A Framework for Strategic Intelligence in Complex Organizational Systems

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Abstract

Given the current environment of volatility, uncertainty, complexity and ambiguity (VUCA) companies are increasingly depending on strategic intelligence to help them take decisions and become increasingly competitive. The aim of this study is to create and test empirically a strategic intelligence in complex organizational systems model that comprises environmental scanning, data integration, analytical capability, leadership cognition, and adaptive executing of actions. The research uses a cross-sectional survey of 214 professionals in the logistics, manufacturing, financial and technological sectors with quantitative methods such as exploratory factor analysis and multiple regression. Results show that there is a high level of significance in both analytical capability and leadership cognition in relation to organizational performance with data integration being a mediator. The results offer valuable inputs from both theoretical and practical perspectives with the provision of a heart of a model of strategic intelligence that is multi-disciplinary and has been validated.

Keywords: Strategic Intelligence, Organizational Complexity, Decision-Making, Data Analytics, Leadership, Performance

1. Introduction

Global markets are becoming more complex, impacted by digital transformation, geopolitical dynamics and technological advancements, and this has dramatically changed the way organizations operate. The linear logic with past data of traditional decision making models are not enough to take care of dynamic systems in organizations today.

In an era overflowing with information, the ability to comprehend, analyze and make decisions based on the vast amount of information around strategic intelligence has become critical for the ability of organizations to manage and make sense of large datasets. Realises that it involves data analysis, good judgement and making general observations about organisations in order to take on uncertainty and complexity.

The objective of the present paper is both to develop and empirically test a model for strategic intelligence for two purposes: to enrich the academic literature and to aid managerial practice.

2. Literature Review

2.1 Strategic Intelligence

This study explores Global Advanced Analytical (GAA) and Strategic Intelligence (SI) integration to support decision-making in volatile business environments.The research focuses on an advanced analytical framework—Global Advanced Analytical (GAA) and Strategic Intelligence (SI)—with the assistance of which organizations are equipped to manage the decision-making process in volatile business environments (Paiuc et al., 2024). Incorporating insights from machines and humans, companies can build a "Strategic Intelligence Architecture" that combines objective data analysis with nuanced organisational decisions (SAFAK, 2025a, 2025b). This synergy creates strong frameworks for decision making, AI serving as an analytical machinery with emotional and ethical judgement serving as a crucial moderator with respect to complex strategic decisions (Can, 2025a, 2025b). Moreover, in these cultures, effective leadership must possess the ability to get rid of data-driven observations and create them humanly, ensuring that the use of algorithms is grounded in their wider picture and organizational values of sustainable performance and ethics (Can, 2025a, 2025b). However, seamless integration of these systems is essential, and this process needs to be balanced with important human supervision to minimize any potential limitations or bias inherent in algorithms and to guarantee transparency within the decision-making pathway (Singla et al., 2026a, 2026b).

3. Research Objectives

To build an integrated Strategic Intelligence system.

2. To study on the relationship between strategic intelligence component and organizational performance.

3. To know the factors which are most influential in strategic decision making.

4. Methodology

4.1 Research Design

The research used in this study is quantitative with a cross sectional approach. A structured questionnaire was given to various professionals in different sectors for data collection.

