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Developing Sustainable Decision Performance for Science and Technology Industries in China

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Abstract: This study considers the mediating role of top management teams' (TMTs) behavioral integration in exploring the relationship between the strategic decision-making process (SDMP; procedural rationality and constructive political behavior) and sustainable decision performance (decision quality and decision satisfaction). Survey data totaling 580 from the TMTs of the science and technology enterprises from first-tier cities in China were analyzed through structural equation modeling. The results indicate a positive influence of procedural rationality and constructive political behavior on sustainable decision quality and satisfaction. Behavioral integration appeared to mediate the nexus between the sustainable decision-making process and strategic decision performance. By categorizing the SDMP into two dimensions, a complete and explicit concept of the SDMP is reached, which permits practitioners to aim investments of a critical resource in realizing the full potential of decision performance in the sustainable decision performance.

Keywords: TMT; strategic decision-making process; behavioral integration; sustainable strategic decision-satisfaction; strategic decision quality; China

1. Introduction

The science and technology innovation enterprise's sustainability and survival in the competitive environment has become increasingly complex, placing pressure on the ability of the enterprise's TMTs to respond flexibly to the continually changing environment [1–3]. As such, scholars and practitioners have increasingly become involved with how to develop fast and effective sustainable strategic decision-making process (SDMP) models for the science and technology enterprise's TMT to reach a strategic consensus in the decision-making [3,4]. TMT is a small group of related top management teams (mainly including the chairperson, general manager, deputy general manager, and top managers) who are responsible for making strategic developmental and business decisions in an organization with significant control powers over the operation and management of the enterprise. As the enterprise's human agents, TMT condenses the organization's crucial intellectual and right capitals as the primary carrier of the organizational system and technical and strategic innovation, which directly serve as the primary decision-makers for sustainable enterprise development [2,5]. Research suggests that a team has complementarity and identity with a stronger decision-making function than a single manager approach when considering sustainable decision performance [3,6].

Developing a sustainable SDMP is one of the essential roles of managers, who seek to define where an organization is and where an organization is going. Sustainable SDMP continues to be a broadly used organizational practice that shields the light between an institution and its missions. This decision process, according to Hambrick and Mason [7], integrates the various perceptions of TMTs into a set of specific strategic behaviors [8] that influences the strategic decision behavior of the TMTs to work harmoniously towards a shared performance goal. Isik and Aliyev [9] posits that

TMT behavioral integration encompasses the degree of close interaction, open information exchange, and joint collaborative decision-making of the top management team [4]. Thus, TMTs with high levels of behavioral integration exhibit a great deal of communication, exchange of information, and collaboration [10], which enhances decision-making performance [5,11,12]. Konradt et al. [13] believed that TMT features' diversity affects the results of strategic decision-making and product performance through reflexivity and knowledge sharing. De Wit et al. [14] found that TMT cognitive conflict is likely to lead to relationship conflict and bias in information processing; thus, negatively affecting the quality of strategic decisions.

We draw from the above studies that findings on SDMP are influenced by country and organizational specific characteristics and goals for strategic decision-making. Regarding the connotation of the SDMP, Papulova and Gazova [15] shares a view that the SDMP is a "set of procedures" (decision preparation, alternative formulation, alternative evaluation, strategic selection, etc.). Thus, the researchers believe that the SDMP is a kind of "complex system" (trying to deepen the understanding of the SDMP by extending the analysis level and expanding the content contained in the strategic decision-making process from the perspective of the system). Rajagopalan et al. [16] uses the characteristics of the SDMPs (such as comprehensiveness, rationality, political behavior, participation, conflict) to define "substitution." While each "interpretation" attempts to outline the definition of "what are the SDMPs," the meaning of each perspective seems reasonable and one-sided, which to some extent, increases the ambiguity of the concept of the SDMPs and how it impacts sustainable decision performance. Moreover, the literature on the SDMP has mainly focused on the impact of TMT social psychological process, the role of situational variables [17], and team processes [3] of sustainable decision performance, e.g., [15,18], without considering the team-wide means through which TMTs' SDMPs influence sustainable decision performance.

Therefore, drawing on the literature on TMTs' decision-making process, leadership, and organizational sustainable decision performance, this article proposes a model that probes into the scientific and technological enterprises' TMT sustainable decision-making, where SDMPs cultivate the sustainable decision performance that can build organizational objectives. Again, this study argues that the relationship between SDM processes and sustainable decision performance is mediated by behavior integration as shown in Figure 1.

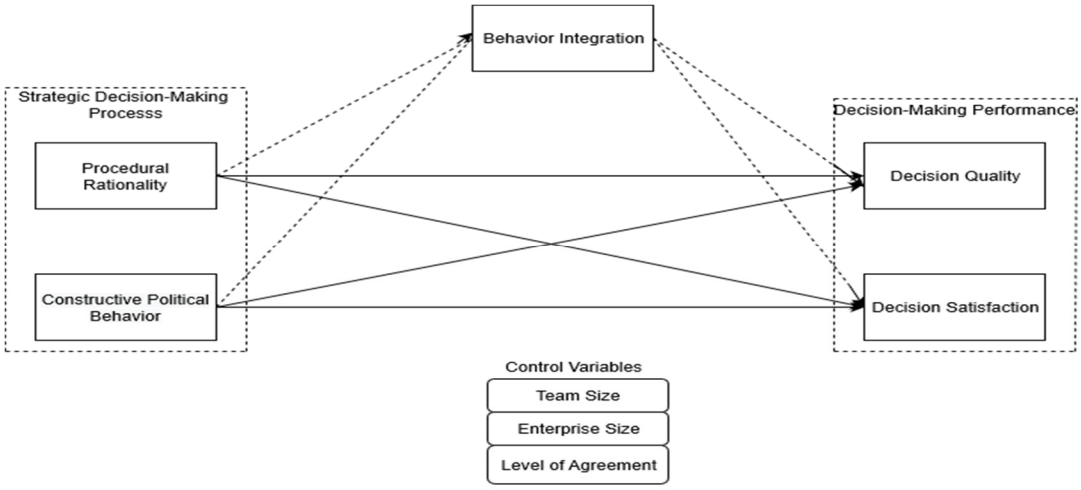

Figure 1. Conceptual framework depicting the role of behavioral integration in the relationship between the strategic decision-making process (SDMP) and the decision performance.

