

Adaptive Collaboration Model for Organizational Change

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ABSTRACT

In order to survive and develop effectively in an increasingly dynamic and uncertain environment, an organization should have the capacity for continuous and adaptive changes. Change can only occur through the collaboration of participants of this process. Collaboration should be adaptive. Adaptability of collaboration is expressed by its adjustment to dynamic organizational changes. Adaptive collaboration (AC) is an organizational capacity needed for coping with adaptive changes. The goal of the developed model is to shape AC, which provides stimulation and facilitation of collaborative interaction so as to face the challenges of conducting adaptive changes. The suggested DOCA (Determining, Organizing, Creating, Assigning) model includes these components: Determining an infrastructure of AC; Organizing AC; Creating AC groups; Assigning collaborative group members to perform the tasks required to conduct adaptive changes. Determining AC infrastructure consists in building an adaptive organizational structure, and forming dynamic change and task structures. Organizing AC consists in defining the conditions that provide creation of suitable AC groups. Creating AC groups is meant to encourage facilitation of adaptive collaboration. Assigning the group members tasks allows stimulation for collaborative interactions.

Keywords: Organizational Change; Adaptive Collaboration Model

1. Introduction

In order to survive and develop effectively in an increasingly dynamic and uncertain environment, an organization should conduct continuously complex adaptive changes [1-4]. For this, it is necessary first to develop the strategy of adaptive changes [5-8].

Development of the strategy takes into account the dynamics of the outside environment, and its specific influence on organizational activity. Detailed elaboration of organizational development strategy involves: Determining the direction of organizational changes, which should take into consideration the characteristics of a change process, strengths and weaknesses of the organization, and threats and opportunities of the outside environment; Setting a multitude of adaptive changes based on evaluation their importance is determined by the measure of their influence on organizational activity towards adaptation to a changing outside environment. The most important change has the most influence on the activity of an organization; Building a structure of adaptive changes by establishing logical interdependences among adaptive changes.

The complexity of adaptive changes in an organization causes the need for sharing accountability among numerous participants of change [9-12]. The change participants include a leader of the organization (a top man-

ager), a change management team, and staff. They must cope with current and forecasted changes and provide breakthrough development of an organization [13].

Multiplicity of change participants requires the availability of organizational capacity, providing their effective relationships through collaboration [14-16]. Collaboration should be adaptive [17,18]. Adaptability of collaboration is expressed by its adjustment to the dynamics and specificity of organizational changes. In essence, adaptive collaboration (AC) is the organizational capacity needed for coping with adaptive changes.

AC requires a suitable infrastructure, and adaptability of the change participants. It should motivate, facilitate, and stimulate collaboration among them, and promote effective management of changes [19]. The infrastructure of AC involves a structure of the adaptive changes, the dynamic structure of the changes' tasks, and a flexible organizational structure. The organizational and the task structures are adjusted to the adaptive changes. Adaptability of the change participants allows dynamic relationships among them through mutual adjustment of personal qualities.

The qualities of a change participant involve knowledge, skills, and competencies. A skill is an ability to do something. There are soft skills and hard (professional) skills. Soft skills are personal traits, habits, and attitudes

that characterize relationships with other people [20]. Professional skills, for example, are innovative openness (use and development of innovation). A competency is the ability of a person to achieve a goal by using a skill. For example, there are emotional intelligence competencies [21] and problem solving competencies (analytical and creative).

Adaptability of the change participants is expressed by the completeness, flexibility, and efficiency in the use of these qualities. The aggregate of the qualities used for coping with changes characterizes the completeness of the use of qualities. Flexibility in the use of these qualities characterizes the adjustment of qualities to organizational changes. Efficiency in the use of qualities is evaluated by the measure of accomplishment of organizational changes by the set deadline.

Building AC (providing adaptive use of the change participants' qualities) is aimed at creating a dynamic change management team, forming managed adaptive collaborative groups of employees to conduct changes, and assigning the members of the collaborative group for the tasks realizing the change. Adaptability of the collaborative group is expressed by building the most adjusted group for conducting a change. The AC group is managed by a member of the change management team.

