The Supporting Actor in Enterprise Executives' Decision-making: A Competitive Intelligence Perspective

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ABSTRACT

The purpose of this study is to investigate empirically how competitive intelligence (CI) impact executives' decision-making support and how decision-making subsequently influence strategic benefits expansion in organization. A questionnaire survey was conducted from 126 enterprise executives in Taiwan. Results indicate that competitive intelligence comprises three separate constructs: the process of CI, the product of CI and prior knowledge. This study is the first effort to examine empirically on a key aspect of CI. It provides a concept to both academicians and practitioners on how to conduct a comprehensive quantitative strand in terms of competitors, competitive environment, situation and strategy through proactive CI activities.

Keywords: competitive intelligence, decision-making support, organizational strategic benefits

Introduction

Competitive intelligence (hereafter CI) is the component of business intelligence aimed at gaining strategic advantage, as proposed by Porter [40] [42]. Per se, CI includes competitor intelligence as well as intelligence collected on customers, suppliers, technologies, environments, or potential business relationships [20] [26] [42]. CI is regarded as a system of environmental scanning which integrates the knowledge of everyone in the company [1]. The concept of CI has a rich heritage [1] [33] and can be traced back over 5,000 years of Chinese history [1] [48]. Porter's [36] seminal work on strategic management and competitive analysis, which focused on tracking specific competitor behavior and linking competitor analysis to competitive strategy, touched off an avalanche of publications on CI [39] [42]. CI is not just market research or business scanning but both a process and a product (intelligence) [1] [22] [24] [32] [45]. Moreover, CI is also a process of knowing what the competition is up to and staying on step ahead of them, by gathering information about competitors and, ideally, applying it to short and long-term strategic planning [19] [50]. Kahaner [32] argued that CI is conceptualized as a process of monitoring the competitive environment, with a goal to provide actionable intelligence that will provide a competitive edge to the organization.

Prior studies have paid a great attention to understanding such as a empirical study on the construct exploration, validation and equivalence [42]; a multiphase precedent to marketing strategy [15]; assessing the impact of using the internet [50]; CI process and tools for analysis [8] and so on [10] [36], which probably encourage current and potential academicians and practitioners to take an innovative research vision on those broad CI subjects. Although their findings are meaningful, the actual supporting actor of CI in executives' decision-making is still inconclusive. The need for organizations to be aware of developments in their business environment ought to be a concept that is well understood, appreciated, and well represented in the literature [1]. Porter [40] asserted that whilst companies were carrying this activity out informally, in his opinion this was nowhere near sufficient. He also advocated the need for a structured intelligence process at all times in order to continuously and systematically identify business opportunities and threats.

In order to consolidate aforementioned relationship, this study provides a concept to both academicians and practitioners on how to conduct a comprehensive quantitative strand in terms of competitors, competitive environment, competitive situation and competitive strategy through proactive CI activities. It is also necessary to understand how factors related to CI and situational factors (e.g., environmental conditions and competitor situation) that influence the causal relationship between decision-making support and organizational strategy benefits. A review of previous studies affords no model to represent how to using the CI as a supporting actor for executives' decision-making. The purpose of this research is to develop a conceptual framework that incorporates aspects of theory of behavioral decision-making to provide a deeper understanding of the relationship between executives' decision-making support and organizational strategic benefits. We outline our research purposes as follows:

(1) To investigate the concept of competitive intelligence (CI) and the support of CI on the

decision-making stage.

(2) To examine the influences of CI on decision-making support and organizational strategic benefits.

Literature Review

Competitive Intelligence

The formal exploration process of the marketing strategy paradigm has been linked with the environmental scanning literature as a basis for gathering and processing the information and the information processing theory paradigm [11] [15]. In fact, the importance of environmental scanning has often been linked to firm performance [13] [15] [25]. Belich and Dubinsky [3] summarized the integration of environmental scanning and information processing for effective strategic decision making as "The ability to develop adequate organizational mechanisms for information acquisition, dissemination, and effective utilization may be precursors to identifying and effectively adapting to major market shifts.".