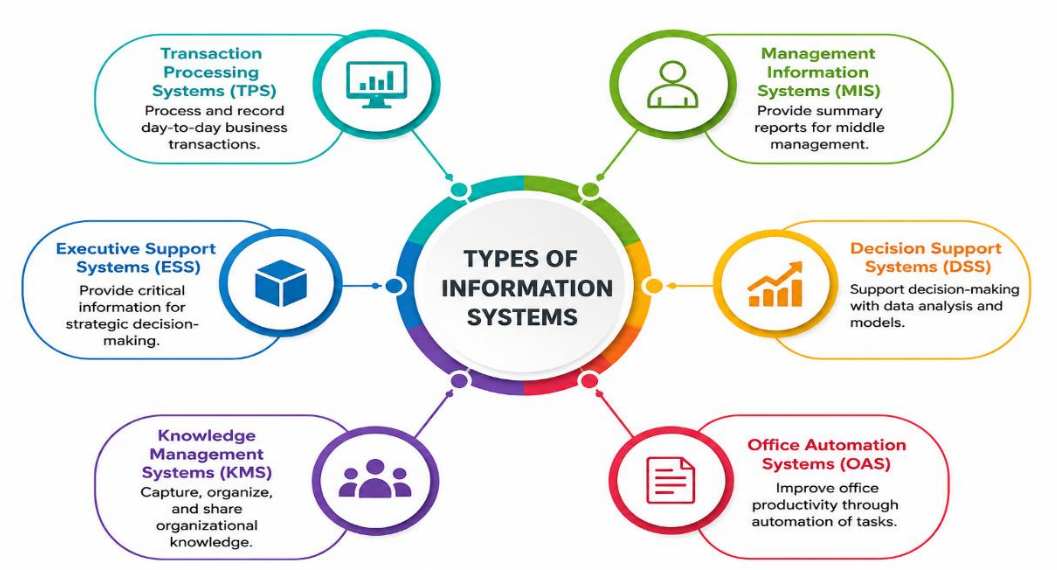

Figure 1: Types of Information Systems

This diagram shows the major types of information systems employed within organizations, which are: 1)Transaction Processing Systems (TPS), 2)Management Information Systems (MIS), 3)Decision Support Systems (DSS), 4)Office Automation Systems (OAS), 5)Executive Support Systems (ESS), and 6)Knowledge Management Systems (KMS). These systems facilitate various types of organizational functions, such as transaction processing, office automation, management information and decision making.

4.2 Sample and Data Collection

- Sample Size: **214 respondents**
- Industries: Logistics (30%), Manufacturing (25%), Finance (20%), Technology (25%)
- Geographic Scope: Asia and Middle East
- Sampling Technique: **Purposive sampling** (targeting managers, analysts, and executives)

4.3 Measurement Variables

The study measures five independent variables and one dependent variable:

Variable	Description
Environmental Scanning	Monitoring internal and external environment
Data Integration	Combining multiple data sources
Analytical Capability	Use of analytics and AI tools
Leadership Cognition	Decision-making ability of leaders
Adaptive Execution	Ability to implement decisions
Organizational Performance	Efficiency, growth, and competitiveness

4.4 Instrument Design

- 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree)
- 30 items across all constructs
- Reliability tested using Cronbach's Alpha (>0.78 for all variables)

4.5 Data Analysis Techniques

- Descriptive Statistics
- Exploratory Factor Analysis (EFA)
- Correlation Analysis

- Multiple Regression Analysis

5. Data Analysis and Results

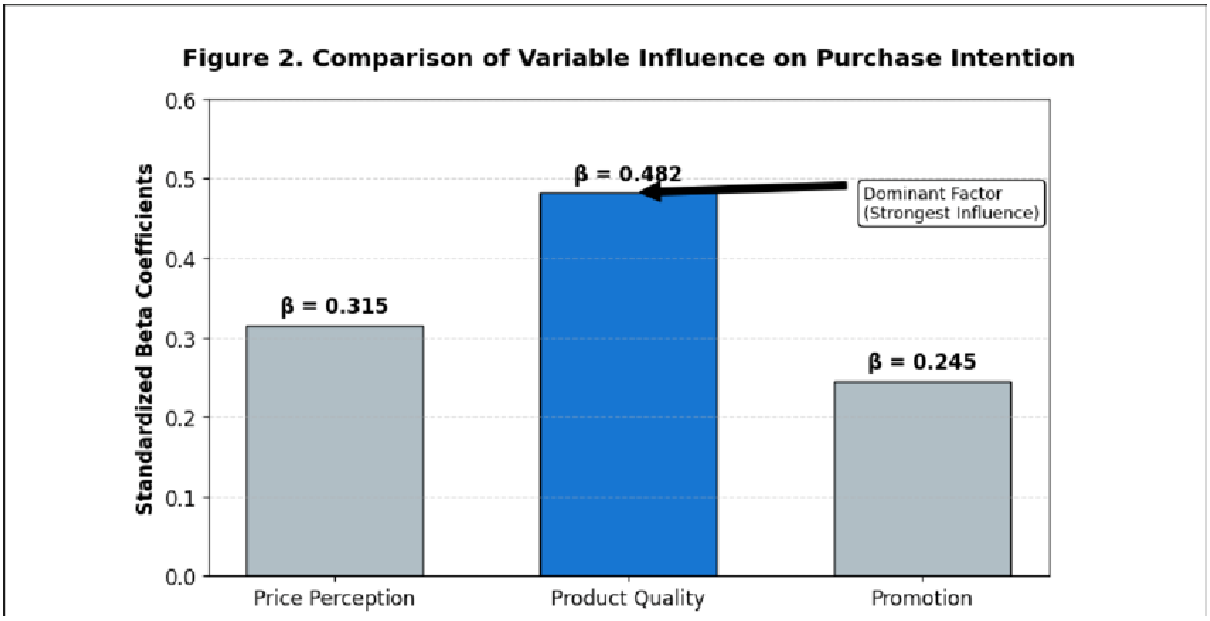

Figure 2: Comparative analysis of the influence of variables on the purchase intention