2. Theoretical Basis and Research Hypothesis

2.1. Sustainable Strategic Decision-Making Process (SDMP)

The sustainable SDMP is a process in which top management teams make imperative and pragmatic sustainable business plans through strategic analysis of the complex internal and external environments of the organization [3]. Scholars are focusing on the process of strategic decision-making behavior characteristics in two related research aspects: Procedural rationality and political behavior [18,19]. Dean Jr and Sharfman [20] believe that procedural rationality and political behavior in the SDMP have a significant impact on the decision-making effect. Procedural rationality refers to the decision-makers in the SDMP involving the collecting of information related to decision-making, and depending on the analysis of the information degree. Pinto [21] defined political behavior as a behavioral choice made intentionally to protect or achieve the interests of individuals or teams [19]. Mohamed and Sathyamoorthy [22] believed that a reasonable, sustainable SDMP consists of rationality, centralization, formalization/standardization, politics/problem solving, and other aspects. Based on reviewing previous studies of scholars, this paper defines political behavior intended to safeguard personal interests as destructive political behavior, and the political behavior that uses its influence to promote organizational goals as constructive political behavior. Scholars in the past have put much emphasis on the negative aspect of political behavior and have seldom studied the influence of constructive political behavior on sustainable decision-making performance [18,19]. Therefore, this paper intends to concurrently explore both procedural rationality and constructive political behavior in the behavioral characteristics of TMT SDMP to analyze the influence of the strategic decision-making process on the enterprises' sustainable performance of strategic decision-making [15,19].

2.2. Behavioral Integration of Top Management Team (BI)

Meta-construct, an aggregated construct named TMT behavioral integration, was first proposed by Hambrick and Mason [7] in the top management team. It refers to the collective interaction among TMT members in terms of thoughts, concepts, value judgment, and actions [18], which reflects the degree of communication and cooperation among TMT members [10]. Hambrick and Mason [7] believes that the executive team achieving behavioral integration has the following three characteristics: 1) Information exchange; that is, team members can freely express their real opinions and fully share decision-making information; 2) Cooperative behavior; that is, team members can help each other spontaneously and voluntarily; and 3) joint decision-making; that is, based on a full discussion and comprehensive understanding of decision-making issues, team members should learn from each other and make collective decisions. Simsek et al. [23] put forward that behavioral integration refers to the team state that TMT members openly and freely exchange information, solve team conflicts, establish standard views, and implement integration strategies to promote the development of the organization. Simsek et al. [23] also supported the three dimensions of behavioral integration divided by Hambrick through empirical research. Based on Hambrick and Simsek's division basis and dimension setting of team behavior integration, this paper considers the influence of behavior integration on strategic decision-making performance as cooperative behavior, information exchange, and joint decision-making. Thus, team behavior integration is the degree of spontaneous mutual assistance and cooperation among team members to actively express their views with high-quality and with an innovative aspect in the team in making collective decisions through full discussion and interdependence.

2.3. Strategic Decision Performance (SDP)

Schläppi-Lienhard and Hossner [24] believes that strategic decision performance can be divided into four dimensions: Decision process satisfaction, decision result recognition, decision result risk degree, and decision implementation degree. Yang and Ge [11] believe that strategic decision performance can be measured from two aspects of decision quality and satisfaction. In this study,

strategic decision performance is defined as the degree of the decision made and implemented by decision-makers and the degree of unanimous recognition of the decisions made by internal members, which is essentially TMT's perception of the achievement of common goals of decision results. The performance of strategic decision-making is divided into two dimensions, namely, the quality of decision-making and the satisfaction degree of decision-making by referring to the division criteria of strategic decision-making performance by scholars [10,11]. Among them, the quality of decision-making substantively contributes to the results of strategic decision-making in the realization of the sustainable goals and visions of the organization, emphasizing the process and outcomes of strategic decision-making. Decision satisfaction refers to the satisfaction degree of TMT decision-makers' satisfaction through the process of decision making, their willingness to take the initiative to implement strategic decisions and their subjective satisfaction with the sustainable results of the implementation of decisions [3,10]. It emphasizes the individual attitude of TMT members toward the results of strategic decisions.