CI refers to actionable information about external business environment that could affect a company's competitive position [22]. CI is not a euphemism of industrial espionage or economic espionage [38] [41]. A key maxim of CI is that 90% of all information that a company needs to make critical decisions and to understand its market and competitors is already public or can be systematically developed from public data [34] [50]. Blankenship et al. [4] posited that CI involves three major functions: the collection and storage of data, the analysis and interpretation of data, and the dissemination of intelligence. Saayman et al. [38] verified the process of CI and comprised six key stages which in terms of planning and focus; collection; analysis; communication; process; organizational awareness which suggested by Calof and Dishman [7], to measure the direct impact on all of the various phases in a model of CI process and structure, the process can have a discrete beginning and end or it can be ongoing and iterative, designed to gather and disseminate information throughout an individual organization, or ultimately, throughout an entire business ecosystem [50].

Decision-making support

Simon [45] [46] proposed a three-phase process of decision making: the intelligence phase, the design phase and the choice phase. Executives are especially dependent on doing the first of these, the intelligence phase as called the CI phase well. The current competitive environment may be even more volatile and unpredictable due to increased globalization, mergers and acquisitions, and an explosion in technology applications and new business practices [51]. In particular, executives need the following supporting functions for their decision-making: (1) an early warning of threats and opportunities; (2) support for the strategy development process; (3) assistance within instilling a sense of urgency and motivation toward action; (4) support for strategic and operational decision making [43]. Moreover, enterprise executives' cognitive limits require some prioritization of information [45]. Enterprise executives need accurate, timely information in order to make effective decision. Attention is often focused on key subsets of the available data, while some potentially external important data sources are ignored [28].

Additionally, strategic decisions in many firms are often influenced by design characteristics of the firm's scanning systems [52]. Daft et al. [13] claimed that as uncertainty increased, information processing activities raised. Environmental uncertainty therefore leads to increasing information processing activities within firms [11] [13]. Regardless of the complexity and uncertainty inherent in any environment, information processing (a firm's ability to adapt to existing market conditions) is largely dependent on its ability to process relevant market information effectively [18]. Thus, the decision-making support is crucial to certain strategic decisions which may instrumental to the growth of strategic effectiveness in organization.

Organizational Strategic Benefits

Technologies such as decision support systems are helpful in solving many kinds of problems, especially those that are based on quantitative data and/or are tactical in scope [43] [51]. Sauter and Free [43] asserted that decision makers can benefit greatly from a tool that tracks and organizes qualitative and other nebulous information. Such a tool would help cultivate and leverage an organization's intellectual assets to help users address decision making in a more informed fashion. Glueck and Jauch [45] examined several studies (e.g. [25] [37]) and determined that in all of the studies that they reviewed, a positive correlation between environmental assessment and performance was demonstrated. A considerable amount of research has emerged on the subject of CI and its relationship to the strategic planning process. The literature based on CI often stresses its importance on organizational performance [15] [50]. CI supports a company a competitive advantage and better organization performance by permitting better business planning; new product introduction success and new market development [1] [13] [14] [26] [40]. Brockhoff

[5] contends that better information, including competitor technological intelligence information is needed to better support strategic decision [13] [14] [50].

It is commonly agreed that CI directly impacts the bottom line of a company, researches tried to measure the CI's value to organizations although a proof for this assumed impact could not be easy identified [6] [9] [30] [42]. The major questions that researchers in the field of CI have tried to answer but still face whether companies are able to quantify the benefits. The empirical part of this study does not solely focus on issues like the development of CI in Taiwan or the organizational circumstances of CI practices in Taiwan companies, the review of the existing CI literatures yielded the blurred in the existing literature that this study wants to close. As a matter of fact, Both CI academicians and practitioners around the world have to deal with the challenge of justifying their work without being able to measure the outcomes of their activities. In the current academic literature a few attempts were made to fill this gap but they were not very successful [9] [10] [15] [42].

