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# ***The Policy Making of the Organizational Management of Intangible Capital and Its Impact on Knowledge Productivity in Maritime Institutions***

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## **Abstract**

In the third millennium, the number of environmental variables and the nature of the complex relationships between them have resulted in the complexity of competition in the business. Accordingly, the role of organizational intangible capital has been more touchable than ever. Actually, as the intensity of competition increases, the importance of intangible capital enhances and the importance of physical and fixed capital decreases. Due to its geopolitical situation and the presence of extensive maritime boundaries in the north and south, Iran possesses countless strengths and opportunities to obtain maximum resources and benefits from this God-given blessing. Therefore, preservation and expansion of maritime institutions in Iran has been raised as an undeniable necessity in all short- and long-term government plans. This study aims to have policy making regarding the management of organizational intangible capital and its impact on knowledge productivity in maritime institutions of the country. Participants were the experts of Iran's maritime organizations, which include IRI strategic Navy, the Ports and Maritime Organization, and the National Iranian Tanker Company. Standard questionnaires were employed for data collection. Results showed that focusing on intangible organizational capital in the policy making of maritime institutions can have a significant impact on knowledge productivity in them, which can lead to benefiting from national capacities in maritime studies.

**Keywords:** Intangible Capital, Maritime Institutions, Policy Making

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## **1. Introduction**

The contemporary world is rapidly transitioning from a production. Based economy to a knowledge-based one. As pointed out by Drucker (1999), the most important requirement of management in the 21st century has been to increase the productivity of labor and knowledge workers, and post-capitalist societies has encountered the basic challenge of the productivity of labor and knowledge workers. A company's knowledge-based point of view identifies its basic logic as a factor for creating and applying knowledge (Nonaka, 1994). Therefore, it is important for the company to be able to create and use new forms of knowledge (Anand et al., 2007). Knowledge productivity possesses a tricky construct. Some researchers explicate the macroeconomics perspective to interpret knowledge productivity as a result (Machlup, 1972). However, others use a managerial perspective to interpret knowledge productivity as a human potential (Drucker, 1993). In this study, both views are integrated concerning the definition of knowledge productivity (Harrison & Kessels, 2004; Stam, 2007). Drucker (1999) states that the productivity of knowledge workers can be the most significant management challenge of the 21st century, and it has also been the first requirement for their survival in advanced countries. Knowledge productivity has not been much attended until the knowledge researchers have investigated the theory of knowledge productivity (Harrison & Kessels, 2004; Stam, 2007). In addition, the literature shows that there has been little information about how new knowledge can be created, and no specific experimental measures have been carried out accordingly.

In order to help organizations to improve knowledge productivity, Drucker (1999) emphasizes six main factors including task, autonomy, continuous innovation, continuous learning, quality, and employees' properties. Researchers in this field argue that company management is responsible for creating productive knowledge, which can be achieved through an organized and systematic application of the knowledge. It is noteworthy



that different approaches are adopted by organizations to gain and use their knowledge. These approaches are presented as different dimensions of intangible capital such as social, human and organizational capital (Davenport & Prusak, 1998; Nahapiet & Ghoshal, 1998). There has been a general consensus that the ability of any organization for innovation depends on its intangible capital (Subramaniam & Youndt, 2022).

Previous studies showed that intangible capital has a positive and significant relationship with organizational performance (Bontis et al., 2020). Recent studies has concentrated on the relationship between intangible capital, innovation, and competitiveness (Tseng & Goo, 2022). On the other hand, the relationship between innovation and knowledge management or intangible capital has also been taken into consideration (liu et al., 2022). In this regard, the dimensions of intangible capital include complementary, mutual, and convertible activities, revealing that resource productivity may be improved through investment in other resources. Many researchers have studied the relationship between intangible capital, innovation, and competitiveness; however, there has been a paucity of research regarding the relationship between intangible capital and knowledge productivity. Hence, the current research aims to make policy regarding the management of organizational intangible capital and its impact on knowledge productivity in maritime institutions of Iran.