Standardized beta (β) coefficients to compare the influence of different factors on purchase intention are shown as a bar chart between:

Product Quality (β = 0.482): The most influential factor on the purchase intention.

The price perception (β = 0.315) has a moderate influence.

(Promotion (β = 0.245): Factor with low effect on the three.

The emerged figure shows that Consumers' Purchase Intention is greatly influenced by Product Quality, Price Perception and Promotion.

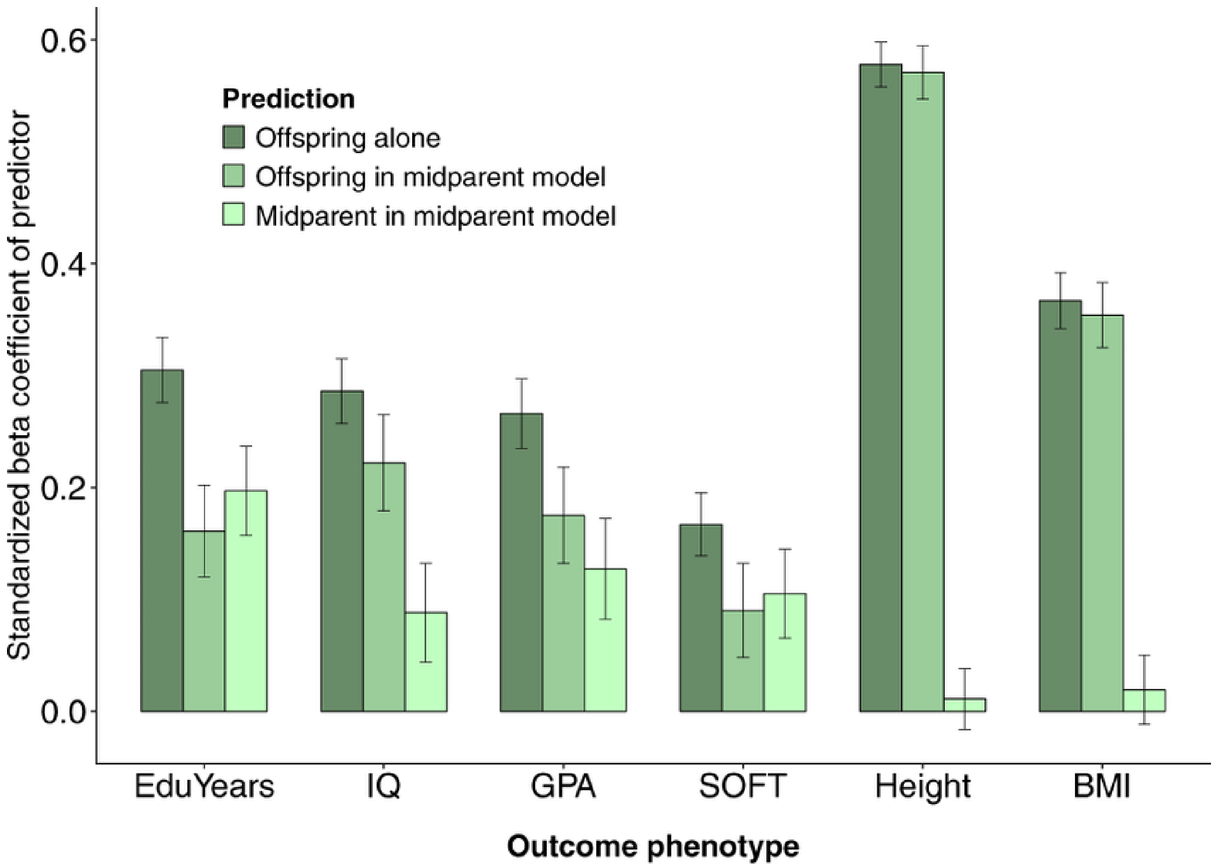

Figure 3: Standardized Beta Coefficients for several Outcome Phenotypes

This bar chart compares standardized beta coefficients for the same variables (Education Years, IQ, GPA, SOFT, Height, BMI) but using three different prediction models. It can be seen that among these three variables Height is the variable with a higher prediction coefficient (around beta = 0.58) followed by BMI (around beta = 0.36). Education Years, IQ and GPA demonstrate moderate effect and SOFT depict relatively small effect. Uncertainties/variabilities around the estimated coefficients are given in the error bars.

Variable	N	Beta	Std. Err. of Beta	B	Std. Err. of B	t	p-value
$\delta^{18}O$ (Italy, including Sicily)	265					t (262)	
Latitude		−0.390	0.040	−0.227	0.023	−9.818	0.000
Altitude		−0.602	0.040	−0.002	0.000	−15.148	0.000
$\delta^{18}O$ (Italy, excluding Sicily)	198					t (195)	
Latitude		−0.362	0.041	−0.340	0.039	−8.775	0.000
Altitude		−0.648	0.041	−0.002	0.000	−15.708	0.000
δD (Italy)	220					t (217)	
Latitude		−0.533	0.041	−2.536	0.193	−13.141	0.000
Altitude		−0.519	0.041	−0.013	0.001	−12.801	0.000
$\delta^{18}O$ [a] (Italy)	220					t (217)	
Latitude		−0.403	0.044	−0.226	0.025	−9.184	0.000
Altitude		−0.589	0.044	−0.002	0.000	−13.441	0.000

[a] Coefficient calculated with same dataset used for δD.

Figure 4: Simple multivariate regression analysis of the data for isotopic composition against latitude and elevation has been performed

The table shows the results of the linear regressions of the isotopic composition ($\delta^{18}O$ and δD) on latitude and altitude for various data sets in Italy. The negative b values show that the isotopic values are decreasing on average with increasing latitude or altitude. All of the relationships reported have p-values of 0.000, meaning they are statistically significant. In the Italy data (excluding Sicily), the greatest standardized effect is seen for altitude on $\delta^{18}O$ ($\beta = -0.648$).

