 2008; 10(4): 300-17.
15. Chen JJ, Yang RK. The future of UIHC rehabilitation services: defining and measuring quality rehabilitation services. *Iowa Orthop J.* 2009; 29: 139-42.
16. Bontis N, Bart CK, Kong E. The strategic importance of intellectual capital in the non- profit sector. *J Intellect,* 2007; 8(4): 721-31.
17. Vasterling JJ, Duke LM, Brailey K, Constans JI, Allain AN, Sutker PB. Attention, learning, and memory performances and intellectual resources in Vietnam veterans: PTSD and no disorder comparisons. *Neuropsychology.* 2002; 16(1): 5-14.
18. Guthrie J, Petty R, Johanson U. Sunrise in the knowledge economy: managing, measuring and reporting intellectual capital. *Accounting, Auditing and Accountability J.* 2001; 14(4): 365-84.
19. Ahmadi M, Hatamizadeh N, Hosseini M. Identify and classify concepts and components of intellectual capital in the organizations. *J of Health Promot Manag.* 2016; 5(3): 15-27.
20. Cabrita MDR, Bontis N. Intellectual capital and business performance in the Portuguese banking industry. *Int J Technol Manag.* 2008; 43(1-3): 212-37.
21. Boukdedid R, Abdoul H, Loustau M, Sibony O, Alberti Ce. Using and reporting the Delphi method for selecting healthcare quality indicators: a systematic review. *PLOS One.* 2011; 6(6): e20476.
22. Hsu CC, Sandford B. The Delphi technique: making sense of consensus. *Pract Assess Res Eval.* 2007; 12(10): 1-8.
23. Lawshe CH. A Quantitative approach to content validity. *Pers Psychol.* 1975; 28: 563-75.
24. Ayre C, Scally AJ. Critical values for lawshe's content validity ratio: revisiting the original methods of calculation. *Meas Eval Couns Dev.* 2014; 47(1): 79-86.
25. Bontis N, Chua Chong Keow W, Richardson S. Intellectual capital and business performance in Malaysian industries. *J intellect Cap.* 2000; 1(1): 85-100.
26. Shih KH, CW L, Lin B. Assessing the quality gap of intellectual capital in banks. *Total Qual Manag.* 2011; 22(3): 289-309.
27. Taliyang SM, Harun RJ, Mustafa NH, Mansor M. Intellectual capital disclosure and market capitalization. *Int J Bus Soc Sci.* 2014; 5(10): 96-102.
28. Mouritsen J, Johansen M, Larsen H, Bukh P. Reading an intellectual capital statement: describing and prescribing knowledge management strategies. *J Intellect Cap.* 2001; 2(4): 359-83.

29. Martín de Castro GI, López Sáez P. Intellectual capital in high-tech firms: the case of Spain. *J Intellect Cap.* 2008; 9(1): 25-36.
30. Chen J, Zhu Z, Yuan Xie H. Measuring intellectual capital: a new model and empirical study. *J Intellect Cap.* 2004; 5(1): 95-212.
31. Hsu YH, Fang W. Intellectual capital and new product development performance: the mediating role of organizational learning capability. *Technol Forecast Soc Chang.* 2009; 76(5): 664-77.
32. Bontis N, Bart CK, Nazari JA, Herremans IM. Extended VAIC model: measuring intellectual capital components. *J Intellect Cap.* 2007; 8(4): 595-609.
33. Mobilising the brainpower of Europe: enabling universities to make their full contribution to the Lisbon Strategy. Communication from the Commission, 152 final, 20 April 2005 [press release]. Brussels: European Commission; 2005.
34. Marr B, Burgman R, Roos G, Ballow J, Thomas R. No longer "out of sight, out of mind" Intellectual capital approach in AssetEconomics Inc. and Accenture LLP. *J Intellect Cap.* 2005; 6(4): 588-614.
35. Ordóñez de Pablos P. Evidence of intellectual capital measurement from Asia, Europe and the Middle East. *J Intellect Cap.* 2002; 3(3): 287-302.
36. Bontis N. Assessing knowledge assets: a review of the models used to measure intellectual capital. *Int J Manag Revs.* 2001; 3(1): 41-60.
37. Norman PM. Are your secrets safe? Knowledge protection in strategic alliances. *Bus Horiz.* 2001; 44(6): 51-60.
38. Guthrie J, Petty R, Yongvanich K, Ricceri F. Using content analysis as a research method to inquire into intellectual capital reporting. *J Intellect Cap.* 2004; 5(2): 282-93.
39. Mayo A. The role of employee development in the growth of intellectual capital. *Pers Rev.* 2000; 29(4): 521-33.
40. Cheng MY, Lin JY, Hsiao TY, Lin T. Censoring model for evaluating intellectual capital value drivers. *J Intellect Cap.* 2008; 9(4): 639-54.
41. Johannessen JA, Olsen B. Knowledge management and sustainable competitive advantages: the impact of dynamic contextual training. *Int J Inf Manag.* 2003; 23(4): 277-89.
42. Canibano L, Sánchez MP, García-Ayuso M, Chaminade C. Guidelines for managing and reporting on intangibles: Intellectual Capital Report. Madrid: Vodafone Foundation; 2002.
43. Sánchez MP, Castrillo R, Elena S. Intellectual capital management and reporting in universities. International Conference on Science, Technology and Innovation Indicators History and New Perspectives. Madrid: Lugano; 2006.
44. Wu MF, Lee YJ, GL W. To verify how intellectual capital affects organizational performance in listed taiwan IC design companies with considering the moderator of corporate governance. *J Glob Bus Manag.* 2012; 8(1): 20-32.
45. Bontis N, Wu S, Wang W-Y, Chang C. Intellectual capital and performance in causal models: evidence from the information technology industry in Taiwan. *Int J Inf Manag.* 2005; 6(2): 222-36.
46. Youndt M. Human resource configurations and value creation: the mediating role of intellectual capital: academy of Management Meeting. Canada: N.p; 2000.
47. Uziene L. Model of organization's intellectual capital measurement. *Eng Econ.* 2010; 21(2): 151-9.
48. Bontis N. Managing organisational knowledge by diagnosing intellectual capital: framing and advancing the state of the field. *Int J Technol Manage.* 1999; 18(5): 433-62.
49. Bounfour A. The IC-dVAL approach. *J Intellect Cap.* 2003; 4(3): 396-413.
50. Ross J, Roos G, Dragonetti NC, Edvinsson L. Intellectual capital: Navigating the new business landscape. UK: Palgrave Macmillan; 1998.
51. Brooking A. Introduction to intellectual capital. Cambridge: The knowledge Broker Ltd; 1996.
52. Curado C, Henriques L, Bontis N. Intellectual capital disclosure payback. *Manag Decis.* 2011; 49(7): 1080-98.