The goal of this paper is to present an AC model for conducting adaptive organizational changes. The model shapes the process of building AC and provides facilitation and stimulation of collaborative interactions. It allows adaptive changes required in an organization to be conducted effectively.

2. Related Research

Complex adaptive change in an organization is a dynamic iterative process for which change and uncertainty are assumed to be a natural state [4,9,22,23]. The complexity of this process drives the need for collaboration among change participants [4]. Hence, effectiveness of adaptive change can be attained in many respects owing to productive collaboration. The approaches, methods, models, and tools used in sustaining collaboration for conducting adaptive change in an organization are examined here.

Harris & Beyerlein [24] introduce the concept of a collaborative work system (CWS) which engenders intra-teams' and inter-teams' collaborative interactions. A team level and organizational level of the CWS are considered. The team level of CWS is represented by a collaborative group who performs interdependent tasks. The organizational level is represented by a set of interdependent teams realizing inter-team collaborative interactions. The authors do not reveal the potential use

of CWS for conducting adaptive changes in an organization.

Chrislip [15] contends that a leader should facilitate collaborative interactions among change participants. The methods and tools which can help the leader to facilitate the collaborative interactions are not concretized.

According to Heifetz, Linsky, Grashow [3], adaptation relies on diversity, which promotes receiving value from difference. Therefore, leading diversity provides adaptability. Nevertheless, a mechanism of leading diversity is not evident.

Rubin [25] suggests creating the structure and climate of an environment that supports the collaborative relationship as a result of building a heterogeneous team. The author does not consider the possibility of creating an adaptive structure and climate of an environment that engenders adaptive collaboration. Furthermore, the conditions of building a heterogeneous team (while taking into account the qualities of change participants) are not determined by him.

Edmondson & Watkins [26] developed a dynamic model of organizing teamwork. According to the model, composition of a team is stable, and there are situations in which the interests of team members diverge. Researchers present a leader process to mitigate the damage from such situations. The authors do not examine the possibility of determining team composition based on exploration of collaborative participants' qualities, which are directed towards providing effective mutual adjustment of team members. As a result of this, adaptation to different situations can not be attained.

Offner A., *et al.*, [27] developed a tool to foster AC through the use of models based on theories of organizational psychology. The tool can be used to assess and influence individual behavior and group performance. The authors do not propose an AC model aimed at building a group.

There are several works devoted to the development of methods and tools of AC for different knowledge domains [17,18,28,29].

The analysis of publications above shows that no complex approach exists that provides effective AC during organizational change. Development of the approach involves creating productive models and methods of building and realizing the AC.

3. The Model of Building Adaptive Collaboration

Concepts, principles, and methods of conducting adaptive changes [3,4] create the need for adaptive collaboration. Such work requires coordinated, full, and flexible use of qualities of a top manager of an organization, a change management team, and a staff conducting changes.

AC is adjusted to the dynamics of required organizational changes. The goal of creating the AC model is to shape the process of adaptive collaboration, promoting stimulation and facilitation of collaborative interaction so as to effectively face the challenges of conducting change. Dynamics of the model correspond to the dynamics of this process.

Development of the model includes elaboration and integration of the following model components: Determining an infrastructure of AC; Organizing AC; Creating adaptive collaborative groups; Assigning collaborative group members to perform the tasks required to conduct adaptive changes. The DOCA (Determining, Organizing, Creating, Assigning) model of adaptive collaboration is illustrated by **Figure 1**.

3.1. Determining AC Infrastructure

The objective of determining an AC infrastructure is to create a favorable environment furthering AC. The AC infrastructure includes: a structure for changes, a structure of the tasks needed to perform a change, and an adaptive organizational structure. Determining AC infrastructure consists in forming dynamic change and task structures, and building an adaptive organizational structure.

3.1.1. Forming Dynamic Change and Task Structures

Required organization changes are interdependent. A

structure of changes expresses interdependence of the changes. This structure may be represented by graph $G(C, E)$ of dependencies between changes, where C is a set of changes, $(c_i, c_j) \in E$, if conducting preceding change c_i is required prior to realizing change c_j .

