Humanities & Social Sciences Communications

ARTICLE

https://doi.org/10.1057/s41599-024-02972-z OPEN

# Causes of conflicts in standardization alliances related to the Belt and Road Initiative

Xiuwen Chen[1]✉, Qing Zhou[1]✉ & Zhigang Wang[2]

Effective conflict management is pivotal for achieving innovation performance within standardization alliances, particularly those for the Belt and Road Initiative (B&R Initiative). However, existing research has paid limited attention to the interdependent relationship between influencing factors of conflicts in these alliances. To address this gap, this paper employs the interpretative structure model (ISM) to establish mutual relationships among 16 identified influencing factors. The results show that target difference, unbalanced input of resources, and unreasonable distribution of benefits are recognized as key facilitators at the top level, while political risks, impact of financial factors, and policy changes are identified as foundational drivers at the bottom level. At the intermediate level, factors such as demand difference, technical capabilities difference, cognitive difference, value pursuit difference, information asymmetry, lack of trust, poor communication, resource dependency, and unreasonable contribution evaluation are positioned. These identified interdependence relationships offer crucial reference information for conflict management in standardization alliances for the B&R Initiative.

[1] Experimental Center of Data Science and Intelligent Decision-Making, Hangzhou Dianzi University, Hangzhou 310018, China. [2] CREEC East China Survey and Design Co., Ltd, Hangzhou 310018, China. ✉email: chenxw@hdu.edu.cn; zhq@hdu.edu.cn

## Introduction

In December 2017, the office of the leading group for the Belt and Road Initiative (B&R Initiative) issued the "action plan on Belt and Road standard connectivity (2018–2020)", which clarified its intention to strengthen alignment with the standardization strategies of countries (regions) along the Belt and Road (B&R countries) and enhance mutual compatibility of standard systems, thereby positively impacting the internationalization of Chinese standards, promoting investment and trade facilitation, and deepening cultural exchanges. Thus, an increasing number of Chinese enterprises are forming standardization alliances with B&R countries to create standards that meet the strategic interests of all parties. For example, for household electrical appliances, Haier and Pakistan's local enterprise Ruba Group have jointly established the Haier-Ruba Industrial Park. With its strategy of localizing research and development, manufacturing, and marketing, Haier continuously innovates new technologies and develops products that meet local consumer demands. This has led to a gradual increase in Haier's market share and industry recognition for household appliances in Pakistan, effectively promoting the internationalization of Chinese standards. With the support of relevant departments in both China and Pakistan, Haier, as a technical resource provider, participates in the formulation of Pakistan household appliance standards that meet the local market demands, playing a crucial role in enhancing standards alignment. In terms of high-speed railway construction, China Railway corporation, along with four Indonesian state-owned enterprises and relevant departments, have collectively discussed the construction of the Jakarta-Bandung high-speed railway and adopted steel rails customized to Chinese standards for production. This signifies the first comprehensive overseas implementation of Chinese high-speed rail technology and standards across the entire system, all elements, and the entire industry chain, which has become a model for the internationalization of Chinese high-speed rail standards. However, a standardization alliance is a collaboration among multiple interest groups, where various contradictions and conflicts among individual members are inevitable (Duarte and Davies, 2003). To ensure the stable operation of the alliances and achieve the expected innovation performance, this paper attempts to identify the influencing factors on conflicts in standardization alliances for the B&R Initiative and their interdependent relationship.

Technical standards have an important impact on business performance and technological development (Hu et al., 2017). According to the underlying logic of resource dependence theory, a single enterprise often struggles to possess all the core technologies and patents needed for standard development (Wen et al., 2020; Wu and de Vries, 2022). This makes monopolizing standards exceedingly challenging for standardization practices (Blind, 2007). Thus, an increasing number of enterprises are encouraged to join standardization alliances when formulating technology standards to make full use of complementary resources and diversify risks (Leiponen, 2008; SatishNambisan, 2013). Existing research has confirmed the advantages of standardization alliances in expanding the scope of standard installation and creating a first-mover advantage for sustainable competitiveness (Blind and Mangelsdorf, 2016; Wen et al., 2020). Notably, similar to a general strategic alliance, all participants in standardization alliances need to make a joint investment, benefit, and risk-sharing (Blind and Mangelsdorf, 2013; Gomes-Casseres et al., 2006). Moreover, standardization alliance activities are a process of discussion, negotiation, and complex coordination (Ranganathan et al., 2018), in which enterprises strive to influence the standardization process to obtain technological dominance (Dai et al., 2018). The final standard is the "compromise proposal" (Wen et al. 2020), which provides a breeding ground for conflicts. Further, the outcome of a standardization alliance is a standard with public good characteristics and involves private benefits (Blind and Mangelsdorf, 2016; Wen et al., 2020). These facts demonstrate that various conflicts inevitably arise in the process of cooperation (Tidström, 2009). Therefore, to ensure the successful and stable operation of the standardization alliance, it is crucial to identify the factors that may lead to conflicts.

In the related literature, they primarily focused on investigating the factors influencing conflicts in organizational, research and development (R&D) alliances or industrial technology innovation strategic alliances (Cristina and Benavides-Velasco, 2011; Hauser et al., 2017). However, few attentions have been paid into alliances in general and the standardization alliances for the B&R Initiative in particular. For instance, James et al. (1995) reported that there are five influencing factors of organizational conflicts: individual characteristics, communication, structure, power, and interests. (Zheng and Du, 2005) analyzed the causes of conflicts and management tactics in cooperative innovation alliances. Blatt (2009a) considered that the degree of trust and familiarity among individuals, coupled with uncertainty in the external environment, may cause different types of conflicts in entrepreneurial teams. (Lee et al., 2010) emphasized that whether the contributions and distribution of payoffs among R&D alliance partners are reasonable is a significant factor contributing to alliance conflicts. Korsgaard et al. (2008) considered that the factors affecting conflicts originated from four dimensions: individual differences, individual status, task structure, and social context. (Zhou et al., 2017) studied conflict factors in industrial technology innovation strategic alliances based on the life cycle, which includes the establishment period, operation period, and disintegration period.