Research Framework and Hypotheses

Doll and Torkzadeh (1991) described a system-to-value chain of system success constructs [16]. The constructs vary from beliefs, to attitudes, to behavior (system-use), to the social and economic impacts of IT. The system-to-value chain suggested an alternative role for the usage construct in a downstream research agenda – as an independent variable [16] [50]. Doll and Torkzadeh [17] adapted the multidimensional measure of system-use which is identified by Hirschhorm and Farduhar [31] to measure downstream impact of system on work. They asserted that a multidimensional system-use measure enables investigation into the patterns and extent of system usage along organizationally relevant dimensions [17] [50]. In a similar vein, this study examines the downstream effects of CI on decision-making support and its subsequent effects on organizational performance (Fig. 1).

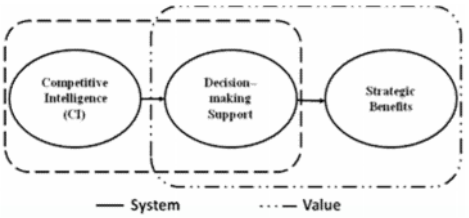

Fig.1 Research Framework

This research attempts to propose a model of decision-making support with a CI perspective [2] [9] [15] [30] [42]. Therefore, we modify the model as Fig. 2.

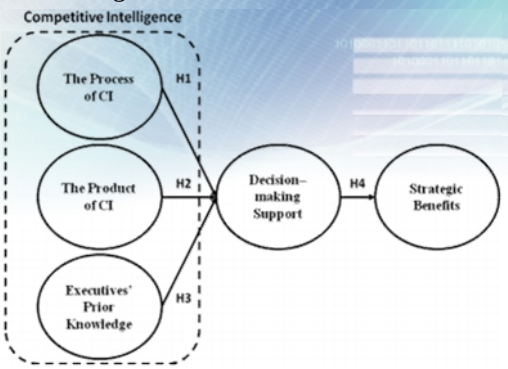

Fig.2 Research Framework after modified

The process and product within CI activities and their impacts on decision-making support are measured using the variables adapted from various studies and research on the functions of CI [9] [10] [30] [32] [42]. CI is measured in terms of process [9] [15] [42], product [19] [22] [24] [26] and executives' prior knowledge [35] [44]. Since the decision-making support is a critical aspect, it would be essential to measure the rapidity of decision-making support and the accuracy of decision-making support [43] [51]. The subsequent organizational influence of decision-making support is measured according to three strategic benefits: (1) revenue prospect; (2) cost evaluation and (3) managerial effectiveness [47] [50].

Hypotheses

Strategy is a framework within which decisions are made, reflecting the future of an organization and the direction which it should take [2]. Feurer and Chaharbaghi [21] discussed how the formulation of competitive strategies are developed using a structured process which requires a knowledge base of external environment together with an understanding of the potential impact of different strategies. They also identified another important factor in the formulation of strategy, is to reflect the dynamics of change in the market or industry [21]. The development of strategies can, and should, rest heavily on the current market situation without considering all potential which could cause the failure of a strategy. Although there is an extensive body of literature on strategic planning and strategy formulation, there is still a lack of a suitable framework, which can provide the basis for integrating CI into the decision-making support process. Badr et al. [2] examined four stages of the strategic decision making process and its relationship with CI. According to well-established theories and previous empirical studies in CI [2] [9] [22] [30], the process of CI constructs consists of four dimensions: (1) setting strategy objectives; (2) strategic analysis; (3)

strategy formulation; and (4) implementation/control [2] [9] [15]. Therefore, the first hypothesis of this study is:

H1. *The process of CI will have direct influence on decision-making support.*

In Teo and Choo [49] study, the product of CI construct consists of two dimensions: primary and secondary product. Primary product of CI is defined as the gathering of intelligence specifically for the project at hand. Secondary product is defined as the research for available intelligence, already gathered for some other purpose [46]. As the literature review on the product of CI, the primary product is a priority which needed to acquire for executives' decision-making support (e.g. patent information and new product/service/customer feedback information). The secondary product is a necessary to get which may benefit a firm in a long term business strategy formulation. Teo and Choo [50] collected the major related CI products that a firm may study and evaluation for executives' decision-making support. Thus, the following hypothesis is put forth.

