Critical success factors of strategic alliance in the shipping industry

Hui Ting Lu, Kum Fai Yuen* and Kim Hock Tan

School of Civil and Environmental Engineering,
Nanyang Technological University, Singapore
Email: m190088@e.ntu.edu.sg
Email: kumfai.yuen@ntu.edu.sg
Email: kh_tan@ntu.edu.sg
*Corresponding author

Guanqiu Qi

Department of International Logistics,
Chung-Ang University, South Korea
Email: xiao20107@cau.ac.kr

Abstract: Attributing to multiple environmental, organisational and cultural factors, shipping alliances (SAs) are complex and challenging to manage. This study aims to identify and categorise the critical success factors (CSFs) in SAs using a theory-driven approach. Moreover, it looks to examine their effects on two vital outcomes in SAs, including opportunistic behaviour (OB) and constructive coordination (CC). The CSFs were categorised into phases: 1) alliance rationale and conditions; 2) partner search and selection; 3) partnership design; 4) partnership implementation; 5) partnership outcome evaluation. A survey questionnaire was then drafted and administered to 180 executives from all shipping lines involved in major SAs (i.e., 2M, Ocean Alliance and The Alliance). Thereafter, the data were analysed using exploratory factor analysis and structural equation modelling. The findings validated the categorisation of the 20 CSFs. Furthermore, it was found that the CSFs have direct and indirect effects on CC via OB.

Keywords: shipping alliances; success factors; theoretical perspectives; structural equation model.

Reference to this paper should be made as follows: Lu, H.T., Yuen, K.F., Tan, K.H. and Qi, G. (2024) 'Critical success factors of strategic alliance in the shipping industry', *Int. J. Shipping and Transport Logistics*, Vol. 18, No. 2, pp.111–137.

Biographical notes: Hui Ting Lu is currently an undergraduate student at the School of Civil and Environmental Engineering, Nanyang Technological University, Singapore. She is also a MaritimeSG Youth Ambassador under Maritime and Port Authority of Singapore. Her research interests include maritime transport management, marine insurance, sustainability, supply chain management and innovation.

Kum Fai Yuen is currently an Assistant Professor and Program Director at the School of Civil and Environmental Engineering, Nanyang Technological University, Singapore. He is also the recipient of the Inauguration Grant, an

award under the Singapore Teaching and Academic Research Talent Scheme. Currently, he is serving as an Associate Editor for *Maritime Policy & Management* (SSCI), and Editorial Advisory Board Member for *Transportation Research: Interdisciplinary Perspectives* (Scopus) as well as *Continuity & Resilience Review*. His research interests include maritime transport management, sustainability, corporate social responsibility, last-mile delivery, shared transport and economy, and technology innovation management.

Kim Hock Tan is currently the Program Director at the School of Civil and Environmental Engineering, Nanyang Technological University, Singapore. His research interest is in maritime safety and security.

Guanqiu Qi is currently an Assistant Professor at Department of International Logistics, Chung-Ang University, South Korea. Currently, she is serving as the Head Professor of International Student Major Education Program. Her research interests include transport economics, spatial economy and logistics connectivity. Her research can be found in journals like *Transport Reviews*, *Marine Policy*, *Transportation Research Part A: Policy and Practice* and *Maritime Policy & Management*.

1 Introduction

Over the years, the container shipping industry has undergone many changes induced by the formation of global alliances, a series of cooperative agreements between container carriers on operational matters such as the sharing of vessels or slots (Merk, 2018). With its extensive range of benefits, shipping alliances (SAs) are becoming pivotal for survival in this uncertain and competitive industry (Notteboom et al., 2017). According to Lin et al. (2017) and Qiu et al. (2018), alliances provide firms with greater networks and wider market accessibility. Moreover, it enhances the firms overall operational synergy and efficiency through slot sharing and joint services (Kutin, 2018; Yang, 2020). These facilitate the alliance partners' venture to achieve their strategic goals.

However, the benefits are not always realised in practice. Crotti et al. (2019) indicated that benefits could only be exploited if partners are willing to integrate or collaborate with one another entirely in the joint optimisation of operations such as vessel departure times, vessel capacities, demand information and operating costs. This can be difficult as, inherently, SAs were found to be unstable (Yap and Zahraei, 2018). According to Merk (2018), up to 80% of SAs in the 1990s failed to achieve their goals. Even though they were found to be more stable over time, there has been a reshuffling of SAs almost every year since the mid-2010s. This instability surfaced from the intensity of competition, the cost of complexity of alliances and the volatility in freight rates in the liner shipping industry (Rau and Spinler, 2017).

In recent years, existing research on alliances had identified several tactics and critical success factors (CSFs) of alliances to mitigate this instability including mutual trust between partners, good exchange of operational information, intra-alliance competition, organisational complexity and the number of members in an alliance (Ghorbani et al., 2022; Yap and Zahraei, 2018). However, among them, there is limited research that employs theories to identify and develop the CSFs holistically. In addition, most existing research is qualitative or focuses on a single theory or perspective. For

instance, some papers have only focused on the revenue of liners and from the resource-based view (RBV) perspectives (Ghorbani et al., 2022). Thus, this rules out several success factors such as cultural differences and the objectives of the SA formation. In addition, there is a lack of empirical support that the CSFs identified in the literature can genuinely lead to positive, strategic outcomes.

The aforementioned research gaps shall be addressed through two objectives. The first objective involves the introduction of several relevant theories which include:

1 transaction cost theory (TCT)

2 RBV theory

3 knowledge-based theory

4 sociological approaches

5 general management and leadership theories to identify a holistic set of CSFs.

Collectively, these theories provide a holistic view on the various CSFs. Each theory is relevant to alliances in different areas. For TCT, existing theoretical research suggests that alliance costs can influence the outcomes of SAs (Lee, 2019). In order to attain benefits from alliances, partners would need to pay for the costs associated with these benefits. This includes costs in areas such as establishing trust to control an alliance partner's opportunistic behaviours (OBs) or cooperation costs to achieve joint goals or collaborative relationships (Russo and Cesarani, 2017; Shakeri and Radfar, 2017). However, if factors such as trust is pre-established, necessary costs to prevent OB will be lowered. Thus, TCT can be applied to identify CSFs of SA, which reduces costs, to enhance the performance of alliances.

While TCT holds that alliance performance is influenced by transactions conducted in alliances, RBV provides a different perspective. Under RBV, organisations are viewed as a bundle of resources, comprising all assets and capabilities that they possess which enables them to draw up plans to improve performance (Russo and Cesarani, 2017). This concept is also further extended in knowledge-based view (KBV) where knowledge is emphasised as the most strategic resource of a firm (Ferreira et al., 2018). It recognises that knowledge can be developed and shared between firms through alliances to create value (Miller, 2019). These theories are relevant as they aid in explaining how alliances may assess, manage and organise shared resources or capabilities to create value (Russo and Cesarani, 2017). Thus, these can be applied to identify several CSFs of SAs, which are proposed to be a bundle of resources or capabilities in this study, to improve the success of alliances goals. In addition, the identified interactions made through transactions and shared resources are embedded in relationships. Alliances often involve networks of multiple partners and sociological approaches (SOC) can aid in explaining behavioural uncertainty between partners which can influence decisions of partners (Cuypers et al., 2021). The last incorporated theory is general management theory (GMT). This theory is relevant as it aids in explaining the influence of organisational processes, internal structures and strategies to achieve goals (de Camargo Fiorini et al., 2018). Thus, compared to the previously discussed theories, these explanations can aid in identifying CSFs for achieving strategic goals.

After identifying the 20 CSFs, they are then categorised into a typical SA's development process, starting with alliance rationale and conditions, followed by partner

search and selection, partnership design, partnership implementation, and partnership outcome evaluation.

Thereafter, the second objective involves examining the effects of each criterion on strategic outcomes in SAs which include OB and constructive coordination (CC). Even though previous studies have identified CSFs in the maritime sector such as partners with trustful and honest relationships and competencies, most evaluate these factors individually, and this may limit their utility and comprehensiveness. According to Yuen et al. (2019), companies' resources are scarce. Thus, by examining the extent of each CSF's effects on outcomes vital for alliance formation, it will allow shipping firms to prioritise and effectively allocate their resources in alliances to achieve optimum stakeholder satisfaction or performance. These chosen outcomes are crucial to alliances for varied reasons. According to Galvin et al. (2021a), OB is proven to be a recognised problem with many cases of partners exploiting unexpected events for their own benefit, which destabilises alliances. In contrast to this, CC is a positive outcome crucial in SAs. Choi et al. (2020) indicated that even in situations of perfect alignment of interest between partners, they are still required to allocate resources and coordinate effectively to achieve their tasks or goals. This is further substantiated by Lee (2019) who identified that interfirm coordination improves shipping companies' organisational performance in SAs by reducing business costs and operation time, improving service flexibility, responsiveness and reliability.

This study contributes to the stream of existing literature through the creation and evaluation of a framework covering the CSFs of SA formation. It utilises five management theories to explain the CSFs of SA formation and their importance in the formation of alliances. This allows SA partners to meet their respective strategic goals while optimising the allocation and utilisation of their resources. These various portions of the research paper are further addressed and organised as follows. It first introduces a framework of CSFs, which have been identified in the literature. Thereafter, it presents the research methodology, and the derived data is used to extract and identify the underlying organisation from the list of CSFs. Based on this structure, the research paper reviews the relationship between the CSFs and two vital outcomes, OB and CC. The paper then concludes with some recommendations for future research.