Every change is conducted by performing suitable interrelated tasks. Hence, a task structure corresponds to a change. The task structure may be represented by graph $D(Z, R)$ dependencies between tasks, where Z is a set of tasks, $(z_i, z_j) \in R$, if performance of task z_i precedes performance of task z_j . The set Z of tasks is put in order according to the ordinal function of the graph [30]. As a result, graph D has several levels. The tasks of the first level do not have preceding tasks. The tasks of the last level do not have subsequent tasks.

Example 1:

Two-level structure of tasks is represented by **Figure 2**.

As appears in the above, the aggregate of task structures corresponds to the structure of changes. The connections between the tasks from different task structures are caused by the order of conducting the changes. Therefore, dynamics of task structures are engendered by dynamics of the structure of changes.

3.1.2. Building an Adaptive Organizational Structure

A functional organizational structure (FOS) should provide the opportunity to making essential changes in an

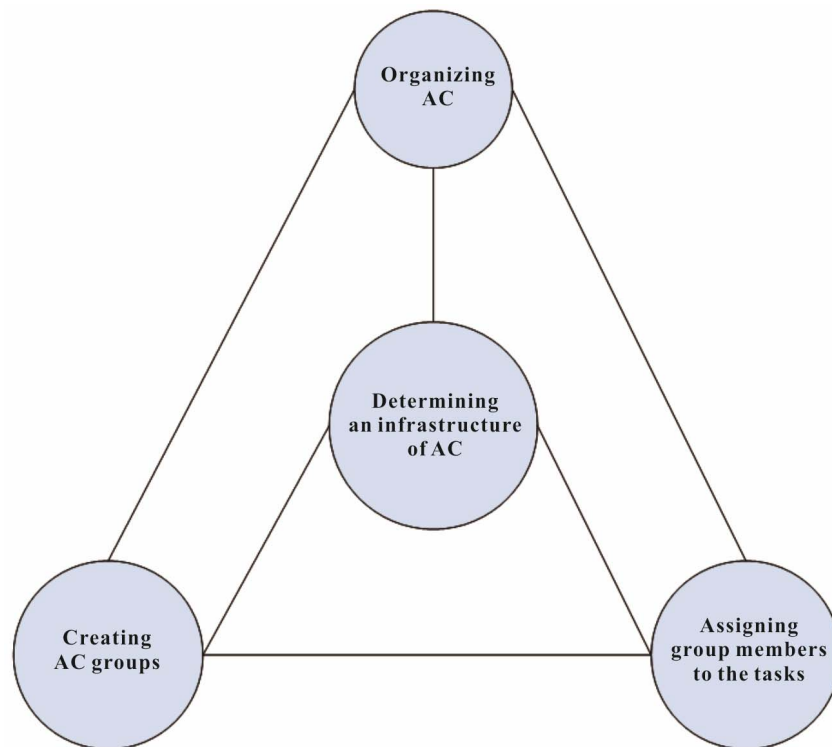


Figure 1. The DOCA model of adaptive collaboration.

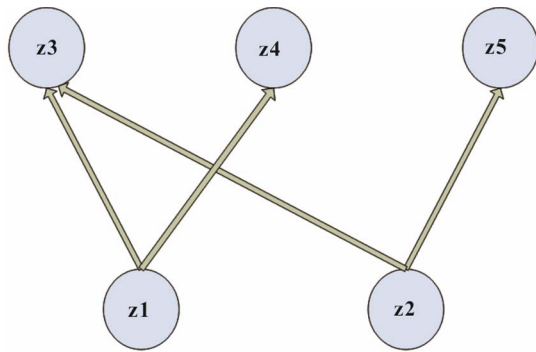


Figure 2. Two-level task structure for conducting a change.

organization. FOS involves a top manager, managers of subdivisions, and a staff for every subdivision. An organization can cope with current and future changes only by coordinating actions and the collaboration of change participants. However, in most cases FOS is a hard hierarchic structure. Such structure prevents collaboration when conducting changes.

