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Impact of Intellectual Capital on International Trade: Knowledge Management and Business Processes as Intermediaries

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Abstract

The global international trade market is changeable and highly competitive. In order to discover the market competitiveness of trading companies, we develop a second-order research model to explore the impact of intellectual capital on a company's performance through the intermediaries of knowledge management and business processes. The main purpose of this study is to discover the roles that knowledge management and business process capabilities play when companies introduce intellectual capital. We used a five-part questionnaire to conduct our research. Structural equation modeling techniques were used to analyze the research model, and we used PLS-SEM for data analysis. The analysis results show that the direct impact of intellectual capital on company performance is not significant (path coefficient is 0.08), and if a company only implements knowledge management it will have no significant effect on performance (path coefficient is 0.06). However, these two factors do have a significant impact on company performance through business process capability. Therefore, the results show that knowledge management and business processes mediate intellectual capital to affect a company's performance and lead to the better identification of the successful elements of competitive export trade strategies in dynamic business environments. Moreover, the results also show that the factor loading of information capital (weight=0.63) in intellectual capital is much higher than the other aspects of intellectual capital. That is, companies must prioritize information capital when investing in intellectual capital.

Keywords: Export trade, Knowledge management, Intellectual capital, Business process improvement, Performance measurement, Survey research.

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1. Introduction

The globalization of international trade markets has transformed the traditional model of competition in the export trade industry [1-4], which continues to face the twin challenges of rising costs and customers' demands for quality [5-7]. In recent years, scholars have come to conceive the international trade market as an enormous community that links intellectual capital (IC) and knowledge assets from both inside and outside organizations [8-11].

In such thinking, information technology (IT) systems facilitate internal business processes (BP) that support customer satisfaction, supplier management, logistic support, and other critical processes [12, 13]. Many organizations regard IC and knowledge management (KM) pathways as two particularly important resources, especially as they increasingly pursue sustainable competitiveness and enterprise value [14-17].

Both the resource-based view (RBV) [1] and the knowledge-based view (KBV) [18], indicate that IC and KM improve the competitiveness and internal organizational processes of businesses [14, 16, 19]. Moreover, they are valuable strategic tools for maximizing human resources, internal structures and relationships, information, and IT [20, 21]. Some studies have linked IC and KM to organizational performance [14, 22-24], but these have focused on the performance of individual organizations or the influence of IC and KM on company performance (CP). As such, few studies have integrated data or discussions on internal BP capabilities as contributing factors of CP [25]. Research has indicated that IC is a precious resource for both individuals and companies that encompasses both tangible and intangible capital, as well as all connections made during and surrounding the dissemination of information [26, 27]. As a result, IC, KM, and BP constitute the core of CP [28, 29]. As Wu and Hu [17] found, KM influences CP in a relationship mediated by BP; however, they overlooked the influence of IC upon KM reported by other scholars [14, 30, 31]. Therefore, we developed a new research framework to compensate for this gap.

Taiwan is an island country. Due to its lack of many industrial raw materials, it has developed an export-oriented economy and a global semiconductor supply chain as the basis for a strategic industry [32]. According to World Trade Organization (World Trade Organization, 2020), Chinese Taipei ranks among the top ten in the world's import and export trade. This means that Taiwan's trade experience can serve as a reference for other countries to develop their international trade. Therefore, taking Taiwan's export trade industry as the research object, we develop and verify an innovative research model that uses IC and KM as intermediary factors to explore the impact of BP on firm performance.

2. Literature Review and Research Model

2.1. Intellectual Capital

Scholars have identified IC as a set of intangible resources, including various capabilities and competences, that drive CP and value creation [28, 33, 34]. At the same time, others have viewed it as a valuable resource, particularly from the RBV and KBV perspectives [18, 35]. When closely aligned with a business enterprise, IC can become an organization's core competitive advantage, generating wealth and improving performance [28].

We have adopted the RBV and KBV theories and integrated the views of most scholars by considering IC as a concept that comprises three categories: human capital, organization capital, and information capital [36-38]. *Human capital* refers to the knowledge, skills, abilities, work-related experiences, and professional knowledge of members of an organizational cohort [39, 40]. By contrast, organization capital refers to the organizational relationships and structures that support the business's purpose; these relationships connect market channels, marketing networks, shareholders, customers, suppliers, and competitors, among other entities, and represent pivotal influences upon the organization [41]. Lastly, *information capital* is the basic infrastructure of IT capability, including strategies of application systems that support organizational advantages.