H2. *The product of CI will have direct influence on decision-making support.*

No longer can management use intuition alone to drive their decision making. Rather, management needs systematic support regarding information external to the organization as the basis of decision making even when such data are qualitative in nature [43]. Executives' prior knowledge is also critical importance [44]. Conceptually, executives' prior knowledge is expected to moderate the effect of decision-making support on organizational strategic benefits. It is often important for CI to be contributed to the executives in their decision-making support and even more importantly, to the top management so that strategic decision making can be improved. Hence, it follows the following hypothesis.

H3. *Executives' prior knowledge will have direct influence on decision-making support.*

The strategic benefits of improved decision-making support are indicated by revenue prospect, cost evaluation and managerial effectiveness. These strategic benefits improve the overall performance of an organization [47]. CI supports a firm a competitive advantage through revenue prospect [22] [32]. Subramanian and IsHak [48] claimed that firms having advanced systems to monitor their competitors' activities exhibited greater profitability. By using CI, decision-making support makes it possible to take advantage of the cost evaluation of streamlining the supply chain to maximize competitive profit. The application of CI can also lead to cost evaluation in business process. Managerial effectiveness is also enhanced through the use of CI, which is positively related to firm performance. Improved decision-making support through CI activities allows better business planning, speed of decision-making and improved decision-making accuracy. Customer relationships can be built or strengthened though the improved convenience of on-demand access to essential information. Consequently, it is expected that better CI information would enhance organizational flexibility, responsiveness to customer needs and production operations, decision making speed and accuracy, and improving forecasting accuracy [50]. Therefore, the following hypothesis is proposed.

H4. *Decision-making support through CI activities will have direct influence on organizational strategic benefits.*

Method

Operationalization of variables

Table 1 summarizes the operational definitions of research constructs and their citation. Minor revisions of these constructs were performed in order to meet our study context.

Table1. Definition of study construct

Variables	Definition	Source
The Process of CI	To collect, store, analyze, and provide access to data to help companies make better business decisions	[2][9][10][11] [42]
Setting Strategic Objective	Strategic objectives are what the company want to achieve	[2][9][10][42]
Strategic Analysis	Strategic analyst would consider related information	[2][9][10]
Strategy Formulation	Concerns the future position of products and markets	[2][9][10]
Implementation and Control	A planned and thorough implementation plan is vital to the ultimate success of any strategy	[2][9][10]
The Product of CI	An actionable information about the external business environment that could affect a company's competitive position	[19][22][24] [30][32][34]
Primary Research	The gathering of new intelligence specifically for the project at hand	[22][24][26] [42][50]
Secondary Research	The available intelligence, already gathered for some other purpose	[22][24][26] [42][50]
Prior Knowledge	The supporting intelligence	[44][45][46]

	for executives' decision-making	
Industrial Knowledge	Executives' accumulated experience	[44][45][46]
Special Interest	Executives' personal intuition	[35][44][45] [46]
Decision-making Support	To support ad hoc decisions as well as some routine analysis	[43][45][46] [50][51]
Rapidity of Decision-making Support	The time between when a decision maker recognizes the need to make some decision to the time when he or she renders judgment	[43][50][51]
Accuracy of Decision-making Support	The decision is evaluated as being right or wrong in a situation	[43][50][51]
Organizational Strategic Benefits	To understand the operating conditions of enterprise, the organizational performance measurement within the assessment of strength and weakness	[40][47] [50][51]
Revenue Prospect	To provide a clear financial performance indicators, including market share, profit margin and return of interest	[47][50]
Cost Evaluation	To provide a clear financial performance indicators, including the material cost, direct cost and indirect cost	[47][50]
Managerial Effectiveness	Under the certain resource inputs, providing a clear measure of performance indicators, including customers, suppliers, business partners, demand satisfication	[47][50]

Sample and procedures

In this study, we would like to investigate the impact of decision-making support through CI activities. Therefore, the executives chosen were drawn from NCCU Global EMBA program. The companies included multinational companies and local companies. A questionnaire survey was used to collect data for this study. The questionnaire was first pre-tested with one professor and five doctoral students. Modifications were made and the revised questionnaire was pilot-tested with three senior executives in local companies. Since there were no major comments, the questionnaire was deemed ready for data collection. The questionnaires were sent to 200 executives via e-mail. A follow-up e-mail was made 2 weeks later to non-responding firms.