2 Literature review

2.1 Conceptual framework

The current paper proposes five organisational theories, which consist of TCT, RBV, KBV, SOC and GMT to develop the CSFs. The theories provide explanations for the firm's existence, firm's boundaries and interfirm collaboration and they are as follows. Firstly, the TCT states that firms should choose the governance mode that minimises the sum of fixed and continual transaction costs (Tjemkes et al., 2017). These costs are affected by three factors, namely OB, bounded rationality and asset specificity (Russo and Cesarani, 2017). OB involves partners acting in pursuit of their self-interests, whereas bounded rationality relates to the inability to predict all possible situations that may arise due to complexities and environmental uncertainties. Asset specificity involves investments made to support collaboration such that if the relationship were to be terminated, the value of these assets would be largely lost. In the shipping industry,

alliances can be considered as an efficient organisational form to minimise transaction and production costs by mitigating the three pre-mentioned factors through sharing resources (Russo and Cesarani, 2017). For example, according to Lee (2019), SAs allow shipping lines to respond better to fluctuations in freight rates or uncertainties while providing them with the benefits of scale and fulfilling their individual interests.

Secondly, the RBV suggests that the rationale for alliances is the value-creation potential of resources pooled together from different firms (Tjemkes et al., 2017). It explains firms as a bundle of resources, comprising all assets and capabilities that a company possesses (Russo and Cesarani, 2017). In accord with this, alliances are used as a strategy to gain access to other organisations' resources when the firm requires additional resources or resources that cannot be built internally with acceptable risk or within an acceptable amount of time.

Thirdly, an extension to the RBV of interfirm collaboration is the KBV. As a major determinant of sustained competitive advantage and performance, the KBV recognises knowledge as a critical and socially complex resource that is difficult to imitate (Kengatharan, 2019). In line with this, alliances can create value through the exchange or combination of knowledge. For example, partners can collaborate to enhance and speed up their organisational learning, reshape their environment as well as reduce strategic uncertainty (Lee, 2019).

Fourthly, sociological approaches describe and explain interfirm collaboration. For example, alliances are viewed as a strategy to enhance legitimacy and its' success is heavily affected by interpersonal and inter-organisational trust (Argyres et al., 2020).

Table 1 Summary of theoretical perspectives

Theoretical perspectives	*Explanation*	*Association with shipping alliances*
Transaction cost theory	The choice of structure which minimises the fixed and continual transaction costs.	A reduction of costs through joint services and shared resources.
Resource-based view	Firms are viewed as a bundle of resources and these resources include the assets and capabilities a company possesses.	Value-creation potential of resources pooled together from two or more shipping lines such as competitive advantages and better customer service through increased ship frequencies in service routes.
Knowledge-based view	It is an extension to resource-based view which focuses on knowledge, a critical resource in firms.	The acquisition, exchange and combination of knowledge between firms plays a vital role in their competitiveness and performance.
Sociological approaches	It describes and explains interfirm collaboration.	Interpersonal and interorganisational trust can affect the organisation and operations of a SA. For example, distrust can lead to an increased need for controls.
General management and leadership theories	It provides explanations for the structure of operational activities.	The organisational structure or strategies adopted in the management of an alliance influences the efficiency of goal attainment.

Lastly, the general management and leadership theories describe and provide explanations for the supervision or organisation of operational activities to ensure that they are on track and efficient in meeting strategic goals (Anderson et al., 2017; Cote, 2017; Russo and Cesarani, 2017). Thus, these five theories provide detailed explanations for the success for SAs, and they are summarised in Table 1.

Table 2 Framework for the formation of SAs

ID	*Critical success factors*	*Theories*
A	*Alliance rationale and analysis*	
1	Strategic alliance potential	GMT, RBV, TCT
2	Time commitment	SOC
3	Objectives and strategies alignment	GMT
4	Environmental fit	RBV, TCT
B	*Partner search and selection*	
5	Synergistic contributions	RBV
6	Alliance size	RBV, TCT
7	Trust-based relationships	SOC, TCT,
8	Partners' competency	RBV
9	Cultural fit	SOC, TCT
C	*Partnership design*	
10	Authority and responsibilities delineation	GMT, TCT
11	Equal partners' contributions	RBV, TCT
12	Competency confidentiality	KBV, RBV
13	Joint value creation	RBV
14	Clear partnership termination	RBV, SOC
D	*Partnership implementation*	
15	Skills and competencies	KBV, RBV
16	Senior management support	GMT, RBV
17	Coordination and information systems	TCT
18	Timely task completion	GMT
E	*Expected partnership outcomes*	
19	Continuous performance evaluation	GMT, SOC
20	Partnership interdependency	RBV, SOC, TCT

Notes: Abbreviations: transaction cost theory (TCT), resource-based view (RBV), knowledge-based view (KBV), sociological theories (SOC), and general management theories (GMT).

For the development of the framework, we build on these five theoretical perspectives. They influence the success of alliances, and these variables are classified into the five phases of alliance evolution:

1 alliance rationale and analysis

2 partner search and selection

3 partnership design

4 partnership implementation

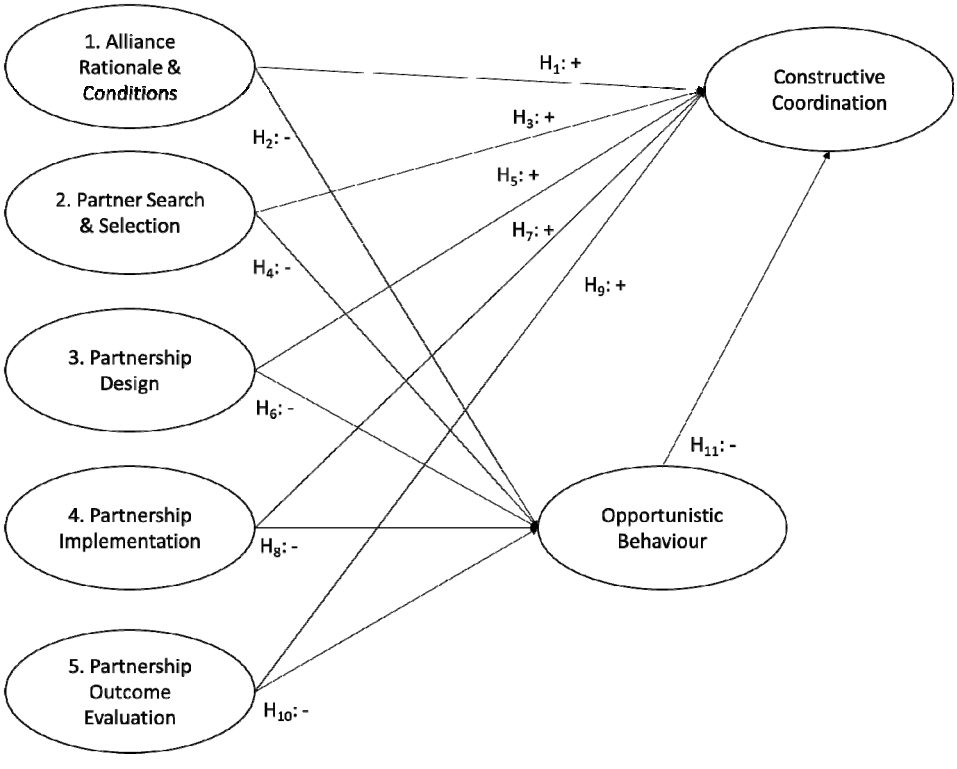
5 partnership outcome evaluation.

As shown in Table 2, the theories and categorisations establish the following 20 variables as CSFs influencing SAs' success in the five stages of alliance evolution.

2.2 Hypotheses development

Based on the framework, 11 hypotheses, numbered from H1 to H11 in Figure 1 are formed with a corresponding positive and negative sign, indicating a negative or positive relationship between each construct. The study hypothesises that the CSFs reduce OB and enhance coordination in SAs. Furthermore, it hypothesises that reduced OB can improve CC due to the emphasis on joint value creation between SA members. These are further addressed in Figure 1.

Figure 1 Graphical depiction of hypotheses



2.2.1 Effect of phase 1: alliance rationale & conditions on strategic outcomes

The first phase of alliance formation looks into the analysis and rationale behind a strategic alliance (Bruun, 2018). It is the initialisation stage where partners identify goals, expectations and external environmental factors directing the alliance.

Strategic alliance potential refers to the unrealised benefits of forming an alliance. According to the GMT, it is crucial to identify them clearly in the form of goals (i.e., GMT). It acts as an indicator of success and gives the alliance a direction to achieve more (Anderson et al., 2017; Zwikael et al., 2018). These objectives can include increasing market share through the pooling of vessels. Shared vessels allow SAs to reach a larger market, increase vessel space utilisation and garner greater economies of scale (Hirata, 2017). Thereby, reducing transaction costs (i.e., TCT) and allowing them to derive greater value from their resources (i.e., RBV).