## **2. Review of Literature**

### **2.1. Knowledge Productivity**

Stam (2007) presents knowledge productivity as an elusive construct. Two different interpretations can be taken into account. On the one hand, the overall productivity is concerned with the amount of output compared to input (work, equipment, and capital), while the concept of knowledge productivity can often be implied as human ability (Drucker, 1999). In fact, the overall productivity elaborates on tangible capital, and knowledge productivity concentrates on intangible capital.

### **2.1.1. Machlup's Perspective**

Machlup (1972) emphasized the importance of knowledge as a product. By calculating the gross national product of the United States, it was found that the production of knowledge in 1985 had the potential to include approximately 29% of the adjusted gross national product. Besides, the knowledge-based industry was not only considered as the largest industry, but it also experienced a rapid growth compared to the traditional industries. Machlup's perspective, which is based on economic theory, interpreted knowledge productivity as a result. Results contributed to highlighting the relationship between knowledge, value creation, and economic growth.

### **2.1.2. Drucker's Perspective**

According to Drucker's perspective, it can be understood that productivity is created and lost in small economic units such as personal businesses, shops or offices. In other words, productivity encounters improvement or weakness. In post-capitalist societies, Drucker insists on the significance of developing a new economic theory that accounts for knowledge as the axis of the value creation process. As to the challenges that the management of the 21st century is facing, Drucker describes the new economic theory and presents a set of management guidelines to obtain knowledge workers' productivity. Drucker believes that knowledge productivity and knowledge workers should be taken as a kind of managerial responsibility. He emphasizes that the productivity of knowledge workers can be the most important management challenge of the 21st century. Drucker's perspective holds on management theories and interprets knowledge productivity as an organizational ability, aiming to improve the knowledge-based production process. Thus, the competitive advantage of the business might be based on the ability of organizations to create more productive knowledge workers. When Drucker focused on the productivity of knowledge workers, he was still acknowledging the importance of organization. The organizations'



responsibility is to apply knowledge in their activities through tools, processes, and products. The knowledge should be organized to create changes and steady innovation. The ability to create new elements has to be generated in the organization. Every organization should take three systematic actions to enhance knowledge productivity as follows:

1) The process of continuous improvement in relation to products and services. There is a Japanese terminology known as Kaizen, which is widely used in standard management theory; 2) continuous use of existing knowledge to develop different products, processes, and services; and 3) objective (real) innovation. These three actions of applying knowledge to bring about change in the economy requires simultaneous implementation and integration (Drucker, 1993). Based on the above-mentioned perspectives, this study defines knowledge productivity as a capability in individuals, teams, and units throughout the organization in order to gain improvement and progress and use knowledge and innovations in knowledge-based fields.

## ***2.2. Significant Elements of Knowledge Productivity***

Economic theory, as well as most business activities, consider manual workers as a kind of cost in the company. For companies to be productive, knowledge workers should be considered as the capital. Expenses should be controlled and reduced while assets should be created and developed (Drucker, 1999). Drucker (1999) emphasized six main factors that contribute to the productivity of knowledge workers. They involved task, autonomy, continuous innovation, continuous learning and training, quality, and considering knowledge workers as an asset instead of a cost. Harrison, and Kessels (2004) discussed that in order for the company's educational planning to be more effective, there should be changes in the daily workplace where learning and work can be effectively integrated with each other. Such a perception facilitates the development of a diverse and rich perspective that encourages employees to learn what they are required to do, leading them to be adaptive and innovative. Stam (2007) recommended factors that improve knowledge productivity, including

expertise in acquiring important subjects, learning to identify and solve problems, maintaining communication skills, acquiring self-regulation skills, motivation and creating turbulence in the work environment, resulting in stimulating the innovation. As to the studies above, researchers have mainly proposed human factors and organizational structure approaches. It can be found that almost all the studies concurred that creating productive knowledge is considered a managerial responsibility, requiring an organized and systematic application of knowledge to knowledge (Drucker, 1993). It has also been stated that organizations benefit from different approaches to collect and use their knowledge. These approaches present themselves with different dimensions of intangible capital such as human, organizational, and social capital (Davenport & Prusak, 1998). The concept of intangible capital is based on the belief that the main resources for creating a competitive advantage are intangible in nature (Stewart, 1997; Sveiby, 1997). It is widely accepted that for the organizational ability to be innovative, it relies on the intangible capital of that organization (Subramaniam & Youndt, 2022). Therefore, this study introduces the theory of intangible capital and investigates its impact on knowledge productivity.