2.2. Knowledge Management

KM refers to how an organization or company uses a series of procedures to process knowledge capital, including implicit knowledge conversion, explicit knowledge transference, and knowledge updates [16, 42, 43]. KM is also a precious resource for individuals and companies and can align closely with business enterprises as it offers their organizations a core competitive advantage [16, 26, 27, 44, 45].

As studies have shown, to become a useful resource for an organization, knowledge first needs to be processed by the organization internally [16, 17, 46]. KM processes involve four dimensions—acquisition, transfer, application, and integration—which together fully explain the implications of KM. Knowledge acquisition includes an organization's capability to develop, compile, and store new knowledge, regardless of its source [17]. Knowledge transfer entails the distribution or dissemination between knowledge producers and users, whether organizations, units, or individuals, and includes both implicit and explicit knowledge [47]. Knowledge transfer plays an important role in CP, especially in the rapidly changing environment of the export industry, as it reflects a company's responsiveness and problem-solving ability in response to external markets [48, 49].

Knowledge application encompasses all the behaviors through which organizations and individuals use and apply acquired knowledge in the workplace, i.e., organizational learning, BP improvement, market reflection and marketing, technique and productivity improvement, all of which further translate the potential of new knowledge into improved business performance [14, 50]. Lastly, knowledge integration refers to how companies and organizations integrate new and existing knowledge, as well as how they replace outdated knowledge to reduce redundancy and increase consistency [16, 37, 51]. Knowledge integration can also involve creating, innovating, and otherwise exploiting intangible aspects of knowledge for new and exclusive organizational purposes [51]. In that way, those intangible resources become important assets for leveraging a competitive advantage and further integrating knowledge into companies' innovation cycles.

2.3. Business Processes

BPs consist of three dimensions: outside-in, inside-out, and spanning [17, 52-55]. Organizations have to be well-equipped in all three dimensions to effectively use their knowledge resources to improve their competitiveness [17, 53]. Outside-in refers to an organization's ability to predict market demands, convey its competitiveness to the industrial environment, collaborate with partners or supply chains, and respond quickly to market changes [17, 53]. By contrast, inside-out refers to the ability of an organization's internal processes to achieve excellent operations [17]. Such internal processes permeate every aspect of the organizational structure and dictate product and service innovations, logistics support, manufacturing techniques, customer services, financial management, cost control, human resource management, and other operational factors [17, 53]. Lastly, spanning is an organization's ability to integrate foreign processes with its internal management systems to develop flexibility, as well as to gather and analyze external knowledge, including information about market opportunities and potential threats [17].

2.4. Company Performance

Scholars such as Groza, et al. [56] believe that a comprehensive performance evaluation can truly reflect the performance of an organizational operation. There are many methods of performance measurement, for example, Balanced Scorecard (BSC) [57], Key Performance Indicators (KPIs) [58], DuPont Analysis (ROI) [59], and Activity-Based Cost Analysis (ABC) [60]. Among these, the BSC is widely used, including by many large enterprises in Taiwan. However, many scholars also believe that small and medium-sized enterprises (SMEs) only need to use part of the BSC [1, 61-63]. That is, it is adequate to simplify it into two aspects, financial and non-financial (service) [7, 31]. Significantly, according to the data of the International Trade Bureau of the Ministry of Economic Affairs of the Republic of China, most of the export trading companies that do not include manufacturing and production in Taiwan are SMEs (http://www.trade.gov.tw/English/). Therefore, this study integrates the views of previous scholars, and measures the performance of trading companies based on two sub-dimensions: financial and non-financial (service).

2.5. Research Model and Hypotheses

Based on the aforementioned literature review, a model is constructed to reveal the relationships between IC, KM, BP, and CP in Taiwan's export trade industry. The research model is presented in Figure 1. This section discusses the model's theoretical bases and presents the working hypotheses.