Time commitment investigates an organisations' clear understanding over the prolonged time period and resources necessary to develop an alliance (i.e., SOC). SAs are formed on a step-by-step basis and involve many negotiations before every partner is on the same page. Thus, a significant amount of time is often exercised and a clear understanding towards this commitment is needed to identify realistic expectations or performance indicators (Bruyaka et al., 2017; Gviniashvili, 2019).

Objectives and strategies alignment represents the alignment of a SA's goals with its partner's individual organisational goals (i.e., GMT). As alliances are used as a means to meet the organisations' separate strategic goals, the alliance's desired outcome should detail how and if an alliance will improve the company's strategic position (Das, 2020). For example, SAs may aid in a company's goals for larger profit margins (Crotti et al., 2019).

Environmental fit refers to the favourability of the external environment to an SA's formation and development. The external environment involves macro factors which are uncontrollable by the organisation such as political, natural, social, technological, legal and economic conditions (Huo et al., 2019). These can affect an alliance's performance or success. For example, if the conditions are unfavourable, it may cause opportunism and deter them from achieving the expected benefits (i.e., RBV) (Huo et al., 2018). An actual case was seen in the P3 alliance between Maersk Line, Mediterranean Shipping Company S.A. and CMA CGM which failed due to disapproval from countries such as China (Finans, 2014).

Overall, these four factors examine the practicality of a firm's desired outcomes in forming a SA. In this stage, a firms' future expectations may influence discussions or agreements in subsequent phases. For example, in accordance with H1, exaggerated expectations on the alliance can result in disagreements between partners and thus, inefficiencies in coordination as more time has to be spent to align partners (Das, 2017). At the same time, these expectations may negatively affect decision making while increasing costs in negotiation (Dror, 2020). These decisions can result in inefficiencies including bottlenecks or over commitments. Thus, building on TCT, such higher costs create uncertainty and partners may act opportunistically, taking self-driven actions to avoid any negative repercussions, as shown in H2 (Dror, 2020; Um and Kim, 2018).

H1 Alliance rationale and conditions have a positive effect on CC.

H2 Alliance rationale and conditions have a negative effect on OB.

2.2.2 Effect of phase 2: partner search and selection on strategic outcomes

After the first phase, the organisation will divert its efforts towards its search and selection of alliance partners. It looks into the characteristics, relationships and

contributions of partners, driving the suitability of each partner (Russo and Cesarani, 2017).

Synergistic contribution is described as the degree of compatibility between the respective partners' contributed resources (i.e., RBV). Shared resources may be regarded as complementary or supplementary (Lee, 2019). Generally, complementary resources are favoured in alliances. It provides partners with a larger range of benefits such as economies of scope, synergies, development of new resources and new forms of competitive advantage (Russo and Cesarani, 2017). Within an SA, shipping lines may complement one another with specialities in different trade routes. For instance, when HMM joined THE Alliance in 2020, it was identified that HMM would expand its service portfolio in the Far East-to-North trade route (Maritime Gateway, 2019). However, supplementary resources can occasionally be regarded as a better alternative because it improves the stability of alliances through greater coordination in cooperation activities and reductions in OBs (Gao et al., 2017).

Alliance size refers to the number of partners and their respective organisational sizes. These sizes can be measured using indicators such as total balance sheet value, number of employees, and total sales (i.e., RBV) (Arifuddin and Usman, 2017). With a larger number or size of partners involved in a SA, more time and coordination costs would be needed to integrate the firms together (i.e., TCT) (Arslan et al., 2020). However, there would also be a larger pool of resources. Thus, the firms must weigh the pros and cons of having more resources relative to the increased costs of control.

Trust-based relationships relate to the mutual trust between alliance partners, and this trust is defined by the willingness of partners to be vulnerable to the actions of other partners based on the expectation that they will perform a particular action regardless of the control measures put in place (i.e., SOC) (Das, 2020). This mutual trust is critical as it reduces the perception of risk associated with OB and the resultant need for controls (i.e., SOC, TCT) (Russo and Cesarani, 2017; Shakeri and Radfar, 2017). Moreover, it facilitates cooperation. Thereby reducing overall transaction costs and improving the effectiveness of alliance activities.

Partner competency is a firm's ability to find, develop, and manage alliances (i.e., RBV) (Bicen et al., 2019). This includes the capacity to coordinate different skills and collective knowledge. Companies should seek firms with strong alliance competencies as it improves alliance performance (Bicen et al., 2019; Russo and Cesarani, 2017).

Cultural fit is described as the compatibility of the respective partners' cultures. It looks into the readiness and sensitivity of partners to accept each other's fundamental values and beliefs (i.e., SOC). A strong fit can cultivate cooperative relationships and the success of the alliance through reduced conflicts or disagreements (i.e., TCT) (Khalid and Ali, 2017; Russo and Cesarani, 2017).

Overall, this stage is vital in determining the synergy of partners and the SAs' forthcoming resource capabilities for achieving goals. In cases where partners lack in these areas, they may struggle to manage uncertainties or work together constructively as they are likely to encounter more conflicts (Wandia and Ismail, 2018). As identified in H3, these conflicts may act as hurdles for efficient coordination as partners may be less willing to share information, understand others' perspective and coordinate with them (Wudaru, 2020). Aside from this, under H4, a lack of synergy can worsen opportunism between partners directly and indirectly (Chathoth and Olsen, 2003). For example, distrust can directly cause partners act opportunistically such as refusing to share vital information for alliance operations in view of own interests (Das, 2018). Aside from this,

the level of synergy between partners can determine the governance structure used to monitor their partners' actions. In the case of low synergy, partners may choose governance structure with more safeguards to reduce the risk OB (Yasuda, 2018).

H3 Partner search and selection have a positive effect on CC.

H4 Partner search and selection have a negative effect on OB.

2.2.3 Effect of phase 3: partnership design on strategic outcomes

The third phase involves the design of the alliance agreement. It outlines the terms and underlying characteristics of the agreement, which influences growth and conflict resolution.

Authority and responsibilities delineation involves outlining the partners' respective rights and tasks in the alliance agreement (i.e., GMT). It influences the level of behavioural uncertainty among partners by providing clarity in their rights and responsibilities. Based on the TCT, the higher the levels of these behavioural uncertainties, the greater the instability of alliances, the need for control measures as well as the costs associated with negotiation and conflict resolution (i.e., TCT) (Niesten and Jolink, 2018; Russo and Cesarani, 2017). Thus, to prevent such problems, this factor can be effectively executed by documenting each partners' tasks and level of authority in detail such as the execution and management of specific shipping service routes.

Equal partners' contributions measures the extent of equality in the total value of resources contributed by each partner (i.e., RBV). Contributions are often desired to be equal across partners as unequal contributions can result in greater dependence or power of one party over the other (Chakravarty et al., 2020). This should be avoided as it can increase the differences in benefits attained by each partner which may affect alliance stability (Arslan, 2018). Instead, alliances should strive for balanced interdependence in contributions as, according to TCT, trust and cooperation among partners can reduce opportunism (i.e., TCT) (Khalid and Ali, 2017).

Competency confidentiality involves the protection of a partners' core competencies (i.e., RBV). Generally, alliances are formed to mitigate deficiencies within firms and learn new organisational competencies from partners. While a firm views this learning as a potential for growth, the other(s) may see it as an undesirable loss of expertise which affects their competitiveness (Russo and Cesarani, 2017). Thus, privacy methods should be drawn to protect their unique core competencies. However, it should be considered that increasing information privacy can limit inter-organisational learning and affect goodwill and benevolence among partners (i.e., KBV) (Russo and Cesarani, 2017).

Joint value creation relates to the alliance's fixation on creating value for the entire alliance rather than individuals (i.e., RBV). According to the TCT, alliances provide for reduced costs. In many cases, firms tend to be focused on these internal costs, their own benefits or their share of the alliance and this limits the resultant value of the alliance (Arslan, 2018; Tjemkes et al., 2017). Thus, following the RBV, they should instead be more fixated on optimising the overall value of the alliance (Tjemkes et al., 2017).

Clear partnership termination involves a clear outline of terms and conditions regarding the termination of the alliance. As most alliances come to an end, prior to it, terms and conditions with regards to the termination must be negotiated and documented to protect self-interests (i.e., RBV) and prevent future disagreements and hampered

relations (i.e., SOC) (Yang et al., 2017b). These can include compensation fees or advance notice agreements upon termination (Tjemkes et al., 2017).

Overall, this stage puts together the terms governing the alliance. Often, when a party contributes to an alliance, they run the risk of expropriation of those assets if the other party acts opportunistically (Yang et al., 2018). Thus, as identified in H6, this phase aids in reducing these risks of opportunism and protecting the respective partners' self-interests by setting out controls or penalties for contract breaches. Aside from this, it clearly sets out the direction of the collaboration and ensures that partners are aware and aligned in their desired outcomes and respective responsibilities (Yang et al., 2017b). Hence, in accordance with H5, this reduces ambiguities in their respective responsibilities and time spent rectifying them, allowing for improved completion of tasks and overall coordination.

H5 Partnership design on strategic outcomes have a positive effect on CC.

H6 Partnership design on strategic outcomes have a negative effect on OB.

2.2.4 Effect of phase 4: partnership implementation on strategic outcomes

During the execution of the partnership, the fourth phase plays a significant role as it comprises the technical and supporting factors of the alliance which drive the actual execution and accomplishment of plans.

