

Article

Inter-Organisational Coordination for Sustainable Local Governance: Public Safety Management in Poland

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Abstract: The goal of this article is to examine the basic characteristics and factors that impact inter-organisational coordination in sustainable local governance to address: 1. What are the factors that effective inter-organisational coordination between independent units creating public safety system on local level in sustainable local governance depends on? 2. What are the principal features of inter-organisational coordination in the public safety management system studied in the context of sustainable local governance? The article's goal was reached using desk research analysis and empirical research. The desk research covers an analysis of international scientific publications. In turn, the empirical research was based on the example of public safety management. It covered interviews with practitioners dealing with public safety and a hermeneutic process within a focus group of scholars. As a result of the conducted research, interdependencies between coordination and other factors of inter-organisational collaboration were identified and the process of inter-organisational coordination during the emergency situations was characterised.

Keywords: inter-organisational coordination; sustainable local governance; sustainability; inter-organisational collaboration; public safety management; emergency; business model

1. Introduction

Civilisational development created goods that facilitate life and raise its standards. At the same time, an increase of hazards has taken place and side effects of technical advancement and space development have come into being [1,2]. Simultaneously the hazard of industrial calamities is growing, degradation of resources and natural resources is occurring, while biological and chemical pollution impacts public life. Moreover, polarisation of society, poverty and privation, terrorism, crime, and violence are expanding [3,4]. Spatial development is gaining significance in the perspective of social development, which to a large extent is characterised by lack of organisation and harmony [5].

The consequences of unlimited civilisational growth, globalisation, urbanisation, and an economic crisis have resulted in paying attention to durability and sustainable use of the possessed potential. Consequently, in the contemporary functioning of an organisation what gains more and more significance is the concept of sustainability, which consists in the realisation of rules of sustainable development and constructive confrontation of resources, goals, and strategic factors in order for the organisation to exist and develop [6].

In our times, the basic significance in assuring safety and sustainability in the public sector is attributed to regional and local development factors [7]. This is due to the fact that in the valid legislative solutions self-governments were given independence and freedom of decision making in the scope of realised tasks. Thanks to that, they have direct possibilities of creating safety and sustainability in the managed area. However, self-governments are able to realise the rules of safety and sustainability only by collaborating with other public and private entities and with the society [8]. This interaction is characterized by inter-organisational collaboration defined as “any joint activity by two or more agencies working together that is intended to increase public value by their working together rather than separately” [9] (p. 508). According to Arthur T. Himmelman, this collaboration includes exchange of information that is favourable to all parties (networking), with altering of activities (coordinating) and sharing of resources (cooperating) [10]. A similar perspective is presented by Richard C. Feiock, In Won Lee, and Hyung Jun Park who claim that coordination is a vital instrument of managing networks [11]. On the other hand Ranjay Gulati, Franz Wohlgezogen, and Pavel Zhelyazkov treat coordination as one of two indispensable facets of inter-organisational collaboration [12]. In our article we both agree with the allegation of the above-mentioned authors and in our analyses we assume a perspective that coordination is one of the principal elements of inter-organisational collaboration. This approach is based on the broadly known five Fayol’s functions: planning, organising, command, coordination, and control. By treating coordination as one of the functions of management we present it in a broad scope, considering that it includes “the activities responsible to ensure the effectiveness of the collaborative work” [13] (p. 88). Consequently, in our approach coordination is a factor of collaboration, which refers to a decentralised approach to problem solving [14].

Despite a great deal of research in the public sector, inter-organisational collaboration is still a challenge. This results above all from decentralisation and narrowing of specialisation of each public organisation [15]. In public safety management problems without inter-organisational coordination may cause serious consequences and generate additional hazards, which was observed for example during Hurricane Katrina and the World Trade Center attacks [16–19]. Moreover, contemporary development trends focused on internationalisation and at the same time regionalisation combined with a strong and stable local governance are also a challenge for coordination. Problems in this scope may result from the overlapping nature of department jurisdictions [20]. There is also a research gap in the scope of the contextual variables in shaping collaborative efforts [21]. Moreover, despite the evident importance of coordinating actions during the time of threat, relatively little attention has been paid to it [22,23]. This means that there are theoretical and empirical gaps in the literature of the field. The necessity of theoretical justification of the sustainable approach to local governance and the lack of exhaustive analyses related to coordination generate the need to conduct research studies in this scope. Thus the goal of this publication is to examine the basic characteristics and factors that impact inter-organisational coordination in the public safety management system as a part of a sustainable local governance to address: 1. What are the factors that effective inter-organisational coordination between independent units creating public safety system on local level in sustainable local governance depends on? 2. What are the principal features of inter-organisational coordination in the public safety management system studied in the context of sustainable local governance?

The article’s goal was reached using desk research analysis and empirical research. The desk research covers an analysis of international scientific publications. In turn, the empirical research was based on the example of public safety management in Poland.

In our article we refer our research to organisational coordination, since we have been studying the actions taken in order to harmonise and synchronise the enterprises of various organisations, which assumption is achieving of common goals and appropriate results [24]. Although we carry out our analyses in the public sector, we do not make any reference to the model of coordinating public policies. Our approach is close to the model of relational coordination [25,26] and decentralized intelligent adaptation [14].

The paper is organised as follows: First, we review sustainability in public safety management. Then, we discuss the general theory of coordination and explain the role of inter-organisational coordination in public safety management. In the part containing the research results we identified factors influencing and influenced by inter-organisational coordination. Next, we analyse the process and the features of inter-organisational coordination during emergency situations using the example of Polish circumstances. We emphasise that inter-organisational coordination is a central attribute of sustainable public safety management. Our results contribute to better understanding of coordination complexity in dynamic circumstances.

2. Methodology Research Method and Context

To achieve the purpose of the article, the desk research method and empirical investigations were carried out.