Significantly, the standardization alliances for the B&R Initiative, as a special strategic alliance, have distinct differences from R&D alliances and standardization alliances. Specifically, (1) From the perspective of alliance members, R&D alliances consist of enterprises with unique knowledge and complementary effects among their knowledge (Veugelers, 1998). Participants in standardization alliances may include not only enterprises, also, for instance, consumer organizations and governments (de Vries, 2008). Members of standardization alliances for the B&R Initiative include enterprises, universities, research institutions, government agencies, intermediary organizations and other stakeholders from China and the B&R countries (Liu et al., 2023). In contrast to other standardization alliances, which are mainly led by enterprises from Western countries with relatively balanced technological levels, the standardization alliances for the B&R Initiative are initiated by Chinese enterprises. The participating enterprises in B&R countries vary in their technological levels, emphasizing the value orientation of mutual benefit and win-win cooperation within the alliance (Zhou et al., 2021b). (2) In terms of alliance functions, R&D alliances integrate the knowledge contributed by alliance members to develop new technologies/products. Standardization alliances focus on reaching consensus regarding a set of specifications that all products, processes, and procedures must adhere to (Wen et al., 2020). The standardization alliances for the B&R Initiative take standard cooperation projects as a carrier to initiate a standard and diffuse it in the market. Notably, depending on the various standardization cooperation projects, the corresponding alliance modes may also be different. The modes of the standardization alliances for the B&R Initiative include standards joint discussion and application, standards co-construction and development, and standard iteration and upgrade, which have different applicable conditions and cooperation methods (Zhou et al., 2021a). The mode of standard joint discussion and application involves

alliance participants advocating for the application and promotion of Chinese standards in B&R countries through communication and negotiation on standards cooperation content. The Jakarta-Bandung High-Speed Railway serves as a typical example of standard joint discussion and application. The mode of standard co-construction and development within the alliance entails the realization of standard creation "from 0 to 1" through collaborative research and development. Standards generated through this mode may represent innovations that are entirely independent of original standards or a fusion of innovations based on the original standards. The Belt and Road Straddle Monorail System International Standard Alliance is a typical representative of this mode. The mode of standard iteration and upgrade leverages advanced technology and standard systems from B&R countries, integrating them with the local institutional environment to iteratively upgrade both standards and cooperation methods. The localized version of Alipay, jointly created by Ant Financial and local partners in nine B&R countries such as India, Thailand, Indonesia, and Malaysia, is a typical representative. (3) From the perspective of operational environment, compared to R&D alliances and standardization alliances, standardization alliances for the B&R Initiative operates in a more complex economic and social environment, deeply influenced by institutional and cultural differences among countries. Besides, some B&R countries are experiencing political turmoil, weak economic foundations, or social instability, which increases the uncertainty of standard application and promotion, as well as the potential for alliance conflicts.

Given the unique nature of standardization alliances for the B&R Initiative, the likelihood and intensity of alliance conflicts may be higher. Thus, it is essential to systematically analyze and evaluate the factor that affect conflicts, thereby providing valuable insights for the effective prevention and management of alliance conflicts. Furthermore, the interrelationship between factors affecting conflicts has seldom been taken into consideration. In reality, influencing factors are not independent but interrelated (Su et al., 2015; Williams, 2019). For example, divergent perspectives on the alliance's objectives have the potential to trigger disagreements, leading to a breakdown in trust and hindering effective communication. Consequently, the conflict's intensity, fueled by the synergistic effects of distrust and poor communication, is likely to escalate. This complexity also adds to the challenge of effectively managing the governance of conflict (Cronin and Bezrukova, 2019). Noteworthily, the operation of the standardization alliances for the B&R Initiative is profoundly influenced by institutional and cultural differences between countries, cultural differences play a pivotal role in triggering conflicts. However, it remains unclear how cultural differences interact with other factors, posing a challenge to effectively managing conflicts in the standardization alliances for the B&R Initiative. Accordingly, the aim of this study is to examine the factors affecting conflicts in standardization alliances for the B&R Initiative and their interdependent relationship.

Overall, this paper makes at least two contributions, supplementing existing research in terms of both topic and methodology. Firstly, in contrast to prior studies that primarily focus on identifying factors influencing conflicts in organizational or industrial technology innovation strategic alliances, we identify the factors that influence conflicts in standardization alliances for the B&R Initiative, which feature more diverse alliance members, innovative alliance modes, and a more complex operating environment compared to general standardization alliances. Secondly, limited attention has been given to exploring the interdependence relationships among factors affecting conflicts in standardization alliances. This gap poses challenges for managers in standardization alliances when discerning the mutual influences among various factors within collaborative governance, thereby impeding progress in innovation performance, effective conflict prevention, and conflict reduction. To address this, we introduce the interpretative structure model (ISM) to establish a hierarchy of relationships, illustrating the interdependence between these diverse factors. The outcomes elucidate the positioning of influencing factors at both upper and lower levels, providing crucial insights for the effective prevention and management of alliance conflicts. Notably, many times, participants in standardization alliances can collaborate and work together, seeking consensus and successfully driving standardization efforts (Isaak, 2006). The paper assumes the possibility of conflicts within standardization alliances because we believe that conflicts are significant issues in regard to collaborations involving different organizations and stakeholders (Omisore and Abiodun, 2014).

The rest of the paper proceeds as follows. Section 2 shows the research questions. The ISM method is introduced in Section 3. Section 4 illustrates the empirical results of this study. The conclusion is shown in Section 5.

## Research questions

This study aims to identify the factors affecting standardization alliance conflicts for the B&R Initiative. Moreover, the interdependence relationship between the factors is also investigated. Further, two research questions are answered in the present study:

1. What are the factors that affect conflicts in standardization alliances for the B&R Initiative?
2. What is the interdependent relationship between the factors? How can this interdependent relationship be identified?

## Research method

ISM is an analysis method of systems engineering theory (Warfield, 1973). It can decompose a complex system into several subsystems and determine the interdependence relationship. The mechanism of ISM is to transform ambiguous thoughts and opinions into a clear model, which helps people analyze complex relationships more intuitively (Xu and Zou, 2020). Conflict management in standardization alliances can be seen as a complex large-scale system that includes multiple influencing factors. By applying ISM, the interdependent relationships among influencing factors become discernible. This facilitates the identification of factors positioned at the top, intermediate, and bottom levels.

The research flow of the ISM is shown in Fig. 1. The several steps to achieve the ISM process are given below:

**Step 1 Identification of the influencing factors**. The factors affecting conflict in standardization alliances are identified by a literature review and expert evaluation. Assuming that there are $n$ elements in the system factor set $S$, then the record is:

$$S = \{S_i | (i = 1, 2, \ldots, n)\} \quad (1)$$

**Step 2 Construct the adjacency matrix *A***. The adjacency matrix $A$ is employed to depict the direct pairwise relationship between system factors. The element $a_{ij}$ of adjacency matrix $A$ represents the impact of factor $i$ on $j$. The value of $a_{ij}$ is determined by expert evaluation. In the process of constructing the adjacency matrix, the invited experts will give a judgment on the direct relationship between factors with a question: does factor $i$ have an impact on factor $j$? After five rounds of discussion, there reaches an

