Review

Inter-Organisational Collaboration Structures and Features to Facilitate Stakeholder Collaboration

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Abstract: Although inter-organisational collaborative structures play a vital role in determining the level of collaboration among organisations, the identification of required organisational structural types and their features to facilitate fruitful collaboration is not satisfactorily discussed in existing studies. In addition, the connection between inter-organisational structural types and features, and their influence on collaboration, is not well understood. This systematised literature review study explores the available inter-organisational collaborative structural types, features, and their suitability to facilitate collaboration among organisations. Our findings underscore the importance of adopting a hybrid form of hierarchy and network arrangements to facilitate effective collaboration among organisations. Furthermore, this study developed a framework that presents how collaboration depends on inter-organisational structures and their features in facilitating vertical and horizontal integration. This framework can be used to identify the inter-organisational collaboration structures that are required to move towards a desired inter-organisational collaboration level.

Keywords: inter-organisational collaboration structures; systematised review; governance; collaboration

1. Introduction

Over the last decade, the importance of inter-organisational collaboration has been promoted by businesses, policymakers, and researchers since it facilitates organisations to develop strategic responses and to be competitive by going beyond their traditional silo-based approaches (Le Pennec and Raufflet 2018; Nahapiet 2009). This promotion of inter-organisational collaboration is due to the fact that modern organisations are interested in employing various collaboration provisions to proficiently handle their current business operations and venture into novel processes, strategically upholding their competitive standing in the ever-evolving business environment (Prasad et al. 2012). Inter-organisational collaboration is embraced as an approach for responding to complex societal challenges or wicked problems such as sustainable urban development, disaster risk management, climate change adaptation, eradicating poverty and homelessness, global pandemics, etc. (Ray-Bennett et al. 2020; United Nations Office for Disaster Risk Reduction 2019; Lagreid and Rykkja 2015). In such a collaborative approach, organisational coordination, as a basic element and the prior stage of collaboration, and communication are vital through governance structures (Xue et al. 2020; Basco-Carrera et al. 2017). As an example, governance structures with hierarchical features and top-down coordination are considered a fundamental hindrance in inter-organisational collaboration, leading to conflicts among stakeholders and eventually to potential failures (Malalgoda et al. 2013; Taylor 2016). Furthermore, the study by Prasad et al. (2012) indicates that organisational structures strongly influence inter-organisational collaboration. Therefore, the governance structures that can facilitate collaboration play a key role in inter-organisational collaboration to solve wicked

problems in an innovative way (Lagreid and Rykkja 2015). However, existing studies do not adequately address the connections between inter-organisational governance structures and the collaboration level.

Hence, there is a need to investigate how the best features of inter-organisational collaborative structures can be combined to support stakeholder collaboration across boundaries, sectors, and administrative levels. Moreover, although existing studies discuss various inter-organisational collaboration arrangements and their effectiveness in specific contexts, they do not provide a general view of suitable inter-organisational collaborative structures and features to enhance collaboration. In addition, the connection between inter-organisational structural types and features and their influence on collaboration is not well established. Therefore, this study intends to answer the research question, "What are the types of inter-organisational governance structures and features necessary to facilitate fruitful collaboration among various stakeholders?". This study further analyses the findings to understand how these features influence stakeholder collaboration.

2. Research Method

A systematised literature review has been selected as the methodology for this study. This method provides a structural approach to make the literature review process transparent as much as possible and thus enhance the quality of the study (Wendler 2012). The search and the selection process adopted in this systemised literature review are presented below (Figure 1). The databases used for the literature survey were Scopus and Web of Science. The research question "What are the suitable inter-organisational collaborative structures to enhance collaboration?" was used to formulate the search terms in this study. The basic search terms captured from the research question were as follows: "formal" and "inter-organisation" and "collaboration" and "structure" and "enhance". These terms were further expanded using relevant synonyms of the key terms to capture all relevant research papers as follows. ("formal") AND ("inter-organisational" OR "inter-institutional" OR "Organi$ation*" OR "Institution*" OR "governance") AND ("Structure*" OR "Arrangement*" OR "Mechanism*" OR "System*" OR "network") AND ("Stimulat*" OR "enhanc*" OR "Increas*" OR "Improv*" OR "Develop*") AND ("Collaboration").

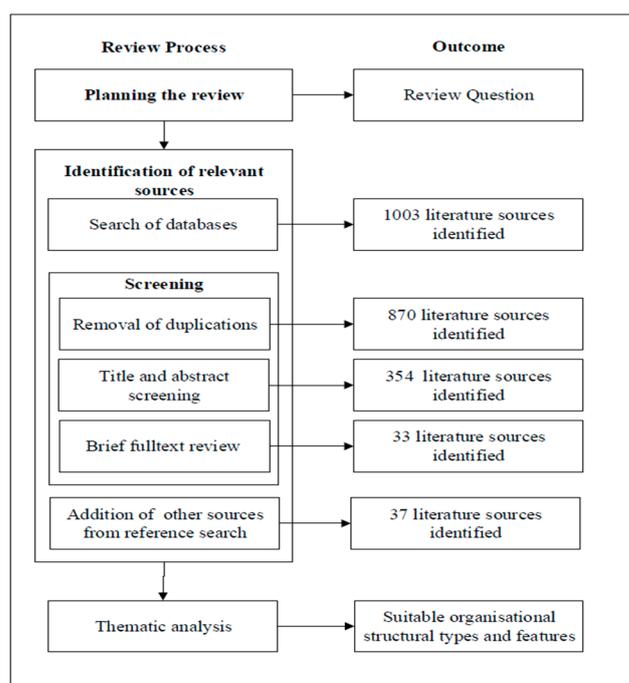**Figure 1.** Screening process of selected literature sources.

The literature sources captured from the key terms were filtered out using the following exclusion criteria: (a) articles that were not in the English language; (b) articles published before the year 2010 to avoid too many articles and to focus on recent articles that are based on modern organisational theories. The selection criteria resulted in a thousand and three articles; however, eight hundred and seventy articles were considered for further analysis after removing any duplications. After reviewing the titles and abstracts, only three hundred and fifty-four articles relevant to inter-organisational collaborative arrangements or structures were chosen for further analysis. After a full-text screening, only thirty-three articles were selected since the other articles did not meaningfully discuss the type or features of inter-organisational collaborative structures or governance arrangements. Furthermore, four articles found through a reference search were added, making the total number of articles thirty-seven. This process is summarised in Figure 1.

The selected articles were studied and synthesised to understand the type of inter-organisational collaboration structures and the adequate features required in the inter-organisational structure to facilitate better collaboration using the thematic analysis method, which supports researchers in identifying repeated patterns and themes with respect to the research question (Alhojailan 2012; Roslan et al. 2021). The findings are discussed in the following sections. This study identified three major types of inter-organisational collaborative structures (see Section 3.1) and the main features of governance arrangements (Section 3.2) to support collaboration, as discussed below.