The desk research was based on the analysis of international scientific literature and it covered issues related to inter-organisational coordination and public safety management. Publications connected with the general coordination theory, inter-organisational coordination in the public sector and in dynamic context played a key role in this scope. We focused on foreign literature, indexed in generally acclaimed databases (Web of Science, Scopus) and works in English, in order to obtain a picture of inter-organisational coordination that would be as objective as possible. We have not covered academic achievements in the scope of coordinating in specific conditions of the private sector and within one organisation. We have focused on those publications dealing with inter-organisational coordination, which concern the problems of collaboration.

Moreover, based upon the research conducted so far [27], the relations occurring between coordination and other factors of effective inter-organisational collaboration were examined. These analyses were carried out within a hermeneutic process within a focus group of scholars conducted in December 2014 within a four-person group of researchers actively involved into investigating inter-organisational collaboration. Two of them have been involved in research in this domain for over 10 years, and the remaining two—for over 5 years. Discussions within two sessions were held in 2014 on the grounds of practical instances and analyses of typical collaborative situations.

Empirical investigation was based on free-form interviews, which were conducted with 15 medium and lower level employees employed at police and fire brigade units and medical emergency stations in the area of the Silesian Province. They concerned the course of collaborative processes in public safety management. These interviews were conducted in September and October 2013. In the scope of coordination, this research covered the following issues:

- (1) coordinating actions taken within collaboration with other units prior to, during, and after the threat
- (2) enterprises in each unit within common action coordination
- (3) the course of the common action coordination process using a random example

In this article we presented the results and interpretation of the conducted analyses.

The research was conducted in Poland, where—in an organisational aspect—the authorities operate on two levels: government (central) and local government. The central level is responsible for the continuity of actions aiming at ensuring safety, it monitors and prevents hazards and their consequences. In turn the task of local governments is to identify hazards at the source, preventing them and eliminating their consequences. However, the decentralization of public authority ceded responsibility in the field of public safety onto each local government level *i.e.*, commune (Polish: *gmina*), district and also province. Local governments fulfil their tasks independently, while the government administration has only a possibility to supervise their actions, which however, is limited and briefly specified by regulations.

The obligation to take action in case of the occurrence of a hazard is borne by the authority, which was first to receive information about it. This authority promptly informs about the event that has occurred the authorities of a higher and lower level respectively, presenting at the same time their assessment of the situation and information on the intended actions [28]. If the event's nature is supralocal, management of the action is taken over by the regional level. Similarly, in case of a supraregional hazard—management is taken over by the central authorities of state power.

Information on the necessity of taking action may be transferred directly from the hazard's location or by the 112 system, which operates in Poland on the local and provincial level. On the local level it is responsible for operating emergency numbers and organisation of emergency endeavours in a given action area by means of emergency call centres. In turn, the provincial level facilitates coordination of actions of a supralocal nature. All reports are registered in an ICT (Information and Communication Technologies) system and their transfer to an appropriate intervention and rescue unit depends on verification and justification of the report and disposing of the means of rescue entities [29].

An important issue in the operations of the public safety management system in Poland is the autonomy of the units participating in the actions. In a situation of hazard, these units operate autonomously, focusing on realising their statutory tasks and the scope of their cooperation results from the valid regulations. It is worth mentioning that a similar situation occurs in many places around the world, including in the scope of coordinating foreign aid during calamities. In other countries there are solutions that enable creation of inter-organisational teams [30–32]. That is why actions realised in the examined area in Poland are mainly based on the complementary roles and competences of many units, properly coordinated work, and effective communication. Taking the above into account, the basis of managing public safety is inter-organisational collaboration and the units taking part in it realise their tasks simultaneously, complementing each other.

Our research covers the context of conducting actions in public safety management, which is dependent on the type, nature, place, and range of the hazard's occurrence and course. During stabilisation, when routine action are carried out, the realisation of actions in the examined scope, including coordinating, is similar to other areas of local governance. General methods of coordination apply here. Situation changes during extreme events. Each hazard is an individual event, which is characterised by peculiar specifics of development and duration. The principal challenges are the following: high uncertainty, sudden and unexpected events; risk and possible mass casualty; increased time pressure and urgency, severe resource shortage, large-scale impact and damage, disruption of infrastructure support, multi-authority and massive people involvement, conflict of interest, and high demand for timely information [23]. Even the same type of hazard concerns a different location, which generates the need to take different actions. The differences in the duration of the hazard's occurrence are also significant. For example, a fire in the summer time, during the occurrence of drought, will carry a greater risk of occurrence of additional hazards compared with the winter time. Moreover, the victims of each hazard are different, which also generates the need to adapt actions to the needs. During extreme events the enterprises conducted in public safety management require proper preparation, and above all coordination of actions. Moreover, the operation of rescue units may seem similar, but in practice they differ by the level of organisation, they operate based on other standards and they are also characterised by a different organisational culture [19]. It is in line with the assumption of Arjen Boin and Paul 't Hart [33], according to which there is no unique and best form of organisation and in addition each emergency situation requires an individual approach that consists of (1) applying the general principles of organisational coordination; (2) lessons learned from experience coming from collaboration in similar situations; and (3) the specifics of a given event.

3. Theoretical Background

3.1. Sustainable Public Safety Management

Public safety is one of the principal foundations of a rich and well functioning society [34]. It constitutes an organised activity realised using personnel, financial, technical, information resources of many organisations, taken in order to minimise potential hazards, ensuring an undisturbed course of social life as well as protecting people's health, life, property, and the environment, which includes law observation and protection of order with focus on realizing the public interest [35]. Public safety management covers a large scope of research, which extends from social policy, through local and criminal policy, up to crisis management [36,37]. Its aim is to ensure the most favourable level of safety using the existing capabilities and limitations and taking into account the dynamics of the environment. The principal entities participating in public safety management include the following [38,39]:

- Local government
- Response and rescue units, including: a core unit where taking actions in response to a specific type of hazard fall into its competences; basic units which mostly respond collectively and mutually collaborate in public safety management; ancillary units which supplement actions taken by a core unit and basic units, and their knowledge and competences are critical in a specific situation
- Society: local communities and enterprises operating in a given territory
- Media: radio, television, press, Internet
- Non-governmental organisations
- Research and development units

The listed groups of entities constitute mutually complementary units, which include not only lawyers and experts on administrative sciences, but also specialists in the scope of management, sociology, economics, political sciences, technical sciences, environmentalists, *etc.* They form a public safety management system that constitutes a dynamic system of units, the aim of which is ensuring safe and sustainable conditions of operating to all entities in a given administrative area by using the possessed resources and within the valid formal rules and informal relations, characterised by the uniqueness and changeability of actions and constant adaptation to current conditions and arising needs [40].