Skills and competencies involve the ability of partners to handle the uncertainties and maintain consistency in completing their respective tasks for the alliance (i.e., RBV). Moreover, it reflects the degree of technical understanding among partners and their consequential ability to learn new knowledge through its cooperation within the alliance (KBV) (Drewniak and Karaszewski, 2020). Thereby affecting the growth of individual partners and the alliance.

Senior management support involves the backing of top management in providing resources and maintaining relationships with partners (i.e., GMT). It largely affects the success of an alliance as it aids in sustaining relationships with partners and assists with alliance operations through the implementation of necessary resources or systems (Chu et al., 2017). The dedication in this area is vital to ensure that there are always sufficient resources in the alliance (i.e., RBV).

Coordination and information systems involve an integrated system used for effective communication and information flows between functions or firms (Zhao and Priporas, 2017). It is said to reduce transaction costs, provide better synergy between partners and resultantly, aids in the success of the alliance (i.e., TCT). Further reductions in cost can also be secured with the use of modern information and communication technology as it allows for real-time exchange of information and increased efficiency.

Timely task completion is associated with the quick completion of tasks and the generation of controls for improvement (i.e., GMT). For example, once the three phases of the partnership have been established, if the initial tasks are completed in a timely manner, partners can quickly get accustomed to working together (Zhao and Priporas, 2017). Moreover, results can be generated as a control for improvements and successful collaboration. Finally, it provides dynamics to strengthen the management of alliances, and early successes can convince sceptics otherwise (Ratner et al., 2018).

Overall, this phase focuses on the extent or capability of the resources in an SA. The formation of an alliance often entails changes. The associated risk and uncertainty with

this change can create confusion within the firm (Li et al., 2021). Thus, inadequacy in this phase or capabilities may further disenable the alliance from completing tasks and handling unforeseen circumstances, bringing about inefficiencies and costs. Building on TCT, these costs or problems may create more doubt and opportunism to protect self-interests, as shown in H8 (Huo et al., 2018). Aside from this, sufficient capabilities and a good supporting system can aid in easier and clearer discussions or communications between partners (Zhao and Priporas, 2017). This results in more efficient negotiations, facilitating coordination within the SA, as identified in H7.

H7 Partnership implementation on strategic outcomes have a positive effect on CC.

H8 Partnership implementation on strategic outcomes have a negative effect on OB.

2.2.5 Effect of phase 5: partnership outcome evaluation on strategic outcomes

This phase occurs concurrently with phase 4. However, it focuses on the continuous monitoring and control of performance as well as the resultant inter-dependencies between partners.

Continuous performance evaluation involves the continual supervision and review of performance and SA relations to ensure the alliance's progress (i.e., GMT, SOC). As the market constantly changes, this poses importance in ensuring the alliance is progressing in the right direction, continuously searching for new opportunities and demonstrating growth (Russo and Cesarani, 2017). Areas of management include productivity, on-time ship services and budget fulfilment.

Partnership interdependency is the degree of reliance among partners for their competencies and resources (i.e., RBV). Often, partners depend on one another for their own deficiencies or needs (i.e., SOC). TCT suggests that this can be beneficial as partners become dependent on mutual cooperation to achieve superior outcomes (i.e., TCT) (Khalid and Ali, 2017). Thereby reducing OB. However, overreliance on each other's resources can result in constrained growth of the alliance due to erroneous interferences and superstitious learning (Tuncdogan et al., 2019). When partners rely too much on other firms' specific competencies, they experience subjective learning and confuse experience with competence.

These factors are critical for SAs as it allows them to keep up with the market and sustain themselves in the long-term. It involves the continual analysis of alliance deficiencies and market changes where partners may agree on adjustments or new goals to improve the SA. Such changes improve the state of the alliance in areas such as operational efficiencies, reduced over-interdependencies or rectifications of ideas so to keep the SA ahead of its competitors (Tuncdogan et al., 2019). These improvements aid in strengthening the overall capabilities of the alliance, clarifying doubts or unaligned areas. Thereby, as identified in H9, facilitating more efficient coordination between partners. Aside from this, these performance measurements and reviews aid in building calculative trust through transparency (Galvin et al., 2021a). Thereafter, this trust aids in fostering collaboration between partners and reducing the risk of opportunism as identified in H10 (Galvin et al., 2021a).

H9 Partnership outcome evaluation on strategic outcomes have a positive effect on CC.

H10 Partnership outcome evaluation on strategic outcomes have a negative effect on OB.

2.2.6 Relationship between strategic outcomes

As companies focus on the different phases, two strategic outcomes can be formed. The first of which is OB (Galvin et al., 2021b). This outcome involves the deliberate actions which partners take to accomplish their own goals or self-interest, and this behaviour can have negative repercussions on alliances (Pathak et al., 2020). Among the first four phases, one of the underlying theories is the TCT. According to TCT, transaction costs and opportunism is interrelated. An increase in transaction costs from reduced emphasis in some of the CSFs will increase opportunism in partners as profit margins decrease and uncertainty increase (Huo et al., 2018). This resultant behaviour can limit the value of an alliance. Thus, proper measures and emphasis should be put on the respective CSFs to reduce costs and the threat of opportunism in SAs.

Aside from this, CSFs affect CC in alliances directly and indirectly via OB. CC refers to the planned and organised alignments or amendments of the partners' actions to fulfil the alliance's joint goals (Galvin et al., 2021a). Through opportunism, the CSFs can influence indirectly as opportunistic partners may fail to cooperate for the benefit of the entire alliance and instead operate only based on their self-interests (Yang et al., 2017a). Conversely, the CSFs can directly improve coordination through the means of proper planning as well as partner selection. Detailed outlines of the SA's goals and responsibilities can reduce confusion and align partners in the desired direction of the SA. In addition, as identified in the RBV, the selections of partners, also known as bundles of resources, can improve coordination. It builds on the SA's foundation with capable and synergistic collaborations in terms of their contributions to prevent conflicting interests (Russo and Cesarani, 2017). Thus, this clarity in the SA's direction and partners' synergy can reduce disputes or disruptions and provide for coordination.

H11 OB has a negative effect on CC.

3 Methodology

To reiterate, the objectives of this research are to:

1 Identify and categorise the CSFs in SAs using a theory-driven approach.

2 Examine the effects of each criterion on two vital outcomes in SAs, which include OB and CC.

Both qualitative and quantitative methodologies were adopted to meet the objectives. The previous section presents the theoretical framework which integrates the different success factors and their respective theories to determine and explain their effects on alliance outcomes. The research first utilises the existing literature to develop 20 CSFs, which are categorised into five phases of a SA. Subsequently, structured interviews with five staff involved in alliances under liner companies were conducted, with each lasting for an average of 20 minutes. In the interview, the staff were asked to review the structure and content of the framework and identify any irrelevant factors. This was conducted to ensure that the identified CSFs genuinely reflected that of the SAs in liner shipping. Thereafter, the improved version of survey questionnaires was curated and released to 180 respondents from nine different shipping lines representing three major SAs (2M, Ocean Alliance and The Alliance). The data collected were analysed using confirmatory

factor analysis (CFA) to validate the categorisation of the 20 CSFs. Thereafter, their effects on two outcomes, OB and CC were assessed using SEM. The procedures for each of these steps are elaborated in subsequent sections.

3.1 Targeted sample groups

The targeted sample group for the survey are professionals involved in SA formation, as they are the most suitable candidates to assess the criticality of these success factors. Twenty responses from each shipping line located in Singapore were solicited to participate in the survey. A total of 180 responses was collected from nine different shipping lines involved in the three major SAs in Table 3. These respondents are directly involved in SAs, either in the planning or execution.

Table 3 Shipping alliances

Shipping alliance	*Shipping lines involved*
2M	Maersk Line, Mediterranean Shipping Company S.A. (MSC)
Ocean Alliance	China COSCO Shipping Corporation Limited, Orient Overseas Container Line (OOCL), Evergreen Line, CMA CGM
THE Alliance	Hapag-Lloyd AG, Yang Ming Marine Transport Corporation, Ocean Network Express

3.2 Survey instrument and procedure

Due to COVID-19 and to create a safe environment for participation, an online survey questionnaire was administered to the targeted sample groups. The survey questionnaire comprises four sections. The first section specifies the background, significance and objective of this research. The second section consists of the 20 CSFs shown in Table 4 and their supporting literature. The respondents were asked to assess the CSFs by choosing the degree of relative importance between 'extremely important (7)' and 'extremely unimportant (1)'.

Following this, the third section aims to identify the importance of the five phases on the OB and CC. The terminology of OB and CC was defined, and respondents were asked to rate each phase on the following areas in Table 5.

For questions measuring the extent of effects in the respective phases on either outcome, a Likert scale with 1 indicating 'To an extremely small extent and 7 as 'To an extremely large extent'. For questions regarding the frequency of outcomes, a Likert scale ranging from 'never (1)' and 'always (7)' is used.

Finally, the last section collects information such as the respondents' seniority, job position and period of involvement in SA formation.

Data were collected from January 2021 to March 2021. An invitation was first sent to 20 individuals in each company within the targeted sample group via electronic mail to request for their participation in the survey. They were given an option to accept or decline the request. Those who accepted the invitation were directed to the website for their completion, while for those who had not completed the survey, five weekly reminders were sent to them. If a respondent did not complete the survey despite several reminders, a replacement from the same company was contacted and invited to complete the survey.