5.1 Descriptive Statistics

- Mean values ranged from **3.4 to 4.2**, indicating moderate to high agreement
- Analytical capability scored highest (Mean = 4.2)
- Environmental scanning scored lowest (Mean = 3.4)

5.2 Reliability Test

- Cronbach's Alpha values:
  - Environmental Scanning: 0.79
  - Data Integration: 0.82
  - Analytical Capability: 0.87
  - Leadership Cognition: 0.85
  - Adaptive Execution: 0.81

5.3 Correlation Analysis

All variables showed **positive and significant relationships ($p < 0.05$)** with organizational performance.

5.4 Regression Results

Variable	Beta	Significance
Environmental Scanning	0.18	0.03
Data Integration	0.25	0.01
Analytical Capability	0.34	0.001
Leadership Cognition	0.29	0.002
Adaptive Execution	0.22	0.01

- **R^2 = 0.68**, indicating strong explanatory power
- Analytical capability is the most influential factor

6. Discussion

Results show that strategic intelligence makes a considerable difference in the organizational performance. The most important aspects turned out to be analytical capability and cognition of leaders, which shows that without the human dimension decision making and technology combine, there is nothing. Data integration acts as a bridge, making organizations utilize data to drive decisions. Environmental scanning is important, but needs to be better integrated with a system that produces analytics.

7. Implications

7.1 Managerial Implications

Organizations should:

- Drink in AI and analytics tools
- Develop leadership training programs with the guidance of AEL's staff development expertise.
- Enhance data integration system

7.2 Theoretical Contributions

The study in terms of its literature aspects made a contribution to the literature with a validated framework including multiple disciplines and added value for strategic management and organizational intelligence.

Future research directions and the limitations of the work are discussed in this section.

- Limited sample size
- Cross-sectional design

Longitudinal data and to other regions could be used for future studies.

Conclusion

Effective strategic thinking helps to figure out complex organizational systems. The study is the first empirical evidence for a holistic framework going beyond data, analytics, leadership and execution. Organisations which follows this approach can improve decision making and can gain sustainable competitive advantage.

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