2.4. Research Hypothesis

2.4.1. Strategic Decision-Making Process and Strategic Decision-Making Performance

Strategic decisions of technology-based innovative enterprises are highly uncertain and risky, and are difficult to reverse [25] when a strategic consensus is reached. The SDMP, which is based on the understanding and prediction of the development of internal and external environments such as technology, products, and customer demands, is an essential stage of strategic management [2]. Procedural rationality determines the extent to which decision-makers extensively collect and systematically analyze information in the SDMP. In the process of strategic decision-making, the procedural and rational top management teams thoroughly evaluate many alternatives on the premise of reasonable consideration of internal and external environmental factors. Hence, based on the opportunities and resources available to the organization, executives select the strategic target most consistent with the actual development of the organization from the alternatives, thus effectively improving the quality of decision-making [3]. Procedural rationality in the process of strategic decision emphasizes the diversity and comprehensiveness of the information and requires the decision-makers to participate in communication and discussion extensively. The completeness of the information and systematic, rational analysis of top executives enhances the satisfaction of the SDMP while improving the level of comprehensiveness or rationality of decision-making [26]. Since the SDMP determines not only the final decision but also affects the organization or individual targeted by the decision, extensive participation and discussion of the new strategic decision-making top management team can effectively improve the implementation effect and satisfaction of the decision. However, information asymmetry and simple actions in the SDMP could lead to decision risks [3]. TMT comprehensively collects, analyzes, and sorts out information, tracks the industrial and competitive situation, identifies opportunities in emerging markets, and studies business threats and other comprehensive information to help reduce the impact of irrational behavior, in order to improve the quality of decision-making effectively. Procedural rationality also includes a series of objective and normative analysis processes, which mainly means decision-makers use a particular set of criteria to evaluate strategic choice after collecting comprehensive data and critical information analysis since it plays a decisive role in decision quality [2,3,10]. SDMP of procedural rationality involves the degree of information collection related to decision-making, the degree of rigor and standardization of the selection process, and the high degree of accountability of decision-makers in the SDMP. The rationality of the application of procedures by managers in the SDMP is related to the improvement of decision-making performance [10]. Moreover, in the process of allocation of strategic decision-making resources, systematic procedures for allocation decisions help managers understand changes in internal and external environments, such as organizational structure and customer demands, to allocate resources better and avoid repeated allocation and unreasonable decisions. Procedural rationality ensures the reasonable allocation of

resources to effectively improve the quality and satisfaction of strategic decision-making. Strategic decisions are involved in new product R&D, merger, acquisition, reorganization, and the allocation of resources. Such decision-making has a relatively prolonged effect on the science and technology innovation enterprises' specific products, markets, and technology resources, which has a far-reaching influence and determines the long-term competitive advantage of enterprises. Procedural rationality for top managers is fully comprehensive. Thus, it provides insight into the consequences of strategic decisions selected from considerable alternatives; responds to specific markets demands; business processes, and operations to promote scientific and technological innovation of enterprise competition and strategic flexibility.

Political behavior in strategic decision-making is defined as "behavior related to the use of power and influence to serve the interests of decision-makers or organizations." Political behavior has both a constructive and destructive aspect, see [18]. Political behavior that are motivated by personal interests rather than the interests of the organization are destructive political acts [27], while political acts that use their influence to promote organizational goals with appropriate political strategies are constructive political acts [28]. Political behavior in strategic decision-making focuses on how individuals who participate in the SDMP use the power they have and take appropriate measures, such as cooperation and negotiation, to influence decisions. Hence, the diversity of education, experience, ability, and functional background of the top management team leads to their acceptance of problems and opinions [11]. Constructive political behavior encourages decision-makers to review multiple perspectives and assumptions to ensure that all decisions are thoroughly discussed, thereby improving the quality and satisfaction of decisions [29]. Thus, they are more likely to help top management teams gain access to information that would otherwise have been virtually impossible, thereby reducing resistance to change and improving the quality of strategic decisions. Constructive political behavior always proceeds from the interests of the organization and achieves feasible goals in specific circumstances rather than for the interests and positions rooted in the organization. For example, as a necessary mechanism for organizational adjustment in a rapidly changing environment or to help companies launch new products to the market faster [27]. Constructive political behaviors help defuse destructive political behaviors. If managers abuse information and choose to defend their interests, decision-makers of constructive political behaviors will publicize this information to weaken the negative impact of destructive political behaviors [30]. SDMP as a constructive political process helps decision-makers to use cognitive and social skills for the importance of information decoding and of different strategy advice for feedback, and to enlarge the community understanding of the background to the decision-making, in order to improve the decision-making quality and satisfaction. Constructive political-strategic decision-makers understand the progress and determine the timing of intervention through meaningful conversations and informal inquiries. Such decision-makers are likely to guide the strategy but will never act arbitrarily. From the above, it is reasonable to argue that constructive political behavior is good at absorbing new faces and ideas and bringing them into the discussion process to make strategic decisions with innovative abilities and new market strategies to compete internally and externally.

To sum up, this paper proposes that:

Hypothesis 1a (H1a). *Procedural rationality has a positive influence on the sustainable decision quality of science and technology enterprises.*

Hypothesis 1b (H1b). *Procedural rationality has a positive impact on the sustainable decision satisfaction of science and technology enterprises.*

Hypothesis 1c (H1c). *Constructive political behavior has a positive effect on the sustainable decision quality of science and technology enterprises.*

Hypothesis 1d (H1d). *Constructive political behavior has a positive effect on the sustainable decision satisfaction of science and technology enterprises.*

2.4.2. TMT SDMP, Behavioral Integration, and Sustainable Decision Performance

To more fully explore TMTs' decision-making processes on the sustainable decision performance, this research follows the extent of trickle-down research expressive of the impact of contingent factors and proposes that behavior integration mediate the nexus between SDMP and sustainable decision performance. Specifically, in the process of strategic decisions, team members are required to integrate management behavior, to some extent, to create a mechanism for mutual understanding, interaction, a balance of power, and influencing team decisions [3]. Procedural rationality in the process of strategic decision-making calls for the executive team to collect all necessary information and form various alternatives, and then the executive team decides the optimal decision scheme by joint decision and cooperative behavior [2,3,8,31]. Franke and Foerstl [31] further argues that behavior integration ability of the policymakers' comprehensively enhances team collection and exchange of information to be more efficient in their services to benefit the entire organization. For example, in the process of strategic decision-making, conflicts are inevitable; however, behavior integration among team members could reasonably resolve disputes and strive to seek common ground while redressing differences in achieving a high degree of coordination and unity of decision-making behaviors [18,30].