In view of these unresponsive subjects and the possible response bias, a bias response test was conducted by comparing the constructs' means of early and late respondents. According to Armstrong and Overton (1977), late respondents are believed to respond less readily and therefore, tend to exhibit the characteristics of non-respondents. On the basis of this presumption, the dataset was divided into two groups (i.e., early and late respondents) based on the total time taken from the invitation to the completion of the survey questionnaire. Using the independent t-test, the mean for the two groups were calculated and compared. The results showcased that the p-value was greater than 0.05, suggesting that the findings are not significant and non-response bias is not a major threat to the credibility of this study.

Table 4 Sources of CSFs

ID	*Phases/critical success factors*	*Sources*
A	*Alliance rationale and analysis*	
1	Strategic alliance potential	Anderson et al. (2017), Hirata (2017)
2	Time commitment	Bruyaka et al. (2017)
3	Objectives and strategies alignment	Das (2020)
4	*Environmental fit*	Russo and Cesarani (2017)
B	*Partner search and selection*	
5	Synergistic contributions	Gao et al. (2017), Russo and Cesarani (2017)
6	Alliance size	Arifuddin and Usman (2017), Arslan et al. (2020)
7	Trust-based relationships	Das (2020)
8	Partners' competency	Russo and Cesarani (2017), Bicen et al. (2019)
9	Cultural fit	Khalid and Ali (2017), Russo and Cesarani (2017)
C	*Partnership design*	
10	Authority and responsibilities delineation	Niesten and Jolink (2018)
11	Equal partners' contributions	Arslan (2018), Chakravarty et al. (2020)
12	Competency confidentiality	Russo and Cesarani (2017)
13	Joint value creation	Tjemkes et al. (2017), Arslan (2018)
14	Clear partnership termination	Tjemkes et al. (2017), Yang et al. (2017b)
D	*Partnership implementation*	
15	Skills and competencies	Drewniak and Karaszewski (2020)
16	Senior management support	Chu et al. (2017)
17	Coordination and information systems	Zhao and Priporas (2017)
18	Timely task completion	Zhao and Priporas (2017), Ratner et al. (2018)
E	*Partnership outcome evaluation*	
19	Continuous performance evaluation	Russo and Cesarani (2017)
20	Partnership interdependency	Khalid and Ali (2017), Tuncdogan et al. (2019)

Table 5 Measurements of OB and CC

Outcomes	*Measurements*	*Description*
Constructive coordination (O1)	Efficiency	To what extent are the resources or costs being incurred to design and operate coordination systems?
	Effectiveness	To what extent did the efforts in coordination bring about sought-after changes or alignments in the respective partners' actions
Opportunistic behaviour (O2)	Exploitation	To what extent has the partners tried to take advantage of the 'holes' in the alliance's contract?
	Crucial disclosures	How often has partners withheld important information so as to benefit themselves and at the expense of other partner(s)?
	Adherence to terms	How often has partners acted dishonestly to contractual terms or changes?
	Integrity	To what extent has partners misrepresented their abilities to acquire self-gains?

3.3 Statistical methods

Once the survey responses were collated, CFA was performed to uncover the commonality, uniqueness, and resultant organisation of the 20 CSFs. Thereafter, SEM was used to examine the structural relationship and strength between the condensed CSFs and outcomes.

4 Results and discussion

4.1 Demographic profile of respondents

The demographics of the respondents are summarised in Table 6. There are 20 responses collected from each major container line that is involved in strategic alliances. As there are nine such container lines, the total response for the survey is 180. The majority of the survey respondents had at least six years of involvement in alliance formation (95.6%) and more than 11 years of working experience in their company (77.8%). Thus, it should be noted that the findings are largely reflective of this profile group.

4.2 Confirmatory factor analysis

CFA was conducted to assess the fitness, reliability, and validity in the categorisation of the 20 CSFs into the five phases. After which, this substantiated smaller set of factors would be used to represent the list of CSFs for SEM. In Table 7, the results are presented with the fit indices of the model displayed below it. These fit indices comprise $\chi^2/df = 2.13$, ($p < 0.05$), CFI = 0.96; NNFI = 0.97; RMSEA = 0.06 and SRMR = 0.05 which are within the criteria identified by Hu and Bentler (1999). This suggests a good fit between the CSFs and their categorised phases.

Table 6 Demographics of survey respondents

Demographic information	*No. of respondents*	*Percentage*	*Cumulative percentage*
Seniority (years)			
Between 6 to 10	40	22.2	22.2
Between 11 to 15	92	51.1	73.3
More than 15	48	26.7	100
Total	*180*	*100*	*100*
Job position			
Director and above	66	36.7	36.7
Manager	106	58.9	95.6
Non-management	8	4.4	100.0
Total	*180*	*100*	*100*
Period of involvement in alliance formation/management			
Below 6	8	4.4	4.4
Between 6 to 10	74	41.1	45.6
Between 11 to 15	70	38.9	84.4
More than 15	28	15.6	100
Total	*180*	*100*	*100*

Aside from this, all λs and CRs exceed 0.7 and 0.8 respectively. Thus, this implies that the measurement items are reliable and represents its constructs with internal consistency.

Table 7 Confirmatory factor analysis

Construct	*Item*	λ	*AVE*	*CR*
Alliance rationale and analysis (A)	A1	0.815	0.693	0.900
	A2	0.832		
	A3	0.817		
	A4	0.866		
Partner search and selection (B)	B1	0.725	0.634	0.896
	B2	0.765		
	B3	0.759		
	B4	0.847		
	B5	0.876		
Partnership design (C)	C1	0.787	0.678	0.913
	C2	0.816		
	C3	0.852		
	C4	0.765		
	C5	0.892		

Notes: Model fit indices: $\chi^2/df = 2.13$, ($p < 0.05$); CFI = 0.96; NNFI = 0.97; RMSEA = 0.06; SRMR = 0.05. λ denotes factor loading. AVE denotes average variance extracted. CR denotes composite reliability.

Table 7 Confirmatory factor analysis (continued)

Construct	*Item*	*λ*	*AVE*	*CR*
Partnership implementation (D)	D1	0.755	0.651	0.881
	D2	0.768		
	D3	0.877		
	D4	0.821		
Partnership outcomes evaluation (E)	E1	0.925	0.847	0.917
	E2	0.916		
Constructive coordination (F)	F1	0.878	0.690	0.869
	F2	0.795		
	F3	0.816		
Opportunistic behaviour (G)	G1	0.826	0.698	0.874
	G2	0.844		
	G3	0.837		

Notes: Model fit indices: $\chi^2/df = 2.13$, ($p < 0.05$); CFI = 0.96; NNFI = 0.97; RMSEA = 0.06; SRMR = 0.05. λ denotes factor loading. AVE denotes average variance extracted. CR denotes composite reliability.

To ensure that the measures of different constructs are not highly correlated with each other, tests for convergent and discriminant validity were performed. Based on these tests, as shown in Table 8, it was found that convergent validity was present as all AVEs are larger than the recommended value of 0.5. Moreover, as the squared correlation between each pair of construct is lower than the AVE of each construct, discriminant validity was also supported.

Thus, the results of the CFA indicates that the measurement model possesses an adequate fit and its respective measurement items are valid and reliable. This implies that the study can proceed with the formal analysis of the hypotheses.

Table 8 Tests for convergent and discriminant validity

	A	*B*	*C*	*D*	*E*	*F*	*G*
A	*0.693*	0.010	0.009	0.001	0.045	0.030	0.208
B	0.102	*0.634*	0.088	0.041	0.017	0.059	0.066
C	0.097	0.296	*0.678*	0.088	0.041	0.017	0.059
D	0.031	0.203	0.152	*0.651*	0.007	0.097	0.036
E	0.212	0.130	0.209	0.084	*0.847*	0.032	0.031
F	–0.173	–0.243	–0.565	–0.311	–0.178	*0.690*	0.211
G	0.456	0.256	0.229	0.189	0.176	–0.459	*0.698*

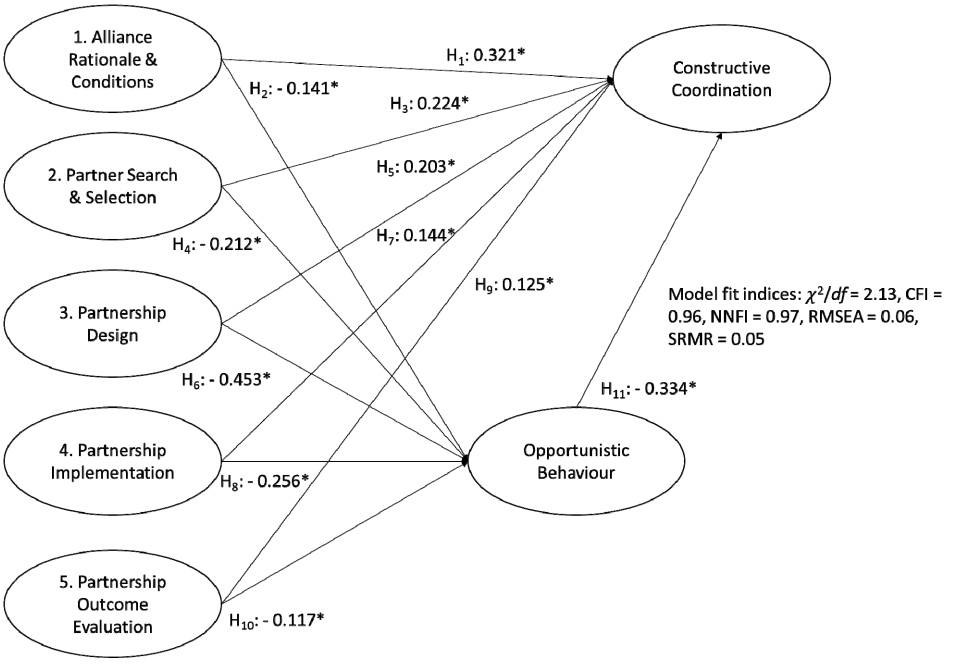
Notes: Principal diagonal – AVEs. Below principal diagonal – correlations between two constructs; above principal diagonal – squared correlations between two constructs.