Table 2 is a list of demographic analysis. In this survey, the number of total respondents is 200 (100%), the number of actual collected sample is 128 (64%) and the number of valid questionnaire sample is 126 (63%), respectively.

Table2. Respondents' demographics (N***=126)

Category	Basic information of respondents	N***	%
Gender	Male	98	77.8%
	Female	28	22.2%
Job title	Chairman, CEO, COO, President, GM, Vice President	39	31.0%
	Associate Vice President, Senior Manager, Manager	21	16.7%
	Assistant Manager, Supervisor, Others	66	52.4%
Work seniority	Below 5 years	23	18.3%
	6 ~ 10 years	30	23.8%
	11 ~ 15 years	20	15.9%
	16 ~ 20 years	23	18.3%
	Above 20 years	30	23.8%
Education	Under university	1	0.8%
	University	73	57.9%
	Master above	52	41.3%
Enterprise scope	Under 50	25	19.8%
	51 ~ 100	7	5.6%
	101 ~ 500	19	15.1%
	501 ~ 1,000	14	11.1%
	1,000 Above	61	48.4%
Industry sector	Information technology	58	46.0%
	Finance	14	11.1%
	Electrical and Electronics	19	15.1%
	Manufacture	9	7.1%
	Trade	10	7.9%
	Others	16	12.7%
Firm age	Below 5 years	16	12.7%
	6 ~ 10 years	10	7.9%
	11 ~ 15 years	15	11.9%
	16 ~ 20 years	11	8.7%
	20 years Above	74	58.7%

N*: Number of survey = 200
N**: Number of collected = 128 (64%)
N***: Number of valid questionnaire = 126 (63%)

Result

Descriptive statistics

Hair et al. [28] recommended an acceptance level of 0.7 for the composite reliability. As summarized in Table 3, the composite reliability values of all constructs range from 0.789 to 0.914 in our model were greater than 0.70 suggested by Bagozzi and Yi [6] and meet this criterion. For convergent validity, two criteria should be met as suggested by Fornell and Larcker [22]. First, all of the factor loadings should not only be significant but also exceed 0.5. Second, average variance extracted (AVE) of each construct should exceed the variance due to measurement error for that construct (i.e., AVE should be greater than 0.5). The values for average variance extracted from each construct (ranging from 0.512 to 0.774) also exceeded the threshold level (0.5) and all item loadings ranging from 0.636 to 0.912 are significant at the five-percent significance level, indicating convergent validity.

Table3. Summary of construct loadings and reliability

Factors	Items	Loading	Mean	S.D.	AVE	Composite reliability	Cronbach's Alpha
SSO	SSO2	0.723	4.065	0.818	0.552	0.832	0.730
	SSO4	0.734					
	SSO5	0.765					
	SSO6	0.750					
SA	SA2	0.636	3.97	0.753	0.512	0.806	0.677
	SA4	0.689					
	SA5	0.811					
	SA6	0.714					
SF	SF2	0.712	3.890	0.793	0.555	0.789	0.603
	SF3	0.742					
	SF4	0.780					
IC	IC1	0.755	3.873	0.836	0.517	0.811	0.688
	IC2	0.719					
	IC3	0.721					
	IC5	0.679					
PR	PR4	0.797	4.000	0.770	0.690	0.870	0.775
	PR5	0.828					
	PR6	0.866					
SR	SR2	0.817	3.803	0.827	0.710	0.880	0.796
	SR6	0.866					
	SR7	0.845					
IK	IK1	0.804	4.237	0.635	0.754	0.902	0.835
	IK2	0.885					
	IK3	0.912					
SI	SI1	0.859	4.437	0.887	0.774	0.911	0.854
	SI2	0.894					
	SI3	0.885					
RDS	RDS1	0.808	4.153	0.804	0.696	0.873	0.781
	RDS2	0.883					
	RDS3	0.810					
ADS	ADS1	0.797	3.973	0.711	0.680	0.864	0.783
	ADS2	0.874					
	ADS3	0.800					
RP	RP3	0.736	3.775	0.761	0.668	0.889	0.832
	RP4	0.812					
	RP6	0.894					
	RP7	0.820					
CE	CE2	0.762	3.775	0.773	0.638	0.914	0.886
	CE3	0.806					
	CE4	0.785					
	CE5	0.779					
	CE6	0.837					
	CE7	0.824					
ME	ME6	0.788	3.943	0.768	0.675	0.892	0.839
	ME7	0.843					
	ME8	0.870					
	ME9	0.781					