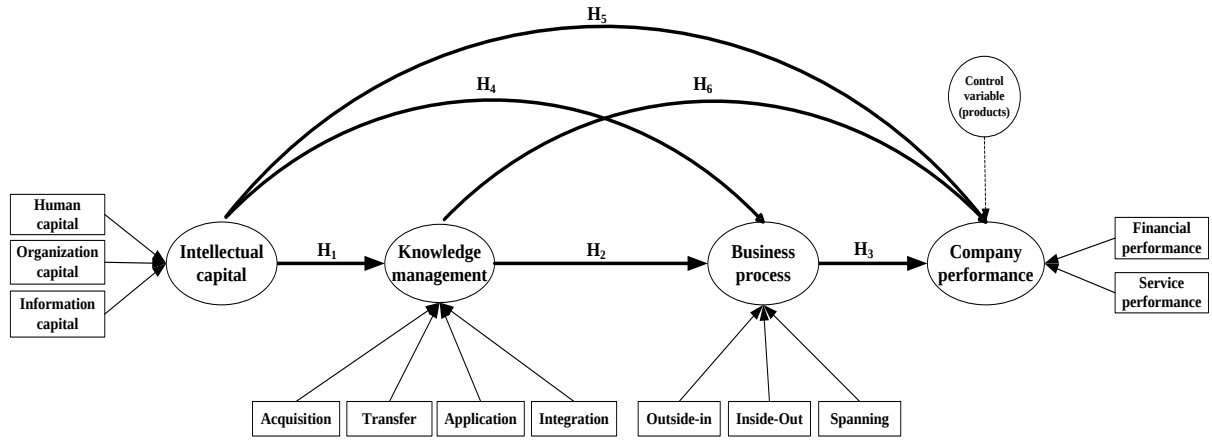

Figure 1.
Research model.

In accordance with the related literature and as illustrated in the model in Figure 1, we first explore the relationship between IC and KM. Many scholars have argued that the structure and culture of organization capital, employee skills, information infrastructure, and the application of information capital play key roles in the processes of acquiring and using knowledge, as well as enhancing organizational creativity [17, 19, 33, 64]. In sum, IC, with its three types of capital, can affect KM, as the first hypothesis articulates:

H_1: Companies' intellectual capital benefits their knowledge management.

Nonaka, et al. [65] posited that KM is an organization's most strategic resource since KM affects its operations and ability to maintain competitiveness. In that sense, KM may affect a company's operations before it affects its organizational performance. Accordingly, we proposed the second hypothesis:

H_2: Companies' knowledge management benefits their business process capabilities.

As scholars have pointed out, organizational performance depends not only on tangible and visible assets, such as human capital and equipment, but also on process capabilities within the enterprise [17, 35]. That relationship suggests that internal operational processes, including KM, are organizations' most precious resources [16, 24, 35, 52, 57, 66]. As such, we proposed a third hypothesis:

H_3: Companies' business process capabilities benefit their performance.

Lastly, prior studies have indicated that both IC and KM affect CP directly and that IC also affects BPs [14, 31], as captured by our three final hypotheses:

H_4: Companies' intellectual capital benefits their business process capabilities.
H_5: Companies' intellectual capital improves their performance.
H_6: Companies' knowledge management improves their performance.

2.6. Control Variables

The trade commodities are diversified [67] and the traders' application of business strategies may be affected by their export products [3, 68]. Therefore, the product type is used as the control variable when researching related issues in the export trade companies.

3. Research Design

The research model is a second-order research framework, and Chin, et al. [69] argued that structural equation modeling (SEM) is an appropriate analytical skill. For studies with a small sample size, Vinzi, et al. [70] suggested using partial least squares (PLS) as an analytical tool. PLS-SEM can be applied to both formative and reflective structures [69, 71] while allowing latent variables to be modeled as either formative or reflective structures. There are minimum requirements for sample size and residual distribution [69, 72]. The main variables of our research model are formulated as a second-order measurement model with formative indicators. When analyzing a scale-validated model, the sample size of the PLS-SEM needs to be 10 times the number of variables in the questionnaire [71]. Since PLS does not provide a significance test or interval estimation and supposes a low response rate, we performed a bootstrapping analysis using 1,000 subsamples [71, 73] to estimate the path coefficients, statistical significance, and relevant parameters, including means, standard errors, item loadings, and item weights. We evaluated the model in two steps: 1) assessment of reliability and convergent validity, 2) examination of discriminant validity.

