

Collaborative Decision Making in Operation-Center Environments

The “oil field of the future” vision has implications for how the industry operates that go beyond technology implementation. The industry has focused on acquisition and transport of data to decision makers to capitalize on the opportunities to optimize productivity, efficiency, and recovery. However, attention is turning to the decision makers and the tools, methods, and work processes that will support their activities. Collaboration and the ways in which integrated multifunctional teams work together to make better and faster decisions are critical.

Collaborative Environment

At its simplest, collaboration is the activity of multiple parties working together toward a common goal. The context of decision making can be added to the definition so that collaborative decision making occurs when multiple parties work together to discuss and execute a decision. The concept of decision making can be broken down into four main parts.

- Gathering data about the problem or situation under consideration.
- Generating ideas and alternative solutions to the problem or situation.
- Making the decision.
- Communicating and executing the decision.

Also, this four-stage process can help distinguish when collaboration can occur. Depending on the

nature of the problem, collaboration can occur at any combination of these stages.

Forms of Collaboration. The scope of collaborative decision making includes all the actions and decision points across a work process so that the process itself becomes collaborative. This scope assumes that the many decision points and actions taken within an asset are a linked series.

Collaboration can be both formal and informal. Formal collaboration can be designed into the work situation. Informal collaboration, the ability to consult one’s peer groups and get a second opinion, is equally important. Problem scenarios that are particularly unusual do not have collaboration designed into their resolution. Informal collaboration is more difficult to design and tends to be a product of the working environment(s) across the asset and its operations.

Collaborative-Environment Scope. Fig. 1 shows the scope of both the operation center and collaborative environment as well as how the interactions between the participants, within the physical and virtual environments, are envisaged to work. The operation center is a physical space, such as a meeting room or the equivalent, in which participants can work together and interact with the various technologies within the space. Technologies, such as video conferencing or teleconferencing, enable the center to interact with other participants who are not physically within it, thus forming a collaborative environment.

A collaborative environment is a virtual space, enabled by technol-

ogy, in which participants can work together to solve problems and make decisions. A collaborative environment may include the operation center and another party using some collaboration technology, but does not necessarily need to include an operation center. The collaborative environment could be linking an operator who is on site with an office-based engineer at the asset’s primary office with operator experts farther afield. It also has the ability to allow for non-simultaneous communication in that documents/drawings can be shared and commented upon by all the parties and locations.

Framework

When Collaboration Is Appropriate.

The four stages of decision making can be used to understand when collaboration might be most valuable and appropriate. Several criteria can be applied to the situation or work process. These criteria can be grouped to optimize the decision-making process.

- Complexity—the difficulty of the problem, the number of variables it has, and the ability to describe the problem.
- Number of participants or stakeholders—those within the main decision-making process and the involved parties to whom the decision may need to be communicated.
- Speed—how quickly an answer is needed.
- Importance/Criticality—how the decision affects a main business driver or one of the critical areas.

The criteria are more relevant to some stages of the decision life cycle than to others. A scoring system is detailed in the full-length paper that can determine where collaboration is best applied. However, the results

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For a limited time, the full-length paper is available free to SPE members at www.spe.org/jpt. The paper has not been peer reviewed.

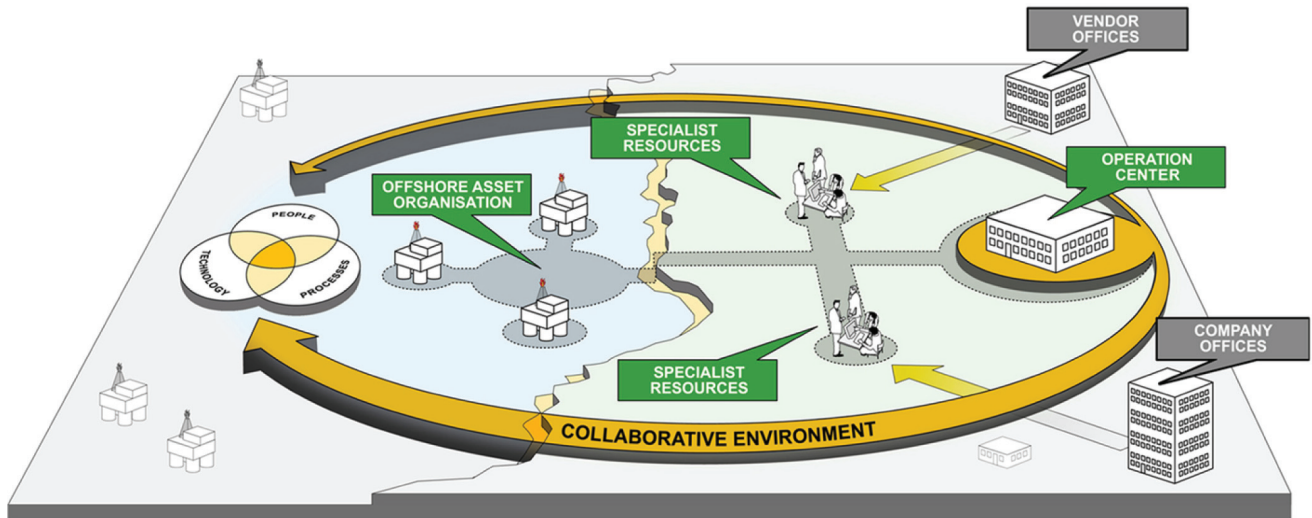


Fig. 1—Participants in the operation center and collaborative environment.

can be further refined with an understanding of the different forms of collaboration.