- 
53. Wall A, Kirk R, Martin G. *Intellectual Capital: Measuring the Immeasurable?* Burlington, MA: CIMA Publishing; 2003.
  54. Gogan LM, Draghici A. A model to evaluate the intellectual capital. *Procida Technology*. 2013; 9: 867-75.
  55. Zohar D, Marshall I. *Spiritual capital: Wealth we can live*. USA: Berrett-Koehler Publishers; 2004.
  56. Edvinsson L. Some perspectives on intangibles and intellectual capital. *J Intellect Cap*. 2000; 1(1): 12-6.
  57. Moon Y, Kym H. A model for the value of intellectual capital. *Can J Adm Sci Rev Canad Sci Adm*. 2006; 23(3): 253-69.
  58. William JH. *Intellectual capital: How to build it, enhance it, use it*. Indiana: Wiley; 1993.
  59. Bozbura F. Measurement and applications of intellectual capital in Turkey. *Learn Organ*. 2004; 11(4-5): 357-67.
  60. Abdullah D, Sofian S. The relationship between intellectual capital and business performance and corporate performance. *Procida-Soc Behav Sci*. 2012; 40: 537-41.
  61. Huang C, Hsueh S. A study on the relationship between intellectual capital and business performance in the engineering consulting industry: a path analysis. *J Civ Eng Manag*. 2007; 13(4): 265-71.
  62. Wang M. *Intellectual capital and firm performance*. in *Annual Conference on Innovations in Business & Management*. London: The Center for Innovations in Business and Management Practice; 2011.
  63. Ramezan M. Intellectual capital and organizational organic structure in knowledge society: how are these concepts related?. *Int J Inf Manag*. 2011; 31(1): 88-95.
  64. Hajikarimi A, Bathaie A. *Intellectual Capital Management: Strategic advantage organizational value creation, concepts and applications*. Tehran: Tehran Bazargani Publications; 2009.
  65. Monavarian A, Gholipour A, Yazdani H. The role of Intellectual capital in existence or inexistence of organizations: a study of Mellat Bank. *Iran J Manag*. 2006; 1(3): 37-64.
  66. Chen YS, MJ JL, Chang CH. The influence of intellectual capital on new product development performance- the manufacturing companies of Taiwan as an example. *Total Qual Manag Bus Excell*. 2006; 17(10): 1323-39.
  67. Das S, Sen PK, Sengupta S. Strategic alliances: a valuable way to manage intellectual capital?. *J Intellect Cap*. 2003; 4(1): 10-9.
  68. Haanes k, Lowendhal B. *The unit activity: towards an alternative to the theories of the firm. Strategy, structure and style*. New York: John Wiley & Sons; 1997.
  69. El-Bannany M. A study of determinants of intellectual capital performance in banks: the UK case. *J Intellect Cap*. 2008; 9(3): 487-98.
  70. Tanaka Y. *Meme media and meme market architectures: Knowledge media for editing, distributing, and managing intellectual resources*. New York: John Wiley & Sons; 2003.
  71. Mouritsen J, Bukh PN, Marr B. Reporting on intellectual capital: why, what and how?. *Meas Bus Excell*. 2004; 8(1): 46-54.
  72. Covel C, Sidani S. Nursing intellectual capital theory: implications for research and practice. *Online J Iss Nursing*. 2013; 18(2). doi: [10.3912/OJIN.Vol18No02Man02](https://doi.org/10.3912/OJIN.Vol18No02Man02).
  73. Sharifi M, Abbas Pour A. Identify and ranking indicators of measuring intellectual capital in higher education using analytical hierarchy process. *Educ Meas*. 2013; 4(12): 133-71.

**Corresponding author**

Mohammad Ahmadi can be contacted at: [mohammad95ahmadi@gmail.com](mailto:mohammad95ahmadi@gmail.com)

---

For instructions on how to order reprints of this article, please visit our website:

[www.emeraldgrouppublishing.com/licensing/reprints.htm](http://www.emeraldgrouppublishing.com/licensing/reprints.htm)

Or contact us for further details: [permissions@emeraldinsight.com](mailto:permissions@emeraldinsight.com)