We empirically test our hypotheses using a five-part questionnaire. In the first part, we gathered basic information about the nature of respondents' organizations in terms of product type, annual turnover, and number of employees. Three product types were included: 1) Computer, Communication, and Consumer Electronics (3C), and other technology products (3C and technology type). 2) Forging products, casting products, machining products, stamping products, and other mechanical products (traditional type). 3) Food, agricultural products, textiles, etc. (other type). To confirm respondent validity, the data also included the respondents' education, work experience, and company name. The other parts of the questionnaire consisted of items adopted from relevant previous studies. We used nine questions to explore the IC characteristics of the export trade industry and 12 questions to explore organizational KM. The questionnaire included nine questions that addressed BP. Meanwhile, we measured CP in two dimensions: financial and service performance. The integration of the BSC with the views of other scholars provided the basis for eight questions. The sources and the number of questionnaire items are shown in Table 1.

Table 1.
Sources of variables.

Variable	Items	Source
IC	9	Hsu and Sabherwal [14]; Bollen, et al. [36]; Kaplan and Norton [57]
KM	12	Cepeda and Vera [19]; Sabherwal and Sabherwal [21]; Joshi, et al. [47]; Simonin [49]; Shin, et al. [74]
BP	9	Ray, et al. [35]; Hooley, et al. [53]; Tallon [75]; Wade and Hulland [76]
CP	8	Kaplan and Norton [57]; Ittner, et al. [77]; Oliveira [78]; Olson and Slater [79]

Before disseminating the questionnaire, we had an expert panel of six CEOs, each with more than 10 years of practical export trade work experience, review the items to ensure their adequacy to reveal the factors critical to assessing the performance of export trade companies. The experts were:

1) A senior sales manager of a forging plant in northern Taiwan, who has a background in mechanical engineering and has worked in the industry for more than 20 years.
2) A deputy general manager of a machining plant in central Taiwan, who also has a background in mechanical engineering and has worked in the field for more than 20 years.
3) The owner of an export trade company in central Taiwan with more than 15 years of experience in quality management.
4) The owner of another export trade company in northern Taiwan with a background in electrical engineering and more than 35 years of experience in the field.
5) The senior marketing manager of an export trade company in southern Taiwan with a background in business administration and more than 10 years in the field.
6) A senior logistics manager of an export trade company in central Taiwan with a background in industrial engineering and more than 6 years in the field.

To ensure the content validity of the questionnaire, we conducted a pretest with 10 senior managers introduced to us by the Taiwan Import and Export Association to confirm the clarity and correctness of the semantic expressions.

3.1. Sampling Design

3.1.1. Sample Demographics

There are 323,013 trade companies, including manufacturers and traders, registered with the Taiwan Bureau of Foreign

Trade (Trade Magazine Summary, May 2020). We randomly selected 600 traders from the list of registered companies published by the Ministry of Economic Affairs in Taiwan. To avoid errors of deviation due to role ambiguity, we excluded companies with the dual characteristics of manufacturing and foreign trading from the sample, and ultimately distributed 458 questionnaires.

Since each variable constructed in this study involves BPs and corporate CPs, we targeted CEOs and managers as appropriate corporate respondents, to whom we sent letters inviting them to participate in the study. We received 112 valid responses for a response rate of 24.4%. Table 2 presents details of their demographics.

Table 2.
Sample demographics.

Company characteristics	Frequency	Percent	Respondent characteristics	Frequency	Percent
Product types			Gender		
3C and technology	6	5.4%	Women	59	52.7%
Traditional	56	50.0%	Men	53	47.3%
Others	50	44.6%			
Annual revenue (million NTD)			Age (years)		
<10	9	8.0%	< 30	20	17.9%
10–20	45	40.2%	30–40	63	56.2%
20–30	33	29.5%	40–50	25	22.3%
30–40	17	15.2%	> 50	4	3.6%
40–50	8	7.1%			
Number of employees			Work experience (years)		
<10	6	5.4%	<5	3	2.7%
10–20	35	31.2%	5–10	78	69.6%
21–30	38	33.9%	10–20	28	25.0%
31–40	28	25.0%	>20	3	2.7%
>40	5	4.5%			
			Education level		
			High school	18	16.1%
			Bachelor's	52	46.4%
			Master's	33	29.5%
			Doctorate	7	6.2%
			Other	2	1.8%
			Position		
			CEO/general manager	34	30.4%
			Management	49	43.7%
			Other	29	25.9%