In the process of strategic decisions, science and technology enterprises' knowledge innovation, technology innovation, and information sharing from the different internal and external groups strengthens the executive team's ability to consider strategic issues in a new way to build consensus in the SDMP, which promotes the cognitive diversity of the management team to achieve more effective results of strategic processes, see [26,29].

In a team with a relatively high level of cooperation, members can actively coordinate with each other and adapt to and implement complex decisions by learning from each other, see, for example, [3,18]. Especially when the environment and situation faced by the organization are relatively complex, behavioral integration is conducive to forming an atmosphere of mutual assistance within the team, to improve the overall mental level and reaction ability of the decision-making team, help TMT process decision-making information more rationally [32], and improve the quality of decision-making. It is found that the behavioral integration of top management teams enhances the ability and overall insight of the team in integrating knowledge, thus helping enterprises to respond to market demands, establish core competitiveness, and develop unique strategies [33]. Dahlin et al. [34] believes that information exchange among top management teams and full discussion could avoid information misunderstanding as far as possible. Hambrick [35] further proposes that joint decision-making can bring collective wisdom into play and overcome the limitations of top management team members due to differences in individual knowledge background, cognitive structure, information level, and value preference. At the same time, it can openly challenge other team members' schemes, thus helping TMT members to have a clearer understanding of each project [35]. Besides, joint decision-making can also enhance the decision-making commitment level of TMT members, reduce organizational resistance, and enable strategic decisions to be fully supported in the implementation process, and thus improve the speed of strategic decision-making implementation [23]. Zhenhua and Haifa [32] proposes that information exchange is an essential way for a team to realize "listening to both sides makes sense." Carmeli [8] shared a view that behavioral integration is conducive to trust and reciprocity among team members, helps team members focus on team tasks, and improves the level of team commitment. Top management teams with a high level of behavioral integration can better coordinate workflow (including cooperative behavior, information exchange, and joint decision-making) [23]. Top management team members can deepen their understanding of the existing knowledge base and material resources of the enterprise through cooperative behaviors, to make fuller use of the enterprise's information and human and material resources. TMTs of scientific and technological innovation enterprise fully share and discuss information related to decision-making such as market entry or

technological innovation, which optimizes the innovation ideas and direction and enhances the ability to resist risks and sustainable competitiveness. Therefore, high-level behavioral integration of scientific and technological innovation enterprises integrates innovative resources, stimulates innovation vitality, and plays a decisive role in improving the strategic decision-making performance of enterprises. Hence, the following hypotheses are proposed:

Hypothesis 2a (H2a). *Behavioral integration mediates the influence of procedural rationality on the sustainable decision quality of science and technology enterprises.*

Hypothesis 2b (H2b). *Behavioral integration mediates the impact of procedural rationality on the sustainable decision satisfaction of science and technology enterprises.*

Hypothesis 2c (H2c). *Behavioral integration mediates the effects of constructive political behavior on the sustainable decision-making quality of science and technology enterprises.*

Hypothesis 2d (H2d). *Behavioral integration mediates the impact of constructive political behavior on the sustainable decision satisfaction of science and technology enterprises.*

3. Methodology

3.1. Sample Selection and Data Sources

Science and technology innovation enterprises are professional-oriented enterprises characterized by technological intensiveness and a high capacity to solve multifaceted problems through creative and innovative solutions [5,6,8,26,27]. The extant literature has shown that developing sustainable decision performance is especially crucial for those enterprises that need to innovate as a means to maintain and build their competitive advantage [6,17,18]. Thus, although science and technological innovation enterprises make significant contributions to the Chinese economy, currently there is mounting competing pressure in the industry seeking the enterprises' strategic decision-makers to improve their decision processes to remain competitive with its counterparts globally [3,36]. Therefore, this paper sample focuses on top managers from 48 Scientific and technological innovation enterprises mainly from first-tier cities (Beijing, Shanghai, Guangzhou, and Shenzhen) in China, which host most of the scientific and innovation industries in the People's Republic of China. While these cities are in China, they are in different provinces with different requisite organizational procedures that have effects on the direction of scientific and technological innovation adopted by top managers and this introduces heterogeneity in our data, which is significant for generalising the findings of this paper [3,4,10].

A questionnaire was used to gather data for this paper. The questionnaire was assessed by five scholars with in-depth experience in academia and ten practitioners comprising heads of research and development, heads of training and talent management in organisations within the selected cities in China. These people were not included in the final data collection and their feeback provided insights on the extent to which to modify some of the questions intended to measure the variables in this paper for clarity for final data collection. Given the TMTs' role at the corporate-level involves decision-making and resource allocation, the questionnaire purposely addressed board members and top executives (CEOs, CFOs, and Heads of Corporate Development and Strategy) [6,8,18]. Whenever possible, meetings were arranged to educate the participants about the general scope of the study. Confidentiality and anonymity of the participants were assured. All TMTs were encouraged to participate in the research and received questionnaires that were filled and returned within two weeks. Questionnaires, 700 in total, were distributed among the TMTs; out of this, 650 were recovered, with a recovery rate of 81.25%. Following the blueprint of Lubatkin et al. [37], this study excluded enterprises for which less than 50% of the TMTs responded to our questionnaire and considered those from 50% and above. Overall, 580 respondent data met our requirement that was used for the

final analysis. Since some of the targeted population failed to respond, we estimated non-response bias to evaluate the representativeness of the sample using a "time-trend extrapolation test." In this case, we compared "late" versus "early" respondents along with key study variables in line with the suggestion of Armstrong and Overton [38]. After comparing, the outcome revealed that there was no problem with non-response bias as we found no significant differences between the respondents and non-respondents.