4.3 Structural equation modelling

Subsequently, a structural model the specifies the various CSFs and outcomes is specified. As shown in Figure 2, the structural model lays out the relationships between the CSFs, OB, and CC. All estimations were standardised to ease interpretation.

According to Shi and Maydeu-Olivares (2020), as the model's comparative fit index (CFI) is ≥ 0.95, root mean squared error of approximation (RMSEA) is ≤ 0.06, and standardised root mean residual (SRMR) ≤ 0.10, it suggests that it possesses a good fit for analysis.

Figure 2 Structural equation model



In descending order of importance, the phases which are responsible for reducing OB in SAs are partnership design (–0.453), partnership implementation (–0.256), partner search and selection (–0.212), alliance rationale and conditions (–0.141) and partnership outcome evaluation (–0.117). Their explanations are as follows.

Firstly, partnership design outlines the characteristics of the partnership such as the partners' respective responsibilities, contributions and the terms governing them. Its primary role involves providing control over resources and clarity for the efficiency in succeeding alliance operations. A stronger control over each partners' resources can be made through instances such as strict contractual terms or restrictions on the use of partners' resources for value creation. With each firm often prioritising their self-interests, in accordance with TCT, these controls are said to prevent these interests from converting into opportunistic actions (Yang et al., 2017a).

Secondly, partnership implementation involves the actual execution of plans to fulfil goals. This focuses on the partners' capabilities to handle uncertainties. During this phase, as operations have commenced, interactions between partner are high. Thus, the

risk of conflicts are already higher (Russo and Cesarani, 2017). In addition, if partners do not have the capability to complete their tasks as planned or handle unforeseen circumstances, it may result in greater costs. Consequently, in accordance with TCT, this may reduce profit margins and create uncertainty, distress, and opportunism among partners.

Thirdly, partner search and selection address the synergy between the partners in resources and sociological factors. If the partners complement one another in these areas, they are likely to work well together, trust one another and have fewer disputes, reducing costs and opportunism (Yu, 2019).

Following after the three factors is alliance rationale and conditions. This factor is the foundation and direction of the SA. If goals and commitments are not made, aligned and in the right environment, it can cause a knock-on effect of costs in the subsequent phases of the SA through areas such as conflicts, resulting in lower margins and opportunism (Paswan et al., 2017).

Finally, partnership outcome evaluation plays a part in opportunism through alliance improvement and partnership dynamics. As the alliance progresses, if proper reviews and improvements are made, the resolved inefficiencies can reduce costs in the long run. Moreover, if they wind up mutually depending on one another heavily for resources, it can prevent opportunism as they need each other to reach their own goals (Khalid and Ali, 2017).

Overall, opportunism is mainly influenced by the management of resources and costs, as expressed in TCT and RBV. These influences also affect the other outcome, CC. However, as shown in Figure 1, the effects are both direct and indirect, which requires conducting a total effect analysis.

4.4 Total effect analysis

Table 9 summarises the direct, indirect and total effects of the five phases on CC.

Table 9 Total effect analysis of CC (i.e., dependent variable)

Phases	*Direct effect*	*Indirect effect*	*Total effect*
Alliance rationale and conditions	0.321	0.047	0.368
Partnership design	0.203	0.151	0.354
Partner search and selection	0.224	0.071	0.295
Partnership implementation	0.144	0.086	0.230
Partnership outcome evaluation	0.125	0.039	0.164

In decreasing order of their total effects on CC, they are alliance rationale and conditions (0.368), partnership design (0.354), partner search and selection (0.295), partnership implementation (0.230) and expected partnership outcomes (0.164). The indirect effects on CC are channelled from the phases via OB. OB has a negative impact on CC (–0.334) as opportunistic actions disrupt cooperation between partners. Opportunistic partners may choose to operate only based on their self-interests, decoupling their actions from the alliance's overall goals (Yang et al., 2017a). This affects coordination efforts from partners as disagreements arise when specific goals are not met.

As shown in Table 9, it was found that the total effect on CC decreases with the progression of SA phases. Thus, it can be inferred that the initial phases of SA are more

prominent as any emphasis or efforts made may affect subsequent phases. Each factor influences CC differently, and their direct effects are further elaborated below. Firstly, the top two factors, alliance rationale and conditions, as well as partnership design, influence coordination in a similar manner. They curate details with regards to the direction and responsibilities of the partnership. Without proper details, partners may not be fully aware of the tasks they are to carry out (Raziq et al., 2018). Particularly in situations where such details are not done in writing, partners may be confused or assume different tasks or directions, thereby causing inefficient, unorganised and uncoordinated operations in later phases as their ideas do not align (Shin et al., 2019). While these two phases are similar in effects, as shown in Table 9, alliance rationale and conditions have a greater influence over coordination as a clear direction formed in this phase is needed to execute the next phase effectively.

Secondly, as mentioned previously, partner search and selection focus on the synergy between partners. If the partners involved in the alliance are amicable and complementing in their contributions, they are likely to conclude on agreements more efficiently with greater coordination as there would be fewer disputes among the partners (Russo and Cesarani, 2017). In the case of SAs, where contributions tend to be similar and involve the sharing of vessels, there may be more conflicts. For example, if two shipping lines are strong within the same trade route, they may be unwilling to relocate their vessels to extend their geographical coverage under the alliance.

Thirdly, partnership implementation involves efforts in the actual operations of the alliance. It focuses on the alliance's available resources to handle its operations, and these resources include both physical and human capital. Physical capital such as information systems can facilitate communication, while in times of unforeseen circumstances, strong human capital can reduce confusion (Merk, 2018). Thereby, contributing to coordination within the alliance.

Lastly, like OB, partnership outcome evaluation focuses on reviewing the alliances' performance. It reduces inefficiencies and facilitates corrective actions, which can include means for improving coordination.

Overall, the total effects of the given phases on CC are heavily affected by the availability of resources, the general management of the alliance, as well as sociological factors, as expressed by RBV, general management and leadership theory and sociology approaches.

Among the five phases, they each play a vital role in the alliance success. However, the criticality of the phases differs. The analysis has identified core criteria such as alliance rationale and conditions and partnership design as well as other less prominent factors such as partner search and selection and partnership implementation.

5 Conclusions

5.1 Summary of findings

This study aims to identify and categorise the CSFs in SAs using a theory-driven approach. Moreover, it looks to examine their effects on two vital outcomes in SAs, including OB and CC. Drawing on theoretical insights from TCT, RBV, knowledge-based theory, sociological approaches, general management and leadership theories, a theoretical model that specifies the interrelationships between the

aforementioned constructs was developed. A survey questionnaire was rolled out to 180 staff from nine different shipping lines in Singapore. Statistical methods including EFA, and SEM were adopted to analyse the data. Among them, it was found that the 20 sub-factors of alliances can be parsimoniously represented by five phases. Moreover, in descending order of importance, the CSFs which drive CC are alliance rationale and conditions, partnership design, partner search and selection, partnership implementation and partnership outcome evaluation. Thus, by addressing the core criteria of SAs, it fills the research gap in the current literature. Moreover, it aids shipping lines in strategic decision making for successful SAs and provides proper explanations to these successes through the theoretical perspectives explained below.

5.2 Theoretical and strategic implications

The efforts devoted to this study contributes well to existing literature. In the past, there had been relatively few theoretical studies on the success factors and their effects on vital outcomes of SAs. Thus, this study supplements prior research by integrating TCTRBV, knowledge-based theory, sociological approaches, general management and leadership theories with the respective CSFs and outcomes. The analysis shows the effects in the relationships among the different phases and outcomes of SAs, providing another level of richness to the CSF-outcome model. Specifically, the study identifies the different phases of SAs and validate which phase is more critical to alliance outcomes.

The research also enriches the literature by examining the importance of each theory in identifying CSFs of SAs in different areas. While TCT explains that transaction costs can lead to OB, RBV and KBV offer a different perspective, viewing organisation as resources which can be shared to create value. For SOC, it explains uncertainties in partners' behaviours which may influence decisions and GMT explains the influence of organisational processes, internal structures and strategies to achieve goals. Most existing studies have only analysed theories in isolation. Thus, by utilising these different perspectives, it provides a more holistic view in identifying different CSFs and their relation to SA outcomes where a single factor could be perceived to have several explanations driving its total effects.