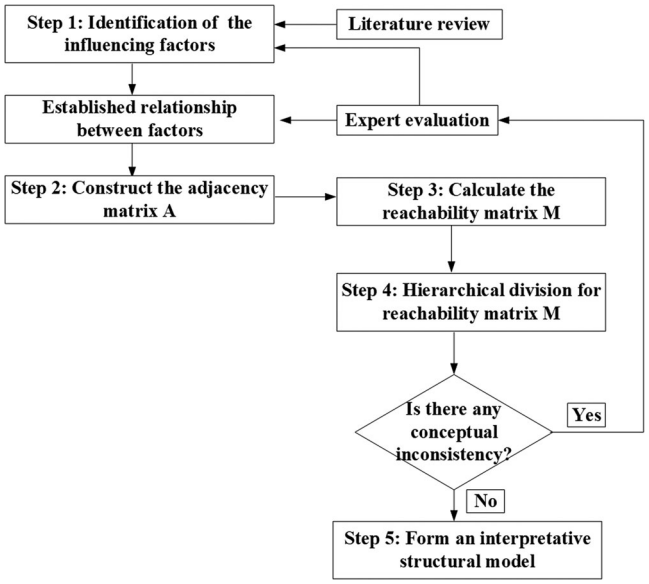


**Fig. 1** Flow chart for preparing the ISM.

agreement about the interrelations between factors. Specifically, the value of $a_{ij}$ is determined by the following three situations:

(1) If factor $i$ has an impact on factor $j$, $a_{ij} = 1$; if not, $a_{ij} = 0$ and vice versa.
(2) If strong mutual influences exist between factor $i$ and factor $j$, then $a_{ij} = a_{ji} = 1$; if the degree of mutual influence is different between them, then the larger equals 1, and the smaller equals 0.
(3) When $i = j$, then $a_{ij} = a_{ji} = 0$.

Finally, the adjacency matrix $A$ is determined.

$$A = \begin{pmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{pmatrix} \quad (2)$$

**Step 3 Calculate the reachability matrix *M***. Different from the adjacency matrix $A$, which depicts only direct relationships, the reachability matrix $M$ reflects direct and indirect relationships between the factors in the system. The calculation equation is:

$$(A+I) \neq (A+I)^2 \neq \cdots \neq (A+I)^m = (A+I)^{m+1} = M \quad (3)$$

Based on the operational rule of Boolean algebra, the adjacency matrix $A$ first adds the identity matrix $I$, then $(A + I)$ is multiplied by itself. When $(A + I)^m$ does not generate a new "1", the reachability matrix $M$ is thus obtained.

**Step 4 Hierarchical division for reachability matrix *M***. A hierarchical division offers a comprehensive analysis of the relationship between influencing and influenced factors within a system, delving into the interconnectedness among these elements. According to the position of each factor in the system, a reachable set $P$ and an antecedent set $Q$ are produced. Specifically, $P(S_i)$ is the set of corresponding factors that can influence $S_i$ through direct or indirect effects, which is a value of "1" in the $i$-th row. $Q(S_i)$ is the set of corresponding factors that are influenced by $S_i$, which is a value of "1" in the $i$-th column. The high-level element can be determined by $L = P(S_i) \cap Q(S_i)$. The three set relations can be expressed by the following mathematical formula:

$$P(S_i) = \left\{ S_j \epsilon S | s_{ij} = 1 \right\} \quad (4)$$

$$Q(S_i) = \left\{ S_j \epsilon S | s_{ij} = 1 \right\} \quad (5)$$

$$L = \left\{ S_j \epsilon S | P(S_i) = P(S_i) \cap Q(S_i), i = 1, 2, 3, \cdots, n \right\} \quad (6)$$

Specifically, based on Eq. (6), the highest-level set is $L1 = \{S_j \epsilon S | P(S_i) = P(S_i) \cap Q(S_i), i = 1, 2, 3, \cdots, \mathrm{n}\}$. For example, if there are two factors in $L1$, these two factors are identified in the highest-level set. Then, we can remove the two factors from the reachable set and antecedent set, and use Eq. (6) to identify the highest-level set of the remaining factors in the system. By repeating the above process, the lowest-level elements can be determined.

**Step 5 Form an interpretative structural model**. After the hierarchical division, each factor is positioned in its level. Relying on the result, a directed graph that describes the interdependence structure relationship between factors can be drawn. Finally, an explanation of the directed graph combined with the system theory and expertize is given.

## Results

**Identification of influencing factors**. Based on the ISM principle and its implementation process, factors influencing conflict in standardization alliances are identified through a combination of literature review and expert evaluation. An initial list of influencing factors is obtained relying on a literature review. A list of key influencing factors is further achieved with expert evaluation.

**Initial list of influencing factors**. Taking the "alliance conflict factors", "alliance conflict influencing factors", and "alliance conflict causes" as the theme keywords, literature retrieval and tracing are executed in the Web of Science and CNKI databases. After carefully reading and analyzing the content of the retrieved articles, we compiled a preliminary list of factors. During this process, we encountered three different situations: (1) some factors appeared only once in the literature, identified as unique factors to highlight their distinctiveness in the scholarly discourse; (2) certain factors were recurrently mentioned in various articles, categorized as recurring factors to underscore their prevalence and significance across the literature. The labeling of factors as "unique" or "recurring" serves as a reference for experts when assessing and selecting key influential factors; (3) certain factors conveyed the same meaning but were expressed using different words in the literature. In such cases, we consolidated similar words and expressed the factors using a uniform term. As a result, an initial list of factors is received. The representative supporting literature is displayed in Table 1.

**List of key influencing factors**. To ensure the rationality of the selected factors, semi-structured interviews were carried out to identify which of these factors are the key factors. Specifically, nine experts were invited for consultation. The invited experts from diverse institutions, ensuring a comprehensive exploration of all aspects of the standardization alliance for the B&R Initiative. In a detail, two experts from the standardization association: they have many years of experience in standard formulation and management. Two practitioners from the Chinese railway construction industry: they have years of experience in engineering construction management and have participated in multiple B&R standardization cooperation projects. Five scholars from

