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Teamwork competencies required by members of integrated operations teams in the petroleum industry

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ABSTRACT: Introduction of the operational concept Integrated Operations (IO) by petroleum companies operating on the Norwegian Continental Shelf implies an increased use of distributed teams (IO teams) in operation of petroleum installations. To develop teamwork training programs for members of IO teams, it is necessary to understand what teamwork competencies IO team members need to work proficiently as a team. This paper accounts for the development of the MAITEC model. The model was developed based on a literature survey. It comprises what is suggested to be ten main attributes of IO teamwork competence: IO-mindset, IO team-technology competence, team leadership, inter-personal relations, inter-positional resources, personal resources, communication, shared situation awareness, mutual trust, and decision making. The content of the model was assessed in an empirical study.

1 INTRODUCTION

The operational concept Integrated Operation (IO) is gradually being introduced by petroleum companies operating on the Norwegian Continental Shelf (NCS). IO has been defined as the use of information technology "… to change work processes to achieve improved decisions, remote control of processes and equipment, and to relocate functions and personnel to a remote installation or an on-shore facility" (The Norwegian Oil Industry Association, 2008). Teamwork is a critical factor for ensuring safety at petroleum installations. Teamwork can be defined as "... a distinguishable set of two or more people who interact dynamically, interdependently and adaptively toward a common goal" (Blickensderfer et al., 1997, 250). Team members often have different functions, i.e., *function specialization* (Brannick and Prince, 1997), and the various functions of the team members will *jointly* be needed to achieve the team's goals. A team is, thus, composed to accomplish goals, which no single team member could achieve on his or her own.

Competence can be defined as the "... ability to apply skills, knowledge and attitudes in order to perform an activity or a job to specified standards in an effective and efficient manner" (IAEA, 2002, 8). To work proficiently as a team, team members overall need to possess two types of competencies: taskwork competence and teamwork competence (Cannon-Bowers et al., 1995). Taskwork competence refers to the disciplinary competence that a team member needs to fulfill his/her function in the team (e.g., competence as a reservoir engineer or as a directional driller). Teamwork competence refers to the skills, knowledge and attitudes that a team member needs, *because* the task is performed jointly with other people. They include, e.g., competence in communication, in constructing shared situation understanding, and in team leadership.

Teamwork under the traditional operational concept mainly involves co-located teams. However, the introduction of IO implies an increased use of distributed teams in operation of petroleum installations. A distributed team may broadly be defined as a team, which consists of minimum two team members. At least one of these will be located at a geographical location that differs from the location of the other team member(s), and collaboration will be mainly technology mediated (adapted based on Hertel et al. (2005)). In a work setting, members of distributed teams tend to have different professional backgrounds and/or to have different departmental or organizational affiliations (Baan and Maznevski, 2008).

The term *IO team* will in the following be used as reference to a distributed team, engaged in operational activity, working under IO within the petroleum industry at the NCS. The goals and tasks of an IO team will not necessarily differ from those of a team that works under the traditional operational concept, but the manner in which the goals and tasks are achieved will differ. This is illustrated in Table 1. The table presents Ringstad and Andersen's (2006) vision of how IO may change the traditional ways of working in petroleum companies. The three last distinctions have been added to the table, based on Skjerve and Nystad (2010).

Table 1. Vision for IO, Ringstad and Andersen (2006) and Skjerve and Nystad (the last three pairs).

Traditional way of working	IO way of working
Serial	Parallel
Single discipline	Multi discipline
Dependence of physical location	Independence of physical location
Decisions are made based on historical data	Decisions are made based on real-time data
Reactive	Proactive
Continuous relationships with team mates	More fragmented relationships with team mates
The collaborative activity will have a higher degree of informal exchange	The collaborative activity will be more formal.
Lower degree of technology-mediated teamwork and use of groupware technology	Higher degree of technology-mediated teamwork and use of groupware technology

In addition to the qualities outlined above, it is characteristic that the task performance of IO teams has significant implications for added value, and often also for the safety level at petroleum installations. It is, moreover, characteristic that team members situated offshore will enter and leave the team, depending on their shift schedules, and that the distributedness of IO teams tends to be a matter of degree, as the team members usually will meet physically from time to time, e.g., as part of rotations and on onshore staffs stay offshore (cf. Skjerve and Rindahl, 2010).