The first strategic implication is that partners should place more emphasis or resources on the first phases of the alliance. If an alliance is not built with a strong base or foundation, it may be difficult to coordinate and handle the issues or tasks along the alliance. In this case, the firm should ensure that their goal in forming out an alliance is feasible under the current external environment. If the current external environment poses high risks to the stability of the alliance, firms may attempt to offset these realised effects with greater focus on other phases. For example, not long ago, on 1st March 2022, the President of the USA, indicated that the container industry was uncompetitive and emphasised the need to pass a tightened US shipping law (Logan, 2022). Such initiatives can increase costs and OB, thereby, affecting coordination between parties and weakening alliances. Thus, firms may compensate this with greater efforts or resources made in the second most critical phase, Partnership Design. For example, to improve coordination, more stringent contract terms such as penalty clauses may be laid out to restrict OB and ensure the members' respective responsibilities are withheld (Yang et al., 2017a; Yasuda, 2018). Alternatively, efforts may be diverted to the remaining three phases. However, more resources or efforts need to be made in the first two phases to exert a similar or substantial positive effect to alliance coordination as the criticality of

the last three phases are lower. With that being said, efforts should still be made sufficiently to each phase as they are integral to the success of the alliance.

Under the phase, partnership search and selection, firms should choose their partners carefully. They should look out for complementary partners with specialities in different trade routes to extend their service portfolio. Also, while it is beneficial to choose a partner with strong competencies in alliance formation and trade, firms should also consider the level of interdependency and resultant bargaining power over alliance terms between partners. Thereafter, for partnership implementation, it involves the harmony of these four factors to realise the identified alliance goals. During this phase, these factors should be made ready to handle unforeseen circumstances. This can be done either through training for the enhancement of skills, competencies and efficiency or through proper security systems to secure coordination and information systems. This is especially important as more cases of cyberattacks emerge in the liner industry (Zhou et al., 2022). For instance, in 2020, MSC was hit by a malware attack which took down all its customer facing systems while CMA CGM was hit by a cyberattack in the form of ransomware (Hand, 2020). Lastly, under partnership outcome evaluation, alliance members should focus on continuous improvement to keep up with the market. Specifically, firms should conduct regular reviews of alliance performance to identify any deficiencies and opportunities in the market to act on.

Overall, the practical framework in this study, which is grounded in theories and validated empirically, is created to guide SAs.

5.3 Limitations and recommendations

Despite the contributions of this study, there are several limitations. Firstly, the research was conducted in Singapore and the results of this paper may not be applicable internationally. By nature, SAs are global, and this brings diverse national cultures with different perspectives, ideas and knowledge to the table. Thus, this diversity could influence the choices of CSFs and the resultant criticality of each phase on alliance outcomes (Elia et al., 2019; Ghorbani et al., 2022). Future research should examine the model in other regions to validate the results' generalisability.

Secondly, the study has only integrated five theoretical lenses to understand and explain the success factors of SAs. Future research can introduce other theories such as institutional theory in the CSFs of SAs.

Lastly, the study may lack industry examples of actual issues or problems affecting SAs. This was limited by the lack of such information reported by shipping lines. Most news focus on the negative or positive impacts of SAs, but do not discuss the barriers or challenges face by the SAs as these might be sensitive information and reporting them might affect their reputation. Future research may consider conducting qualitative studies such as interviews, case studies and focus groups with industry professionals to elicit real examples to support the CSFs.

Acknowledgements

We wish to acknowledge the funding support for this project from Nanyang Technological University under the URECA Undergraduate Research Programme.

This work is supported by China Merchants Energy Shipping.

References

Anderson, H.J., Baur, J.E., Griffith, J.A. and Buckley, M.R. (2017) 'What works for you may not work for (Gen) Me: limitations of present leadership theories for the new generation', *The Leadership Quarterly*, Vol. 28, No. 1, pp.245–260.

Argyres, N., Bercovitz, J. and Zanarone, G. (2020) 'The role of relationship scope in sustaining relational contracts in interfirm networks', *Strategic Management Journal*, Vol. 41, No. 2, pp.222–245.

Arifuddin, K.H. and Usman, A. (2017) 'Company size, profitability, and auditor opinion influence to audit report lag on registered manufacturing company in Indonesia Stock Exchange', *International Journal of Applied Business and Economic Research*, Vol. 15, No. 19, pp.353–367.

Armstrong, J.S. and Overton, T.S. (1977) 'Estimating nonresponse bias in mail surveys', *Journal of Marketing Research*, Vol. 14, No. 3, pp.396–402.

Arslan, B. (2018) 'The interplay of competitive and cooperative behavior and differential benefits in alliances', *Strategic Management Journal*, Vol. 39, No. 12, pp.3222–3246.

Arslan, O., Archetti, C., Jabali, O., Laporte, G. and Grazia Speranza, M. (2020) 'Minimum cost network design in strategic alliances', *Omega*, Vol. 96, p.102079.

Bicen, P., Hunt, S.D. and Madhavaram, S. (2019) 'Coopetitive innovation alliance performance: Alliance competence, alliance's market orientation, and relational governance', *Journal of Business Research*, Vol. 123, pp.23–31.

Bruun, R. (2018) *Partner Selection Process in Project Alliances*, Unpublished Master's thesis, University of Turku, Turku, Finland

Bruyaka, O., Philippe, D. and Castañer, X. (2017) 'Run away or stick together? The impact of organization-specific adverse events on alliance partner defection', *Academy of Management Review*, Vol. 43, No. 3, pp.445–469.

Chakravarty, A., Zhou, C. and Sharma, A. (2020) 'Effect of alliance network asymmetry on firm performance and risk', *Journal of Marketing*, Vol. 84, No. 6, pp.74–94.

Chathoth, P.K. and Olsen, M.D. (2003) 'Strategic alliances: a hospitality industry perspective', *International Journal of Hospitality Management*, Vol. 22, No. 4, pp.419–434.

Choi, Y.R., Phan, P.H. and Choi, J. (2020) 'Formal governance, interfirm coordination, and performance in partnerships: An empirical investigation of a mediation model', *European Management Journal*, Vol. 38, No. 3, pp.413–424.

Chu, S.H., Yang, H., Lee, M. and Park, S. (2017) 'The impact of institutional pressures on green supply chain management and firm performance: top management roles and social capital', *Sustainability*, Vol. 9, No. 5, p.764.

Cote, R. (2017) 'A comparison of leadership theories in an organizational environment', *International Journal of Business Administration*, Vol. 8, No. 5, pp.28–35.

Crotti, D., Ferrari, C. and Tei, A. (2019) 'Merger waves and alliance stability in container shipping', *Maritime Economics & Logistics*, Vol. 22, No. 1, pp.1–27.

Cuypers, I.R., Hennart, J-F., Silverman, B.S. and Ertug, G. (2021) 'Transaction cost theory: past progress, current challenges, and suggestions for the future', *Academy of Management Annals*, Vol. 15, No. 1, pp.111–150.

Das, A. (2020) 'Trust in 'trust-free' digital networks: how inter-firm algorithmic relationships embed the cardinal principles of value co-creation', *AIS Transactions on Human-Computer Interaction*, Vol. 12, No. 4, pp.228–252.

Das, T.K. (2017) *Managing Alliance Portfolios and Networks*, Information Age Publishing, Incorporated.

Das, T.K. (2018) *Managing Trust in Strategic Alliances*, Information Age Publishing Incorporated.

de Camargo Fiorini, P., Seles, B.M.R.P., Jabbour, C.J.C., Mariano, E.B. and de Sousa Jabbour, A.B.L. (2018) 'Management theory and big data literature: from a review to a research agenda', *International Journal of Information Management*, Vol. 43, pp.112–129.

Drewniak, R. and Karaszewski, R. (2020) 'Diffusion of knowledge in strategic alliance: empirical evidence', *International Entrepreneurship and Management Journal*, Vol. 16, No. 2, pp.387–416.

Dror, I.E. (2020) 'Cognitive and human factors in expert decision making: six fallacies and the eight sources of bias', *Analytical Chemistry*, Vol. 92, No. 12, pp.7998–8004.

Elia, S., Petruzzelli, A.M. and Piscitello, L. (2019) 'The impact of cultural diversity on innovation performance of MNC subsidiaries in strategic alliances', *Journal of Business Research*, Vol. 98, pp.204–213.

Ferreira, J., Mueller, J. and Papa, A. (2018) 'Strategic knowledge management: theory, practice and future challenges', *Journal of Knowledge Management*, ahead-of-print.

Finans, R. (2014) *Media: Maersk and MSC have not Learned from Failed P3*, ShippingWatch.

Galvin, P., Tywoniak, S. and Sutherland, J. (2021a) 'Collaboration and opportunism in megaproject alliance contracts: the interplay between governance, trust and culture', *International Journal of Project Management*, Vol. 39, No. 4, pp.394–405.

Galvin, P., Tywoniak, S. and Sutherland, J. (2021b) 'Collaboration and opportunism in megaproject alliance contracts: the interplay between governance, trust and culture', *International Journal of Project Management*, Vol. 39, No. 4, pp.394–405.

Gao, H., Yang, J., Yin, H. and Ma, Z. (2017) 'The impact of partner similarity on alliance management capability, stability and performance', *International Journal of Physical Distribution & Logistics Management*, Vol. 47, No. 9, pp.906–926.