**Table 1 Literature and the causes of conflicts.**

| Research | Causes of conflicts |
|---|---|
| (Salleh and Adulpakdee, 2012) | Specialization, Common resources, Goal differences, Interdependence, Authority relationships, Status differences, Jurisdictional ambiguities, Roles and expectations, Skills and abilities, Personality conflicts, Diversity, Communication |
| (Elmuti and Kathawala, 2001) | Clash of culture, Incompatible personal chemistry, Lack of trust, Lack of clear goals and objectives, Lack of coordination between management teams, Differences in operating procedures and attitudes among partners, shirking, pursuing self-interest, appropriating the partners resource, distorting information |
| (Chen, 2004) | Goal differences, Information differences, Cognitive differences, Poor communication, Culture differences, Resource dependency |
| (Omisore and Abiodun, 2014) | Specialization, Common resources, Goal differences, Interdependence, Authority relationships, Jurisdictional ambiguities |
| (Qing Zhou et al., 2014) | Cognitive differences, Goal differences, Information asymmetric, Demand differences, Culture differences, Distrust, Unbalanced resource, Unreasonable benefit allocation |
| (Yan Yang and Gao, 2012) | Goal differences, Information asymmetric, Knowledge difference, Expectation differences, Unbalanced resource |
| (James et al., 1995) | Values, Goals, Values, Communications, Behaviors, Status differences, Past failures to reach agreement, Power imbalance, Dislike, Distrust of others |
| (Zheng and Du, 2005) | Goal differences, Information asymmetric, Unreasonable alliance performance evaluation mechanism |
| (Tidström, 2009) | Competition for scarce resources, Desire for autonomy, Goal divergence, Perceptual incongruities |
| (Qi Wang et al., 2004) | Goal differences, Values differences, Status differences, Stress, Distrust, Misunderstanding, Power imbalance, Resource scarcity, Confronting interests, Incomplete compensation system, Power struggle |
| (Amason, 1996) | Cognitive diversity |
| (Blatt, 2009b) | Trust, identification, and mutual obligation, familiarity |
| (Korsgaard et al., 2008) | Interweaving individual differences, states, behaviors, and sense making; interpersonal contexts, interactions, and sense making; and team-level contexts, interactions, and collective sense making |
| (De Dreu, 2016) | Distribution of resources, judgments and interpretation of facts, political preferences, values, or interpersonal style |
| (Qing Zhou et al., 2013) | Unreasonable resource allocation, Unclear goal, Unclear task, Unreasonable distribution of benefits, Cognitive differences, Distrust, interpersonal conflicts, quarrel, Stress |

The result of this table is related to Step 1 "Identification of the influencing factors" in the ISM model, which results from the literature.

Hangzhou Dianzi University: these five scholars have profound insights into the relationship between standards and innovation and have published many academic papers in the field of standardization alliances. Based on a comprehensive consideration of the characteristics of standardization alliances for the B&R Initiative and the literature review, the key influencing factors are identified from both the internal and external environments of the alliance. After five rounds of consultation, we ultimately identified and summarized 16 key factors contributing to conflicts in standardization alliances. The classification and descriptions of these 16 key factors are presented in Table 2.

From the perspective of the internal of alliance, there are 13 representative influencing factors related to target difference, demand difference, technical capabilities difference, cultural difference, cognitive difference, value pursuit difference, information asymmetry, lack of trust, poor communication, unbalanced input of resources, unreasonable benefits distribution, resource dependency, and unreasonable contribution evaluation As independent individuals, alliance members harbor their own beliefs, interests, and demands, laying the groundwork for potential conflicts. Jakobs (2023) suggests that promptly reflecting the needs, perspectives, and interests of each participating entity is essential, as these factors play a critical role in the successful development of standards. Moreover, scholars have affirmed that information asymmetry, unreasonable benefits distribution mechanisms, and unbalanced input of resources are critical factors inducing conflicts. These issues should be a focal point for alliance managers.

From the view of the external environment of the alliance, there are 3 influencing factors: political risks, impact of financial factors, and policy changes. As illustrated above, the standardization allice for the B&R Initiative is a typical multinational alliance influenced by the government's guiding policy and industrial policy. As highlighted in (Jakobs, 2014; Jakobs, 2017), external influences such as changes in policies and technological progress have a substantial impact on the formulation of standards. Changes in exchange rates and financial conditions also affect the stability of cooperation (Park et al., 2014).

**Adjacency matrix and reachability matrix**. Table 3 shows the interconnected relationships among 16 key influencing factors, which determined by expert evaluation. Specifically, alliance conflict is numbered S*. 16 identified influencing factors are numbered from $S_1$ to $S_{16}$. The factors directly influenced by the 16 influencing factors are also listed. For example, demand difference ($S_2$) imposes a direct influence on alliance conflicts (S*) and target difference ($S_1$).

Table 4 shows the adjacency matrix $A$ of $16 \times 16$, which indicates the direct binary relationship between 16 key influencing factors. Moreover, the adjacency matrix is a numerical representation of Table 3. By running the program in MATLB2018a, we obtain the reachability matrix $M$ (Table 5), which represents the direct or indirect interaction relationships between influencing factors.

**Hierarchical division results**. Following the ISM method flow, the reachable set, antecedent set, and their intersection for reachability matrix $M$ are obtained (Table 6). Finally, the hierarchical decomposition of 16 influencing factors has four levels (Table 7).

**Analysis of the ISM**. To intuitively have a clear interconnected relationship between 16 influencing factors, a directed graph is drawn (Fig. 2). As shown in Fig. 2, the diagram of influencing factors involves a four-level hierarchical model.

First, target differences ($S_1$), unbalanced input of resources ($S_{10}$), and unreasonable distribution of benefits ($S_{11}$) are recognized as key facilitators at the top level (L1), exerting a direct impact on inducing alliance conflict. The motivation for joining a standardization alliance includes realizing the synergistic and complementary effects of resource integration (Delcamp and

**Table 2 Category of influencing factors.**

| Category | Influence factors | Brief description |
|---|---|---|
| Internal level of alliance | Target difference | Target difference refers to different alliance members have different stakes and thus differ in what they want to achieve. |
| | Demand difference | There are differences in the development goals, backgrounds, cognition, and needs of alliance members. |
| | Technical capabilities difference | The differences in technical capabilities not only reflect in the quantity and quality of technical resources but reflect in how enterprises combine and coordinate technical resources. |
| | Cultural difference | Cultural difference span both company and country levels, manifesting in language, decision-making approaches, and values, significantly impacting the operation of standardization alliances. |
| | Cognitive difference | Alliance members differ in the process of acquiring knowledge or processing information. |
| | Value pursuit difference | There are differences in the basic beliefs and goals of alliance members in the pursuit of business success. |
| | Information asymmetry | Information asymmetry makes it difficult for enterprises to accurately assess the resources, capabilities, and interests of alliance partners, which increases the probability of opportunistic behaviors. |
| | Lack of trust | The trust relationship between individuals plays a decisive role in the establishment of long-term stability in the alliance. Lack of trust can induce dissatisfaction among members, low work efficiency, etc. |
| | Poor communication | Lack of communication among alliance members may lead to information asymmetry, leading to decision-making mistakes, and induce a crisis of trust. |
| | Unbalanced resources input | The unbalanced input of resources, including equipment, intellectual property, technical standards, or talents may lead to internal tension and dissatisfaction among alliance members, potentially impeding the overall achievement of the alliance's goals. |
| | Unreasonable benefits distribution | The alliance is built based on common interests. If the distribution of benefits is unreasonable, the collapse or disintegration of the alliance is likely to occur. |
| | Resource dependency | Enterprises that are highly dependent on their partners' resources, will be in a weak position in the alliance. Resource dependence may lead to unbalanced input resources and cause dissatisfaction. |
| | Unreasonable contribution evaluation | The contribution evaluation and compensation mechanism of the alliance plays a decisive role in the fairness and rationality of the distribution of benefits. |
| External environment of alliance | Political risks | Political risks refer to the risk of losses caused by conflicts between races, religions, interest groups, and countries, as well as changes in power. |
| | Impact of financial factors | Financial factors, like economic downturns, natural disasters, and currency fluctuations, may trigger changes in the enterprises' own demands and strategic objectives, impacting their capacity and commitment to participate in the alliance. |
| | Policy changes | The policy is a guideline for the development of enterprises. Policy changes have a direct impact on a firm's demand and the goal of the alliance. |

The result of this table is related to Step 1 "Identification of the influencing factors" in ISM model, which is conducted by literature review and expert evaluation.

