Chapter 4
Collaborative Work Environments in Smart Oil Fields: The Organization Matters!

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ABSTRACT
In the last decade, oil companies are increasingly viewing collaborative work environments as an important component of their smart oil fields programs. Collaborative work environments (CWEs) have been implemented by several major oil companies, to support the use of technology in smart oil fields. The implementation of these collaborative work environments is not without problems. After major oil companies successfully implemented the hardware, tools and applications in CWEs, organizational design challenges remained unsolved. The biggest challenge is to change behavior of staff and to effectively integrate people across disciplinary boundaries. This chapter emphasizes the importance of the organizational aspect of CWEs in smart oil fields. The objective of this chapter is to provide the upstream petroleum industry with guidelines for the organizational design of the collaborative work environments, in support of the operation of smart oil fields. In order to provide the organizational design guidelines, a PhD research was conducted at three different operating units of a major oil company. This research focused on the business processes, organizational structure, and competencies of staff in the CWEs.
INTRODUCTION

The upstream petroleum industry is undergoing a period of significant change (Knoppe & Holloway, 2008). In this research, three current business challenges in the upstream petroleum industry are distinguished: (1) increasing demand for energy (Hickman, Guidry & Seaton, 2008; Rawdon, 2003). The increase in world population, economic growth per person, and importance of transport/mobility, result in increasing demand for energy (Brufau, 2008). These demand requirements push oil companies to maximize their production from both existing and new oil and gas fields (Bartram & Wood, 2009). (2) Operating in difficult oil fields (Brufau, 2008; Hickman, Guidry & Seaton, 2008; Rawdon, 2003; Saggaf, 2008). Oil companies claim that there is hardly any easy accessible oil reservoir left. Most of the large oil fields have been exploited since the 1960s and 1970s; therefore their production has declined significantly in the last two decades (Babadagli, 2005). As the ‘easy’ oil and gas reserves become increasingly scarce, the upstream petroleum industry is aware of the need to develop unconventional resources in more complicated operating environments (Yawanarajah et al., 2008). Unconventional resources include heavy oil, ultra deepwater oil and gas, tar sands and gas-to-liquids (Miskimins, 2009; Tye, 2010; Yawanarajah et al., 2008). (3) The Big crew change (Brett, 2007; Edwards, Saunders & Moore-Cernoch, 2006; Heaney & Davidson, 2006; Hickman, Guidry & Seaton, 2008; Knoppe & Holloway, 2008; Popham & Edwards, 2009; Tealdi, Kreft & Donachie, 2006). The workforce in the upstream petroleum industry is diminishing, both in numbers and experience (Popham & Edwards, 2009). Within the industry this is referred to as ‘the Big crew change’. The industry is facing difficulties in attracting smart young graduates (Tealdi, Kreft & Donachie, 2006). As a result of a large proportion leaving the industry, and fewer graduates entering the industry, a big gap in experience occurs. This big gap is partly caused by the major lay-off of staff in the 1980s, who have not returned to the oil companies (Treat et al., 1994).

Most major oil companies introduced ‘Smart Oil Fields’ to deal with the current issues. The implementation of Smart Oil Fields often requires a transformation of work processes and staff (Van den Berg, 2007). Smart Oil Fields Technology enables oil companies to reduce costs, increase production, and increase recovery factor (cf. De Best & Van den Berg, 2006; Henderson, 2005; Murray et al., 2006). Major oil companies have implemented Smart Oil Fields concepts in various oil and gas fields around the world, in order to make better decisions, which result in increasing production and recovery of oil and gas (Van den Berg, 2007).

Collaborative Work Environments can be perceived as the platform on which Smart Oil Fields operate. Collaborative Work Environments are being implemented by the petroleum industry to access data (which results from the Smart Oil Fields Technology), in order to enhance collaboration and decision-making between locations (Van den Berg, 2007).

The focus of this chapter is on the organizational design of Collaborative Work Environments.

In the remainder of this chapter, the implementation of Smart Oil Fields, and an introduction to Collaborative Work Environments is provided. Afterwards, the observed challenges of Collaborative Work Environments are discussed. In addition, guidelines to deal with the observed challenges of Collaborative Work Environments for the upstream petroleum industry are provided. In the last section, conclusions are drawn and future directions are indicated.
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