3. Research Findings

This study identified three major types of inter-organisational collaborative structures (see Section 3.1) and the main features of governance arrangements (Section 3.2) to support collaboration, as discussed below.

3.1. Types of Inter-Organisational Collaboration Structures

Organisational theories mostly focus on three ideal types of organisational structures, each relying on a particular form of governance to coordinate activities. These structures were found to be hierarchical (relies on authority and centralised control), market (relies on prices and dispersed competition), and network (relies on trust across a web of association) (Bevir 2012). As shown in Figure 2, organisational governing structures that provide coordination among actors in various forms with their own features can be placed on a spectrum.
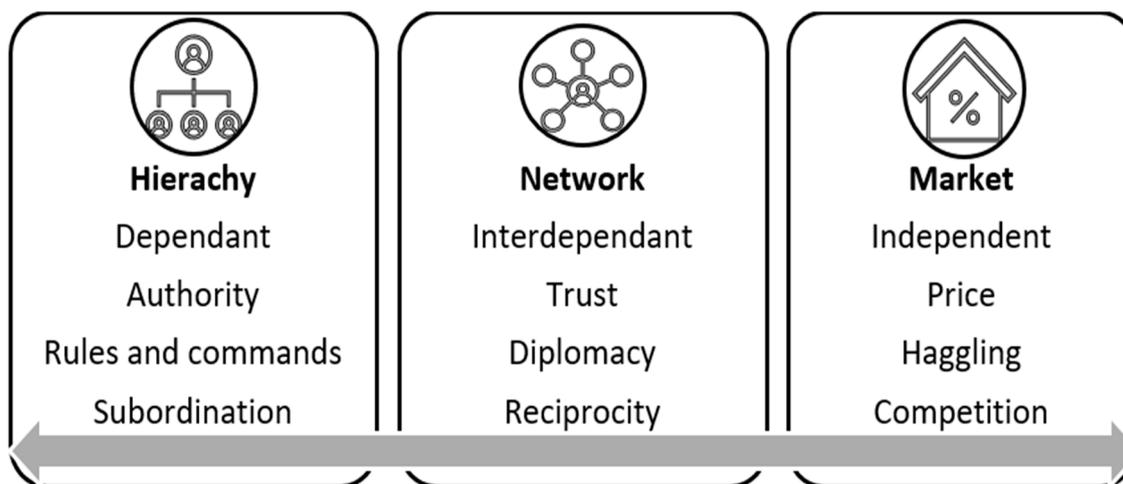

Figure 2. Spectrum of primary organisational governing structures: Adopted from Bevir (2012).

Hierarchical structures lead to strong line ministries with well-established vertical coordination and weak horizontal coordination. Such vertical coordination produces fragmented departments (departmentalism), tunnel vision, and vertical silos, creating insufficient horizontal coordination; therefore, hierarchical structures tend to experience challenges in horizontal coordination (Lagreid and Rykkja 2015). The key characteristics of the hierarchical governance model are accountability, formal or bureaucratic features, dependent or authoritative relationships, information deficit, and vague and inconsistent objectives (Sorensen and Gudmundsson 2010).

The market structure, on the other hand, is an abstract idea of an ideal marketplace where prices and competition take place. Here, coordination occurs for the exchange of goods, and actors are isolated and largely independent. As a result, social bonds and trust are relatively low in the market structure. Unlike hierarchy, the market structure provides a degree of coordination without guidance, and here, the competition drives the innovations. Therefore, the market structure is unsuitable for governance where competition is absent (Bevir 2012).

Bevir (2012) further argued that hierarchy and market are two ends of the spectrum, and all other hybrid forms of organisational structures fall somewhere in between. Organisational theorists focus on hybrid forms to overcome the limitations of both the hierarchy and the market. As a result, as an example, the network has emerged as a third main form of organisational structure (Bevir 2012). Networks are considered more suitable for solving complex problems, ensuring commitments, and establishing shared identity among the actors in collaboration (Khayatzadeh-Mahani et al. 2019; Paulsson et al. 2018; Rondelez 2018; Van Dijk and Winters-Van Beek 2009). Therefore, networks are established to enhance vertical and horizontal collaboration (Lagreid and Rykkja 2015; Paulsson et al. 2018; Sorensen and Gudmundsson 2010) and are suggested as an ideal form of governance for solving complex problems collaboratively. Networks are formed with a high level of trust among actors, and actors are interdependent instead of being under central control, thus having the freedom to experiment and innovate (Bevir 2012; Klijn and Koppenjan 2016). However, the effectiveness and performance of network governance are still questionable (Rondelez 2018) due to the lack of accountability (Sorensen and Gudmundsson 2010), hence requiring proper network management. As a result, two styles of network governance management have emerged, shared and brokered, to ensure the effectiveness of collaboration. With these two management styles, three types of network governing structures are evident in the literature: (1) Self-governance network, which does not have any formal entity to drive network members from the top. Here, the shared responsibility can be taken up by members, each taking on specific responsibilities; therefore, this structure heavily depends on the participation of members; (2) lead organisation-governed networks that refer to a centralised form of network governance with one leading entity. Generally, this leading entity can be one of the collaborative members who offer a greater contribution financially or politically; and (3) network administrative organisation (NAO)-governed networks, where an external organisation that is not a network member leads the network. This external leader is often a government or a non-profit organisation (Provan and Kenis 2008; Rondelez 2018). However, Bevir (2012) argued that even though there is an agency to monitor and coordinate the network, other actors in the network will still try to manage it in some form. In essence, in terms of managing large-scale collaborative members, decentralised networks that enable self-governance face difficulties; as more people get involved, there are more opportunities for misunderstandings, and it becomes more challenging to achieve consensus without any centralised control (Brafman and Beckstrom 2006). Therefore, it can be argued that lead organisation-governed networks and network administrative organisation (NAO)-governed networks are more suitable for managing large-scale collaborative arrangements due to their centralised features (Provan and Kenis 2008).

3.2. Key Features of Inter-Organisational Collaboration Structures

This section analyses the important characteristics of governance structures to support and facilitate multi-dimensional stakeholder collaboration.

3.2.1. Vertical and Horizontal Integration

Both vertical and horizontal interconnection and links are essential for healthy stakeholder collaboration. Whilst vertical collaboration links together different administrative levels of governance in the government or non-government organisations such as national, regions, zones, provinces, districts, and municipalities, horizontal collaboration integrates different sectors and organisations. Therefore, this vertical and horizontal integration can be considered as two fundamental dimensions of collaboration.

Vertical integration refers to the act of creating alignment and coordination across different governance levels, leveraging each respective level's potential through collective efforts and promoting top-down and bottom-up information exchanges (C40 Cities Climate Leadership Group 2020). For example, the bottom-up approach of city initiatives will influence national action, and the top-down approach of country-level frameworks will influence local actions. Here, the optimum outcome is more likely to be achieved through a balanced combination of both approaches (C40 Cities Climate Leadership Group 2020). However, the extent of vertical integration might differ from country to country based on their governance context. Jiren et al. (2018) argued that effective vertical integration should connect all different governance levels rather than just interacting with others at the same level or the level immediately above or below. It is evident that vertical integration in inter-organisational structures varies depending on the level of interaction across the levels.