Consequently, it is necessary to form an adaptive structure for conducting changes—change organizational structure (COS). Adaptability of this structure to required organizational changes is provided by shifts in the number and composition of the conducting change participants. COS involves a top manager, a change management team, and groups of employees for conducting changes. A change management team formed by the top manager contains the managers selected from different subdivisions. A change manager selected from a change management team by a top manager builds a group of employees for conducting some change. The members of a group are selected from different subdivisions. The aggregate of the employees realizing all the changes constitutes the staff for conducting changes.

Integration of FOS and COS is needed so as to coordinate management of changes with management of current work in an organization. The adaptive organizational structure is formed as a result of the integration. Availability of the managers and the employees from different subdivisions in the change groups indirectly defines fullness of changes produced in an organization. For example, if a multitude of change participants does not include some subdivision of managers or the employees, the produced changes are not complete.

The proposed adaptive organizational structure clarifies the participants' collaboration when conducting a change. The collaboration participants include a top manager, members of the management team, and employees occupied with conducting a change. Consequently, the following forms of collaborative interactions can be defined: Between a top manager and change managers; among the change managers; between the change managers and the employees; among the employees.

3.2. Organizing AC

The objective of organizing AC is to define the conditions providing creation of AC groups and promoting facilitation and stimulation of collaborative interactions. AC among participants conducting changes is organizational capacity allowing to face complex change challenges. According to the proposed change organizational structure, the set of interacting dynamic groups of employees should be created in order to cope with required interdependent changes in an organization.

Adaptive intra- and inter-group collaboration among the change participants is based on these principles: Completeness and flexibility of use of qualities of collaborative participants that provides the chance to cope effectively with adaptive changes, and a diversity of qualities of collaborative participants that facilitates the adjustment to required changes. These principles allow to define conditions for building AC groups able to cope with the required changes.

A necessary condition for coping with a change is:

A) The multitude of qualities of the minimal quantity of the group members unified with qualities of the group manager should be equal to or exceed change-relevant qualities (the multitude of the qualities necessary to cope with a change).

The conditions aimed at building a managed dynamic group are:

B) Combined qualities of a group manager and group members should differ as little as possible from change-relevant qualities. It empowers the collaborative group to cope with a change without assistance.

C) Maximal mutual supplementation of qualities of the group members. It provides heterogeneity of a collaborative group.

D) Interpersonal compatibility. It provides an opportunity for effective collaborative work owing to the availability of consistent personal qualities.

E) Qualities of the group manager must differ as much as possible from the combined qualities of the group members. During collaboration it provides an extension of the manager's strengths by compensating for his lacking qualities with the qualities of group members.

The defined conditions provide synergy due to the diversity of qualities of the group members, stimulation of collaboration, and facilitation of two-way collaborative interactions [31]. Consequently, these conditions may serve as a means of guiding the process of building adaptive collaborative groups.

3.3. Creating Adaptive Collaborative Groups

The objective of creating AC groups to conduct change is to facilitate adaptive collaboration. The aforementioned conditions of AC empower to create a collaborative

group satisfying this objective. Creating AC groups is realized by the following steps:

Step 1. Selection of a group manager from a team of the change managers

For that determination of diversity measure between the change manager’s qualities and the change-relevant qualities is needed.

A diversity measure is determined according to the formula:

$$\begin{aligned} \mu(q(m_i), q(c_j)) &= \|q(m_i) \oplus q(c_j)\| \\ &= \|(q(m_i) \cup q(c_j)) / q(m_i) \cup q(c_j)\|, \end{aligned} \tag{1}$$

where

- $q(m_i)$ —qualities of change manager m_i .
- $q(c_j)$ —change c_j -relevant qualities.

A change manager is selected according to condition B. The diversity measure for the selected change manager should be minimal. If for some change managers the diversity measures are minimal and equal, then any change manager can be selected.

Example 2

Change-relevant qualities are $q(c_j) = \langle q_1, q_2, q_3, q_4, q_5, q_6, q_7, q_8, q_9 \rangle$. Qualities of change managers m_1, m_2, m_3 from a change manager team are $q(m_1) = \langle q_1, q_2 \rangle, q(m_2) = \langle q_4, q_{12} \rangle, q(m_3) = \langle q_{10}, q_{11} \rangle$.