The increased use of IO teams makes it pertinent to obtain a better understanding of what teamwork competencies IO team members need to perform proficiently as a team. If the needed teamwork competencies under IO differ from the needed competencies under the traditional operational concept, it is important that the training programs applied by petroleum companies are updated to include these changes.

The purpose of the present study was to develop a model comprising the main attributes of teamwork competencies needed by members of IO teams. The study comprised two parts: A literature study based on which the MAITEC model was developed, and an empirical study performed to assess, and if necessary adjust, the model.

2 LITERATURE STUDY

The literature study involved a survey of 30 papers on co-located teamwork, distributed teamwork, and/or teamwork in offshore operation (Skjerve, 2009b). The survey was structured in three parts. The first part aimed at identifying generic attributes of teamwork competence, and was mainly based on studies of co-located teams. The second part focused on establishing attributes of teamwork competence based on studies of distributed teams. The last part aimed at understanding the attributes of teamwork competence required in offshore operations. This step-wise approach was applied to first obtain an overview of the attributes associated with teamwork in general, and then to explore what the main attributes of IO teamwork could be, based on the more specialized teamwork literature, using the generic characteristics of IO teams and IO teamwork (see section 1) as a point of reference. The papers surveyed were selected based on searches in the data-base BIBSYS using the following search words: teamwork, competence, skill, training, co-located, distributed, virtual, petroleum, and integrated operations. In addition, papers were included based on references in the selected documents.

2.1 *Generic attributes of teamwork competencies*

The first part of the literature survey suggested that the attributes of teamwork most often are specified with reference to the individual level, i.e., to the knowledge, skills, attitudes, and/or traits required of the individual team members.

The study showed that teamwork is a multidimensional concept, but that there is still no final agreement about what specific teamwork attributes (dimensions, competencies, etc.) the concept implies. To exemplify this, a subset of the teamwork attributes reported in the literature is outlined below: McIntyre and Dickinson (1992) included the following attributes: team orientation, team leadership, monitoring, feedback, backup, and coordination. Gaddy and Wachtel (1992) argued that it would be generally beneficial for team members to possess the following non-technical skills: Communication, feedback, effective influence, conflict resolution, and leadership. Schiflett et al. (1985) included: Orientation, resource distribution, timing, response co-ordination, and motivation. Morgan et al. (1986) included: Communication, cooperation, team spirit and morale, giving suggestions or criticism, acceptance of suggestions or

criticism, coordination, and adaptability. Prince and Salas (1999) included: Communication, leadership, decision-making, adaptability, assertiveness, situation awareness, and mission analysis (planning). Salas et al. (2005) suggested that five core components promoted team effectiveness: Team leadership, mutual performance monitoring, backup behavior, adaptability, and team orientation. To meld these core components, three coordination mechanisms were further suggested to be needed: Shared mental models, mutual trust, and closed-loop communication.

Overall, the first part of the literature survey suggested that competence in communication (e.g. giving feedback, critique and suggestions), in leadership (e.g., resource management and use of authority/assertiveness), and in establishing shared situation awareness are mandatory for ensuring proficient teamwork. It, moreover, suggested that the ability to flexibly adapt to the situation at hand (e.g., competence in coordination and in mutual performance monitoring) and to maintain a positive attitude to teamwork, are key factors for ensuring proficient teamwork.

2.2 *Attributes of teamwork competencies in distributed teams*

Focusing explicitly on distributed teamwork, Baan and Maznevski (2008) argued that the day-to-day virtual collaboration may distinguish itself from traditional co-located teamwork in three ways: Complexity (team members tend to be professionally and culturally diverse and the teams are more fluid), invisibility (individuals' access to monitor team mates' task performance is limited), and restricted communication (communication is mediated via technology rather that face-to-face). They suggested that the dynamic interaction between three teamwork attributes were critical success factors for virtual teams: shared understanding, trust and communication (ibid. 350).

