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A strategic management and innovation approach to onshore gas transmission pipeline construction

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**A STRATEGIC MANAGEMENT AND INNOVATION
APPROACH TO ONSHORE
GAS TRANSMISSION PIPELINE CONSTRUCTION**

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Submitted as Requirements for MEng Research
Department of Mechanical Engineering
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2007

ABSTRACT

This research investigates whether a traditional manufacturing planning and control strategy would make Onshore Gas Transmission Pipeline Construction more competitive and if so, design the strategy. An in-depth case study of Gas Transmission Pipeline Construction was carried out, along with an extensive literature review. The current pipeline construction process was analyzed from a strategic management perspective. From this perspective, it was found that the traditional 'make and sell' attitude of manufacturers has now almost entirely given way to a customer orientated 'sense and respond' service philosophy. This is compounded by the needs for waste avoidance, cost efficiency and service to the customer. This research investigates the strategic opportunities for establishing advantages over competitors by designing unique service oriented supply chain strategies. Rather than relying on functional hierarchy and command and control governance where a chain of commitments are poorly connected and difficult to reconfigure, the pipeline construction participants are challenged to develop more flexible process designs around a state of the art service based architecture. *Complexity reduction* has traditionally been used to deal with intricate construction supply chains. However, the architecture developed and demonstrated in this thesis will allow participants in pipeline construction to develop strategic opportunities around ideas of *complexity absorption*. The architecture is built on the premise that complexity *absorption* creates an organization that is strategically superior because it becomes a complex adaptive system that is unique to that organization. A case study is presented based on a major onshore gas transmission pipeline construction organization that illustrates an application consisting of Pipeline Construction Portal and Service Oriented Architecture. This model is internet-based and has three main constituents of Web Services, Portal and Client Services.

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