A study by Dobre et al. (2018) argued that verticality or the hierarchical attributes of governance can be analysed based on the centralised or decentralised features of the governance arrangement. The centralised process shows the hierarchical attributes of a governance structure, and the decentralised process shows the flattened attributes of a governance structure. For example, even though the network structure is meant to be flattened, if the ownership of the central authority prevails, the network will not be fully flattened, hence displaying centralised and hierarchical structural features (Faul 2016). Faul (2016) opined that flattened network structures, which provide equal powers among stakeholders, are essential for effective collaboration in order to avoid some actors having centralised powers and thus enjoying the benefits of hierarchical structures in inter-organisational collaboration. Jiren et al. (2018) supported this view and argued that although centrality helps integrate diverse sectors, it is associated with several disadvantages such as power abuse, centralised decision-making, and the withholding of essential information. The dominance of powerful actors could overrule other stakeholders and, therefore, collaboration among stakeholders can be affected due to the breakdown in trust. Therefore, there is a belief among researchers that the centrality feature in a collaborative network is not suitable for effective collaboration, as opposed to a decentralised co-management governance system, which is much more favourable for stakeholder collaboration since it offers a power balance and a combination of top-down and bottom-up approaches (Petursson et al. 2016). However, it is important to note that, as stated earlier, this pure decentralised approach is only suitable for a small number of collaborative members, for example, a self-governance network, and is not suitable for large collaborative arrangements that require suitable governance mechanisms to control a network that creates centrality. Accordingly, this study argues that vertical integration is possible in structural types in which hierarchical or centralised features can be seen, for example, hierarchy, lead organisation-governed networks, and network administrative organisation (NAO)-governed networks. Similarly, the concept of vertical integration or verticality will not take place in structures in which pure decentralisation can be seen, for example, self-governance network structures.

Horizontal integration involves connections between government ministries and sectoral departments, sometimes including external stakeholders such as academia, business

and industry, non-profit organisations, and citizen groups (C40 Cities Climate Leadership Group 2020). This horizontal integration supports cross-boundary and cross-sector collaboration and increases heterogeneity in the collaboration network to enhance innovation.

3.2.2. Leadership

Although leadership is considered essential for stakeholder collaboration, a lack of leadership is identified as a critical barrier to stakeholder collaboration (Uittenbroek et al. 2014). This leadership can take different forms, such as key actor leadership (Rouillard and Spray 2017), which can be seen in lead organisation-governed networks (Provan and Kenis 2008; Rondelez 2018), boundary-spanning organisational leadership (Dow et al. 2013), steering committee (Gilfillan et al. 2017), or an external entity such as a network administrative organisation (NAO) (Provan and Kenis 2008; Rondelez 2018). Among these leadership modes, NAO and steering committee leadership are identified as successful inter-organisational collaboration leadership arrangements (Gilfillan et al. 2017; Lagreid and Rykkja 2015) since they facilitate equity and power sharing among the stakeholders.

3.2.3. Need for Boundary-Spanning Network Behaviour and Bridging Organisations

A boundary organisation, which is also known as a bridging organisation or an intermediate organisation, is essential, as local trusted intermediaries in collaborative arrangements, to overcome institutional gaps and enhance collaboration (Rahman et al. 2017; Rouillard and Spray 2017). Moreover, because this boundary-spanning structure provides formal and intensive coordination across organisational boundaries (Lee et al. 2010), it is important to have a dedicated inter-organisational collaboration structure with boundary-spanning organisations to handle formal agreements, initiate collaboration, perform intermediary functions, manage relationships with stakeholders, and promote effective collaborations (Lee 2014).

Boundary spanners contribute to effective decision-making policies and adaptation policies to achieve sustainable outcomes (Bowen et al. 2014).

The primary responsibility of boundary organisations is to link organisations (across jurisdictions or boundaries), donor agencies, academics, policymakers, communities, and other actors vertically and horizontally as a network in integrated decision-making (Armitage et al. 2015; Huitema and Turnhout 2009). For example, NGOs are often identified as boundary-spanning organisations that fill the gap between stakeholders, community, and local actors (Farooqi 2016). For the effective function of boundary organisations, they require skills, experience, and the involvement of higher and lower levels of governance (Armitage et al. 2015; Huitema and Turnhout 2009). Boundary spanners need to be specialised to cope with various boundary needs and collaboration forms to perform the additional bridging and brokering activities necessary to span across closed clusters and fill in the structural holes in inter-organisational collaboration (Edelenbos and van Meerkerk 2015). Moreover, leadership, one of the main features discussed in Section 3.2.3, can be seen as an important function of these boundary organisations. These bridging organisations can be inter-agency leadership teams that have representatives from different sectors that can bring multiple agencies together (Dow et al. 2013). Trust and boundary-spanning leadership are considered essential in stakeholder collaboration to stimulate and consolidate coordination and interaction between different actors.

3.2.4. Heterogeneity

According to scholars, the heterogeneity of collaborative actors facilitates the sharing of various knowledge, resources, and information and inter-organisational learning that can lead to innovative solutions (Powell and Grodal 2006). In contrast, homophily in networks limits the innovative ability of such networks due to the existence of similar knowledge, information, resources, and uniform ideas (Bodin and Crona 2009; Newman and Dale 2005). Therefore, encouraging and establishing heterogeneity in a collaborative network facilitates innovation and experiments that assist in answering complex problems (Hölscher et al.

2019). To support this, Therrien et al. (2019) argued that having peripheral organisations with enough distance and thematic sub-groups in a collaborative network that can be coordinated through boundary organisations is essential to avoid the homogenisation of ideas. Therefore, collaboration across different sectors, actors, and different administrative boundaries can boost heterogeneity in collaboration.

4. Analysis and Discussion

In essence, inter-organisational collaboration can be covered by two dimensions: vertical integration and horizontal integration. Vertical integration is essential for cross-level collaboration, and horizontal integration is essential for the cross-sector and cross-boundary collaboration that can be seen among different administrative boundaries. Therefore, vertical and horizontal integration are the main variables supporting inter-organisational collaboration.