In the stabilisation phase the local government plays the leading role in the public safety management system in a given administrative area, ensuring conditions of sustainable local development. In this scope, preventing hazards achieved by education and building of resilience is of priority importance. These functions are realised above all by education, media, non-governmental organisations, and local governments within the formation of culture and national identity. Also the Police and State Fire Service prepare professional prevention programs aiming at excluding the occurrence of hazards. Local government fosters growth of the idea of inter-organisational collaboration.

However, the core of the system covers actions taken by the response and rescue units [41]. These units are appropriately prepared operation wise, they are trained and have appropriate skills and knowledge and they have at their disposal means and tools adequate to a given situation. Taking the above into account, during realisation the leading role is taken over by intervention and rescue units, while the local governments supervise their actions. Moreover, the principal function in realising intervention and rescue actions is fulfilled by: the Police, the State Fire Service, and medical rescuers. Most often these units participate in the actions in the first place. Depending on the type of hazard and the situation, other entities are engaged as well. The principal actions may be assisted by among other the Municipal Guard, Border Guard, Railway Guards, Road Transport Inspection, the army, or non-governmental organisations. In turn, the Environmental Protection Inspectorate, Sanitary Inspection, Construction Supervision Inspectorate, or social assistance workers may act as advisers

and assist in decision making with their specialist knowledge. The type and degree of engagement of each unit depends on the level of complexity of a given situation [40].

In that context sustainability is the organisation's ability to continuously learn, adapt, and develop, and also revitalize, reconstruct, and reorientate in order to offer high value to recipients in a long period of time [42]. In the public sector it constitutes a tool which enables partner participation in making use of public goods taking into account limitations of resources.

From the analysed perspective sustainable local governance is defined as a process run by local governmental bodies aimed to socially and economically boost a specific region or locality, while respecting environmental protection and land development, being committed to sustainable management of the resources pool and tapping into cutting-edge public management tools, *i.e.*, coordination of inter-organisational collaboration [8] (p. 325). Its basis is a diagnosis of social needs, possessed resources, and condition of the environment, in which public services are offered. Based upon it, local development programs are created that serve sustaining of social life processes. Improvement of public institution actions, owing to collaboration, increases entrepreneurship and effectiveness of sustainable activities of local governments. As a result of this, the competitiveness of a given area grows, while the required environment quality standards are maintained.

Consequently, sustainability in public safety refers to efficient realisation of enterprises by taking actions that are appropriate to an existing need, without harm to society, economically justified and with the highest degree of care for the natural environment. Sustainable public safety management aims at well-balanced management of resources including local and natural ones as well as those possessed by each unit of the system being analysed. It constitutes a process realised by local response and rescue units within inter-organisational collaboration using modern public management tools, which aims at minimising potential hazards and ensuring most favourable level of public safety simultaneously respecting and ensuring of principal and integrated order. Taking into account the fact that it covers all orders of integrated development, it constitutes an interesting research area that is adequate to the issues being raised.

The characteristic features of public safety management make it an area of public governance, in which the need for coordination is especially visible. For that matter, it constitutes an interesting research area that is adequate to the issues being raised.

3.2. Coordination as a Factor of Inter-Organisational Collaboration

In local governance collaboration, which is one of the most important tasks of self-governmental sub-sector organisation, combining activities in favour of local development, is of key significance in this scope [43,44]. Local government units constitute collaborating institutions, which require appropriate coordination within co-governance. Based on the surveys and theoretical considerations, the literature state that collaboration between public sector organisations is one of several tools of local development management since it contributes to the growth of public services [45,46]. It is characterised by interdependence with simultaneous autonomy of functioning as well as settlement of collaboration rules by means of negotiation and based on organizational and legal factors. As it is emphasized by R. Lozano, collaboration constitutes a key element in running of the strategy of sustainability [47].

Inter-organisational collaboration includes sustainable relations, which join each organisation in realising their common goals. It is defined as a union of two or more organisations that is favourable to all parties and well-defined, which serves achieving of common goals [48] (p. 4). Among the causes of establishing inter-organisational collaboration one may distinguish the following: high levels of interdependence, need for resources and risk sharing, resource scarcity, previous history of efforts to collaborate, situation in which each partner has resources that other partners need, and complex issues [49]. Identified on the base of empirical evidence, the principal benefits in the scope of inter-organisational collaboration include among other [50–53]: consolidation of the resources of collaborating organisations, knowledge sharing, organisational learning, making use of the experience

of other organisations, transfer of best practices, and creating innovative solutions. This is not a new concept, however it has enjoyed great interest only for about two decades [54]. Recently, more importance is given to the relational aspects.

The growing significance of inter-organisational collaboration in the activity of enterprises and public institutions results to a large extent from the dynamics of changes in the organisations' environment, seeking competitive advantage and the fact that at present it is not possible to act alone. Although the practice of collaboration between organisations is broadly applied, the presumptions of its implementation are generally known and it does not constitute a new phenomenon, it is a very difficult process [55]. The results of empirical and theoretical studies, presented in the literature, indicate that this is mainly due to its complexity, different approaches to realisation of mutual actions, potential disturbance in the course of collaboration processes, *etc.* [56,57]. Moreover, legal requirements or collaboration agreements do not constitute conditions sufficient enough to ensure sustainable inter-organisational collaboration. This is because its course is impacted by multiple factors with features that refer to both external and internal conditions, relational factors, and instruments of inter-organisational collaboration. They have a prerequisite nature. The most important one is coordination [27].