In terms of demographic characteristics of the top management team of the sample, males accounted for 68.4% and females 31.6% of the respondents, among which 39.8% were aged 31–40, 36.3% were aged 41–50; 23.9% were 30 and below. According to the distribution of education level, TMT members had relatively high degrees, with the proportion of bachelor's degrees and above reaching 90.6%, among which the portion of bachelor's degrees and master's degrees was 47.7% and 32%, respectively. In terms of ownership type, private enterprises accounted for approximately 40.2% of the total. From the perspective of enterprise-scale, the proportion of 101–300 employees accounting for 29.3% was the highest. From the standpoint of the size of the top management team, the highest percentage of the top management team with 5–10 members is 36.7%. From the overall distribution of the statistical characteristics of the research objects, the selection of the research sample has good representativeness and integrity, which meets the basic requirements of the empirical research of the top management.

3.2. Variable Measurements

Based on the literature and framework of this research, a survey instrument applicable to TMTs was employed from already validated instruments to measure top management team SDMP, behavioral integration, and sustainable decision performance among the TMTs in China.

(1) TMT strategic decision-making process: Referring to the scale developed by Dean and Sharfman [39] combined with the characteristics of Chinese enterprises, SDMP is divided into two dimensions, procedural rationality and political behavior. Procedural rationality was gauged through five items and political behavior has a four-item five-point scale (1 = personal goals, 5 = organizational goals)

(2) Behavioral integration of top management team: Referring to the scale designed by Simsek and Veiga [23], behavioral integration is defined as the degree of cooperative behavior, information exchange, and joint decision-making. This covers a five-item five-point scale (1 = strongly agree, 5 = strongly disagree).

(3) Sustainable decision performance: This research mainly referenced [10,11] measuring tools with two dimensions, decision-making quality and satisfaction. Both aspects are comprised of a three-item seven-point scale (1 = strongly disagree, 7 = strongly agree). All the items with respective loadings are reported in Appendix A Table A1.

Control variables: Team size, enterprise size, and level of agreement with decision-making were employed for control purposes for minimizing the possibility of other factors influencing TMT decision performance and following previous studies on TMT [14,18].

4. Data Analysis and Results

The relationship between variables was analyzed using SPSS AMOS version 22. Before testing the hypothesis in this study, we first examined the measurement model to evaluate the reliability and validity of the instrument. This research questionnaire covers three variables and five dimensions, including the SDMP, team behavior integration, and strategic decision-making performance. As our data was collected from the individual level, we strive to avoid potential sources of bias and social desirability. This was carried out before our date of collection; thus, in line with Elbanna [18] and to make it difficult for the survey respondents to predict our hypotheses, we placed the dependent variables after the independent ones. Besides, we added a control variable to determine the extent to

which respondents accept the decision sought, as their responses may be influenced by their consistency with the decision under consideration.

The reliability analysis results of variables and dimensions in the measurement scale are presented. As shown in Table 1, the reliability coefficient alpha of each dimension is more significant than 0.7, which further indicates that the questionnaire has good internal consistency and effectiveness [40]. The Kaiser Meyer Olkin (KMO) values of procedural rationality, political behavior, behavioral integration, decision quality, and strategic decision satisfaction of TMT are, respectively, 0.877, 0.862, 0.765, 0.926, and 0.892; the *P* values are all 0.000, reaching the significant level of 0.01. Hence, the scale has good validity.

Since the respondents of the questionnaire in this paper are all members of the top management team and the variables in the model are all variables at the team level, it is necessary to aggregate the individual data collected from the questionnaire to the team level. In line with Carmeli et al. [8], we calculated the intergroup reliability (R_{wg}) and intraclass correlations (ICCs) to measure the degree of data consistency of the team member. The average R_{wg} values of procedural rationality and constructive political behavior are 0.875 and 0.827, respectively. The average R_{wg} value of behavioral integration is 0.760; there are two dimensions of strategic decision performance. The average R_{wg} values of strategic decision quality and satisfaction are 0.906 and 0.872, respectively. Thus, the R_{wg} values of each variable and each dimension are above 0.7, indicating that aggregation is justified, see [8]. ICCs for assessing agreement of group members were employed. As shown in Table 1, the ICC (1) at the individual level of each variable was more significant than the reference value of 0.05, and to determine whether group can be differentiated, the ICC (2) values were more significant than the reference value of 0.50; that is, both reached the accepted reference value and far exceeded the standard empirical value, and were significant. Therefore, the data at the individual level of each variable in this study can be aggregated to the team level in field research, see [8]. Moreover, the measurement model fit indices (χ^2/df = 2.64, RMSEA = 0.09, GFI = 0.95, SRMR =0.06, CFI = 0.94, IFI = 0.94) demonstrate that the measurements are within acceptable values [41].

Finally, to ensure that the Common method of variance (CMV) bias is not a severe threat in our study, the study employed Herman's one-factor test to check to access the presence of CMV bias as it is, arguably, the most extensively applied approach for assessing CMV. Following the suggestion of Podsakoff et al. [41], the study employed the un-rotated factor analysis to inspect all the eigenvalues. Neither any factor nor the first factor explained 27.2% of the variance in our data; therefore, there is no problem of CMV with our study data. Successive to the above tests, this study followed Judd and Kenny [42] for testing mediation analysis.

Table 1. Reliability and validity of independent variables, intermediate variables, dependent variables, and intra-group consistency.