The vertical integration concept is applicable in structural arrangements where only verticality or centrality prevails. Therefore, vertical interaction is not applicable in flat networks and isolated organisations where centrality is absent. Vertical coordination can be seen among hierarchical structures that facilitate top-down or bottom-up coordination, which is considered in this analysis to be a "one-way interaction". However, this is seen as low vertical integration since the proper combination of top-down and bottom-up coordination can lead to an optimum vertical integration that supports balanced top-down and bottom-up approaches in decision-making (C40 Cities Climate Leadership Group 2020). Hierarchical structures can also facilitate balanced top-down and bottom-up approaches with intermediate-level interaction in the hierarchy, and this study calls this feature a "two-way interaction". On top of all the structural features, if the direct interaction among various administrative levels in the hierarchy facilitates a hierarchical structure, this study calls this feature a "unified vertical integration" —this feature can be seen in heterarchy structures (Cumming 2016)—which promotes high vertical integration according to the argument of Jiren et al. (2018), who stated that effective vertical integration should connect all the administrative levels within governance rather than interacting with the levels just above and below immediate administrative levels. Additionally, where the vertical connection among all administrative levels is absent, the availability of boundary organisations to create vertical connections can also be considered an important factor in strengthening vertical integration since boundary organisations can fulfil this requirement by connecting different administrative levels. However, this study argues that the vertical integration level in this structural arrangement is equal to the two-way hierarchy structural vertical integration level since both facilitate indirect interaction among different levels in the hierarchical structure. Vertical integration varies from low to high based on the type of organisational structure, as shown in Figure 3.

The horizontal integration variables depend on the horizontal connections between different sectors, different actors, and different administrative boundaries. Boundary organisations play an important role in helping to connect different types of organisations across sectors and boundaries. Therefore, the availability of boundary organisations is important in facilitating horizontal integration where direct connections are not available. The heterogeneity of organisations in collaboration is seen as a crucial factor in bringing innovative solutions to solve complex problems through collaboration. Collaboration across different sectors, actors, and different administrative boundaries can boost heterogeneity in collaboration. Therefore, the high heterogeneity of collaborative organisations can be seen as a vital indicator of a successful high level of horizontal integration. The heterogeneity of a governance arrangement can be boosted by keeping thematic subgroups in an inter-organisational collaborative arrangement rather than having similar types of organisations within a collaborative group (Therrien et al. 2019). In general, silo-based organisational arrangements lack horizontal integration (Scott and Gong 2021) and, in contrast, a networked organisational arrangement facilitates horizontal integration by coordinating with various sectors and, additionally, with sectors across boundaries. Therefore, this study concludes

that the "silo" term represents no/low horizontal integration and the "networked" term represents high horizontal integration.
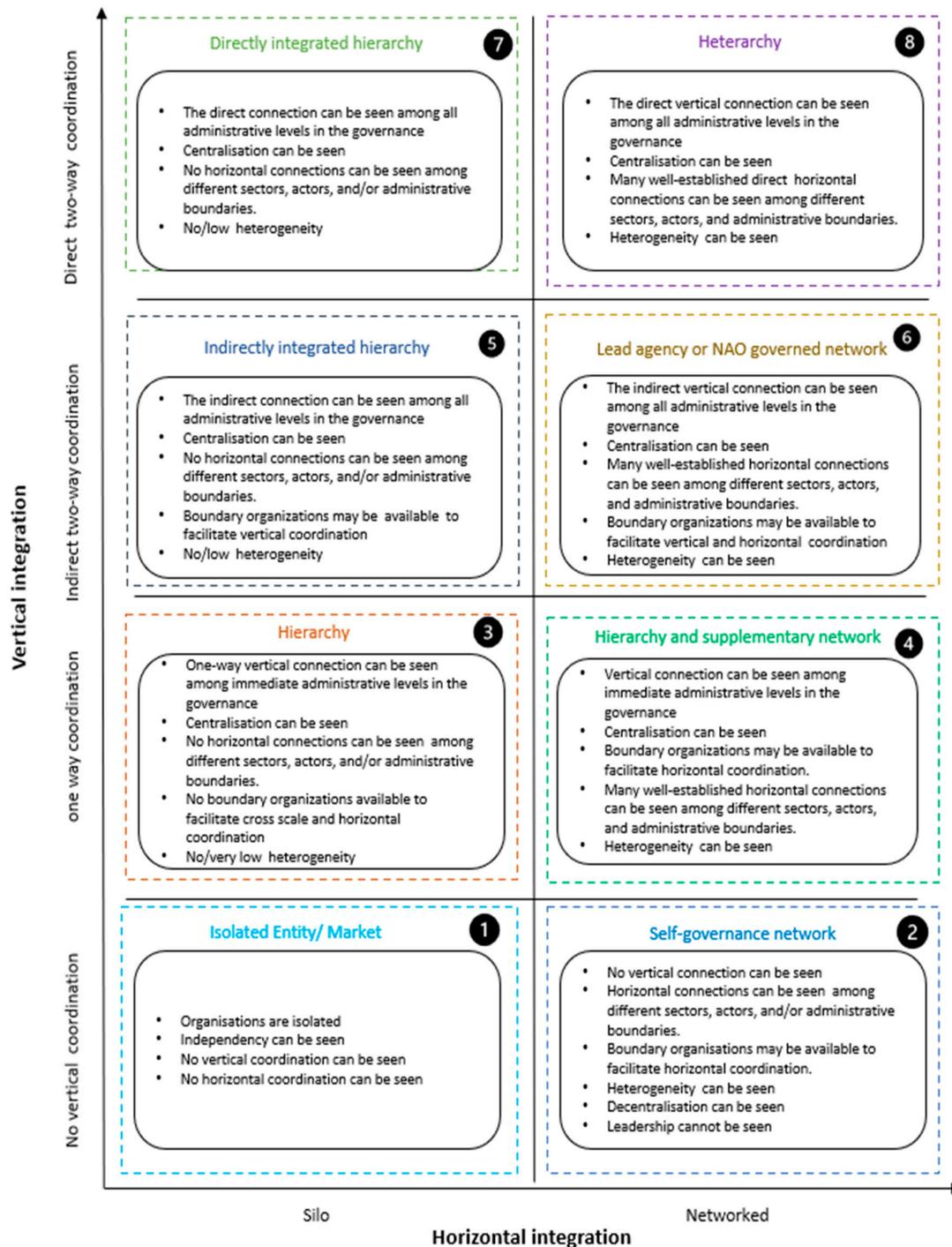

Figure 3. Framework to determine the collaboration levels based on the structural features.

The leadership feature is not discussed separately under each integration criterion since leadership can be seen as a common factor in increasing vertical and horizontal integration in governance arrangements. However, it is important to note that, as an exception in collaborative arrangements, the self-governance network does not have any leadership within it.

Figure 3 presents a framework that captures the vertical and horizontal integration characteristics of an organisational structure based on identified structural features that

help us to understand how they lead to a low, medium, and high level of collaboration. Horizontal and vertical integration are considered in the X and Y axes, respectively, to develop the framework. The vertical integration varies from low to high, through the Y axis, based on the features represented in the framework and named "no vertical interaction", "one way interaction", "two-way interaction", and "unified vertical integration" for the reasons discussed above. Similarly, the horizontal integration varies from low to high, through the X axis, based on the features represented in the framework and is named "silo" and "networked" due to the reasons discussed above.