Klein and Pena-Mora (2001) argued that teamwork competencies related to team leadership and inter-personal relations were of key importance in virtual teams, because management of virtual teams, as compared to co-located teams, "… requires more extensive discipline and attention to details because there are fewer opportunities for informal or ad hoc interaction" (ibid.).

In addition, several studies reported that members of distributed teams need to master collaboration technologies (e.g., Rindahl et al., 2009; Skjerve, 2009a). Limited ability to operate the collaboration technologies applied to support teamwork will increase the threshold for initiating and engaging in teamwork activities across locations (e.g., for providing information to colleagues located at different sites), and thus reduce the possibility for establishing proficient teamwork.

In general, the second part of the survey indicated that the teamwork competencies required by members of co-located and distributed teams—at least at the general level addressed in the present study—are highly similar, except for the requirement that concerns mastering of collaboration technology. Still, the particular knowledge, skills, and attitudes needed to master the specified attributes of teamwork competence may differ in co-located and distributed teams, due to the differences in the two work settings. It seems, e.g., that trust between non co-located team mates needs to be built and maintained by other means than trust between co-located team members (e.g., Baan and Maznevski, 2008; Skjerve and Rindahl, 2010).

2.3 *Attributes of teamwork competencies in offshore operations*

The attributes of teamwork competence needed by staff members in offshore petroleum production were assessed by O'Connor and Flin, (2003). They suggested that six non-technical skills were required: situation awareness, decision making, communication, team working, supervision/leadership, and personal resources.

Ringstad and Andersen (2006, 3) suggested that when IO is introduced at Norwegian petroleum installations, employees will need to develop the following overall competencies: 1) Training in skills needed to master new work forms (e.g. faster decision making and working on line with people on different locations). 2) Cross discipline training needed to join multi-disciplinary teams.

The first point covers taskwork and teamwork competencies that are new to staff members, who enter an IO environment from a traditional work environment. Point 2 refers to inter-positional knowledge/competence. It stresses the importance of ensuring that IO team members have insights into the functions performed by their team mates, as well as a certain level of competence overlap.

The *Structured Observation and Feedback in Integrated Operation* (SOFIO) method was developed specifically for identification of success factors associated with IO teamwork (Rindahl, et al., 2009). It was later turned into a method for training of IO teams. SOFIO addresses four overall attributes of teamwork competence: 1) *Presentation techniques*. This refers to competence in the ways a message is conveyed so that the recipient(s) perceives, understands and remembers the message in a best possible way; 2) *Team, role and communication*. This refers to competence in understanding and utilizing the contributions of other team members; 3) *Technology literacy*. This refers to "computer skills and

the ability to use computers and other technology to improve learning, productivity, and performance" (U.S. Department of Education, 1996); 4) *Institutional language and culture*. This refers to competence in communicating without using terminology particular to a given institution or culture. It also refers to insights into the main principles governing IO, and understanding of the associated work processes and work practices.

The four attributes of teamwork competence addressed by the SOFIO method were defined based on a theoretical analysis of teamwork characteristics in flexible organizations (Torgersen and Steiro, 2009), and on empirical data obtained through an observational study of IO team's task performance during video conferences (Rindahl, et al., 2009).

This last part of the literature study provided more detailed information about the required teamwork competencies within offshore operations. It emphasized the importance of understanding how IO is intended to work, and of mastering the associated work processes. It, further, introduced *personal resources* as a teamwork competence attribute.

3 THE MAITEC MODEL

The *Main Attributes of IO Teamwork Competence* (MAITEC) model (see Figure 1) was developed, based on the findings in the literature. It contains what is suggested to be ten main attributes of IO teamwork competence. The model assumes that team members possess the taskwork competence needed to fulfill their role in the team.