The diversity measures between qualities of change managers m_1, m_2, m_3 and change-relevant qualities determined by formula (1) are 7, 9, and 11, accordingly. Hence, according to condition B, change manager m_1 is selected for management of a group which would conduct change c_j .

Step 2. Adaptation of change-relevant qualities

Change-relevant qualities are adapted by taking into account the qualities of the selected group manager. Adapted change-relevant qualities $q^{\wedge}(c_j)$ are determined as $q^{\wedge}(c_j) = q(c_j) / q(m_i)$.

Example 3

Adapted change-relevant qualities after choice of group manager m_1 (Example 2) are

$$\begin{aligned} q^{\wedge}(c_j) &= \langle q_1, q_2, q_3, q_4, q_5, q_6, q_7, q_8, q_9 \rangle \setminus \langle q_1, q_2 \rangle \\ &= \langle q_3, q_4, q_5, q_6, q_7, q_8, q_9 \rangle. \end{aligned}$$

Step 3. Combined analysis of the employees’ qualities

Mutual supplementation of the employees’ qualities, interpersonal compatibility of individual qualities, diversities between qualities of the employees and the change-relevant qualities are analyzed. Mutual supplementation of the employees’ qualities is characterized by the supplementation measure determined by formula:

$$s(q(e_i), q(e_j)) = \|q(e_i) \cap q(e_j)\|, \tag{2}$$

where $q(e_i), q(e_j)$ —qualities of employee e_i and e_j , accordingly.

If the supplementation measure $s(q(e_i), q(e_j))$ is equal zero, then mutual supplementation of the qualities of employees e_i and e_j is maximal. If the measure exceeds zero, then mutual supplementation of the employee qualities is reduced.

Employee e_i is compatible with employee e_j , if their personal qualities are completely consistent. Diversity measures between qualities of the employees and the adapted change-relevant qualities can be determined also by formula (1). While doing so, qualities of the employees are compared with adapted change-relevant qualities.

Results of the analysis are presented in a matrix (**Figure 3**). Row and column names of the matrix correspond to qualities of the employees which are the candidates in a collaborative group for conducting a change. Diagonal cells of the matrix contain diversity measures between qualities of employees and adapted change-relevant qualities. Each cell from other cells of the matrix is divided into two parts. The upper part of a cell contains the sign of complete interpersonal compatibility (+) or sign incomplete interpersonal compatibility (−). Under part of a cell contains the sign of maximal mutual supplementation of the qualities of employees (∞) or the determined supplementation measure.

Example 4

Qualities of the employees—the candidates into a collaborative group for conducting a change c_j are $q(e_1) = \langle q_3, q_4 \rangle, q(e_2) = \langle q_5, q_6 \rangle, q(e_3) = \langle q_7, q_8, q_9 \rangle, q(e_4) = \langle q_6, q_7 \rangle, q(e_5) = \langle q_4, q_8 \rangle, q(e_6) = \langle q_5, q_8, q_9 \rangle$. Results of analysis of the employees’ qualities are presented in a matrix (**Figure 3**).

Step 4. Building a suitable collaborative group

First, a set of possible collaborative groups for conducting a change and their composition satisfying condi-

	$q(e_1)$	$q(e_2)$	$q(e_3)$	$q(e_4)$	$q(e_5)$	$q(e_6)$
$q(e_1)$	5	+ ∞	+ ∞	− ∞	− ∞	+ ∞
$q(e_2)$		5	+ ∞	+ 1	− 1	+ ∞
$q(e_3)$			4	+ 2	− 1	− 1
$q(e_4)$				5	− 2	− ∞
$q(e_5)$					5	− 1
$q(e_6)$						4

Figure 3. A matrix presenting results of combined analysis of employee qualities.

tion **A** is determined as a result of examination of the qualities of the candidates to a collaborative group, unification of the candidate qualities, and a comparison of the joint qualities with the multitude of the adapted change-relevant qualities.