Coordination is defined as “... the act of managing interdependencies between activities performed to achieve a goal” [58] (p. 6). It is a relational process based on task interdependencies [59]. It originates from the need for simultaneous execution of activities falling under the powers of various organisations, and results from the specifics of their operations. From the traditional perspective, it refers to hierarchical control, whereas the organisational perspective pertains to centralised, dispersed coordination or a combination of two types at the organisational level [60]. Coordination is a continual process and a component of the organisation. It depends on the specifics of the entities involved, the circumstances as well as dynamics of change in the external environment in which the entities operate. It is assumed that good coordination is nearly invisible, only being noticed most clearly when it is lacking [61].

In the subject literature there are two levels of coordination: intra- and inter-organisational [62]. The former is related to coordination within an organisation, whereas the latter to coordination between organisations. In the subject literature one may also find many types of coordination between collaborating units, for example interim coordination, cross-agency coordination, relational coordination, network coordination, or network governance [63–66]. In all of the above-mentioned cases, the aim is to ensure sustainable inter-organisational collaboration by enhancing relations and task integration. This process is based on shared goals, shared knowledge, and mutual respect [26]. For the needs of this article, the term inter-organisational coordination was assumed.

Inter-organisational coordination is related to harmonising the actions of each unit in order to common and systematic rendering of specific services [63] (p. 118). It is defined as “the deliberate and orderly alignment or adjustment of partners' actions to achieve jointly determined goals” [12] (p. 12). It is based on such mechanisms as: partner-specific communication, rules and procedures, routines, liaison, and integration roles, interim authorities, *etc.* [59] (pp. 909–910). However, in order to realise common actions, it uses above all informal interactions and pays less attention to the valid procedures and organisational structures. These mechanisms, in particular, enable sustainable local governance through building durable relations between collaborating organisations. Key characteristics and differences of collaboration and coordination were presented in Table 1.

As it results from table 1 collaboration is a broader term than coordination. The subject literature emphasises that the priority significance of coordination in inter-organisational collaboration results from its role in the continuous synchronization of tasks and the contribution of collaborating organisations. It is because it constitutes a relational process, which covers managing correlation between tasks and between the entities that perform these tasks [63]. It manifests itself through systematic and reliable communication, which strengthens social relations in order for better integration of mutual enterprises. It emphasises the significance of the organisational structure, communication,

and process management [12]. According to such concept, coordination enables going beyond rigid administrative structures and task centralisation towards greater freedom of action based on goodwill, trust, and commitment. It enables a more balanced management of resources and actions. Therefore, inter-organisational coordination indicates specific ways of implementing and conducting joint actions, owing to which it complements collaboration [12]. The notion of coordination is therefore related to operational activity, while collaboration concerns strategic decisions to a greater extent.

Table 1. Characteristics of collaboration and coordination.

Characteristics	Antecedents	Features	Modes
Collaboration	Interdependence; need for resources and risk sharing; resource scarcity; previous history of efforts to collaborate; situation in which each partner has resources that other partners need [49]; trust, trustworthiness [11]	Managing resource dependencies, sharing risk [12]; Conflict management [67]	Environment (history of collaboration, collaborative group seen as a legitimate leader in the community, favourable political and social climate); membership characteristics (mutual respect, understanding, trust, ability to compromise); process and structure (members share a stake in both process and outcome, multiple layers of participation, flexibility, development of clear roles and policy guideness, adaptability, appropriate pace of development); communication (open and frequent, established informal relationships and communication links); purpose (concrete, attainable goals and objectives, shared vision; resources (sufficient funds, staff, materials, and time, skilled leadership) [48]
Coordination	Information [11]; perception of common objects, communication, group decision-making [58]	Regulating and managing interdependencies [68]; managing uncertainties [12]; Goal decomposition [58]	Impersonal (plans, schedules, rules, procedures); personal (face-to-face communication); group (meetings) [69]; communication and decision procedures; mutual monitoring or supervisory hierarchy; group decision making; Mutual monitoring or property-rights sharing; programming; Hierarchical decision making; Integration and liaison roles; authority by expectation and residual arbitration [68]; formal (departmentalization or grouping of organizational units; centralization or decentralization of decision making; formalization and standardization; planning; output and behaviour control) and informal (lateral relations; informal communication; socialization) [70]

Source: own elaboration based on quoted literature.

A great number of research studies, information, and models in the scope of coordination causes that this area has been developing in various directions, depending on the conducted analyses. In some works its cognitive nature is emphasised, while in other the behavioural one, moreover it may be understood as a form of organizational control or team-based concertive control [67]. Attempts to model the interdependencies and level of coordination in specific fields are not consistent in the scope of coordination characteristics, but they point out which specific challenges are related to coordination [71]. For example, Henry Mintzberg's coordination model relates the coordination mechanisms to the organizational structure [72]. On the other hand, the model of Thomas W. Malone

and Kevin Crowston is based on a concept of coordination as management of dependency between actions [61]. Moreover, on the one hand it is assumed that the problems of coordination may be solved by implementing appropriate mechanisms, of a general nature, which means that they may be applied in various organisational systems. On the other hand, there are opinions stating that one should identify in detail the nature of the environment in which an organisation operates in case of specific events and next develop appropriate procedures in relation to them [14]. We agree with the second approach and also the assumption that the higher the degrees of interdependency and the levels of tasks and environment uncertainty are, the more developed forms of coordination are required [12]. These dependencies are especially visible in public safety management.