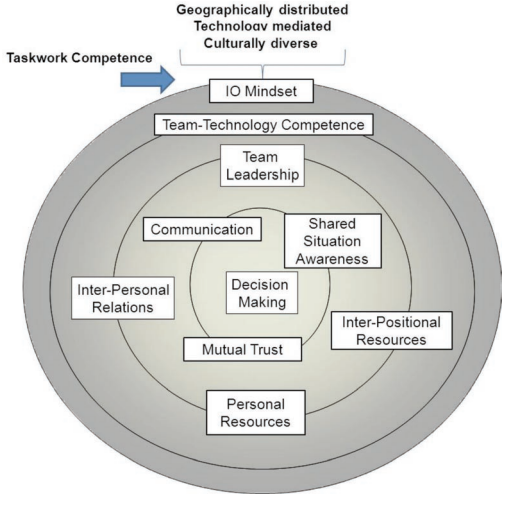

Figure 1. The MAITEC model of the main attributes of IO teamwork competence (Skjerve, 2009b).

The ten teamwork competence attributes comprised by the MAITEC model are taken to *jointly* constitute the central part of the teamwork competence required, i.e., the *skills*, *knowledge* and *attitudes*, to work in an IO team.

The MAITEC model assumes that that the attributes of IO teamwork competence are highly interrelated. The ten attributes are distributed across four different layers, centering on the attribute *decision making*. Facilitation of decision processes, which adheres to the standards of the company in charge of the operation, is taken to be essential to ensure that IO teamwork will achieve its intended goals: facilitating better decisions in order to increase safety and efficiency in operations. It is, also, assumed that the IO teamwork attributes at the outer layers of the MAITEC model are needed to achieve *practical excellence in an IO setting* with respect to the attributes located at the inner layers. This means, e.g., that even if a person in general possesses a high level of communication competence (see below), the person also needs to master and be able to adapt to, e.g., the teamwork practices and technology implied by IO teamwork, in order to communicate efficiently in an IO teamwork setting.

The additional nine attributes of IO teamwork competence comprised by the MAITEC model can briefly be characterized as follows (cf. Skjerve, 2009b):

IO-mindset: insights into how IO is intended to work and a *positive attitude* to working in this way. The specific content of an IO-mindset will depend on the IO strategy of the company in charge of the operation. On the NCS, the generic attributes of an IO-mindset will typically include a focus on *benefitting from the joint competencies* possessed by the individual team members, for *involving* all team mates in decision processes, and for *speaking up*. *Mutual respect, empowerment,* and need for *continuous promotion of learning* are in general also central.

IO Team-technology competence: competence required to *operate* technology (e.g., start, stop and navigate within) and to *work via* the technology (e.g., to also look into the camera when addressing people at other locations, to adapt to technology constraints such as delays in microphone activation, to actively use a shared surface to focus attention, etc.). Studies show that lack of technology competence can be interpreted as a lack of functional ability by team mates (e.g., Greenberg et al., 2007). Team-technology competence may, thus, also come to influence a person's impact on decisions made in the team setting.

The following four attributes are located at the third circle from the outside of the MAITEC model, and concern team members' ability to interact:

Team leadership implies competence in leading/directing team mates' activity. This competence is in general considered to be useful for all team members regardless of their actual role in the team (Gaddy and Wachtel, 1992).

Inter-personal relations: competence in optimizing the quality of the collaboration processes within the team. This implies that attention should be given to the teamwork processes (what happens within and between the team members)—in addition to the task work processes. It, moreover, implies that teamwork is actively facilitated, e.g., by ensuring that that relevant team mates are involved in given dialogues.

Inter-positional resources refers to an individual's ability to take the perspective of a team mate—including the ability to act with due consideration (e.g., to adapt language use)—and to perform a subset (smaller or larger) of the team mate's tasks, based on insights into his or her cultural and disciplinary background, and the characteristics of his/her team role.