Variable	The Dimension	Factor Loadings	A	Average-Rwg	KMO	ICC(1)	ICC(2)
SDMP	PR	0.751–0.884	0.927	0.875	0.877	0.217	0.581
	CPB	0.695–0.833	0.928	0.827	0.862	0.226	0.594
BI	BI	0.744–0.799	0.929	0.760	0.765	0.335	0.716
SDP	DQ	0.784–0.826	0.959	0.906	0.926	0.212	0.575
	DS	0.731–0.795	0.942	0.872	0.892	0.225	0.592

Note: Strategic decision-making process: SDMP; procedural rationality: PR; constructive political behavior: CPB; behavior integration: BI; strategic decision performance: SDP; decision quality: DQ; decision satisfaction: DS.

Hypothesis Test

This study evaluated the structural model using structural equation modeling. The fit indices (χ^2/df = 2.22, GFI = 0.92, IFI = 0.93, CFI = 0.92, RMSEA = 0.08, SRMR = 0.06) exhibit and satisfy the

recommended value, thus passing for an acceptable model fit [43]. Table 2 presents the standardized path coefficients, adjusted R^2, and their significant levels' values to estimate support for the hypotheses.

According to Model 1 in Table 2, there is a significant positive correlation between TMT procedural rationality and the quality of strategic decision making (beta = 0.671, $p < 0.001$). Hence, H1a is assumed to be true. Model 3 shows that there is a significant positive correlation between TMT constructive political behavior and the quality of strategic decision making (beta = 0.649, $p < 0.001$); therefore, H1c is established. Model 7 in Table 3 shows that there is a significant positive correlation between TMT procedural rationality and strategic decision satisfaction (beta = 0.687, $p < 0.001$); therefore, H1b is supported. Model 9 shows that there is a significant positive correlation between TMT constructive political behavior and strategic decision satisfaction (beta = 0.671, $p < 0.001$), supporting H1d.

It can be seen from Model 5 in Table 2 that procedural rationality and behavioral integration have a significant positive correlation (beta = 0.553, $p < 0.001$); Model 2 shows that behavior integration and strategic decision quality have a significant positive relationship (beta = 0.336, $p < 0.05$); meanwhile, procedural rationality and decision quality also have a significant and positive correlation (beta = 0.485, $p < 0.001$); therefore, behavior integration partially mediates between procedural rationality and decision quality, supporting H2a. In Model 6 in Table 2, constructive political behavior and behavior integration have a significant positive correlation (beta = 0.588, p < 0.001); furthermore, behavior integration and strategic decision quality in Model 4 have a significant positive relationship (beta = 0.289, $p < 0.05$); meanwhile, constructive political behavior and strategy quality also have significant positive correlation (beta = 0.479, $p < 0.001$). This shows that behavior integration plays a partial intermediary role between constructive political behavior and strategic decision quality; hence, H2c is supported.

Furthermore, it can be seen from Model 5 in Table 3 that procedural rationality and behavioral integration have a significant positive correlation (beta = 0.553, $p < 0.001$); behavior integration and strategic decision satisfaction in Model 8 have a significant positive relationship (beta = 0.353, $p < 0.05$); meanwhile, procedural rationality and strategic decision satisfaction also have a significant positive correlation (beta = 0.492, $p < 0.001$). This explains that behavior integration partially mediates between procedural rationality and decision satisfaction. Thus, H2b holds. By Model 6 in Table 3, constructive political behavior and behavior integration have a significant positive correlation (beta = 0.588, $p < 0.001$); behavior integration and strategic decision satisfaction by model 10 have significant positive correlation (beta = 0.302, $p < 0.01$); meanwhile, constructive political behavior and strategic decision satisfaction also have a significant positive correlation (beta = 0.493, $p < 0.001$), thus indicating that behavior integration partially mediates between constructive political behavior and decision satisfaction; hence, H2d was established. The results for the SEM model are presented in Figure 2.

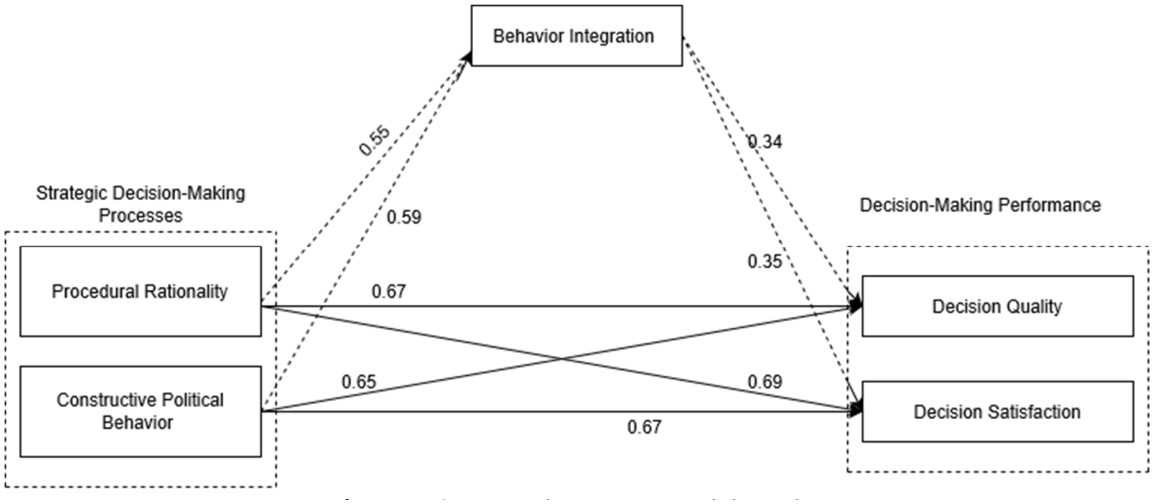

Figure 2. Structural equation model results.