* SSO = Setting Strategic Objectives. SA = Strategic Analysis. SF = Strategy Formulation. IC= Implementation and Control. PR =Primary Research. SR=Secondary Research. IK = Industrial Knowledge. SI = Special Interest. RDS = Rapidity of Decision-making Support. ADS = Accuracy of Decision-making Support. RP = Revenue Prospect. CE = Cost Evaluation. ME = Managerial Effectiveness.

Discriminant validity evaluated the extent to which a construct and its indicator variables differed from another construct and its indicator variables [7]. The square root of the AVE should be greater than the correlations between the construct and other constructs. Table 4 presents the correlations among constructs, with the square root of the AVE on the diagonal. The correlation between each pair of constructs was less than the corresponding square root of average variances extracted (diagonal values), providing evidence of discriminant validity.

Table4. Descriptive statics and correlations among study variables

	SSO	SA	SF	IC	PR	SR	IK	SI	RDS	ADS	RP	CE	ME
SSO	**0.743**												
SA	0.684	**0.715**											
SF	0.522	0.637	**0.745**										
IC	0.577	0.687	0.536	**0.919**									
PR	0.426	0.374	0.391	0.496	**0.831**								
SR	0.459	0.428	0.342	0.410	0.442	**0.843**							
IK	0.248	0.312	0.206	0.282	0.195	0.268	**0.868**						
SI	0.424	0.326	0.283	0.360	0.381	0.294	0.375	**0.880**					
RDS	0.507	0.520	0.383	0.501	0.428	0.430	0.316	0.306	**0.835**				
ADS	0.488	0.466	0.469	0.493	0.504	0.382	0.220	0.417	0.649	**0.825**			
RP	0.453	0.527	0.398	0.572	0.362	0.446	0.198	0.291	0.462	0.521	**0.817**		
CE	0.468	0.543	0.346	0.578	0.412	0.456	0.263	0.280	0.564	0.446	0.755	**0.799**	
ME	0.469	0.484	0.419	0.493	0.429	0.541	0.273	0.313	0.601	0.571	0.576	0.638	**0.822**

* SSO = Setting Strategic Objectives. SA = Strategic Analysis. SF = Strategy Formulation. IC= Implementation and Control. PR =Primary Research. SR=Secondary Research. IK = Industrial Knowledge. SI = Special Interest. RDS = Rapidity of Decision-making Support. ADS = Accuracy of Decision-making Support. RP = Revenue Prospect. CE = Cost Evaluation. ME = Managerial Effectiveness.

* Diagonal elements (in bold) are the square root of the average variance extracted (AVE). Off-diagonal elements are the correlations among constructs. For discriminate validity, diagonal elements should be larger than off-diagonal elements

Structural modeling analysis

Fig.3 shows the summary of the structural model resulting from the PLS analysis. This table sets out the explained variance by model (R^2), the standardized path coefficients (β), and t-values observed with the level of significance achieved from the bootstrap approach. The results showed that the process of CI had a significant effect on decision support (β=0.438, p<0.001) and also the product of CI (β=0.256, p<0.001), supporting hypotheses H1 and H2 (as illustrated in Fig.3). The results also showed that decision support had a significant, direct influence on strategic benefit (β=0.655, p<0.001), hypothesis H4 supported. Moreover, prior knowledge had a influence (β=0.123, p<0.01) on decision support, hence, H3 were also supported.