Various organisational structural types that promote coordination can be mapped to the segments in the framework in terms of supporting collaboration. Therefore, the framework can be used to place each structural type in one of the segments based on its characteristics and, as a result, the connections between its structural type, the characteristics of the structural arrangements, and the level of collaboration can be understood. Furthermore, the "silo" column represents various levels of vertical integration associated with a silo approach where no horizontal collaboration can be seen. Similarly, the "network" column represents the horizontal integration aspect associated with various vertical integration at each level. Since the silo approach reflects a pure vertical integration approach, the "silo" column can be seen as a basis for the development of the "networked" column, as discussed below.

Segment 1 in the framework indicates no vertical and horizontal coordination, which leads to isolated organisations whereby such organisations do not consider collaboration, which can be seen as a market structure. Segment 2 represents pure horizontal coordination and no vertical coordination. In this stage, there is no control, centrality, or hierarchy prevailing among organisations. Therefore, this is considered a self-governance network in which collaborative members have the same powers and equality in collaborative initiation.

Segment 3 represents one-way vertical coordination among intermediate levels, presumably, and no horizontal coordination. General hierarchical structures fall in this category since this structure hinders horizontal coordination and facilitates one-way coordination, such as pure top-down or bottom-up among intermediate levels. Segment 4 represents the horizontal coordination feature in addition to the features of segment 3, which means that the organisations in the hierarchical arrangement are experiencing horizontal collaboration, forming a network structure in any of the administrative levels, which can be one or more levels; the hierarchy structure prevails as the most prominent. This study calls this structure a hierarchy with a supplemental network.

Segment 5 represents the two-way vertical coordination among intermediate levels and no horizontal coordination. Hierarchical structures with balanced top-down and bottom-up approaches can fall in this category since this structure hinders horizontal coordination and facilitates two-way coordination, such as pure top-down or bottom-up among intermediate levels. Therefore, the different administrative levels in the hierarchy structure attain interconnection indirectly. The intermediary level organisations in the hierarchy undertake the role of boundary spanning, and any other boundary-spanning organisations can indirectly connect the top and bottom administrative levels. This indirect coordination among the various administrative levels with the direct coordination among intermediary levels creates indirect interaction in the hierarchical structure. The study names this structure an "indirectly integrated hierarchy". Similarly, segment 7, an advanced version, in terms of vertical integration, of segment 5, provides high vertical integration of hierarchy with direct coordination among various administrative levels, and this study names the structure with these characteristics "directly integrated hierarchy."

Segment 6 represents the horizontal coordination features in addition to the features of segment 5. This study argues that lead organisation networks and network administrative organisation-governed organisational networks can be placed in this category with the following justifications: (1) both networks have centralised features that represent hierarchical features (Borgatti et al. 2009); (2) the networks are highly brokered, with few direct organisation-to-organisation interactions, and network participants typically have limited

formal accountability for network-level goals and conformity to rules and procedures is purely voluntary; (3) indirect forms of coordination characterise networks through mutual adjustment, shared norms, trust, and reputation (Provan and Kenis 2008). Moreover, these network types can have one or more (polycentric) centrality points. However, in special cases, networks can have direct connections among organisations depending on the situation. This study views these formal direct networks with centrality as heterarchy structures since heterarchy is the co-existence of a hierarchy and network system between actors with direct interactions (Cumming 2016; Wilson and Hölldobler 1988; Stephenson 2009). Furthermore, this heterarchy structure can also have one or more central points (Cumming 2016). By giving the above justification, this study argues that lead organisation-governed networks and network administrative organisation-governed networks fall under segment 6 and, similarly, heterarchy falls under segment 8 with high vertical and horizontal integration and direct vertical and horizontal coordination. The above discussion regarding organisational structure type within collaborative arrangements is graphically presented in Figure 4.
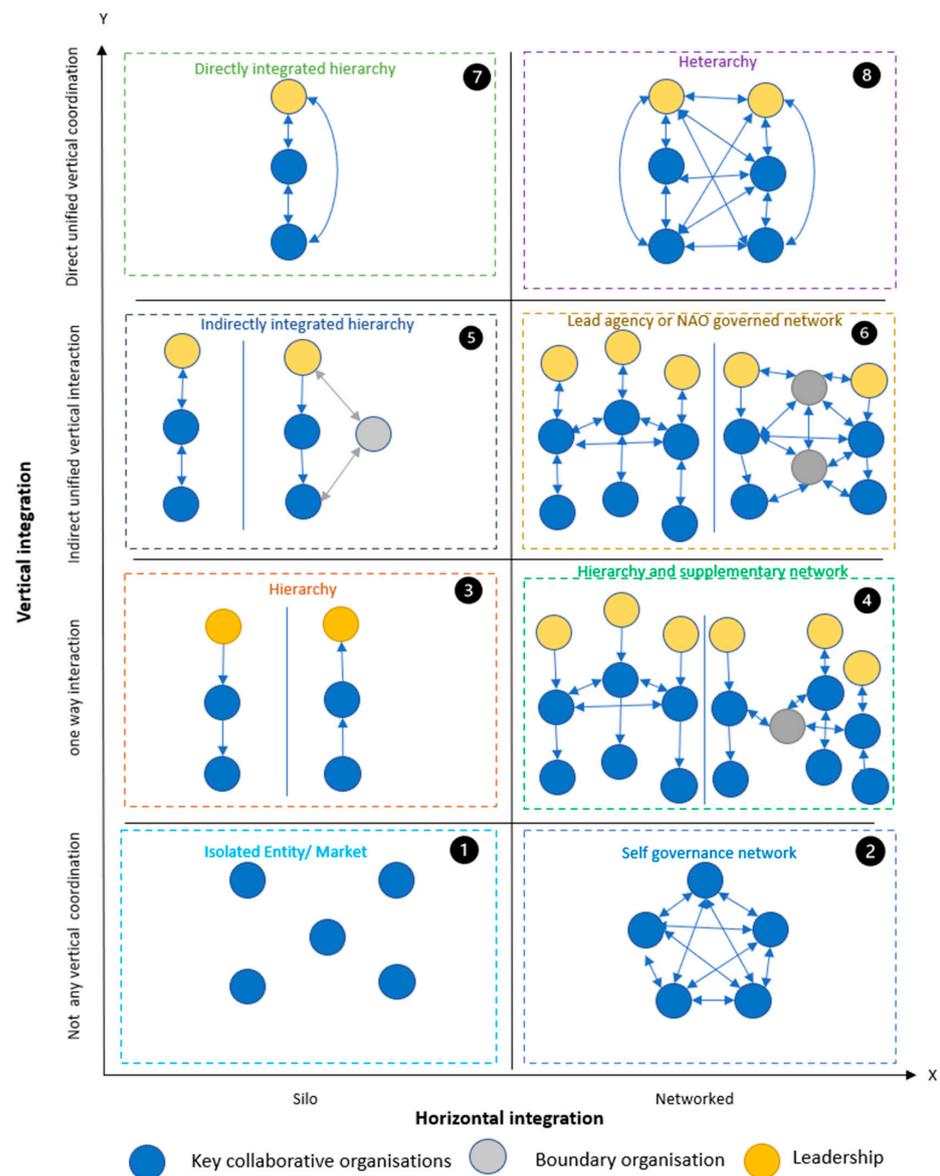

Figure 4. General structural arrangement of each segment.