Ghorbani, M., Acciaro, M., Transchel, S. and Cariou, P. (2022) 'Strategic alliances in container shipping: a review of the literature and future research agenda', *Maritime Economics & Logistics*, Vol. 24, No. 2, pp.1–27.

Gviniashvili, A. (2019) *Collaboration for innovation in the financial sector: A qualitative study of Norwegian FinTechs*, Unpublished Master's thesis, TIK Center for Technology, Innovation and Culture, Faculty of Social Sciences, University of Oslo.

Hand, M. (2020) 'CMA CGM latest shipping victim of a cyber attack', *Seatrade Maritime News*.

Hirata, E. (2017) 'Contestability of container liner shipping market in alliance era', *The Asian Journal of Shipping and Logistics*, Vol. 33, No. 1, pp.27–32.

Hu, L.t. and Bentler, P.M. (1999) 'Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives', *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 6, No. 1, pp.1–55.

Huo, B., Ye, Y., Zhao, X., Wei, J. and Hua, Z. (2018) 'Environmental uncertainty, specific assets, and opportunism in 3PL relationships: a transaction cost economics perspective', *International Journal of Production Economics*, Vol. 203, No. 2, pp.154–163.

Huo, W., Chen, P.S-L., Zhang, W. and Li, K.X. (2019) 'International port investment of Chinese port-related companies', *International Journal of Shipping and Transport Logistics*, Vol. 11, No. 5, pp.430–454.

Kengatharan, N. (2019) 'A knowledge-based theory of the firm', *International Journal of Manpower*, Vol. 40, No. 6, pp.1056–1074.

Khalid, S. and Ali, T. (2017) 'An integrated perspective of social exchange theory and transaction cost approach on the antecedents of trust in international joint ventures', *International Business Review*, Vol. 26, No. 3, pp.491–501.

Kutin, N. (2018) *Market Structure in the Container Liner Shipping Industry: An Analysis of the Maritime Network, Port Efficiency and Competition*, Unpublished PhD thesis, National University of Management, Phnom Penh, Cambodia.

Lee, E-S. (2019) 'Improving a firm's performance within a strategic shipping alliance', *The Asian Journal of Shipping and Logistics*, Vol. 35, No. 4, pp.213–219.

Li, J.-Y., Sun, R., Tao, W. and Lee, Y. (2021) 'Employee coping with organizational change in the face of a pandemic: the role of transparent internal communication', *Public Relations Review*, Vol. 47, No. 1, p.101984.

Lin, D-Y., Huang, C-C. and Ng, M. (2017) 'The coopetition game in international liner shipping', *Maritime Policy & Management*, Vol. 44, No. 4, pp.474–495.

Logan, D. (2022) *Biden in Attack on Container Alliances: Price Increases Threaten our National Security*, ShippingWatch.

Maritime Gateway (2019) *HMM to Bring Modern Ships in the Alliance*.

Merk, O. (2018) *The Impact of Alliances in Container Shipping*, Technical Report OECD/International Transport Forum [online] https://www.itf-oecd.org/impact-alliances-container-shipping.

Miller, D. (2019) 'The resource-based view of the firm', *Oxford Research Encyclopedia of Business and Management*.

Niesten, E. and Jolink, A. (2018) 'Alliance governance choices: disentangling the effects of uncertainty and alliance experience', *Long Range Planning*, Vol. 51, No. 2, pp.320–333.

Notteboom, T.E., Parola, F., Satta, G. and Pallis, A.A. (2017) 'The relationship between port choice and terminal involvement of alliance members in container shipping', *Journal of Transport Geography*, Vol. 64, pp.158–173.

Paswan, A.K., Hirunyawipada, T. and Iyer, P. (2017) 'Opportunism, governance structure and relational norms: an interactive perspective', *Journal of Business Research*, Vol. 77, pp.131–139.

Pathak, B., Ashok, M. and Tan, Y.L. (2020) 'Value co-destruction: exploring the role of actors' opportunism in the B2B context', *International Journal of Information Management*, Vol. 52, p.102093.

Qiu, X., Wong, E.Y. and Lam, J.S.L. (2018) 'Evaluating economic and environmental value of liner vessel sharing along the maritime silk road', *Maritime Policy & Management*, Vol. 45, No. 3, pp.336–350.

Ratner, B., Burnley, C., Mugisha, S., Madzudzo, E., Oeur, I., Mam, K., Rüttinger, L., Chilufya, L. and Adriázola, P. (2018) 'Investing in multi-stakeholder dialogue to address natural resource competition and conflict', *Development in Practice*, Vol. 28, No. 6, pp.799–812.

Rau, P. and Spinler, S. (2017) 'Alliance formation in a cooperative container shipping game: Performance of a real options investment approach', *Transportation Research Part E*, Vol. 101, pp.155–175.

Raziq, M.M., Borini, F.M., Malik, O.F., Ahmad, M. and Shabaz, M. (2018) 'Leadership styles, goal clarity, and project success', *Leadership & Organization Development Journal*, Vol. 39, No. 2, pp.309–323.

Russo, M. and Cesarani, M. (2017) 'Strategic alliance success factors: a literature review on alliance lifecycle', *International Journal of Business Administration*, Vol. 8, No. 3, pp.1–9.

Shakeri, R. and Radfar, R. (2017) 'Antecedents of strategic alliances performance in biopharmaceutical industry: a comprehensive model', *Technological Forecasting and Social Change*, Vol. 122, pp.289–302.

Shi, D. and Maydeu-Olivares, A. (2020) 'The effect of estimation methods on SEM fit indices', *Educational and Psychological Measurement*, Vol. 80, No. 3, pp.421–445.

Shin, N., Park, S.H. and Park, S. (2019) 'Partnership-based supply chain collaboration: impact on commitment, innovation, and firm performance', *Sustainability*, Vol. 11, No. 2, p.449.

Tjemkes, B., Vos, P. and Burgers, K. (2017) *Strategic Alliance Management*, 2nd ed., Routledge, London.

Tuncdogan, A., Lindgreen, A., Volberda, H. and van den Bosch, F. (2019) *Strategic Renewal: Core Concepts, Antecedents, and Micro Foundations*, Taylor & Francis.

Um, K-H. and Kim, S-M. (2018) 'Collaboration and opportunism as mediators of the relationship between NPD project uncertainty and NPD project performance', *International Journal of Project Management*, Vol. 36, No. 4, pp.659–672.

Wandia, W.M. and Ismail, N. (2018) 'Effects of strategic alliances on performance of commercial banks in Kenya: a case of Kenya Commercial Bank Limited', *International Journal of Business Management & Finance*, Vol. 1, No. 58, pp.986–1001.

Wudaru, S.R. (2020) *The Paradox of Coordination and Conflicts in Organisations*, Unpublished PhD thesis, Warwick Business School, University in Coventry, England.

Yang, C-S. (2020) 'An evaluation of alliance motives, shipping alliances, and alliance performance in Taiwan', *International Journal of Shipping and Transport Logistics*, Vol. 12, No. 5, pp.445–461.

Yang, D., Sheng, S., Wu, S. and Zhou, K.Z. (2018) 'Suppressing partner opportunism in emerging markets: contextualizing institutional forces in supply chain management', *Journal of Business Research*, Vol. 90, pp.1–13.

Yang, P., Qian, L. and Zheng, S. (2017a) 'Improving performance and curtailing opportunism: the role of contractual issue inclusiveness and obligatoriness in channel relationships', *Journal of Business & Industrial Marketing*, Vol. 32, No. 3, pp.371–384.

Yang, W., Gao, Y., Li, Y., Shen, H. and Zheng, S. (2017b) 'Different roles of control mechanisms in buyer-supplier conflict: an empirical study from China', *Industrial Marketing Management*, Vol. 65, pp.144–156.

Yap, W.Y. and Zahraei, S.M. (2018) 'Liner shipping alliances and their impact on shipping connectivity in Southeast Asia', *Maritime Business Review*, Vol. 3, No. 3, pp.243–255.

Yasuda, H. (2018) 'Governance mechanisms of inter-organizational relationship: comparative analysis of three forms of alliance governance', *Journal of Strategic Management Studies*, Vol. 10, No. 1, pp.81–93.

Yu, P-L. (2019) 'Interfirm coopetition, trust, and opportunism: a mediated moderation model', *Review of Managerial Science*, 1 No. 135, pp.1069–1092.

Yuen, K.F., Wang, X., Ma, F., Lee, G. and Li, X. (2019) 'Critical success factors of supply chain integration in container shipping: an application of resource-based view theory', *Maritime Policy & Management*, Vol. 46, No. 6, pp.653–668.

Zhao, S. and Priporas, C-V. (2017) 'Information technology and marketing performance within international market-entry alliances', *International Marketing Review*, Vol. 34, No. 1, pp.5–28.

Zhou, Y., Li, X. and Yuen, K.F. (2022) 'Holistic risk assessment of container shipping service based on Bayesian network modelling', *Reliability Engineering & System Safety*, Vol. 220, p.108305.

Zwikael, O., Chih, Y-Y. and Meredith, J.R. (2018) 'Project benefit management: setting effective target benefits', *International Journal of Project Management*, Vol. 36, No. 4, pp.650–658.