**Table 3 Interconnect relationship between 16 identified influencing factors.**

| Influencing factors | Directly influenced factors | Influencing factors | Directly influenced factors |
|---|---|---|---|
| Alliance conflict S* | / | / | / |
| Target difference $S_1$ | S* | Poor communication $S_9$ | S* $S_7$ $S_8$ $S_{13}$ |
| Demand difference $S_2$ | S* $S_1$ | Unbalanced resources input $S_{10}$ | S* |
| Technical capabilities difference $S_3$ | S* $S_{12}$ | Unreasonable benefits distribution $S_{11}$ | S* |
| Cultural difference $S_4$ | S*$S_5$ $S_6S_9$ | Resource dependency $S_{12}$ | S* $S_{10}$ |
| Cognitive difference $S_5$ | S* $S_1$ $S_2$ $S_7S_9$ | Unreasonable contribution evaluation $S_{13}$ | S* $S_{11}$ |
| Value pursuit difference $S_6$ | S* $S_1$ $S_2$ | Political risks $S_{14}$ | S* $S_1S_2$ $S_{16}$ |
| Information asymmetry $S_7$ | S* $S_5S_9$ $S_{13}$ | Impact of financial factors $S_{15}$ | S* $S_1S_2$ $S_{16}$ |
| Lack of trust $S_8$ | S* $S_9$ $S_{13}$ | Policy changes $S_{16}$ | S* $S_1$ $S_2$ |

The result of this table is related to Step 2 "Construct the adjacency matrix A" in the ISM model, which is conducted by expert evaluation.
Asterisks indicate marking of alliance conflicts.

Leiponen, 2014). Due to varying interests held by alliance members, thus what they want to achieve is differ, directly leading to conflicts within the standardization alliance. The unbalanced input of resources, not only in funds or technologies, will lead to the dissatisfaction of the strong individual who has invested more resources. Moreover, the strong party may manipulate the operation and management of the alliance according to its wishes. The distribution of benefits is the most critical and contradictory issue of standardization alliances (Soekijad and Andriessen, 2003). Dealtry et al. (2005) argue that the unreasonable distribution of benefits directly affects the cooperation positivity of each participant, which ultimately leads to the failure of the alliance.

**Table 4 Adjacency matrix.**

| | $S_1$ | $S_2$ | $S_3$ | $S_4$ | $S_5$ | $S_6$ | $S_7$ | $S_8$ | $S_9$ | $S_{10}$ | $S_{11}$ | $S_{12}$ | $S_{13}$ | $S_{14}$ | $S_{15}$ | $S_{16}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $S_1$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_2$ | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_3$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| $S_4$ | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_5$ | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_6$ | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_7$ | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| $S_8$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| $S_9$ | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| $S_{10}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_{11}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_{13}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| $S_{14}$ | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| $S_{15}$ | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| $S_{16}$ | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

This is the result of adjacency matrix A, which is the numerical representation of Table 4.

**Table 5 Reachability matrix.**

| | $S_1$ | $S_{10}$ | $S_{11}$ | $S_2$ | $S_{12}$ | $S_{13}$ | $S_5$ | $S_7$ | $S_8$ | $S_9$ | $S_3$ | $S_{16}$ | $S_6$ | $S_{14}$ | $S_{15}$ | $S_4$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $S_1$ | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_{10}$ | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_{11}$ | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_2$ | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_{12}$ | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_{13}$ | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_5$ | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_7$ | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_8$ | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_9$ | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| $S_3$ | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| $S_{16}$ | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| $S_6$ | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| $S_{14}$ | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| $S_{15}$ | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| $S_4$ | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |

The result of this table corresponds to Step 3 "Calculate the reachability matrix M" in the ISM model.

Second, factors such as demand difference, technical capabilities difference, cognitive difference, value pursuit difference, information asymmetry, lack of trust, poor communication, resource dependency, and unreasonable contribution evaluation are positioned at the intermediate level (L2 and L3). This positioning indicates these factors require special attention due to not only their high driving power but also their strong dependence power. In L2, the influencing factors are demand difference ($S_2$), resource dependency ($S_{12}$), and unreasonable contribution evaluation ($S_{13}$). In L3, the influencing factors are policy changes ($S_{16}$), value pursuit differences ($S_6$), technical capability differences ($S_3$), cognitive differences ($S_5$), information asymmetry ($S_7$), poor communication ($S_9$), and lack of trust ($S_8$). Although there is a common goal for individuals when they decide to join a standardization alliance, the difference in the demands of individual members exists universally (Tidström, 2009). With the operation of the standardization alliance, the demands of individuals may change. Like a chain reaction, the expectations, and understandings of standardization alliance goals will change accordingly. When an individual's goal becomes challenging to attain, conflicts are inevitable. Furthermore, demand differences ($S_2$) at L2 are also affected by policy changes ($S_{16}$) at L3, such as changes in government laws, financial policy, and industry policy, which impose a direct effect on the development of individual firms (Blind and Mangelsdorf, 2016). Similarly, it is easily understood that different value pursuits ($S_6$) at L3 are the direct reason for demand differences ($S_2$) at L2. Resource dependency ($S_{12}$) at L2 results in the unbalanced input of resources ($S_{10}$) at L1. Technical capability differences ($S_3$) at L3 will contribute to resource dependency ($S_{12}$) at L2, particularly in terms of technical resources. Significantly, technical capabilities difference is one of the most representative features of the standardization alliance for the B&R Initiative.

The unreasonable contribution evaluation ($S_{13}$) L2 is the direct cause of the unreasonable distribution of benefits ($S_{11}$) at L1. If the parties do not reach a consensus on the method of benefit distribution, alliance individuals may become self-centered and have difficulty listening or accepting the opinions of others, thus intensifying the contradiction between the two parties, and widening their cognitive difference. We also find that cognitive differences ($S_5$), information asymmetry ($S_7$), and lack of trust ($S_8$) at L3 are reasons for unreasonable contribution evaluation ($S_{13}$) at L2. Cognitive differences between individuals in the standardization alliance for the B&R Initiative exist universally,

which leads to differences and disputes between the two parties in terms of value judgments, goals, beliefs, etc. This view is consistent with (Kaiser and Bostrom, 1982), who pointed out that occupational and cognitive differences between the members of software project teams might increase the potential for conflicts.