3.3. Basics of Inter-Organisational Coordination in Public Safety Management

According to Thomas E. Drabek [73], coordination is at the core of the practice of actions for safety. It is the philosopher's stone of public administration, and a central factor in poor performance during an response activities [74,75]. In actions for safety, coordination proceeds at diverse organisational levels [76]. It occurs in an intra-organisational dimension as coordination within specific organisations as well as an inter-organisation aspect as a regulator of external relations in an organisation. In this context, it is possible to talk about capabilities for effective resources administration in the form of inter-organisational teams, partnerships, alliances, *etc.* [77]. This capability is determined by the ability of specific organisations to adapt to dynamic conditions under which they operate, and to effective communication aimed at hammering out common agreements and a common stance regarding manners for conducting operations. At the core are both legal regulations as well as formal and informal relations emerging within collaborated organisations. Vertical coordination puts into place rigid principles as to the division of responsibility, the execution of activities and the control of outcomes. However, a new approach incorporating organisational connections gives priority to the mutual adaptation of entities and the integration of resources, authority and knowledge over formal mechanisms of authority [75,78].

Effective coordination is a necessary element of conducting action in public safety management. It is difficult to conduct in this area because it is connected with uncertainty, unexpected events, risk of hazards' accumulation, urgency, and infrastructure interdependency [23]. Apart from that, the situational complexity creates conditions, in which participation of various agencies is required and collaboration between them is necessary for realisation of actions. What is more, the higher the number of various organisations trying to achieve a common goal, the less probable that they will act in a coordinated way in order to achieve this goal [79]. In this connection, inter-organisational coordination in public safety management is a big challenge. The differences between the general theory of coordination and coordination between organisations in public safety management were presented in Table 2.

The principal difference between inter-organisational coordination in general and in public safety management lies in the nature of joint action. This influences all characteristics of coordination. It also causes that failures have more serious consequences and the intrinsic and extrinsic motivation, concerns, and results depend on the creativity and skills in making decisions in changeable and uncertain conditions, with limited pieces of information.

In the deliberations concerning inter-organisational coordination, we assume that its significance results from counterbalancing in the scope of actions and the level of participation of many independent organisations, taking into account social needs, natural environmental and spatial values as well as economic conditions. It facilitates achieving of the assumed goal avoiding excessive costs and damage. Consequently, inter-organisational coordination enables realisation of actions in changing, unsure, and dynamic conditions in accord with the philosophy of sustainability.

Table 2. General and specific approach to coordination.

Specification	General Theory of Coordination	Coordination in Public Safety Management
Substance of inter-organisational agreement	Ways of shaping interactions	Ways of shaping interactions between autonomous organizations
Motivation	More effectively managing task interdependencies and uncertainties	More effectively managing task interdependencies in order to identify and remove the sources and consequences of hazards
Concern/risks	Operational risk: inability to coordinate across organizational boundaries	Operational and situational risks: inability to coordinate joint actions of autonomous organisations in dynamic and uncertain circumstances
Typical positive results	Efficiency, effectiveness, flexibility/adaptiveness of joint action	Effectiveness, flexibility, adaptiveness of joint action in unique and rapidly changing situations
Typical failures	Omission, incompatibilities, misallocation	Inadvertent omissions leading to chaos, incompatibilities in rescue procedures, inadequate response, insufficient prevention of accumulation of hazards, increasing number of victims, additional damages
Remedies against failures	Hierarchies, authority, and formalisation; institutions and conventions; inter-personal linkages and liaisons	Changing hierarchical positions, integrated authority structures, improvement of rescue procedures, shared organising of training and simulations of events during the stabilisation phase, progressive adapting of regulations, advancing communication systems, creating good formal and informal relationships based on trust and organisational concern

Source: own elaboration based on [12] (p. 66).

4. Research Results

4.1. Relations between Coordination and other Instruments of Inter-Organisational Collaboration

Our previous research indicated that coordination is one of the key factors of inter-organisational collaboration [27]. These factors have a mutual impact on each other, which in effect influences both their role and the efficiency of collaboration itself. Taking this into consideration, we have decided to present our own reasoning based on chosen publications, which include the relations that characterise coordination and other factors of efficient inter-organisational collaboration. In our investigation a 3-level grade scale was applied to evaluate the impact of each factor, *i.e.*: 1—weak influence, 2—medium influence, and 3—strong influence. Whereas the relations between the factors were analysed in reference to the following grade scale: 0—lack of impact or minor impact, 1—significant impact, and 2—key impact.

Inter-organisational coordination was evaluated as a factor which has strong influence on the course of actions. This mainly results from specific and complementary competences of each organisation, task distribution, and responsibilities. These factors create the foundations of efficient realisation of actions. Taking this into account, inter-organisational coordination is of key importance to the course of collaboration.

Studying the relations occurring between inter-organisational coordination and other factors of efficient inter-organisational collaboration, our focus was directed to those factors that have a significant and key impact on the processes of action coordination between organisations. The relations, which were identified, are illustrated in Figure 1. It depicts those factors, which:

- only impact the course of inter-organizational coordination
- both impact and are a result of inter-organizational coordination
- are only a result of inter-organizational coordination

In figure 1 factors having a significant impact were indicated by a thinner arrow, while the key factors were indicated by a thicker one.

As it results from the verified connections, the key factors of inter-organizational collaboration, which influence inter-organisational coordination processes are:

- communication in inter-organisational working teams,
- constraints in inter-organisational collaboration,
- leadership with organisational and communication skills,
- organisation of collaborative work (e.g., time pressured, competitive, rapidly changing, stability),
- management of inter-organisational collaboration (e.g., styles, transparency of decisions and guidance),
- inter-organisational trust,
- professional communication between personnel from individual organisations.

These factors show that inter-organisational coordination depends mainly on organisational and relational conditions, which exist between collaborating units. Whereas, the key factors influenced by inter-organisational coordination include:

- organisation of collaborative work,
- support within collaborating organisations,
- adaptability to changing work requirements,
- flexibility and openness to changing circumstances of collaboration,
- performance of inter-organisational collaboration,
- self interest of individual organisations from collaboration.