Notable among the responses, companies with fewer than 40 employees represented fully 95.5% of the sample, and 92.9% of all companies reported a turnover of less than 40 million NTD. Export product types were mostly traditional and other types. The sample distribution indicates that, regarding staff size and turnover, the companies in the sample can be classed as SMEs, as they have similar characteristics to that population (http://www.trade.gov.tw/English/).

3.1.2. Non-Response Bias

With a response rate of 24.4%, we faced the risk of generating non-response bias during our analysis [80]. As an antidote, we followed the suggestions of Sheikh and Mattingly [81] and Whitehead, et al. [82] when carrying out the assessment for non-response. Briefly, we divided the respondents into two groups: an early response group (n = 81) and a later response group (n = 31). We performed a t-test focused on the basic information of the groups, including trade product type, number of employees, and annual turnover, which yielded t-values of 0.86, 0.32, and 0.42, respectively, without any significant difference between the groups. Since this test confirmed that the sample had no non-response bias, we considered the sample to be valid for the purposes of the study.

3.2. Common Method Variance (CMV)

CMV refers to the artificial covariant between predictor and criterion variables, due to their having a common data source (i.e., respondent or operating environment) and the conditions caused by the question itself. The phenomenon of induced covariance can produce confusing results that can lead to incorrect conclusions [83]. Therefore, in the early stages of the study design, we controlled for process methods and prevented the occurrence of CMV from the data source as much as possible. At the same time, to ensure that CMV would not occur during data analysis, we adopted Haman's one-factor test, as described by Malhotra, et al. [84]; Podsakoff, et al. [83], and others. Results showed a high correlation between variables, with a correlation coefficient of at least 0.77, meaning that no significant common variance emerged during analysis.

3.3. Scale Validation

PLS is particularly suitable for a formative structure and can accommodate several indicators within the model, largely because latent variables are modeled as formative constructs, while minimal demands are placed on sample size and residual distributions [69]. Given the small sample size, we also conducted a bootstrapping analysis with 1,000 subsamples [85]. The primary variables in our study were a second-order measurement, with formative indicators, and we evaluated the model in two steps: by assessing reliability and convergent validity and by examining discriminant validity.

For reliability, Cronbach's α value must be greater than 0.7 [86]. According to Chin [86]; Fornell and Larcker [87] and other scholars, convergent validity needs to meet three criteria: 1) all variable factor loadings should be larger than 0.7 and significant; 2) the composite reliability value of each construct should be greater than 0.8; and 3) the average variance extracted (AVE) value of each construct should be greater than 0.5. We assessed the discriminant validity between constructs by using the criterion that the square root of AVE for each construct should be greater than its correlations with all other constructs [87].

Table 3.
Convergent validity.

Subconstruct	Item	Item loading	Composite reliability	AVE	Cronbach's α
Human capital	3	0.91–0.92	0.94	0.85	0.90
Organization capital	3	0.85–0.87	0.89	0.67	0.83
Information capital	3	0.93–0.93	0.93	0.87	0.86
Knowledge acquisition	3	0.93–0.94	0.94	0.85	0.91
Knowledge transfer	3	0.90–0.92	0.92	0.85	0.83
Knowledge application	3	0.83–0.84	0.93	0.86	0.84
Knowledge integration	3	0.79–0.82	0.95	0.80	0.91
Outside-in	3	0.87–0.89	0.91	0.77	0.85
Inside-out	3	0.85–0.90	0.90	0.76	0.84
Spanning	3	0.90–0.93	0.94	0.85	0.91
Financial performance	4	0.90–0.93	0.94	0.84	0.91
Service performance	4	0.92–0.94	0.95	0.87	0.93

Note: AVE: Average variance extracted.