### ***2.3. Intangible Capital and Knowledge Productivity***

Intangible capital has largely been attracted by academics. Galbraith (1996) was the first economist who proposed the concept of intangible capital and explained it as a behavior that requires brain practice. Intangible capital is not static and fixed, rather it has been proposed as activities related to the development of dynamic capital. Reviewing previous studies shows that intangible capital includes a set of intangible resources (such as capabilities and competencies) that stimulate organizational performance and create value (Marr & Roos, 2022). It is accepted that competitive advantage depends on how the company creates knowledge, shares it and finally applies it. The study defines intangible capital as the types of knowledge that companies use for creating competitive advantage (Seetharaman et al., 2004). Intangible capital is defined as a collection of available knowledge



that companies use to create competitive advantage. A systematic interpretation of intangible capital has specifically been presented by identifying three main components of organizational, human, and social capital that are taken into consideration in the literature (Youndt et al., 2004).

#### ***2.4. Human Capital***

Human capital is defined as the knowledge, skills, and abilities that individuals possess and use. Human capital is known as the main component of intangible capital (Choo & Bontis, 2002), since human interactions are an essential source of intangible value in the age of thought (O'Donnell et al., 2003). In post-capitalist societies, the appropriate action is that an individual with any knowledge should acquire new knowledge for four to five years otherwise it will become obsolete and old-fashioned (Drucker, 1993). At the individual level, creating and transferring knowledge are parts of their desire. Creating productive knowledge workers demands changes in their basic attitudes, while workers with manual and traditional productive skills need to be informed of the dos and don'ts of the job (Drucker, 1999). Besides, such attitude changes not only occur in knowledge workers, but they encompass the entire organization. At the organizational level, human capital is a source of innovation and strategic renewal (Bontis, 1998). According to the characteristics of the desired workforce, the features of human capital include creative, intelligent, and skilled employees with expertise in the roles and tasks assigned to them. Finally, they are outstanding sources for presenting new thought and knowledge that perform duties in the organization (Snell & Dean, 2021). Individuals and their related human capital are considered vital factors for the organization to reach the frontiers of technology, increasing the ability of the organization to absorb and expand the realm of knowledge (Hill & Rothaermel, 2003).

#### ***2.5. Organizational Capital***

Organizational capital can be defined as institutionalized knowledge and codified experiences in companies that are employed through databases,

patents, manuals, structures, systems, and processes (Youndt et al., 2004). Organizational capital provides organizational capabilities to encounter internal and external challenges. The components of organizational capital include infrastructure, information systems, routines, procedures, and organizational culture. Nonaka and Takeuchi (1995) believe that knowledge management requires a commitment to create new and work-related knowledge and to share knowledge throughout the organization and embody it in products, services, and systems. At the organizational level, knowledge development takes place through internal actions and operations or through external sources related to the company's structure. As Hibbard and Carrillo (1998) pointed out, the information technologies employed by the organizations can support the management of intangible capital in order to improve employees' potential to create of value. Subramaniam and Youndt (2022) concluded that organizational capital strengthens the dominant knowledge in the organization and affects the innovation capabilities of an organization.

## **2.6. Social Capital**

Social capital is defined as institutionalized knowledge that is accessible and used through interactions between individuals and their internal communication networks (Nahapiet & Ghoshal, 1998). The concept of social capital is mainly applied in social studies to describe the communication resources available in personal interactions within society. This concept has widely been used intra-organizational and extra-organizational research (Yli-Renko et al., 2001).

Researchers consider social capital as a key factor in understanding value creation (Nahapiet & Ghoshal, 1998). The social capital of an organization improves the quality of teamwork and enriches the exchange of information among team members (Subramaniam & Youndt, 2022). Social capital and knowledge creation are positively correlated, and social capital can directly affect the process of combining and exchanging knowledge





and provide relatively easy access to network resources (Nahapiet & Ghoshal, 1998).