These factors impact, above all, situation conditions in sustainable public safety management and the will to collaborate. The other analysed factors are also of significance, but they are not that important in inter-organisational coordination. Each of the said factors impacts the level of coordination sustainability. However, the significance of each one individually depends on the existence of other factors, which may mutually strengthen or weaken its influence. Moreover, the nature of relations taking place between inter-organisational coordination and other factors influencing and influenced by this process, is complex. This mainly results from the existing interdependency between all factors of effective collaboration and their mutual stimulating.

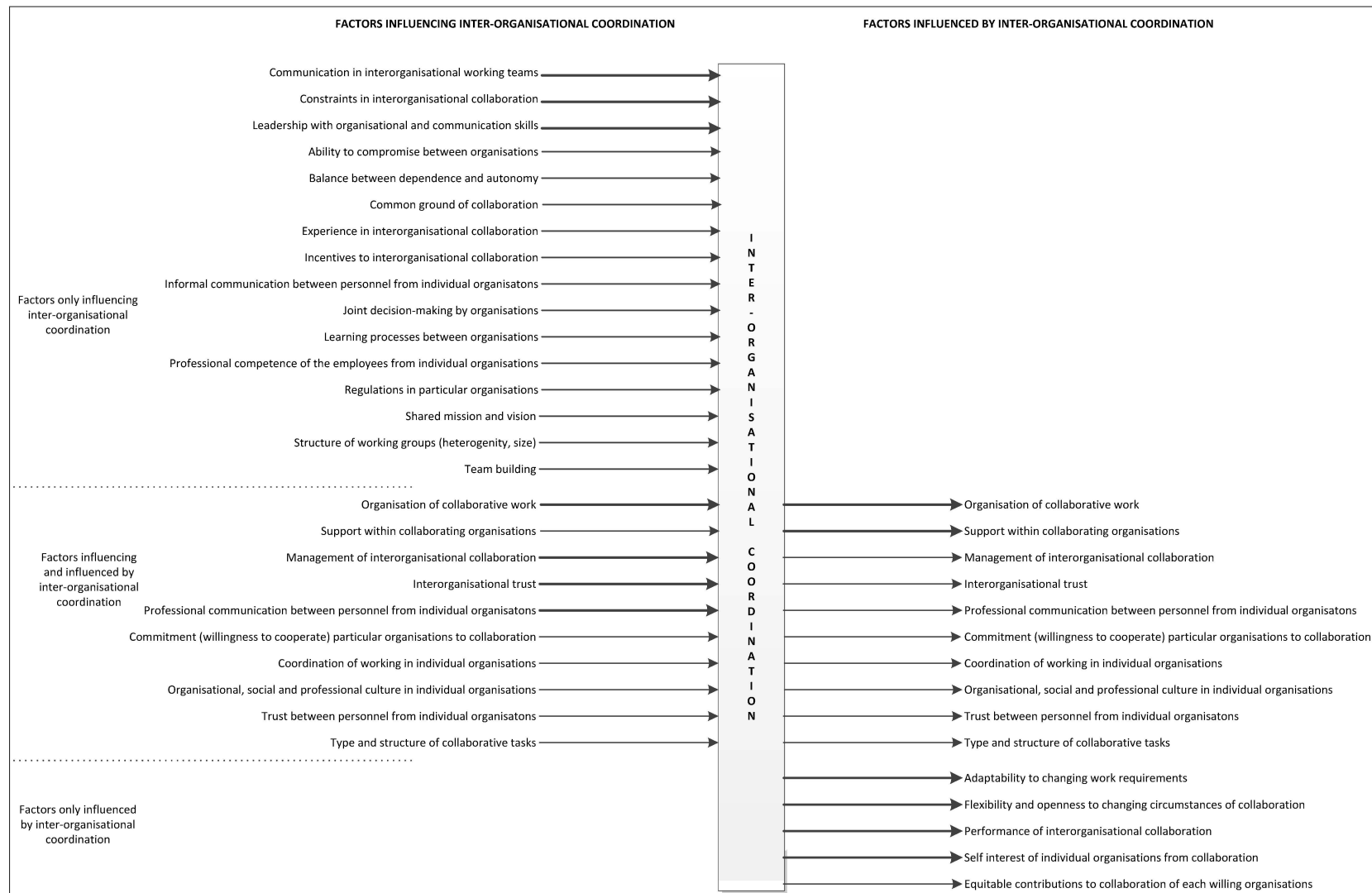


Figure 1. Factors influencing and influenced by inter-organizational coordination. Source: own elaboration based on [48,80–91].

4.2. Inter-Organisational Coordination during Emergency Situations

The process of managing public safety in terms of phases may be presented in the following cycle: actions taken prior to the hazard occurrence, during the hazard, after the hazard has been obviated [29]. Inter-organisational coordination takes place in all of the said phases, however its significance can be seen to the biggest degree in the phases in time and once the hazard has been obviated. Prior to the occurrence of the hazard, coordination is necessary in such action as preparing mutual enterprises, common training, and team building. However, these actions are conducted in stable conditions, in which considered modifications and changes are possible. The effect of turbulence and uncertainty of conditions in emergency situations is that inter-organisational coordination plays a key role in the phases prior to the occurrence and during the hazard.