The study further argues that market structure (segment 1), which hinders coordination among isolated entities, is not suitable for collaborative arrangements and has no vertical and horizontal integration. The self-governance network structure (segment 2) is unsuitable for inter-organisational arrangements in which no centrality or hierarchical features prevail to control or monitor a large number of collaborative members. Therefore, this structure is not suitable for public and collaborative governance arrangements. Hierarchy (segment 3), indirectly integrated hierarchy (segment 5), and a directly integrated hierarchy structure (segment 7) are suitable for creating vertical coordination. However, these structural types are unsuitable for the cross-sector actors' collaboration beyond the silo boundaries. Among the three other structural types, the hierarchy and supplementary network (segment 4) can facilitate low horizontal integration and high vertical integration and, therefore, is considered to be a structural type that can provide a medium level of collaboration across administrative levels, boundaries, sectors, and actors. The lead agency or NAO-governed network structure (segment 6) and the heterarchy structure (segment 8) can facilitate high vertical and horizontal integration and can, therefore, facilitate high collaboration across administrative levels, boundaries, sectors, and actors. However, since a heterarchy structure can facilitate direct coordination among all collaborative members, a heterarchy structure is considered the ideal structural arrangement to facilitate inter-organisational collaboration.

The framework helps us to subjectively plot the organisational structural arrangements in the quadrants based on the horizontal and vertical integration features they have. The horizontal and vertical integration levels vary through the X and Y axes depending on the intensity of the features determining the vertical and horizontal integration, as described in Figure 3.

5. Application of the Framework Using Case Examples

In this section, this study intends to demonstrate the use of the proposed framework (Figure 3) to identify the degree of horizontal and vertical collaboration in three real cases identified from the three literature sources identified in this study, representing the hierarchy (Gilfillan et al. 2017), the network (Bowen et al. 2014), and the hierarchy and supplementary network as a form of hybrid of hierarchy and network arrangement (Lagreid and Rykkja 2015). The type and features of inter-organisational collaborative structures discussed in the cases are assessed using the developed framework in Figure 3. This framework allows the subjective placing of the cases based on their structural type and nature. Brief descriptions of these cases and the assessment based on the framework are given below.

Case 1: Vietnam climate change adaptation within the health sector in the Vietnamese Mekong Delta (Figure 5)

The case reported by Gilfillan et al. (2017) discusses the Vietnam climate change adaptation within the health sector in the Vietnamese Mekong Delta. Vietnam's governance arrangement is hierarchical and based on a bureaucratic culture. Therefore, to facilitate collaboration, a steering committee was set up at the regional level, named "the Southwest Steering Committee (SWSC)", chaired by the deputy prime minister under the central Communist Party. This steering committee assists ministries and provinces in implementing plans and acts as a coordinating agency in the collaboration process. The steering committee is directly connected to the Provincial People's Committees (PPCs) and has access to the provincial head of line ministries and provincial line departments through the PPC to facilitate cross-level, cross-sectoral, and cross-boundary coordination by linking the provincial level and central government. According to Gilfillan et al. (2017), this structure was identified as weak since the SWSC had no authority over the provincial authorities, and the government wanted to maintain a clear separation between the government and the Communist Party; therefore, the SWSC did not have decentralised authority. This made it difficult for the SWSC to gain support to fulfil its official governing role and

attract the required funding. As a result, even though the steering committee was a suitable entity to facilitate collaborative cooperation in the Vietnamese Mekong Delta, state-centred top-down hierarchical decision-making still prevails and the sectoral departments in the Provincial People's Committee are controlled by line ministries from the centre. This condition limits collaborative coordination across levels, boundaries, and sectors. Gilfillan et al. (2017) further suggested that it is important to move away from the current hierarchical top-down governance approach and bureaucratic environment to a positive collaboration culture to address climate change adaptation.
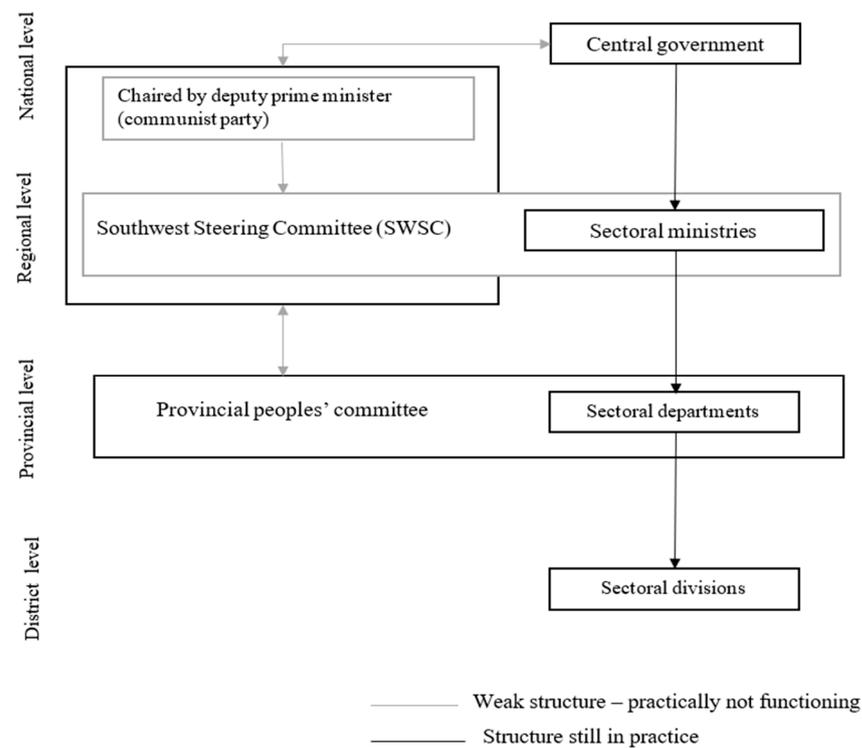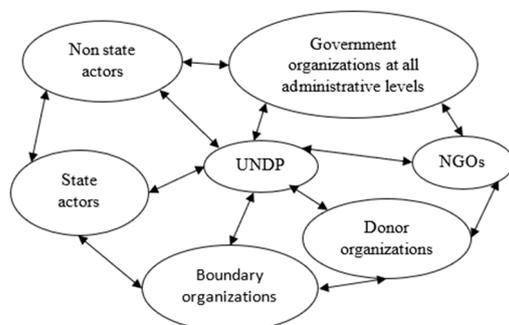

Figure 5. Graphical representation of case 1. (Adopted from Gilfillan et al. 2017).