### **3. Previous Studies**

Sedghiani et al. (2013) investigate the effect of organizational intellectual capital on knowledge productivity in media organizations. The researchers concluded that organizational intellectual capital had a positive and significant effect on knowledge productivity in media organizations.

Hassanzadeh Samarin et al. (2015) examined the relationship between intellectual capital and knowledge productivity. Results indicated that there was a positive and significant relationship between intellectual capital and knowledge productivity among the members of the engineering system of Guilan, Iran. Besides, a positive and significant relationship was found between the dimensions of intellectual capital and knowledge productivity.

Ganjinia and Habibzadeh (2013) highlighted the relationship between intellectual capital and knowledge productivity of the workforce, concluding that intellectual capital and its dimensions had a positive and significant effect on the knowledge productivity of the workforce.

Bashardoust (2012) investigated the relationship between intellectual capital and employees' productivity at Payam Noor University of Guilan, Iran. It was found that three dimensions of intellectual capital (i.e., human capital, structural capital, relational capital) were significantly correlated. In addition, there was a significant relationship between intellectual capital and productivity.

Huang and Jim Wu (2010) investigated the effects of intellectual capital, organizational capital, and social capital on knowledge productivity and the mutual effects between intellectual capital and knowledge productivity. Results revealed that all dimensions of intellectual capital had a positive and significant effect on knowledge productivity. It was also found that

there were mutual effects between the components of intellectual capital and knowledge productivity.

Hence, the hypotheses underlying the current study are as follows:

1. Policy making on human capital has a positive and significant effect on knowledge productivity in maritime institutions of Iran.
2. Policy making on social capital has a positive and significant effect on knowledge productivity in maritime institutions of Iran.
3. Policy making on organizational capital has a positive and significant effect on knowledge productivity in maritime institutions of Iran.

#### **4. Methodology**

Being a survey research, this study was practical in nature. Data were collected in two stages. Initially, the necessary information were gathered through library study and review of books and papers. Then, four questionnaires were administered. Since standard questionnaires were used in this research, their content validity was acknowledged, and Cronbach's alpha for all four questionnaires was above 0.7, which indicated an acceptable consistency coefficient. Participants were the experts of Iran's maritime organizations, which include IRI strategic Navy, IRI Navy of the Revolutionary Guard Corps, the Ports and Maritime Organization, and the National Iranian Tanker Company. Non-probability judgment sampling was used. In this research, structural equation modeling and Amos23 software were used to examine and test research hypotheses.

#### **5. Results**

After ensuring the validity and reliability of the collected indicators, the research model and the research hypotheses were taken into account. In this study, the structural equation modeling was used to test the measurement model concerning the impact of intangible capital factors on knowledge productivity and research hypotheses. To investigate the model fitness, the



structural equation modeling fit criteria listed in Table 1 were used, which indicated whether the model represented by the data confirmed the research measurement model (Ghassemi, 2010).

*Table 1. Model Fit Indices*

Index	Abbreviation	Acceptable fit
Goodness of fit index	GFI	GFI>90%
Adjusted goodness of fit index	AGFI	AGFI>90%
Normed fit index	NFI	NFI>90%
Compatible fit index	CFI	CFI>90%
Incremental fit index	IFI	IFI>90%
Root mean square error of approximation	RMSEA	RMSEA<10%
Chi.square fit statistics/degree of freedom	CMIN/df	between 1 to 3

After collecting the required information to determine how much the measurement indicators (observation variables) were acceptable for measuring hidden variables (intangible capital), all the observation variables that were related to hidden variables had to be initially checked and tested separately. General fit indices for measurement patterns (confirmatory factor analysis) were conducted using Smartpls software as shown in Table 2.