As Table 3 demonstrates, at p = 0.01, item loadings ranged from 0.79 to 0.94 after the standardization of each variable, AVE values for each construct ranged from 0.67 to 0.87, Cronbach's α values ranged from 0.83 to 0.93, and the composite reliabilities of each construct ranged from 0.89 to 0.95. These results demonstrate the high levels of reliability and convergent validity for all first-order constructs. As Table 4 shows, the correlation coefficients between the constructs were less than the square roots of their standardized AVE values, which indicates that all subconstructs also met the standards of discriminant validity.

Table 4.
Discriminant validity of subconstructs.

Subconstruct	HC	OC	IC	KA	KT	KU	KI	FA	IM	CO	FR	SP
HC	0.92											
OC	0.15	0.82										
IC	0.09	0.13	0.93									
KAC	0.08	-0.07	0.05	0.92								
KT	0.19	0.15	0.16	0.23	0.92							
KAP	0.24	0.25	0.24	0.10	0.20	0.93						
KI	0.17	0.13	0.20	0.07	0.21	0.23	0.95					
OSI	0.22	0.24	0.13	0.15	0.13	0.15	0.20	0.88				
ISO	0.18	0.09	0.19	0.14	0.31	0.26	0.18	0.28	0.87			
SPA	0.15	0.27	0.14	0.25	0.10	0.10	0.18	0.16	0.08	0.92		
FP	0.10	0.22	0.09	0.15	0.15	0.22	0.17	0.17	0.24	0.23	0.92	
SP	0.17	0.28	0.10	0.09	0.18	0.21	0.07	0.05	0.19	0.14	0.15	0.93

Note: Diagonal values are the square roots of the average variance extracted (AVE) for each construct; HC: Human capital; OC: Organization capital; IC: Information capital; KAC: Knowledge acquisition; KT: Knowledge transfer; KAP: Knowledge application; KI: Knowledge integration; OSI: Outside-in; ISO: Inside-out; SPA: Spanning; FP: Financial performance; SP: Service performance.

4. Results

We applied SEM to analyze the results generated with the research model in Figure 1. We overlaid the results from the PLS analysis on the research model and present them in Figure 2.

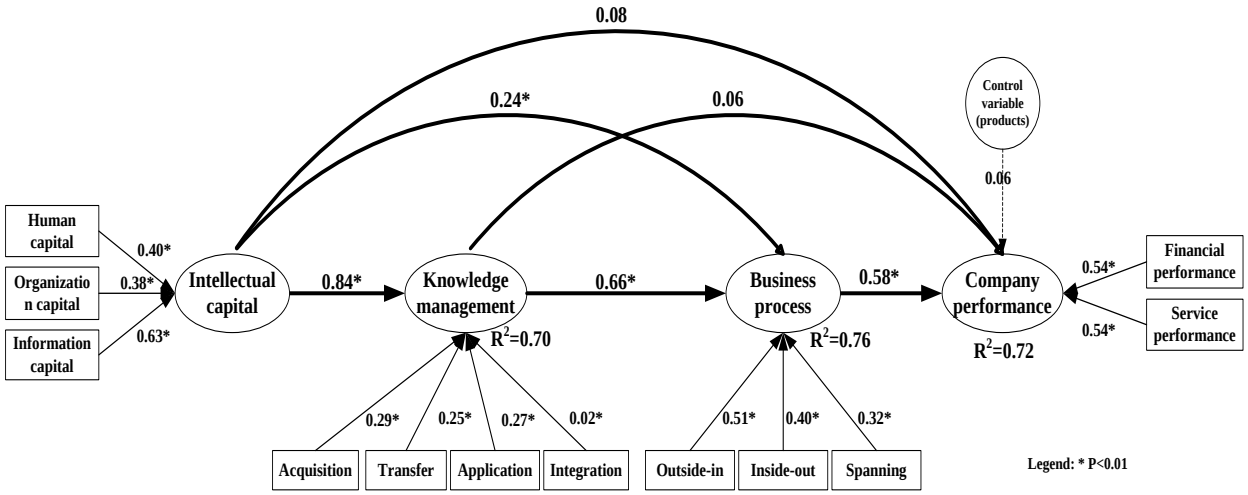

Figure 2.
Results of analysis.