The groups are then examined by correspondence to condition **B**. According to this condition, minimal difference between joint qualities of group members and the adapted change-relevant qualities should be observed. In other words, the sum of diversity measures determined as a result of comparison between the group members' qualities and the adapted change-relevant qualities by formula (1) should be minimal. If a group doesn't satisfy condition **B** (sum of diversity measures isn't minimal in comparison with other groups), then it is removed from the set of possible collaborative groups.

At last, the groups are compared relative to mutual supplementation and interpersonal compatibility of individual qualities of the group members according to conditions **C** and **D**. As a result of comparison, the group with complete interpersonal compatibility of group members and maximal mutual supplementation of their qualities is selected from the set of possible collaborative groups.

Example 5

The possible collaborative groups satisfying condition **A**, and determined based on data from Example 4 are $Gr_1 = \langle e_1, e_2, e_3 \rangle$, $Gr_2 = \langle e_2, e_3, e_5 \rangle$, $Gr_3 = \langle e_1, e_4, e_6 \rangle$. The multitude of qualities received as a result of unification of the group members' qualities is equal to adapted change-relevant qualities (Example 3) for each from these groups. Quantity of group members is minimal. Minimal sum of diversity measures determined based on data included in diagonal cells of the matrix (**Figure 3**) is the same for these groups and equal to 14.

Comparison of the group relative to mutual supplementation and interpersonal compatibility of the individual qualities of the group members realized based on data from the matrix (**Figure 3**) allows the conclusion that: all members of the group Gr_1 have complete interpersonal compatibility and maximal mutual supplementation of their qualities; the members of the group Gr_2 have incomplete interpersonal compatibility and maximal mutual supplementation of their qualities; all members of the group Gr_3 have maximal mutual supplementation of their qualities but complete interpersonal compatibility is only between the group members e_1 and e_6 .

Consequently, the collaborative group Gr_1 is the most suitable for conducting organizational change c_j .

3.4. Assigning Collaborative Group Members for Performing Tasks

The objective of assigning the group members for per-

forming tasks is to stimulate collaboration by creation a maximal number of two-way collaborative interactions among the group members. A two-way collaborative interaction is a result of interdependence of the group members relative to their qualities.

Each change is conducted by performing suitable interrelated tasks. The task structure is presented by different levels (**Figure 2**). A level contains unrelated tasks. The group members are assigned to the tasks sequentially: from the beginning to the tasks of first level of task structure, then to the tasks of second level, and so forth.

Assigning the group members to the tasks is done as follows:

- 1) Calculation of the diversity measures $\rho(q(e_i), q(z_j))$ between the qualities $q(e_i)$ of the collaborative group members and task-relevant qualities $q(z_j)$ is done by used of formula (1). The task-relevant qualities are the qualities necessary to perform a task. The results of calculations may be shown in a table. Row names would correspond to task-relevant qualities. Column names would correspond to qualities of group members. At the intersection of a row and a column would be a measure of diversity between the task-relevant qualities and the group member qualities.

- 2) Assignment of the group members to perform the tasks of some level **L** of the task structure according to conditions:

The group member qualities should differ as little as possible from the task-relevant qualities. It provides maximal ability of a group member to complete the task. If a group member satisfying this condition is missing, then several group members are assigned to the task according to this condition.

Interdependency of the group members' qualities. It promotes two-way interactions among group members performing various tasks.

Assignment of the group members to the tasks is realized with the help of aforementioned table containing the diversities between the qualities of the collaborative group members and task-relevant qualities. The rows corresponding to the tasks of some task structure level and columns corresponding to the group members are selected from table. In each of the chosen rows a minimal value is searched. The found values are compared. The column corresponding to the least value from these values determines a suitable group member for assigning to the task.

If the rows contain minimal and equal values in the same column, then the group member corresponding to the column can be assigned to perform either task from the tasks' corresponding rows. If the rows contain minimal and equal values in the different columns, then assignment of the group members to the tasks corresponding to the rows is equivalent. After assigning a group

member to perform a task, the corresponding rows and the columns of the table are deleted.