Significantly, there exists a mutual influence between information asymmetry ($S_7$), poor communication ($S_9$), and lack of trust ($S_8$), which highlights the importance of information communication and trust in conflict management. A high level of trust can reduce opportunistic behavior, increase commitment and contribution, enhance emotional identity, and strengthen cooperation among members (Zahoor et al. 2021). Good communication is the foundation of mutual trust. Misunderstanding or even distrust of information caused by poor communication is an important source of conflicts. Moreover, poor communication leads to low efficiency of information transmission and information asymmetry among members (Shin et al. 2012). If handled improperly, this may come into a vicious cycle.

Third, political risks ($S_{14}$), impact of financial factors ($S_{15}$), and cultural differences ($S_4$) are identified as foundational drivers at the bottom level (L4). They have significant influencing power to affect the factor of the top level and intermediate level, needing the maximum attention and focus. Changes in relevant policy ($S_{16}$) in L3 will occur as a direct result of political risks ($S_{14}$) at L4, as well as the impact of financial factors ($S_{15}$). For international alliances, particularly standardization alliances for the B&R Initiative, political risks should be considered. In reality, geopolitical relations and political instability created severe challenges to China's enterprise's cooperation with the B&R countries (Zhao et al. 2021). The impact of financial factors such as unexpected fluctuations in exchange rates, may induce related policy changes (Zhen, 2017). Cultural differences objectively exist in international trade. Specifically, language habits and belief differences are important expressions of cultural differences. Individuals in standardization alliance for the B&R Initiative must readjust to cultural differences and change their accustomed lifestyles and thinking principles (Mukhtar et al. 2022). Cultural difference ($S_4$) at L4 has a direct influence on an individual's value pursuit difference ($S_6$), cognitive difference ($S_5$), and information asymmetry ($S_7$) at L3.

**Table 6 Table of reachable set, antecedent set, and their intersection.**

| $S_i$ | $P(S_i)$ | $Q(S_i)$ | $P(S_i) \cap Q(S_i)$ |
|---|---|---|---|
| $S_1$ | 1 | 1, 2, 4, 5, 6, 7, 8, 9, 14, 15, 16 | 1 |
| $S_2$ | 1, 2 | 1, 2, 4, 5, 6, 7, 8, 9, 14, 15, 16 | 2 |
| $S_3$ | 3, 10,12 | 3 | 3 |
| $S_4$ | 1, 2, 4, 5, 6, 7, 8, 9, 11, 13 | 4 | 4 |
| $S_5$ | 1, 2, 5, 7, 8, 9, 11, 13 | 4, 5, 7, 8, 9 | 5, 7, 8, 9 |
| $S_6$ | 1, 2, 6 | 4, 6 | 6 |
| $S_7$ | 1, 2, 5, 7, 8, 9, 11, 13 | 4, 5, 7, 8, 9 | 5, 7, 8, 9 |
| $S_8$ | 1, 2, 5, 7, 8, 9, 11, 13 | 4, 5, 7, 8, 9 | 5, 7, 8, 9 |
| $S_9$ | 1, 2, 5, 7, 8, 9, 11, 13 | 4, 5, 7, 8, 9 | 5, 7, 8, 9 |
| $S_{10}$ | 10 | 3, 10 | 10 |
| $S_{11}$ | 11 | 4, 5, 7, 8, 9, 11, 13 | 11 |
| $S_{12}$ | 10, 12 | 3, 12 | 12 |
| $S_{13}$ | 11, 13 | 4, 5, 7, 8, 9, 13 | 13 |
| $S_{14}$ | 1, 2, 14, 16 | 14 | 14 |
| $S_{15}$ | 1, 2, 15, 16 | 15 | 15 |
| $S_{16}$ | 1, 2, 16 | 14, 15, 16 | 16 |

The result of this table corresponds to Step 4 "Hierarchical division for reachability matrix M".

**Table 7 Hierarchical decomposition of factors.**

| Hierarchy | Influencing factors |
|---|---|
| $L_1$ | $S_1$, $S_{10}$, $S_{11}$ |
| $L_2$ | $S_2$, $S_{12}$, $S_{13}$ |
| $L_3$ | $S_3$, $S_5$, $S_6$, $S_7$, $S_8$, $S_9$, $S_{16}$ |
| $L_4$ | $S_4$, $S_{14}$, $S_{15}$ |

This is the final result of hierarchical division of influencing factors.

## Discussion and conclusions

This paper offers a fresh perspective on the influencing factors of conflicts within standardization alliances for the B&R Initiative. The contributions to existing research unfold in two critical dimensions: (1) Previous studies have primarily focused on exploring the factors influencing conflicts in organizational, industrial technology innovation strategic alliances or R&D alliances. Research specifically addressing the factors influencing conflicts in standardization alliances for the B&R Initiative is noticeably lacking. Different from R&D alliances or other standardization alliances, standardization alliances for the B&R

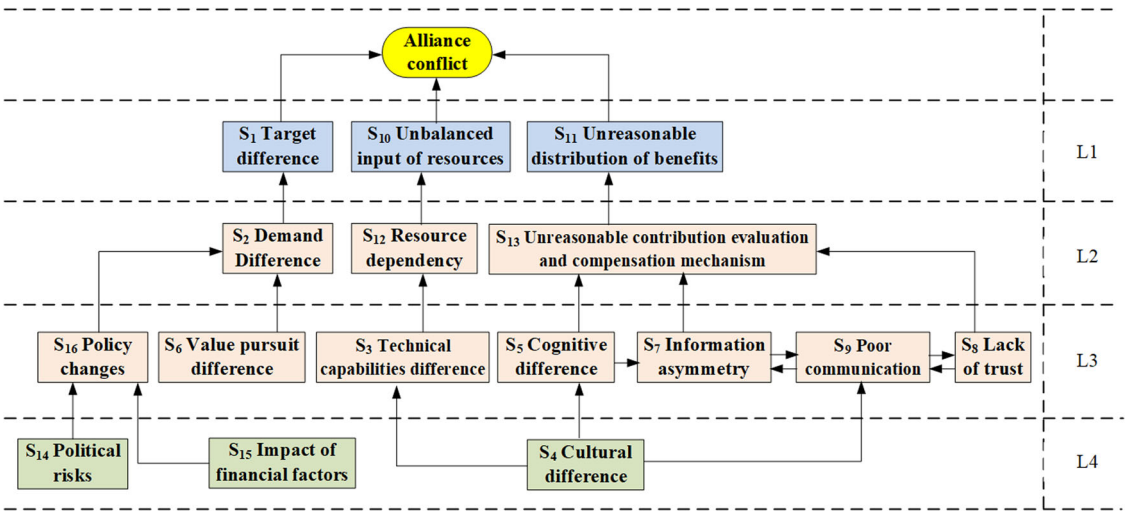


**Fig. 2** Hierarchical topology diagram of influencing factors of standardization alliance conflicts for the B&R Initiative.