Table 2. Mediating effect of behavioral integration between the top management team (TMT) strategic decision-making process and sustainable decision quality.

Variable		DV: DQ				MV: BI	
		M1	M2	M3	M4	M5	M6
CV	TMT SIZE	0.087	0.058	0.088	0.063	0.085	0.085
	ES	0.096	0.067	0.095	0.068	0.086	0.092
	LAG	0.098	0.067	0.097	0.070	0.091	0.094
IV	PR	0.671 ***	0.485 ***			0.553 ***	
	CPB			0.649 ***	0.479 ***		0.588 ***
MV	BI		0.336 ***		0.289 ***		
	R^2	0.467	0.735	0.571	0.789	0.490	0.504
	F	21.882	29.795	33.309	38.379	16.175	25.399
	$\triangle R^2$	0.467	0.268	0.571	0.218	0.490	0.504

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$. Control variables: CV; independent variables: IV; mediating variable: MV; dependent variable: DV; TMT size: TS; enterprise size: ES; level of agreement with decision making: LAG.

Table 3. Mediating effect of behavioral integration between the TMT strategic decision process and sustainable decision satisfaction.

Variable		DV: DS				MV: BI	
		M7	M8	M9	M10	M5	M6
CV	TMT SIZE	0.089	0.059	0.087	0.061	0.085	0.085
	ES	0.098	0.068	0.094	0.066	0.086	0.092
	LAG	0.101	0.069	0.096	0.068	0.091	0.094
IV	PR	0.687 ***	0.492 ***			0.553 ***	
	CPB			0.671 ***	0.493 ***		0.588 ***
MV	BI		0.353 ***		0.302 ***		
	R^2	0.491	0.658	0.465	0.651	0.490	0.504
	F	23.878	29.757	28.497	36.374	16.175	25.399
	$\triangle R^2$	0.491	0.167	0.465	0.186	0.490	0.504

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

5. Discussion

In sum, following the existing literature, this study highlights the importance of considering behavioral integration as a mediator when exploring the impact of decision-making processes (procedural rationality and constructive political behavior) on sustainable decision-making performance (quality and satisfaction) of (scientific innovation) TMTs, particularly among the science and technology innovation enterprises in China. Our findings revealed that TMT procedural rationality and constructive political behavior have a significant impact on the performance of strategic decision-making. This indicates that both TMT procedural rationality and constructive political behavior are valuable resources for successful quality and satisfaction of strategic decisions [18,29,30,44]. Thus, this finding accords with previous scholarship that documents that TMTs' procedural rationality and constructive political behavior jointly enhance decision ability in exploring the complex environments to land on a successful quality and satisfaction of strategic decisions [1,3,26]. The result further revealed that behavioral integration partially mediates the influence of TMT strategic decision-making processes on strategic decision-making performance [31,45]. Thus, the result indicates that, through behavioral integration, TMT members can share vital information, communicate effectively, and act in a collaborative way to

influence decision quality and satisfaction [10,31,36]. These findings could relate to the study setting, China. TMTs in PRC are noted to be task-oriented [3]; as such, TMTs in PRC are psychologically motivated to improve their SDMP and strategic decision performance [10,36]. This could provide a possible explanation; hence, a unit of improvement in the team SDMPs (procedural rationality and constructive political behavior) that exist could enhance the behavioral integration, which subsequently impacts the decision quality and satisfaction of the enterprises [3,10,45]. The contribution of these outcomes to the existing research on TMTs and leadership decision-making are described below.

5.1. Theoretical Implications

This research adds to the literature on TMTs in developing SDMP that facilitates driving enterprises' sustainable decision-making performance [3,44]. The outcomes from this study also extend the existing scholarship on the ways TMTs' behavioral integration facilitates team decision-making performance. We document that procedural rationality and constructive political behavior in the decision-making process appear to be instrumental because they influence TMT behavioral integration and sustainable decision performance. TMT behavioral integration is especially critical for enterprises operating under this current turbulent business environment that are faced with challenges to respond to uncertain demands rapidly, because behavior integration helps team members in cultivating high-quality interactions through information sharing and collaboration in joint decision-making. The findings provide further support on the importance of the collective decision that empowers TMT members to participate and exercise control over decision-making processes to enhance the quality and satisfaction of the sustainable decision performance.

Recent empirical studies have shown that procedural rationality and constructive political behavior is associated with higher quality strategic decisions [18,30,44]. We found that TMT behavioral integration is positively associated with TMT decision making performance. When TMT members interact freely by exchanging valuable information [46] and collaborating in the making decisions jointly, TMT members can reach a consensus on complex information that facilitates the team's successes [33,44,46].

From this study, we first found that the effect of TMT SDMP on enterprise decision-making performance could be enhanced through TMT behavior integration; that is, if team members incorporate appropriate behaviors in SDMP, quality and satisfaction of the decision-making could be improved. Thus, the present study not only shows the centrality of TMT's SDMP to enterprise decision-making performance, but it also identifies a high certainty role of behavior integration as a facilitator of this linkage.

5.2. Management Practice and Inspiration

TMTs behavior integration in joint decision-making adds to a new dynamic in reaching a commonly accepted decision quality and satisfactory performance of team members. Therefore, understanding how TMTs harness the benefit of behavior integration and circumvent the drawbacks of poor SDMP on decision performance is of great importance in leadership literature. The results from this research have several implications for enterprises that are considering or have engaged in TMT joint strategic decision-making processes to improve sustainable decision performance.