The inter-organisational coordination of operations in emergency situations is executed by a single commander-in-chief. Our own empirical research showed that in Poland, responsibility for that is devolved on the Rescue Action Supervisor who is, in most cases, a fireman. Only in the event of a terrorist attack or demonstration command is taken over by a policeman with sufficient powers. Such inter-organisational coordination involves collecting, analysing, and verifying information, as well as assigning a sequence of operations performed and entities engaged. A classic example illustrating the coordination of operations in emergency management, is the flooding that took place in May and June of 2010 which engulfed the Czech Republic, Slovakia, Poland, Hungary, Ukraine, Austria, Germany, and Serbia. It was one of the largest floods in Poland in that during the period from 14 May to 30 June 2010, around 76,800 interventions related to relief and recovery actions were reported [92]. At that time, there was an increased demand for pumps with higher capacity than those the services already possessed. Efforts at the national level were launched, and firemen from other EU states took part in the operations. Persons charged with rescue actions in this event accomplished the following tasks based on communication processes:

- (1) prepare scenarios for potential situations, analyses, weather forecasts, collect information, anticipate demand;
- (2) calculate forces and resources, assess potential, analyse situations, prepare proposals for disposing forces depending on the demand, examine potential for requesting external forces;
- (3) contribute to the formulation of solutions intended to accomplish operations, raise forces, dislocate forces, put forces into operation, continue monitoring the situation and its reporting;
- (4) monitor the efficacy of the formulated solutions, participate in the work of military staff and teams, monitor the situation's progress, collaborate with commanders with regard to specific actions;
- (5) control efficacy of operations conducted by operational groups, verify information handed over, e.g., by phone, with the actual situation.

Another example of operations coordination and emergency management in Poland was the head-on collision of two high-speed passenger trains on 3 March 2012 near the town of Szczekociny. As a result, 16 people were killed and 57 passengers were injured. In the first train, an electric locomotive was destroyed and the first two carriages were derailed, while in the other train the locomotive and one carriage were derailed. Services from the national emergency management level and fire brigades from four provinces were used in the rescue action, including 450 rescuers and 400 policemen. The coordination process covered such operations as evacuation of the people affected, rendering first aid, searching destroyed carriages and the surrounding crash site, enabling access to trapped passengers, designating a temporary landing strip for helicopters of the Air Rescue Service, and securing the incident site. Coordination of basic operations did not pose a problem. However, contentious issues were exposed, and they referred to extra activities and details, e.g., places for tents. These examples confirm that both formal as well as posteriori relationships provide a basis for the coordination of operations during emergency situations. Moreover, they allow us to ascertain that

organisational factors and organisational behaviours constitute the key determinants for improving communication and coordination in sustainable public safety management.

The quantity of information is essential for coordination and execution of effective operations in dynamically changing circumstances requires application of cutting-edge organisational and technical solutions. In addition, "some of the major challenges (...) include information mismanagement, resource allocation issues, and ineffective communication" [93] (p. 260). These challenges can lead to communication and consequently coordination breakdowns. To ensure efficacy of rescue actions and to streamline communication as well as coordination processes, there are emergency coordination centres established and they make up complex organisational and technical structures in line with administrative division at the local, regional, and national levels. Such centres also operate at the international level, e.g., Emergency Response Coordination Centre functions in the EU. It is a one-stop-shop providing an overview of the available civil protection assets and acts as a communication hub between the participating states, the affected country and dispatched field experts. The main purpose of its existence is to facilitate collaboration in civil protection interventions in the event of major emergencies, e.g., through pool resources that can be made available to help disaster-hit countries and share best practices in disaster management [94].

Emergency coordination centres are a support centre for those in charge of rescue actions. They handle information transfer as well as vertical and horizontal communication outside the incident site. They also oversee the course of action and if needed they bring and send extra resources to action. Thus, emergency coordination centres run the so-called "external coordination". The centres operate in line with a mutual substitution principle. It means that a report which cannot be received for any reason in a centre relevant for the caller's domicile will be automatically redirected to another Centre. For receiving the reports operators are employed, there may be also officers delegated, assigned from the police or fire brigade, employees in emergency management departments as well as municipal policemen. In Poland the tasks conferred on the centres include [95]:

- (1) handle alarm reports, excluding fire signalisation systems,
- (2) register and store data regarding alarm reports, including phone recordings with the complete alarm report, personal data of the reporting person and other persons indicated when receiving the report, information on the incident site and its type and shortened description of the event for the period of 3 years;
- (3) conduct analyses related to functioning of the system in the area handled by the centre and producing statistics with regard to numbers, types, and response time for alarm reports;
- (4) collaborate and exchange information with emergency coordination centres;
- (5) exchange information and data, excluding personal data, for the purposes of analyses with the Police, National Fire Service, administrators of medical rescue teams, and entities which phone numbers are handled within the system.

In other countries, tasks accomplished by centres are essentially similar. For instance, in Sri Lanka they are as follows [96]:

- (1) Maintaining and operating early warning towers and other early warning dissemination equipments
- (2) Dissemination of early warning messages and ensuring reception at remote vulnerable villagers
- (3) Coordination of donor assistance to strengthen capacity of technical agencies for early warning
- (4) Initiating awareness on activities related to early warning among various agencies and the public
- (5) Guiding district disaster management units in coordinating and implementing warning dissemination-related activities in the province, district, and local authority levels.

Emergency coordination centres collaborate with services statutorily appointed for security protection as well as social rescue organisations. Their operations enable to reduce the waiting time for assistance as well as time for rescue actions themselves, properly match forces and resources to the operations, bolster information transfer as well as create a consistent database for events [97].

Receipt of alarm reports in the centre by alarm number operators and dispatchers is carried out by means of information and communication technology systems. These systems ensure automatisisation of receipt and registration of reports. They allow for identification of the phone number, location, and visualisation of the place from which the emergency call comes. Besides, it also enables overseeing the actual state of calls handled, elimination of hoax calls, and their selection [98–100].

An interesting example of the emergency coordination centre is the Integrated Security Centre operating in Ostrava in the Czech Republic since 2011. Its initial concept originated in the 1990s when the urgency for collaboration among rescue services was identified. It is currently a part of the Czech Integrated Rescue System which covers a connections system as well as principles guiding collaboration and emergency coordination of local and central authorities, as well as individuals and authorised persons when the necessity arises to undertake rescue or humanitarian actions and to prepare and conduct emergency operations. The Integrated Security Centre houses such units as: fire brigade, police, medical emergency, and municipal authorities. They form the mainstay of the system. An auxiliary role is played by: municipal police, military forces, ministry of health, ministry of interior, remaining rescue units, security companies, and non-governmental organisations. The unit responsible for response activities is the fire brigade across all levels of the state organisation depending on the scale of the event. However, the conditions for conducting the operations are determined by the public administration. The functioning of the Centre has helped to eliminate problems related to communication and operations coordination and to boost inter-organisational collaboration which through direct contacts and joint resolution of problems enables to continually improve collaboration principles within the system.