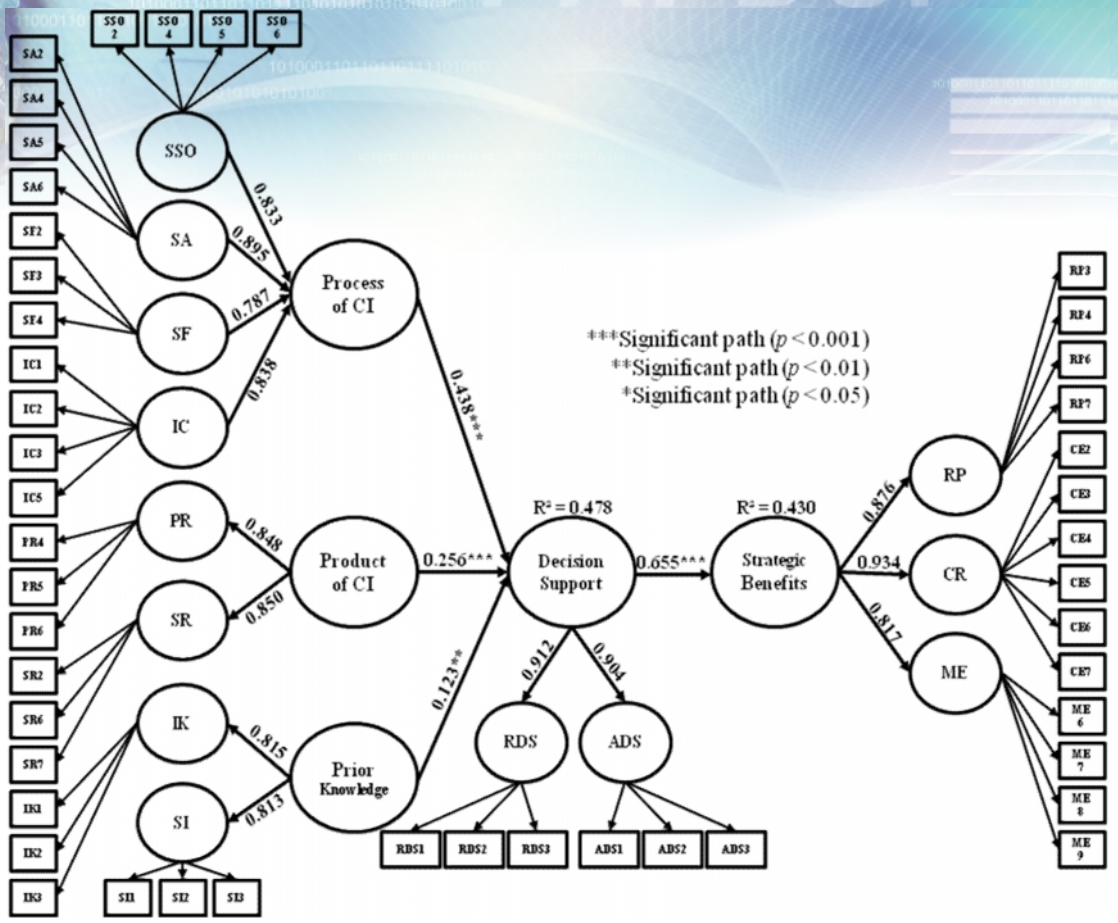

Fig.3 Results of structural modeling analysis

Conclusions

While this paper illustrated the use of CI as a supporting actor in enterprise executives' decision-making, it would be of use to any organization pursuing strategic or competitive decision-making support. Further, the model provides enterprise executives accessing to the information earlier than other forms of data gathering since the model encourages executives to enter information early, and certainly before rules of statistical significance would apply. This, in turn, allows the enterprise executives to act upon the information before competitors have access to it or before it could be damaging in the eyes of customers, employees, or constituents.

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