The research model is a second-order analysis model and therefore contains the path analysis of the various hypotheses and the analysis of each subconstruct, as described in the following subsections.

4.1. Path Analysis and Hypothesis Testing

Among the IC components, information capital had the greatest contribution (path coefficient = 0.63), meaning that it plays the most important role in a company's IC. IC has a significant impact upon KM (path coefficient = 0.84) and BP (path coefficient = 0.24), but a non-significant one on CP (path coefficient = 0.08). Therefore, H1 and H4 were supported, whereas H5 was not, implying that in the export trade industry, IC alone cannot improve CP, although it can when mediated by the relationship of KM and BP. That dynamic explains why many companies invest in IC, especially in information capital, yet ultimately fail. In short, IC alone cannot be expected to significantly improve the performance of an export trade company.

KM has a significant impact on BP (path coefficient = 0.66), but not on CP (path coefficient = 0.06). As such, H2 found support, but not H6. Again, KM alone cannot be expected to significantly improve the performance of an export trade company. Lastly, BP exerts a significant impact on CP (path coefficient = 0.58), meaning that H3 found support.

With the positive impact of IC upon KM, IC has a 70% explanatory power over KM (R^2 = 0.70). IC is therefore a critical variable in explaining KM. KM also positively affects BP and, jointly with IC, has a 76% explanatory power over it. Moreover, BP significantly influences CP and, in conjunction with IC and KM, demonstrates a 72% explanatory power of CP (R^2 = 0.72). These results suggest that to enhance a company's performance, the company has to first invest in IC appropriately, especially in information capital, so that it cooperates with KM, as well as embed KM in BP to further influence CP significantly.

4.2. Measurement Model Analysis

4.2.1. Intellectual Capital

Comparing the weighting factors of the three types of IC, we observed weights for human capital (w = .40), organization capital (w = 0.38), and information capital (w = 0.63). The high weighting factor of information capital indicates that an information management system provides an important channel to communicate strategic information and competitive ability. As such, a company that can effectively control all of its internal and external resources via IT is better positioned to deploy and realize other forms of IC, including human and organization capital, even when the industrial market changes. These findings are consistent with prior perspectives on the effective management of IC through information systems. In short, capital investment in information infrastructure is critical to leverage a company's IC.

As for the influence of organizational and human capital on CP, our results are similar to those of Wu and Hu [17]. For the export trade industry, which consists of mainly SMEs, it is reasonable to expect that both dimensions of IC are significant. Therefore, if a company adopts the right configuration of human and organization capital, then it will also be able to benefit from its strategic BPs, as suggested by Wu and Hu [17].

4.2.2. Knowledge Management

Among the four dimensions of KM—acquisition, transfer, application, and integration—knowledge acquisition, transfer, and application have similar weight coefficients (w = 0.29, w = 0.25, and w = 0.27, respectively), whereas that of knowledge integration is slightly lower (w = 0.02). These results mean that knowledge obtained in practice contributes more to explaining the KM process. A possible reason why knowledge integration did not contribute significantly to KM is that the domestic export trade industry consists mostly of SMEs, and there is a lack of capability to provide comprehensive knowledge integration, especially as it applies to creation or innovation. The participating companies were capable of applying the obtained knowledge and converting, at best, part of it.

4.2.3. Business Processes

As noted, a company's operational processes involve three constructs: outside-in (w = 0.51), inside-out (w = 0.40), and spanning (w = 0.32). We observed that the weight coefficients of the three dimensions are roughly average and significant; that is, they all contribute to BPs nearly equally, though the weight coefficient of spanning capability is slightly lower, again possibly due to organization size. As such, human resources are often prioritized above marketing activities and internal operations, including domestic supplier development and supply chain management, whereas other relevant abilities are less likely to be integrated. However, that finding does not mean that spanning is unimportant; from a statistical viewpoint, the differences among the three weight coefficients are not large, meaning that outside-in, inside-out, and spanning are all important operational functions for trade companies.

4.2.4. Company Performance

The results indicate that for the export trade both types of CP have significant weight coefficients (financial performance, w = 0.54, service performance, w = 0.54). Clearly, financial performance is a significant measure of any business, although the trade industry is a service industry at its core and differs significantly from manufacturing, which focuses on production capacity and product performance, among other things. Therefore, high weights for those measurement constructs confirm that our sample was consistent with industry characteristics.