Collaboration Types.

- Autocratic—minimal collaboration is used because the leader or “decision owner” operates alone. The autocratic approach may include some approach to other participants in the process, but input is minimal.
- Consultative—a more collaborative approach, in which the decision owner or leader may elicit views, information, and ideas either individually with other participants or as a group.
- Group participative—full collaboration with a group engaged; the final decision is arrived at by consensus.

The framework can identify both the stage within the decision-making process at which collaboration is going to have greatest effect and what that collaboration will look like.

Tools and Methodologies

Tools include the technologies that enable collaboration over distances, such as audio and video conferencing and shared electronic workspaces that allow real-time sharing and visualization of data. Collaborative methodologies are concerned with the processes that ensure that collaboration occurs and include tactics for consensus building, gathering a range of input within a meeting (avoiding groupthink), brain-storming techniques, and proper meeting organi-

zation. Domain-specific tools (such as for production optimization) will need certain characteristics to function within a collaborative environment. For example, tools need to be set up such that two locations can see exactly the same visual output, and each location should have the ability to take control of the application.

Opportunities and Requirements People and Organizational Structure.

Formal organization structures influence how people collaborate and focus. Because a main objective of implementing operation centers is to promote collaboration, organizational-unit structure must be considered to support the use of such environments. For instance, organizations may be better structured in units that support the horizontal flow of tasks that produce the results rather than the traditional vertical structures that accommodate only command lines. How people are arranged in the operation centers and collaboration facilities is important. It has been shown that small distances better enable contact between colleagues and influence how frequently facilities are used. Therefore, operation-center environments must be placed in immediate proximity to all those who are supposed to use them on a regular basis. It also has been found that careful grouping of individuals improves both the frequency and quality with which these facilities are used. For instance, by placing

well-behavior and process-capacity experts next to each other, the likelihood that they will collaborate to optimize the overall production increases significantly.

Operation-center environments allow several tasks to be performed over large distances. Consideration should be given to what extent discipline experts can work across several assets, allowing company and/or vendor experts to participate regularly in asset work processes.

Collaborative decision making requires that many people perform most of their work in new environments and participate in a wider range of workflow areas than before. The collaborative nature of the operation-center environment requires new skills. Many participants will require more cross-discipline or general skills in combination with operational field experience to contribute fully in collaborative decision-making processes.

The new environments also require participants to possess strong teamwork skills, including the capability to collaborate actively and constructively, assist getting the job done through the team, see other people’s ideas as a positive contribution, and seek help and advice and be someone others can turn to for help and advice. These general teamwork skills are more important when working in collaborative environments than in ordinary meetings and face-to-face situations. An associated management-skill requirement is the capabil-

ity to properly facilitate meetings and other collaborative sessions, so that all participants are given ample time to understand, reflect, comment, and present their views.

Process and Workflows. Some of the benefits are improved understanding of the problems at hand, access to all discipline expertise required to make better decisions, and better acceptance and execution of the decisions. However, it is necessary to evaluate existing workflows and modify them to support the new working environments. If operation centers are used just to support conventional workflows, only minor performance gains are acquired. To help frame the workflow analysis, the following questions are useful.

- What activities are performed by the team, and what decisions are made and when?
- What information is needed to perform the activities and make the decisions?
- Where is this information found, and how is it accessed?

- How are decisions made, who makes them, and by whom are they executed?

- What are the current problems, and how can the workflow be improved?

Risks. There are potential risks that collaborative decision making will bring to the organization and its way of working, as well as the more standard risks that come with business change projects. Collaborative decision making should provide increased awareness and confidence to management of the decisions being made, but it also could result in the wrong individuals or disciplines collaborating and, therefore, in misdirected management attention. While collaborative decision making should create an integrated way of working by encouraging multidisciplinary teams to access and consider all relative viewpoints when making decisions, it also could encourage individuals to revert to their existing silos. Domain experts may become detached or iso-

lated from natural peer groups, and individuals may gravitate toward generalizing and sacrifice development of domain expertise in these new working environments.

By encouraging, facilitating, and rewarding individuals involved in collaborative decision making, institutional barriers should be removed over time. However, a new generation of organizational silos may be created by new divisions perceived to be created by those inside and outside operation centers, and less-confident and -vocal members of the decision-making process may become isolated. To mitigate these organizational risks, management members must be committed advocates of collaboration and must support and reward early adopters of collaborative decision making and communicate the successes and benefits, and collaboration should be supported by comprehensive training. JPT