Personal resources refer to the ability to monitor and adequately manage and communicate one's own physical fitness (e.g., in terms of stress and fatigue) (cf. O'Connor and Flin, 2003). This competence is suggested, here, to be of key importance for members of IO teams. Members of IO teams are generally less familiar with each other than members' of traditional teams, and they may not as readily notice if a team mate is no longer fit to fulfill his or her function in the team.

The innermost circle that immediately surrounds the attribute decision making contains three attributes of teamwork competence:

Communication: the process "... by which information is clearly and accurately exchanged between two or more team members" (Salas and Cannon-Bowers, 2000, 317). In technology-mediated collaboration, misunderstandings may arise more easily, because communication is restricted (Nemiro et al., 2008). In the MAITEC model, communication competence implies the ability to communicate in a way that is understandable to all team mates in an IO setting (e.g., to speak a bit slower and higher than usual, to articulate clearly, to use emphasis efficiently, and to master relevant dialogue techniques).

Shared situation awareness: the process "… by which team members develop compatible models (shared understanding) of teams' internal and external task environment" (ibid). Maintaining shared situation awareness requires the ability to promote a sound information flow both within and between meetings, e.g., updating new team members and ensuring that information to the extent possible is distributed on all locations simultaneously.

Mutual trust: the assured reliance on the character, ability, strength, or truth of team mates (based on Merriam Webster, 1993). Mutual trust is reflected in the attitude: "I trust that you are motivated and capable and have the team's best interests at heart. So if you've done something I wouldn't have done, it must be because you thought it was the right thing: "Help me understand" (Baan and Maznevski, 2008, 352). Mutual trust must be well-calibrated (Skjerve & Rindahl, 2010): Under-trust may, e.g., lead to excessive checks of the information or interpretation offered by a team member. Over-trust may, e.g., lead team mates to skip required cross-checks of the out-come of a colleague's task performance process.

4 METHOD

The empirical study constituted an initial assessment of the MAITEC model. Two research questions were addressed: 1) Do the attributes of teamwork competence contained in the MAITEC model adequately cover the competencies observed in practice—or is there a need for adjusting, expanding, and/or eliminating any of these? 2) Are the inter-relationships between the attributes of IO teamwork competence sufficiently pronounced to support the use of the layered structure to account for these attributes in the MAITEC model?

The study involved an analysis of written reports on the quality of teamwork in an IO team, across 19 morning status meetings. The meetings were performed in the pre-operational phase, i.e., prior to start-up of production at the oil platform addressed. They typically involved between 8 and 12 participants, who had different disciplinary backgrounds and/or held different roles in the team. The participants were distributed across 2 or 3 locations, and the meetings were carried out in video conferences (VCs). For each of the 19 morning status meetings, a report was written immediately after the meeting by 3–4 observers, as part of a SOFIO training course (see page 3), and these reports constitute the basis in the present study. It should be noted that the authors of this paper were both members of the team of observers.

Initially, the content of each of the 19 records was divided into segments (n = 332). To constitute a segment, two requirements had to be fulfilled: First, the text should comprise feedback on one particular issue only (e.g., camera zoom or team-member involvement). Second, it should be possible to organize the text into one out of three broad categories: (a) Factors challenging teamwork (n = 79); (b) Factors promoting teamwork (n = 137); (c) Guidance to the team on how to improve teamwork (n = 116).

The 332 segments were then assessed and classified with reference to the ten attributes of teamwork competence contained in the MAITEC model. This task was performed by the authors of this paper, independently.

The classification implied that the concrete, observable aspects of IO teamwork contained in each segment was translated into—or related to—the more abstract concepts of competence contained in the MAITEC model. The classification was based on an assessment of what attributes of teamwork competence that were *most pronounced* (subjectively assessed) in each particular segment, seen in the light of the segment's content and the overall content of the given record to which it belonged. Figure 2 illustrates how the observed teamwork behaviors observed and documented in the segments (represented by the elliptic forms) were related to the attributes of IO teamwork competence in the MAITEC model (represented by the rectangles): The segments located in the elliptic forms world generally, as a minimum, be associated with the attributes of IO teamwork competence located in the adjacent rectangular forms.