Example 6

Task-relevant qualities of the tasks performed during conducting a change (Example 1) are

$q(z_1) = \langle q_3, q_5 \rangle$, $q(z_2) = \langle q_1, q_4, q_6 \rangle$, $q(z_3) = \langle q_3, q_5, q_7 \rangle$, $q(z_4) = \langle q_4, q_8 \rangle$, $q(z_5) = \langle q_2, q_6, q_7, q_9 \rangle$. The aggregate of task-relevant qualities is equal to the change-relevant qualities (Example 3). The results of the calculated measures of diversity between the qualities of the collaborative group members (Example 4) and task-relevant qualities are shown in **Table 1**.

The rows of Table1 corresponding to the tasks z_1 and z_2 of first task structure level (**Figure 2**) and columns corresponding to members e_1 , e_2 , and e_3 of collaborative group Gr_1 (Example 5) are selected from **Table 1**. In these rows minimal values are searched. The found values are 2 and 3, accordingly. The least value from these values reveals the group member e_1 who should be assigned to perform the task z_1 . Then, the group member e_2 is assigned to perform the task z_2 .

Analogously, the minimal values in the rows of **Table 1** corresponding to the tasks z_3 , z_4 , and z_5 of the second task structure level are 3, 2, and 3, accordingly. The least value from these values detects the group manager e_1 who is assigned to perform the task z_4 . Assignments of the group members e_2 and e_3 to perform the tasks z_3 and z_5 are equivalent since the rows corresponding to the tasks contain the same minimal value. The group members e_2 and e_3 are assigned to perform the tasks z_3 and z_5 , accordingly.

Proposed assignment of the group members e_1 and e_2 to perform the tasks z_1 and z_2 , accordingly, provides two-way collaborative interaction between them. It stimulates collaboration as a result of created interdependence of the group members relative to their qualities. The interaction creates the need to compensate for the lack of the group members' qualities required for successful performance of the tasks. The group members e_1 and e_2 have the lack of qualities q_5 and q_4 , accordingly. Furthermore, collaboration of group member e_2 with change manager holding quality q_1 allows to compensate

Table 1. The diversities between task-relevant qualities and the group members' qualities.

	$q(e_1)$ $= \langle q_3, q_4 \rangle$	$q(e_2)$ $= \langle q_5, q_6 \rangle$	$q(e_3)$ $= \langle q_7, q_8, q_9 \rangle$
$q(z_1) = \langle q_3, q_5 \rangle$	2	2	5
$q(z_2) = \langle q_1, q_4, q_6 \rangle$	3	3	6
$q(z_3) = \langle q_3, q_5, q_7 \rangle$	3	3	4
$q(z_4) = \langle q_4, q_8 \rangle$	2	4	3
$q(z_5) = \langle q_2, q_6, q_7, q_9 \rangle$	6	4	3

additionally for the lack of his qualities.

4. Conclusions

The suggested DOCA (Determining, Organizing, Creating, Assigning) model shapes adaptive collaboration and provides stimulation and facilitation of collaborative interaction so as to face the challenges of coping with adaptive changes. Adaptability of collaboration is expressed by its adjustment to dynamics of organizational changes. The model includes the components: Determining an infrastructure of AC; Organizing AC; Creating AC groups; Assigning collaborative group members to perform the tasks required to conduct adaptive changes.

Determining an infrastructure of AC consists in creating a dynamic change structure, forming a structure of the tasks conducting change, and forming an adaptive organizational structure which is adjusted to the dynamics of organizational changes. It is provided by shifts in the number and composition of change participants.

Organizing AC consists in defining the conditions guiding process of building self-sufficient AC groups. The conditions require providing interpersonal compatibility and interdependency of participants in a collaboration.

Creating AC groups is based on combined analysis of data characterizing interpersonal compatibility, mutual supplementation of employee qualities, and measures of diversity between qualities of employees and adapted change-relevant qualities. It allows to facilitate AC.

Assigning the group members to the tasks is done by taking into account conditions of assignment using results of calculation of the measures of diversity between the qualities of the collaborative group members and the task-relevant qualities. It allows stimulation in two-way collaborative interactions.

The model may serve as a constructive basis for creating a tool that supports AC.

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