4.2.5. Summary

We found that, in the export trade industry, IC can effectively enhance organizational KM capability, yet that relationship does not translate into a positive effect on CP. If a company does not already have the capability to process KM, then IC might not produce returns in terms of CP. At the same time, BPs are collectively a key factor for success in the international trade industry and include products, services, cash flow, logistics, and information flow. Accordingly, BPs that support functions such as service quality, procurement efficiency, process flexibility, and delivery reliability are critical to a trade company's competitiveness. We also found that BPs constitute an important intermediary variable since it is only through BPs that the impact of IC and KM upon CP can occur. In sum, robust BPs are a precondition of leveraging IC and KM to improve CP. We also discovered that the control variable of product type has no significant effect on export trade CP (path coefficient = 0.06). A possible explanation is that the export trade industry is flexible and can adapt easily to fluctuations in the global business world. Unlike the manufacturing sector, it is not restricted by, for example, downtime pressure from plants.

5. Conclusion and Implications

Our study elucidates the impact of critical factors on the performance of Taiwan's export trade. As our analysis has shown, IC and KM are critical to enhancing CP. However, even if trade companies implement IC and KM, it is only through the intermediary factor of BP that both IC and KM can effectively influence CP. Simply put, export trade companies have to consider adjustments to BPs while simultaneously implementing IC and KM.

As for the three types of capital related to IC, information capital must be prioritized. Due to rapid changes in the global competitive environment and the revolution in IT, export traders face extreme challenges in terms of global business competition. IT can change business models, even those of SMEs, toward e-commerce and trading platform changes, or else Internet marketing and global logistics integration. For export traders, continuous innovation in IT is fundamental to their company's operation and governance. Concerning the four processes of KM, the most important for export traders is knowledge acquisition. As our literature review and sample demographics have revealed, export traders are generally SMEs. In other words, the size of these companies, their number of employees, and amount of capital are relatively small, which complicates how they complete the fourth process of KM. The advantage of SMEs, however, is organizational flexibility, since they do not have to navigate a bureaucratic organizational structure; when they are faced with changes in the business or trading environment, they can quickly adapt and change their mode of operation. Therefore, they can gain the most up-to-date knowledge quickly from the external market.

According to the results of our analysis, without the mediation of BP, IC and KM do not exert a significant influence on CP. Regarding the three processes of BP, because most export traders are SMEs, their organizational operations are relatively flexible and responsive. Export traders enhance their outside-in processes to counter the treacherous and changeable external business environment, in which responding quickly is vital. Since export products are diverse, the type of products exported is relatively insignificant. Therefore, assessing the CP of export traders in terms of finances and services is highly consistent with their status as SMEs. Our study has some implications for practitioners and researchers. First, when companies adopt IC, they need to consider the appropriate proportion of each type of IC in which to invest, according to the size of their organization. The implementation priorities should proceed from information capital to human capital to organization capital. Furthermore, export traders should enhance their KM processes in parallel with IC, and the focus of such enhancements should be on the extraction of more detailed external and internal information. However, that does not mean that the conversion, application, and integration of knowledge are unimportant, only that they are less so, given the organizational characteristics of SMEs. Therefore, we suggest that to enhance KM the first priority should be knowledge acquisition via IT, followed by the creation of a sound knowledge base. Because knowledge integration is the least significant aspect, it should not be an immediate consideration if the export trader is not of considerable size. Because IC and KM influence intermediary BP, poor responsiveness negatively affects CP. Therefore, we suggest that in addition to adjusting BPs in response to changes in the business environment, export traders should also adjust their IC and KM accordingly. As for the research implications, IC and KM can be described as a company's path to improved performance. However, one oft-neglected factor is that an organization's internal BPs perform a key intermediary role in affecting CP.

Therefore, when conducting studies on the topic, researchers must include other important variables to increase the explanatory power of CP. Applying the results to other industries and sectors—for instance, medicine, 3C manufacturing, agriculture, government, or military—requires caution and the combination of the methods employed in this study with qualitative techniques, longitudinal and in-depth observations. A case study could yield more generalizable results that could inform organizations' management of IC and KM.

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