*Table 2. Confirmatory Factor Analysis*

variables	IFI	CFI	P	GFI	RMSE
Human capital	.808	.823	.633	.822	.003
Social capital	.822	.802	.678	.876	.006
Org capital	.823	.808	.732	.806	.023

Considering that the P value for all measurement patterns (observation variables) is greater than .05, it can be concluded that the measurement patterns were appropriate. Another valid indicator used for model fit is GFI. This index can be considered as a characteristic similar to R<sup>2</sup> in multivariate regression. The closer the GFI is to 1, the better it can be. RMSE is another indicator of model suitability, which has a value of .08 or less in acceptable models. The fit of models that have values higher than .1

are estimated to be weak. As Table 2 shows, the value of this index for the measurement model is less than .08, which shows the good fit of the models. Finally, it can be concluded that the measurement models (observation variables) have a good fit and it means that the obvious variables can measure the hidden variables well. Also, the results of the confirmatory factor analysis along with the partial P index were checked to test the acceptability of the factor loading of each question, and the factor loadings of all questions were higher than .05 and the partial P value was less than .05. As a result, it can be concluded that the questions measured the observation variables well. After examining and confirming the model, two partial indicators of the critical value CR and P have been used to test the significance of the hypotheses. Based on the significance level of 0.05, the critical value must be greater than 1.86, the parameter value lower than this is not considered important in the model. Furthermore, values smaller than .05 for the P value indicated a significant difference between the values calculated for the regression of .00 at the 0.95 level.

As to Table 3 (model fit), the model had an acceptable goodness of fit. According to the results of the analysis of the model, the hypotheses were investigated, the results of which are presented in Table 3.

Table 3. Results of Hypotheses Testing

Hypotheses	Regression	C value	P	Result
First Hypothesis	.93	5.11	.000	Accepted
Second Hypothesis	.67	2.23	.000	Accepted
Third Hypothesis	.81	4.19	.000	accepted

As illustrated in Table 3, with 95% confidence interval, it can be concluded that the dimensions of intangible capital (human, social, and organizational) had a significant impact on knowledge productivity in maritime institutions in Iran.

## 6. Discussion and Conclusion

Results revealed that the sea, particularly presence in international waters has been one of the main concerns of countries that possess the power. In



fact, the more the country has gained dominance over the sea, the more they have been powerful. This study aims to theoretically and experimentally investigate the relationship between intangible capital and knowledge productivity in maritime institutions. It was found that all dimensions of policy making in intangible capital had significantly and positively affected knowledge productivity in maritime institutions. It was also demonstrated that social capital would be the key factor in understanding of creating and developing the knowledge. Besides, since the knowledge is controlled through organized activities (organizational capital) of organizations, it results in enriching the knowledge within the organization and authorizing the understood value. Results indicated that social capital increased the human and organizational capital to improve knowledge productivity. Findings are in alignment with research conducted by Dessi (1982) in the sense that creating the knowledge is a path-dependent process. Findings are also supported by Subramaniam and Youndt's (2022) research, concluding that human capital can provide a suitable opportunity to generate novel and various thoughts, and social capital can encourage cooperation in all sectors of the organization. Results revealed that the organizational and social capital were significantly correlated with knowledge productivity. Findings of the study had several implications: 1) this study demonstrated that intangible capital had a significant relationship with knowledge productivity in maritime institutions; and 2) while previous studies have examined the relationship between social capital (Mc Fadyen & Canella, 2004) and external venturing (Wadhwa & Kotha, 2006), this study was an attempt to investigate the relationship between intangible capital and knowledge productivity. It was concluded that intangible capital had been a key evidence in determining knowledge productivity. This study empirically proves the interactional nature of intangible capital. For instance, social and organizational capital interactions had a significant relationship with knowledge productivity. Formal processes, systems, and structures have a tendency towards improving the existing norms and solving the problems regarding changes, leading to the improvement of knowledge productivity. Therefore, findings suggest that managers can make economic situations that result in dynamic knowledge productivity. This recommendation is similar to that of Drucker

(1883) presenting a theory that clarifies the relationship between knowledge productivity of workers and environment. Drucker emphasizes that the inability to observe the jungle due to the trees is a serious failure. Besides, a serious failure can include the inability to observe the trees due to the jungle. To create a productive knowledge, it is necessary to learn that both the jungle and trees have to be observed. The point is to learn how to communicate among the elements.

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