Initiative possess distinct characteristics of the times, aiming to promote standard alignment among B&R countries, while their operation is heavily influenced by institutional and cultural differences among participating nations. Additionally, some B&R countries face issues such as political turmoil, weak economic foundations, or social instability, increasing the possibility of alliance conflicts, which are rare in R&D alliances or standardization alliances. Therefore, it is necessary to comprehensively identify the factors influencing conflicts in standardization alliances for the B&R Initiative to help enhance the effectiveness of alliance conflict management. In this study, we compile an initial list of influencing factors through a comprehensive literature review. The key influencing factors are further refined through expert evaluation. (2) Current research on factors influencing conflict ignores the interdependence between different influencing factors, thereby posing challenges for managers when discerning the mutual influences among various factors within collaborative governance. To address this gap, we innovatively introduce the ISM to reveal the interdependent relationships among factors that influence conflicts in standardization alliances for the B&R Initiative, which also provides insights for analyzing conflicts in R&D alliances or standardization alliances.

The main results were summarized into four aspects. First, 16 factors affecting conflicts in standardization alliance for B&R Initiative have been identified. Second, target differences, unbalanced resource allocation, and unfair distribution of benefits are recognized as key facilitators at the top level. These 3 factors play the least influential role as compared to the other 13 influencing factors. Third, factors such as demand difference, technical capabilities difference, cognitive difference, value pursuit difference, information asymmetry, lack of trust, poor communication, resource dependency, and unreasonable contribution evaluation are positioned at the intermediate level. This positioning indicates these factors not only have high driving power but also have strong dependence power. Finally, political risks, impact of financial factors, and policy changes are identified as foundational drivers at the bottom level.

The study's findings have major implications for enterprises, governments, and managers of standardization alliances. Specifically, (1) Enterprises intending to join a standardization alliance should identify potential conflict-influencing factors and develop a response plan, facilitating effective conflict resolution. (2) The results reveal the different positions of factors affecting standardization alliance conflicts for the B&R Initiative. Thus, in the process of conflict management, the managers of the alliance should consider the stage of occurrence of the influencing factors and their priorities. For example, the issue of unreasonable distribution of benefits, positioned at the top level, must be addressed as a priority in conflict management (3) As an international strategic alliance, a standardization alliance for the B&R Initiative is affected by institutional and cultural differences between countries, and the relevant government departments need promptly coordinate when dealing with conflicts.

Overall, this study provides a new perspective for analyzing the factors affecting conflicts in standardization alliances for the B&R Initiative. Notably, some limitations also exist. First, the paper has concentrated solely on the adverse effects of each factor, overlooking their potential positive contributions. For example, differences in goals among alliance members may impact technological synergy and potentially slow the alliance's technological research and development progress, leading to negative effects on alliance innovation performance (Duarte and Davies, 2003). Throughout this process, alliance members can also gain insights and learn from each other's perspectives on issues, fostering creativity and debate (Mele, 2011) and consequently positively influencing innovation performance. Therefore, future research could consider the positive effects of these factors. Second, our interviewees are all from China, which represents a limitation in this paper. Due to varying economic foundations, technical conditions, cultural backgrounds, and roles between China and the B&R countries, differences in understanding the factors influencing conflicts may arise. For example, B&R countries may perceive lack of effective communication among participants as the fundamental cause of conflicts, which is different from the findings of this article. The Qasim Coal Fired Power Plant is a case where the relevant certification process faced setbacks due to ineffective communication. Thus, conducting in-depth interviews or surveys with the stakeholders from B&R countries needs endeavor in our future work. Third, this article predominantly relies on the literature pertaining to alliance and organizational cooperation conflicts, with less emphasis on factors specific to standardization alliances. We will enhance this aspect in our future research.

## Data availability

The datasets generated during and/or analysed during the current study are available in the Mendeley repository (https://data.mendeley.com/datasets/yf7s47rcth/1).

Received: 9 December 2022; Accepted: 21 March 2024;
Published online: 29 March 2024

## References

Amason AC (1996) Distinguishing the effects of functional and dysfunctional conflict on strategic decision making: resolving a paradox for top management teams. Acad Manag Ann 39(1):123–148
Blatt R (2009a) How communal schemas and contracting practices build relational capital in entrepreneurial teams. Acad Manag Rev 34(3):533–551
Blatt R (2009b) Tough love: how communal schemas and contracting practices build relational capital in entrepreneurial teams. Acad Manag Rev 34(3):533–551
Blind K (2007) Explanatory factors for participation in formal standardisation processes: empirical evidence at firm level. Econ Innov N Technol 15(2):157–170
Blind K, Mangelsdorf A (2013) Alliance formation of SMEs: empirical evidence from standardization committees. IEEE Trans Eng Manag 60(1):148–156
Blind K, Mangelsdorf A (2016) Motives to standardize: empirical evidence from Germany. Technovation 48-49:13–24
Chen Z (2004) Conflict management of strategic alliance partners. Sci Sci Manag ST 25(3):106–109
Cristina Q-G, Benavides-Velasco CA (2011) Knowledge organisation in R&D alliances: Its impact on product innovation. Technol Anal Strat Manag 23(10):1047–1061
Cronin MA, Bezrukova K (2019) Conflict management through the lens of system dynamics. Acad Manag Ann 13(2):770–806
Dai H, Zeng D, Qualls WJ, Jian L (2018) Do social ties matter for the emergence of dominant design? The moderating roles of technological turbulence and IRP enforcement. J Eng Technol Manag 47:96–109
Dealtry R, Elmuti D, Abebe M, Nicolosi M (2005) An overview of strategic alliances between universities and corporations. J Workplace Learn 17(1/2):115–129
Delcamp H, Leiponen A (2014) Innovating standards through informal consortia: the case of wireless telecommunications. Int J Ind Organ 36:36–47
De Dreu CKW (2016) When Too little or too much hurts: evidence for a curvilinear relationship between task conflict and innovation in teams. J Manag 32(1):83–107
Duarte M, Davies G (2003) Testing the conflict–performance assumption in business-to-business relationships. Ind Mark Manag 32(2):91–99
Elmuti D, Kathawala Y (2001) An overview of strategic alliances. Manag Decis 39(3):205–217
Gomes-Casseres B, Hagedoorn J, Jaffe AB (2006) Do alliances promote knowledge flows? J Financial Econ 80(1):5–33
Hauser F, Hautz J, Hutter K, Füller J (2017) Firestorms: modeling conflict diffusion and management strategies in online communities. J Strat Inf Syst 26(4):285–321
Hu Y, McNamara P, Piaskowska D (2017) Project suspensions and failures in new product development: returns for entrepreneurial firms in co-development alliances. J Prod Innov Manag 34(1):35–59