The analysis of the course of inter-organisational coordination during emergency situations enables stating that coordination constitutes a liaison which bonds actions taken in the scope of public safety management. Its significance results from the span of tasks that are realised, in which performance many entities are engaged, in each case in a different quantity and configuration. The conducted actions are based on collaboration between each of the partners, which separate and autonomous units and whose competences complement each other. This leads to a conclusion that inter-organisational coordination is a key factor of public safety management, which principal features are as follows:

- integrity of actions: the enterprises of each organisation are coherent and mutually complementary, while efficiency may be achieved only within mutual realisation of tasks;
- interdependence: each organisation is mutually dependent both in the scope of conducting actions, transferring information, as well as managing resources;
- mutuality: mutual enterprises are based on relations between each organisation;
- multiplicity: there are many possibilities of coordinating actions within one enterprise;
- adaptability: methods of coordination are adapted to existing conditions.

Moreover, inter-organisational coordination is a result of legal and organisational, social, and situational conditions. The first above-mentioned conditions are related to the existing legal regulations, procedures, and by-laws. They specify the rules of coordinating commonly conducted actions. In turn, the social conditions cover inter-organisational relations, which through shaping of appropriate behaviours, influence the enterprises' efficiency. Whereas, situational conditions specify the current context of actions' realisation. They cause that flexibility and agility is required of organisations participating in the actions. Both the factors and conditions of inter-organisational coordination impact the level of sustainable local governance. In principle, local governance is characterised by accountability, transparency, openness, and publicness. These features are favourable to improving sustainable local governance.

The analyses confirm the complexity of inter-organisational coordination and significance of relational aspects in the theory and practice of managing public safety.

5. Discussion and Conclusions

In this article we analyse inter-organisational coordination in the public safety management system. In our opinion the notion of collaboration is broader than coordination, which is consistent with the analyses conducted by Arthur T. Himmelman [10]. We also adapted the opinion of Richard C. Feiock, In Won Lee, and Hyung Jun Park [11] and we believe that coordination and collaboration are not points on a simple scale of service integration, but differ in their forms and structure. Starting from Fayol's understanding of coordination, we reinforce this notion as one of the key factors of collaboration. In our deliberations we also claim that in our research the context of realisation of actions is of significant importance, since the mechanism of coordination, which regulate the ways of effective collaboration, result from it [101]. According to Elodie Gardet and Caroline Mothe groups of representative mechanisms of coordination include the following [102]: exchange formalisation, trust, result division, guarantees against opportunistic behaviour, and conflict resolution. In turn, Jody Hoffer Gittel and Leigh Weiss on the base of a nine-hospital quantitative study of patient care coordination analysed such coordination mechanisms as [103]: routines, information systems, meetings, and boundary spanners. In our research we have demonstrated that in the Polish context of public safety management the formal mechanisms of coordination play the main role, which results from institutional arrangements. In the conditions of uncertainty and risk the formal decision-making structures constitute the foundation of conducting actions, although other mechanisms—such as trust, meetings, and routines—are also significant. To a greater extent these mechanisms are applied in the period of stabilisation, during action preparation. This proves that the priority significance of each coordination mechanism results from the situational context.

The analyses presented in this article are not free from limitations. These limitations result above all from the fact that the research is of a preliminary nature and it concerns a diagnosis of the level of inter-organisational coordination in public safety management in relation to factors of effective inter-organisational collaboration. In the future, we plan to expand these research studies in relation to enhanced inter-organisational coordination endeavours. Moreover, the research is located in the Polish context. Taking that into account, it is necessary to study the course of inter-organisational coordination in other social and political conditions. It is also recommended to comprehensively analyse the internal and external conditions of effective inter-organisational coordination, for which purpose the research on business models of public safety organisations may prove useful.

Despite these limitations we have been able to achieve the assumed goal of this publication. We argue that inter-organisational coordination as an instrument of collaboration between autonomous units is the key factor in sustainable public safety management. It binds the actions taken by each organisation, enables flexible adaptation of enterprises and possessed resources to the existing conditions, it configures the networks of public services' delivery and it maximises the usage of the possessed abilities. As a result of this, it increases the efficiency of public safety management.

In conclusion we claim that:

- (1) Inter-organisational coordination depends to a large extent on organisational and relational conditions, which occur between collaborating units. They include among other such factors as: communication in inter-organisational working teams, constraints in inter-organisational collaboration, leadership with organisational and communication skills, organisation of collaborative work (e.g., time pressured, competitive, rapidly changing, stability), management of inter-organisational collaboration (e.g., styles, transparency of decisions, and guidance), inter-organisational trust, and professional communication between personnel from individual organisations.
- (2) Coordination in public safety management is protean. During stabilization it is carried out by public administration and it involves determination of preventive operations. Some ways of that coordination can be applied in other areas of sustainable local government. However during the realisation phase the person in charge of rescue actions coordinates activities within

the incident site. Outside the incident site the coordination function is fulfilled by emergency coordination centres. This solution is the result of complexity embedded in the unique situation and efforts to be undertaken in face of hazard. Such coordination, particularly creation of formal and informal relationships based on trust and organisational concern, can be used in sheer inter-organisational collaboration.

- (3) The principal features of inter-organisational coordination considered with regard to collaborated management are: integrity of actions, interdependence, mutuality, complexity, and adaptiveness to unique and rapidly changing situations. At the same time, inter-organisational coordination is a result of legal, organisational, social, and situational conditions. Features of inter-organisational coordination have a considerable impact on the level of sustainable public safety management.

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