This governance arrangement shows the adequate features of the network structure since the steering committee facilitates horizontal integration among various sectors and vertical integration across different administrative levels by connecting the provincial level to the central government. Therefore, this structure can be placed in segment 6. However, as an exemption, case 1 was placed in segment 3 due to failures in governance as follows. The steering committee does not have any authority over provincial authorities and has not been given any decentralised powers. Therefore, the central government still controls the sectoral departments through line ministries through top-down vertical coordination. Hence, the steering committee is not functioning practically and, therefore, a hierarchical governance structure with a top-down approach is more prominent in practice. In addition, no boundary organisations are available to connect the organisations at different administrative levels. Thus, vertical integration is hindered in this structural arrangement since coordination can be seen only at immediate administrative levels and not at all levels. In terms of horizontal connections, this structure failed to facilitate horizontal connections across sectors, actors, or boundaries for the following reasons: (1) there is no coordination among other provincial-level departments, even though cross-administrative coordination is essential in this case; (2) ministries are functioning in silos and no coordination among sectoral ministries takes place; and (3) only government organisations are working on this initiative without the involvement of non-governmental organisations. Additionally, these features limit the heterogeneity of the structure. Therefore, the level of opportunity for

horizontal and vertical integration in case 1 is considered low. Hence, case 1 falls within quadrant 1 and is classified as a weak collaborative structure.

Case 2: Governance structure for making decisions in health-related adaptation in Cambodia (Figure 6)
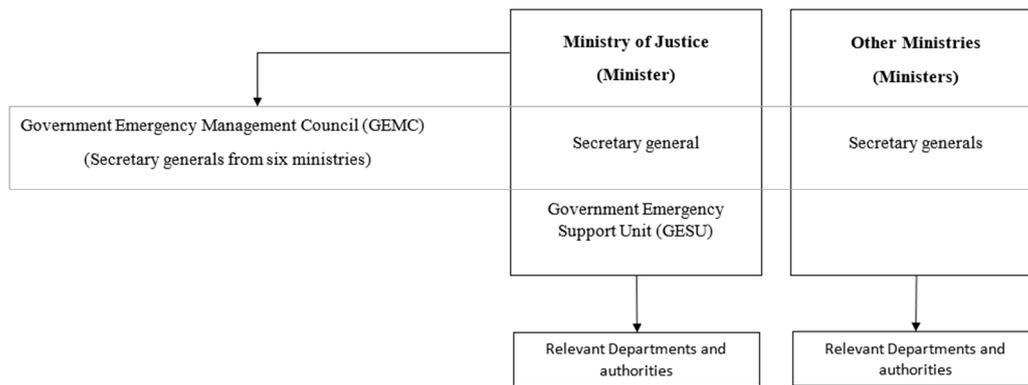

Figure 6. Graphical representation of case 2. (Adopted from Bowen et al. 2014).

A study by Bowen et al. (2014) investigates the inter-organisational governance structure for making decisions in health-related adaptation in Cambodia. The network structure analysis identified the following features: (1) There is a large number of connections among the key organisations compared to the rest of the organisations in the network, and a number of bridging organisations are available to facilitate links between the key agencies and secondary agencies; (2) Boundary-spanning behaviour is evident in the structure due to the connection across the government and non-government organisations.

According to Bowen et al. (2014), network arrangement provides healthy collaboration, although some improvements are considered necessary. This network structure facilitates coordination among state and non-state actors and sectors, and across different administrative levels with the support of bridging organisations. Furthermore, the existence of a high level of involvement of government organisations that are collaborating with other organisations (such as partners, donors, and traditional non-government organisations) was seen as a desirable collaborative feature for health and climate change adaptation activities.

In this network, several non-government organisations such as the World Health Organisation (WHO), the United Nations International Children's Emergency Fund (UNICEF), the United Nations Development Programme (UNDP), the Asian Development Bank (ADB), and the World Bank act as boundary spanners. For example, in this case, even though the Ministry of Health (MoH) does not have a direct connection with the Ministry of Interior (MoI), UNICEF plays a boundary-spanning role in connecting these two different ministries to promote cross-sectoral collaboration in the network. In addition to high horizontal integration, the connection with various stakeholders who are from various countries and regions creates heterogeneity in the network and leads to innovative decision-making. Hence, it is clear that this network structural arrangement has collaboration among cross-sectors, cross-actors (government and non-government), and cross-administrative boundaries with heterogeneity. Therefore, this structure has high horizontal integration. In terms of vertical integration, this network structure connects organisations from the national level to the local level, such as ministries, national committees, provincial committees, departments, and local NGOs, with the help of boundary spanners. Even though this network structure has centrality towards MoH and UNDP, all the organisations at all levels are connected through NGOs as boundary-spanning organisations. Therefore, this structure allows indirect unified vertical integrations. Therefore, case 2 is placed in segment 6 and is identified as a structure that has a high level of vertical and horizontal collaboration with the support of boundary spanners.

Case 3: Internal security governance arrangement in Norway (Figure 7)

Figure 7. Graphical representation of case 3. (Adopted from Lagreid and Rykkja 2015).

A study reported by Lagreid and Rykkja (2015) discusses the internal security governance arrangement in Norway. Norway has a strong democratic tradition and adopts bureaucracy and a hierarchical decision-making process steered by top management. However, the internal security governance arrangement of Norway adopts both a traditional hierarchy arrangement and a network arrangement. Thus, this structure represents a hierarchy and a supplementary network structure. The Ministry of Justice (MJ) takes the leading agency role within the central government, an intermediate form of traditional hierarchy and network. The Ministry of Justice at the national level is connected to the administrative levels below as a hierarchical structure. Moreover, two additional network organisations have been set up and led by the MJ, such as the Government Emergency Management Council (GEMC) and the Government Emergency Support Unit (GESU). The GEMC is a superior coordinating body consisting of the secretary generals from six ministries and is expected to meet regularly even when there is no crisis. The GESU, a permanent unit within the Ministry of Justice (MJ), assists the affected authorities in a crisis and serves whichever ministry or public authority is involved in a crisis. Both networks can be expanded upon as needed. This hierarchy and supplementary network arrangement has been adopted by the Norwegian government to handle wicked problems in their internal security with satisfactory performance.

In this case, the Ministry of Justice (MJ) at the national level is connected with administrative levels below in a hierarchical structure. This feature facilitates vertical links among the immediate administrative levels, but there are no direct connections with other administrative levels below, resulting in low vertical integration. In this case, there is an additional network arrangement to connect the heads of units from different ministries (e.g., the Government Emergency Management Council and the Government Emergency Support Unit), hence promoting horizontal integration. However, since a top-down approach from the centre to the local level through ministries prevails, there is no collaboration among various administrative boundaries and with various actors such as NGOs or technical organisations. As a result, the level of horizontal integration and the heterogeneity of case 3 is considered low. Therefore, case 3, which represents a hierarchical and supplementary network structure, falls under segment 4 and depicts a medium level of collaboration.