Assessments concerning team-technology competence were, e.g., *mainly* based on segments related to documentation (of decisions and actions), agenda, and the visibility of participants in the camera view across locations, and issues related to housekeeping (distracting clutter within the camera view). The assessments concerning *team leadership* was based on the activities of the team leader in general (dashed line), focusing on how the team leader performed with reference to the remaining (solid line) elliptic forms. It should be underlined that segments could be (and often were) associated with more than one attribute of IO teamwork competence—and thus also with attributes not located close by in Figure 2 (see next section).

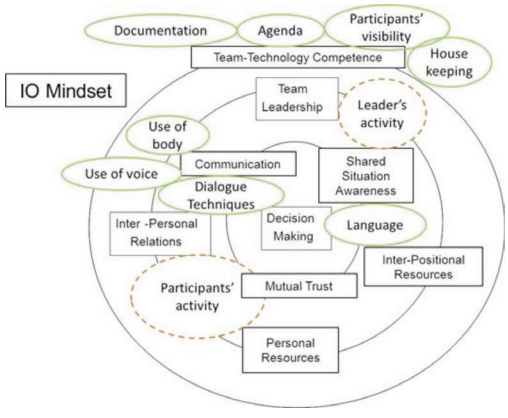

Figure 2. Classification of segments based on the attributes of IO teamwork competence contained in the MAITEC model.

5 RESULTS

The distribution of segments across the ten attributes of IO teamwork competence of the MAITEC model is documented in Table 2. The number of times each MAITEC attribute received a score can be seen in the first column ("No."). The number of times one or more other attribute(s) concurrently received a score, can be seen in the second column ("Conc."). Finally, the number of meetings in which an attribute received one or more scores, can be seen in the third column ("Meet."). All 332 segments could be classified with reference to the categories of the MAITEC model.

Table 3 provides an overview over which of the MAITEC attributes that received concurrent scores. The table should be read as follows: when "IO mindset" (variable A) received a score, then

Table 2. Scores across the ten MAITEC categories (each segment may be located in more than one category.

	Scores		
MAITEC categories	No.	Conc.	Meet.
Communication	132	169	19
Inter-personal relations	98	172	19
Team-technology competence	95	96	18
Team leadership	76	132	17
Mutual trust	76	117	17
IO-mindset	64	162	12
Shared situation awareness	62	157	17
Decision making	26	73	12
Inter-positional resources	15	48	11
Personal resources	4	8	4

Table 3. Concurrent scores on MAITEC categories: A: IO Mindset. B: Team-technology competence. C: Team leadership. D: Inter-Personal Competence. E: Inter-Positional Resources. F: Personal Resources. G: Communication. H: Shared Situation Awareness. I: Mutual Trust. J: Decision Making.

	B	C	D	E	F	G	H	I	J
A	11	20	25	15	0	30	29	15	17
B		9	10	0	0	14	18	29	5
C			26	1	1	31	15	15	14
D				8	1	35	25	33	9
E					0	12	10	2	0
F						4	2	0	0
G							32	1	10
H								15	11
I									7
J									

variable B (team-technology competence) concurrently received a score 11 times, variable C (team leadership), 20 times, etc.

6 DISCUSSION

The empirical study indicated that three of the IO teamwork competence attributes contained in the MAITEC model might need to be adjusted or eliminated: *Personal resources, inter-positional resources,* and *decision making*, as these attributes received low scores. To obtain a better understanding of what the implications should be, the three attributes were analyzed one-by-one, based on the content in the segments they comprised.

The attribute of *personal resources* received four scores, each in a different meeting (see Table 2). The scores all constituted "Guidance to the team" from the observers (see section 4) on how the participants could prepare for performance in situations with a higher pressure. This suggests that the attribute of *personal resources* is not of key concern in morning status meetings in the pre-operational phase, but will be an issue of concern in during the operational phase. For this reason, the attribute is maintained in the MAITEC model.