Isaak J (2006) The role of individuals and social capital in POSIX standardization. Int J IT Stand Standardiz Res. 4(1):1–23
Jakobs K (2014) Managing corporate participation in international ICT standards setting. Paper presented at the International Conference on Engineering, Technology and Innovation (ICE), Bergamo, 25-26 June 2014
Jakobs K (2017) Two dimensions of success in ICT standardization—A review. ICT Express 3(2):85–89
Jakobs K (2023) ICT Standardisation Management. Dissertation, Erasmus University
James, Wall A et al. (1995) Conflict and its management. J Manag 21(3):515–558
Kaiser KM, Bostrom RP (1982) Personality characteristics of MIS project teams. MIS Q. 6(4):43–60
Korsgaard MA, Soyoung Jeong S, Mahony DM, Pitariu AH (2008) A multilevel view of intragroup conflict. J Manag 34(6):1222–1252
Lee J, Park SH, Ryu Y, Baik Y-S (2010) A hidden cost of strategic alliances under Schumpeterian dynamics. Res Policy 39(2):229–238
Leiponen AE (2008) Competing through cooperation: the organization of standard setting in wireless telecommunications. Manag Sci 54(11):1904–1919
Liu Y, Zhou Q, Liu R (2023) Research on the value co-creation, model of "the belt and road" enterprise technology standard alliance. Sci Sci Manag ST 44(8):50–65
Mele C (2011) Conflicts and value co-creation in project networks. Ind Mark Manag 40(8):1377–1385
Mukhtar A, Zhu Y, Lee Y-i, Bambacas M, Cavusgil ST (2022) Challenges confronting the 'One Belt One Road' initiative: social networks and cross-cultural adjustment in CPEC projects. Int Bus Rev 31(1):101902
Omisore BO, Abiodun AR (2014) Organizational conflicts: causes, effects and remedies. Int J Acad Res Econ Manag Sci 3(6):118–137
Park BJ, Srivastava MK, Gnyawali DR (2014) Impact of coopetition in the alliance portfolio and coopetition experience on firm innovation. Technol Anal Strat Manag 26(8):893–907
Qi W, Du Y, Xi Y (2004) Review and prospect of research on organizational conflict. Forecasting 23(3):74–80
Qing Z, Wang N, Ma X (2013) Influence of conflict in industrial technology innovation strategic alliance on innovation performance of enterprise in alliance. Technol Econ 32(12):5–9
Qing Z, Wang N, Ma X (2014) The correlation analysis between conflict type of industrial technologies and innovation strategic alliance and its influential factors. Stud Sci Sci 32(3):473–480
Ranganathan, Ghosh A, Rosenkopf L (2018) Competition-cooperation interplay during multifirm technology coordination: The effect of firm heterogeneity on conflict and consensus in a technology standards organization. Strat Manag J 39(12):3193–221
Salleh MJ, Adulpakdee A (2012) Causes of conflict and effective methods to conflict management at Islamic Secondary Schools in Yala, Thailand. Int Interdiscip J Educ 1(1):15–22
SatishNambisan (2013) Industry technical committees, technological distance, and innovation performance. Res Policy 42(4):928–940
Shin J-K, Park M-S, Ingram R (2012) Market orientation and communication methods in international strategic alliances. J Bus Res 65(11):1606–1611
Soekijad M, Andriessen E (2003) Conditions for knowledge sharing in competitive alliances. Eur Manag J 21(5):578–587
Su JF, Yang Y, Yang T (2015) Simulation of conflict contagion in customer collaborative product innovation. Int J Simul Model 14(1):134–144
Tidström A (2009) Causes of conflict in intercompetitor cooperation. J Bus Ind Mark 24(7):506–518
Veugelers R (1998) Collaboration in R&D: an assessment of theoretical and empirical findings. De Econ 146(3):419–443
de Vries HJ (2008) Best Practice in Company Standardization. In: Jakobs K (ed) Standardization Research in Information Technology: New Perspectives. IGI Global, Hershey, PA, USA, p 27–47
Warfield JN (1973) Participative methodology for public system planning. Comput Electr Eng 1(2):187–210
Wen J, Qualls WJ, Zeng D (2020) Standardization alliance networks, standard-setting influence, and new product outcomes*. J Prod Innov. Manag 37(2):138–157
Williams RA (2019) Conflict propagation within large technology and software engineering programmes: a multi-partner enterprise system implementation as case study. IEEE Access 7:167696–167713
Wu Y, de Vries HJ (2022) Effects of participation in standardization on firm performance from a network perspective: evidence from China. Technol Forecast Soc Change 175:121376
Xu X, Zou P(2020) Analysis of factors and their hierarchical relationships influencing building energy performance using interpretive structural modelling (ISM) approach J Clean Prod 272(1):122650
Yan Y, Gao S (2012) Alliance stability, knowledge protection of partner firms, and knowledge acquisition of focal firms. Sci Res Manag 33(8):80–89
Zahoor N, Gabriel Pepple D, Choudrie J (2021) Entrepreneurial competencies and alliance success: the role of external knowledge absorption and mutual trust. J Bus Res 136:440–450
Zhao L, Li D, Guo X, Xue J, Wang C, Sun W (2021) Cooperation risk of oil and gas resources between China and the countries along the Belt and Road. Energy 227:120445
Zhen Z (2017) Giving play to the leading role of energy cooperation in the belt and road initiative. China Oil Gas. 24(2):17–24
Zheng N, Du Y (2005) The approach of causes and management tactics about cooperative innovation alliance. East China Econ Manag 19(9):109–113
Zhou Q, Wu T, Yang W, Fang G (2021a) Research on mode of enterprise technical standards alliance for the"belt and road"initiative based on proceduralised grounded theory. Manag Rev 33(2):108–119
Zhou Q, Wu T, Yang W, Liang Y (2021b) Research on driving factors and mechanisms of enterprise technology standard alliance for the "belt and road" initiative-based on the integration of text mining and programmatic grounded theory. Nankai Bus Rev24(3):150–159
Zhou Q, Zou F, He Z (2017) Study on the evolution of conflict factors in industrial technology innovation strategic alliance on the basis of life cycle perspective. Sci Technol Prog Policy 34(4):66–71

## Acknowledgements

This work was supported by National Natural Science Foundation of China (No. 72104066, 71932005), and Natural Science Foundation of Zhejiang Province (No. LQ22G010010).

## Author contributions

The authors confirm their contribution to the paper as follows: study conception and design: XC, QZ; model building: XC; analysis and interpretation of results: XC, QZ, and ZW; original draft preparation: XC, QZ. All authors reviewed the results and approved the final version of the manuscript.

## Competing interests

The authors declare no competing interests.

## Ethical approval

Ethical approval was not required as the study did not involve human participants.

## Informed consent

Ethical approval was not required as the study did not involve human participants.

## Additional information

**Correspondence** and requests for materials should be addressed to Xiuwen Chen or Qing Zhou.