Figure 8 positions the above case studies in a VI/HI chart, which combines vertical integration (VI) and horizontal interaction (HI), using the framework presented in Figure 3. The placement of the governance arrangement in each case in the chart is based on the entirely subjective judgement of the authors using the criteria established in the framework in Figure 3. It is important to note that the placement was made using the data available for each study case. The explanation of the rationale for the placement of the cases in a particular quadrant is discussed below.
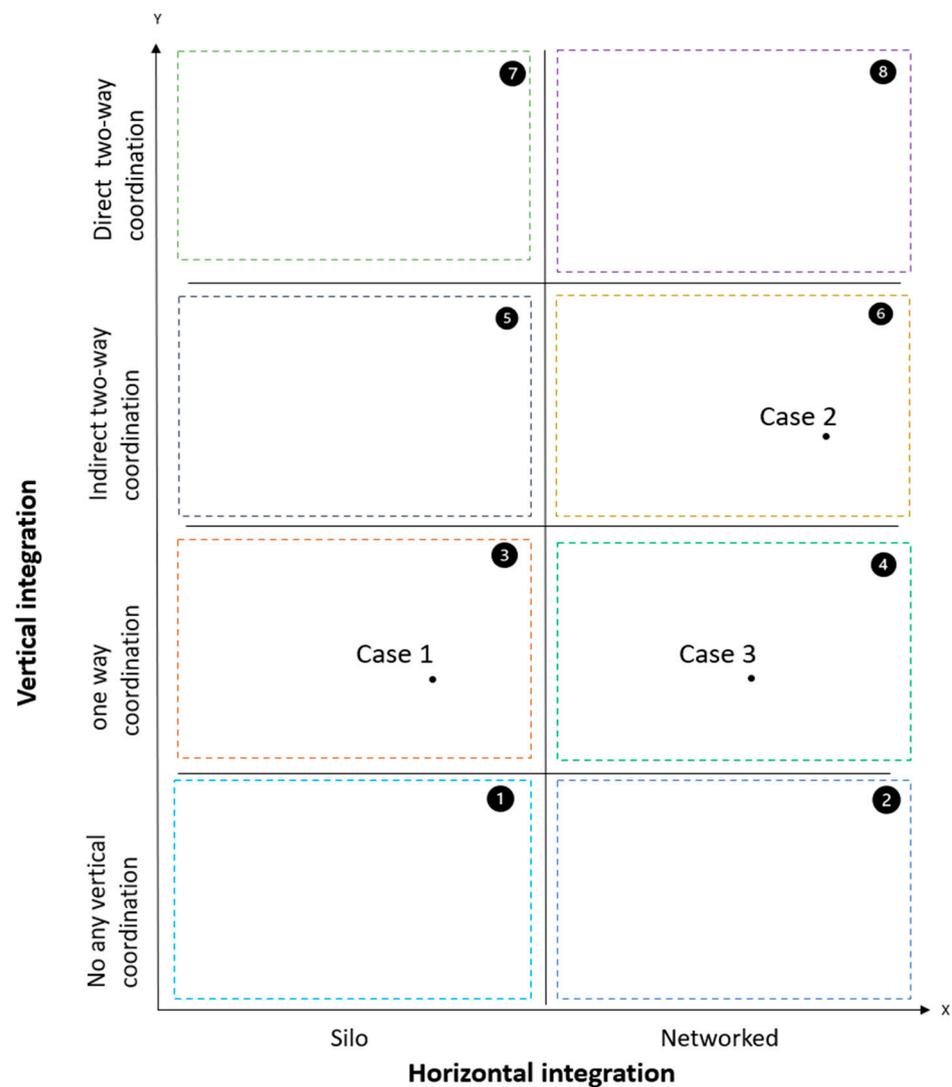
Figure 8. VI/HI chart.

The analysis of the above three case studies has allowed the researchers to demonstrate the use of the proposed framework (Figure 3) to determine collaboration levels based on the structural features of an organisation and to understand how various organisational structures are used in a real-world context to achieve different levels of collaboration.

The analysis of the structural characteristics of case 1 is much in line with the characteristics of segment 3 of the framework presented in Figure 3. As a result, weak horizontal and vertical collaboration was expected, which was confirmed by independent research carried out by Gilfillan et al. (2017). Similarly, case 2 displays the characteristics identified in segment 6 of the framework presented in Figure 3. As a result, strong horizontal and vertical collaboration was expected, which was confirmed by the independent research carried out by Bowen et al. (2014). Furthermore, case 3 was placed in segment 4 since it had a hierarchy with a supplementary network with weak vertical integration. Therefore, a medium level of collaboration was expected, which was confirmed by the independent research carried out by Lagreid and Rykkja (2015).

The case study analysis confirmed that hierarchical governance arrangements generally hinder horizontal integration and are, therefore, unsuitable for cross-sectoral, cross-administrative boundary collaborations. The pure decentralised network arrangement is not suitable for the situations in which centrality takes place. Furthermore, if it is a pure decentralised network with equal power, the administration or governance of the network is questionable (Rondelez 2018). Therefore, the hybrid forms of hierarchy and network

governance arrangements are suitable for facilitating high collaboration since they are capable of allowing high vertical and horizontal integration among multiple actors with high heterogeneity. Nevertheless, according to studies by Gilfillan et al. (2017), Khayatzadeh-Mahani et al. (2019), and Lagreid and Rykkja (2015), countries that follow bureaucratic cultures can adopt hierarchical and supplementary network governance arrangements for collaboration purposes since these structural forms allow vertical management and horizontal collaboration to a certain extent. Furthermore, the heterarchy structural type is ideal and facilitates collaboration at an optimum level.

6. Conclusions

This study found hierarchy, network, and hybrid forms of hierarchy and network are the key structural arrangements that are commonly adopted for inter-organisational collaboration as they facilitate vertical coordination or horizontal coordination or both vertical and horizontal coordination. However, this study found that the hybrid forms of hierarchy and networks are suitable for facilitating both vertical and horizontal collaboration directly or indirectly. In addition, this study's findings underscore that countries with a deeply rooted bureaucratic culture can potentially adopt hybrid governance to overcome barriers in hierarchical governance structures and meet their cross-level and cross-boundary collaborative needs at a satisfactory level.

By analysing the characteristics of various inter-organisational structures, this study proposes a framework that presents how the inter-organisational governance structures determine vertical and horizontal integration, which reflects on the effectiveness of the overall collaboration. Hence, this study provides a roadmap to move to the desired level of collaboration by implementing the required structural features. It is hoped that future researchers can utilise this framework to analyse and propose suitable governance structures for different application contexts.

It is essential to note that these findings are limited to the literature sources selected based on the selection criteria of the study, and the case study evaluation was based on the data availability within the respective studies. However, despite this limitation, this study structured and presented a basic understanding of the suitable types of inter-organisational governance structures and the adequate features required to strengthen collaboration. Moreover, these findings contribute to theory and practice for assessing the adequacy of an inter-organisational collaborative structure to facilitate effective collaboration.

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