The 15 segments scored as reflecting the attribute *inter-positional resources* mainly concerned the language use, i.e., whether participants used professional terminology and/or abbreviations without explaining what they meant. Across the 19 meetings, *inter-positional resources* received scores in 11 meetings. In 7 of the segments, the participants used language in a way that promoted teamwork. In 1 segment, they used language in a way that was clearly not understandable to all team members. The remaining 7 segments were "Guidance to the team" from the observers on how to use language adequately (e.g. use professional language only when necessary). Thus, even though *inter-positional resources* received few scores, it was still a topic of concern in more than half of the morning status meetings. Meetings in the operational phase may, moreover, come to imply an even stronger focus on the need for being able to communicate efficiently across cultures and disciplines. For these reasons, the attribute will be maintained in the model.

The attribute *decision making* received 26 scores across 12 of the 19 meetings observed. Out of the 26 scores, 12 segments concerned factors promoting decision making (e.g., volunteering information, following-up on issues, deciding to take meetings on issues of concern to only a few participants at another time, etc.). 4 segments contained challenges to decision making (i.e., lack of documentation of the decisions made, or lack of following up on issues raised). The remaining 10 segments contained "Guidance to the team" on how to facilitate decision making. Still, the focus of the morning status meetings observed tended to be information sharing, rather than on decision making. In this light, the low score obtained on *decision making* cannot be considered critical, and the attribute will be maintained in the MAITEC model. However, the description of the attribute *decision making* will be broadened to also contain *information sharing* (i.e., sharing of information that may impact decision making in a longer-term perspective).

The second research question concerned whether the interrelationships between the attributes of teamwork competence were sufficiently pronounced to support the use of the layered structure to account for these attributes in the MAITEC model. The results indicated that this was the case. Each segment was in the majority of the cases concurrently scored as belonging to more than one attribute (see Table 2). To determine whether the current organization of the attributes of teamwork competence in the layered structure is adequate, more data is, however, needed.

The outcomes of the empirical part of the study, only lead to a few adjustments of the MAITEC model. Still, the study may have been impacted by several biases: First, the written reports were generated as part of a SOFIO training course, and the feedback contained in the reports was proportioned based on what seemed most adequate to support the learning processes of the participants. The purpose was, thus, not to document all attributes of IO teamwork competence observed. Second, the analysis was based on data from one type of meetings (i.e., morning status meetings) only. Studying teamwork other types of IO teamwork settings may lead to further adjustments of the MAITEC model. Pre-analyses of data from *integrated planning meetings,* e.g., indicate that adherence to the operational model and work processes implied by IO should be given a more pronounced role in the MAITEC model: They indicate that both the content of *IO mindset* (emphasizing willingness to follow the work processes) and *decision-making* (emphasizing adherence to standards) should be updated. The suggested need for adjustments, however, also highlights the inter-relatedness between IO teamwork competences attributes, and thus support use of a layered structure in the MAITEC model.

7 CONCLUSION

The MAITEC model contains what is suggested to be *ten main attributes of IO teamwork competence* organized in a layered structure, and the findings in the empirical study did not disprove the validity of the model.

Overall, the MAITEC model may assist designers of IO teamwork training in deciding what attributes of teamwork competence to include in the training programs. It may further offer some assistance in deciding in which sequence the various teamwork competencies should be the focal point of attention throughout a training program, and thus in defining the training scenarios.

Ensuring IO teamwork competence is mandatory for an IO team to perform proficiently. However, it is not—on its own—sufficient. To ensure proficient teamwork it is, moreover, necessary that the team members possess the *taskwork* competence required to achieve the team's goal(s). In addition, a range of *contextual factors* will impact the proficiency of IO teamwork. If, e.g., the *work processes* that guide a team's performance do not leave adequate time for team members to interact, and/or if the needed *collaboration technology* is unavailable, teamwork proficiency will degrade. To attain proficient IO teamwork, it is, thus, necessary to ensure that the team members possess the required teamwork and taskwork competencies, and that the work environment is designed to facilitate IO teamwork.

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