First, the bottom line is to strive to optimize the SDMP of the top management team. Therefore, science and technology innovation enterprises in the process of strategic decision (procedural rationality) in promoting strategic decision process should (1) try avoiding vital decision time pressure, set aside adequate time for both external and internal information integration environment scanning, fully gather all the information they need for strategic decision, and ensure that every link of vital decision-making information comprehensive; (2) strengthen the executive team understanding of decision-making in related fields with the latest development trend, share relevant problems affecting the enterprise, encourage innovative team ideas, and provide feedback on the DMP to the team members to motivate them to participate in the decision-making widely; and (3) TMT should strengthen the degree of rigor

and standardization of decision-making in the whole process of decision preparation, alternative formulation, alternative evaluation, and strategic selection and form a specific internal decision-making accountability mechanism, and avoid irrational behaviors and distribution of decision-making caused by non-standard procedures.

To improve constructive political behavior in the SDMP, on the one hand, the appeal and determination of the top management team should be fully exerted, and the resistance to change in the process of scientific and technological innovation should be intervened in in a timely way; the negotiation in the decision-making conflict process should be actively participated in, to promote the strategic decision-making that can support the realization of organizational goals. Moreover, the internal power structure balance mechanism of the TMT should be established to authorize non-core executives to participate in major strategic decisions, to promote the unity of high management team objectives, enhance team members commitment and team effectiveness, and strengthen mutual trust between top management teams [3,9] to form a shared vision.

In the process of strategic decision-making, excellent TMT should not only attach importance to the external information widely collected with in-depth and comprehensive analysis and processing but also pay attention to strengthening the executive team members behavior commitment in making strategic decisions between each member, enhancing the communication between, reasonably avoiding conflict within the team, and strengthening team cohesion and trust among members [9]. As cooperation between the team members in decision participation could enhance enterprises' TMTs to reach a consensus on internal integration that is crucial for effective strategic enterprise performance, creating excellent corporate culture and team atmosphere could encourage effective communication and enhance enthusiasm, creativity, and knowledge sharing between the TMT members so they can effectively participate in strategic decision-making to reach a common agreement, and keep the enterprise top team members' conduct in overall consistency to improve upon the decision performance strategic decisions [9,10,44].

5.3. Limitations and Prospects of the Study

While this research makes a significant contribution to the existing literature, some deficiencies need to be considered. First, the samples in this study are mainly from the scientific and technological innovation enterprises in first-tier cities such as Beijing, Shanghai, Guangzhou, and Shenzhen, all of which have a well established governance structure, relatively clear strategic decision-making objectives, and high efficiency of the top management team. Therefore, the results may not be applied to enterprises with irregular management and weak TMT team. While our data is hetergenuous in nature, considering that is drawn from one country, results may require fine-tuning to be applicable to other organisations in different countries. Further studies can test our proposed TMT model to make a comparison with our statistical results. Moreover, we employed first order constructs in this study, so higher order constructs can be used in the future.

To add up, the research object of this paper is relatively unique; it is not easy to collect data and information. Moreover, while the upper echelon theory claimed that TMT background accounts for their decision-making, this study failed to examine the influence of such attributes on the SDMP. Therefore, it could be valuable to explore TMTs' related characteristics to account for the SDMP of the science and innovation enterprises. Besides, observing the power of a mediation tactic to explain the relationship between SDMP and DMP, future research should put into consideration other variables, such as TMT trust, TMT innovative behavior, and TMT psychological empowerment, to build a profound understanding of this relationship. In conclusion, we believe that the future study may continue to develop on this work in multiple directions to clarify the role of TMT's SDMP in improving decision performance even further.

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Appendix A

Table A1. Constructs and items

Statement	Factor Loading
TMT Strategic Decision-Making Processes	
Procedural Rationality	
How extensively does your team look for information in making the decision for this type of investment? (1 = not extensively at all; 7 = very extensively)	0.870
How extensively does your team analyze the relevant information before making a decision for this type of investment? (1 = not extensively at all; 7 = very extensively)	0.884
How important were quantitative analytic techniques in making the decision for this type of investment? (1 = not at all important; 7 = very important)	0.751
How would you describe the process that had the most influence on the team's decision for this type of investment? (1 = mostly analytical; 7 = mostly intuitive)	0.812
In general, how effective was the team at focusing its attention on relevant information and ignoring irrelevant information for this type of investment? (1 = not at all effective; 7 = very effective)	0.799
Constructive Political behavior (1 = personal goals, 5 = organizational goals)	
The decision-makers used their power to defend their . . .	0.788
The decision-makers used bargaining to defend their . . .	0.833
The decision-makers formed alliances with each other to enhance their . . .	0.695
The decision-makers controlled meetings related to this decision, e.g., the meeting agenda, its date and time, to defend their . . .	0.829
TMT Behavioral integration	
The dialogue among the TMT members produces a high level of creativity and innovativeness	0.748
When a team member is busy, other team members often volunteer to help her/him out to manage her/his workload	0.799
The fact the TMT members are flexible about switching responsibility makes things easier	0.762
The TMT members usually let each other know when their actions affect another team member's work	0.744
The TMT members have a clear understanding of the job problems and needs of other members on the team	0.767
sustainable Strategic decision performance	
Decision-making quality(1 = strongly disagree, 7 = strongly agree)	
The quality of this strategic decision is very high	0.806
The quality of this strategic decision is far beyond our initial expectations	0.826
This strategic decision is very beneficial to the company performance	0.784
Decision-making Satisfaction(1 = strongly disagree, 7 = strongly agree)	
We would work hard for this strategic decision	0.787
Comparing with other strategic decisions, we are most satisfied with this strategic decision	0.795
We would like to see this strategic decision to be implemented	0.731

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