

Factors that influence the outsourcing of maintenance activities within the South African petrochemical industry

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Content

'If you deprive yourself of **outsourcing** and your competitors do not, you're putting yourself out of business'

(Lee Kuan Yew)

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INTRODUCTION



Introduction

- In asset intensive organisations, e.g. those in the petrochemical industry, maintenance can account for 2/3 of the life-cycle cost of an asset
- The petrochemical industry accounts for ~R329 billion of South Africa's turnover
- This turnover is generated by six petrochemical plants across the country
- Asset Intensive Organisations typically spend more than 10% of the operating budget on maintenance (Garg & Deshmukh 2006)
- Outsourcing is one of the methods the asset manager can use to improve asset performance and/or to reduce cost
- The maintenance manager needs to consider the benefits, risks, decision factors and performance measures before making the decision to outsource a specific maintenance function



Research Objectives

- The objectives of this research were to determine:
 - What maintenance managers and supervisors within the South African petrochemical industry perceive as the deciding factors
 - What are the expected benefits of outsourcing
 - What are the expected risk associated with outsourcing
 - What are the performance measures that need to be in place to monitor the performance of the outsourced activity
- The literature shows that the current primary driver of outsourcing decisions is cost reduction





LITERATURE AND THEORY



LITERATURE AND THEORY

- The literature identified 27 critical factors that must be taken into account before deciding to outsource. These factors are grouped into 7 categories
 - **Strategic** – core vs. non-core activities, competitive advantage, alignment with business strategy
 - **Economic** – will outsourcing result in cost reduction, what are the indirect costs involved?
 - **Organisational** – can the organisation structure support the outsourced maintenance activity, what will the interface with production involve
 - **Maintenance activity characteristics** – what maintenance activities are amicable to outsourcing in terms of their nature, complexity, and maintenance planning required
 - **Employee impact** – what happens to internal staff after an activity is outsourced, issues regarding training, redeployment due to operational requirements
 - **Supplier** – availability of suppliers who can provide the outsourced maintenance at the required cost, schedule and quality, competence of the supplier, type of contract, performance of supplier
 - **Management** – relationship management between organisation and supplier, performance

Literature and Theory

- By outsourcing, the organisation is able to concentrate its resources on a core set of competencies (Quinn and Hilmer, 1994)
- In the UK, outsourcing has helped to reduce the power of the trade unions. This is relevant to the highly unionised South African workforce (Harland et al. 2005)
- Despite the potential benefits, outsourcing presents risks to the organisation
- Functions that are highly integrated into business processes may be severely affected if outsourced to the “wrong” supplier
- Different organisational culture could present a challenge for other internal functions (e.g. production) to effectively communicate with the outsourced maintenance
- Loss of knowledge and organisational know-how, decrease in morale, loss of control, and decreased performance are risks of outsourcing (Nili et al. 2013)

- The following items could be measured to determine a contractor's performance (Bertolini et al., 2004)
 - Price of service
 - Maintenance cost
 - Equipment availability (MTBF)
 - Safety and environmental performance (number of incidents, accidents)
 - On-time performance (MTTR)
 - Work quality (amount of re-work, infant failure rates)
 - Schedule compliance
 - Actual work completed against planned work (schedule attainment)



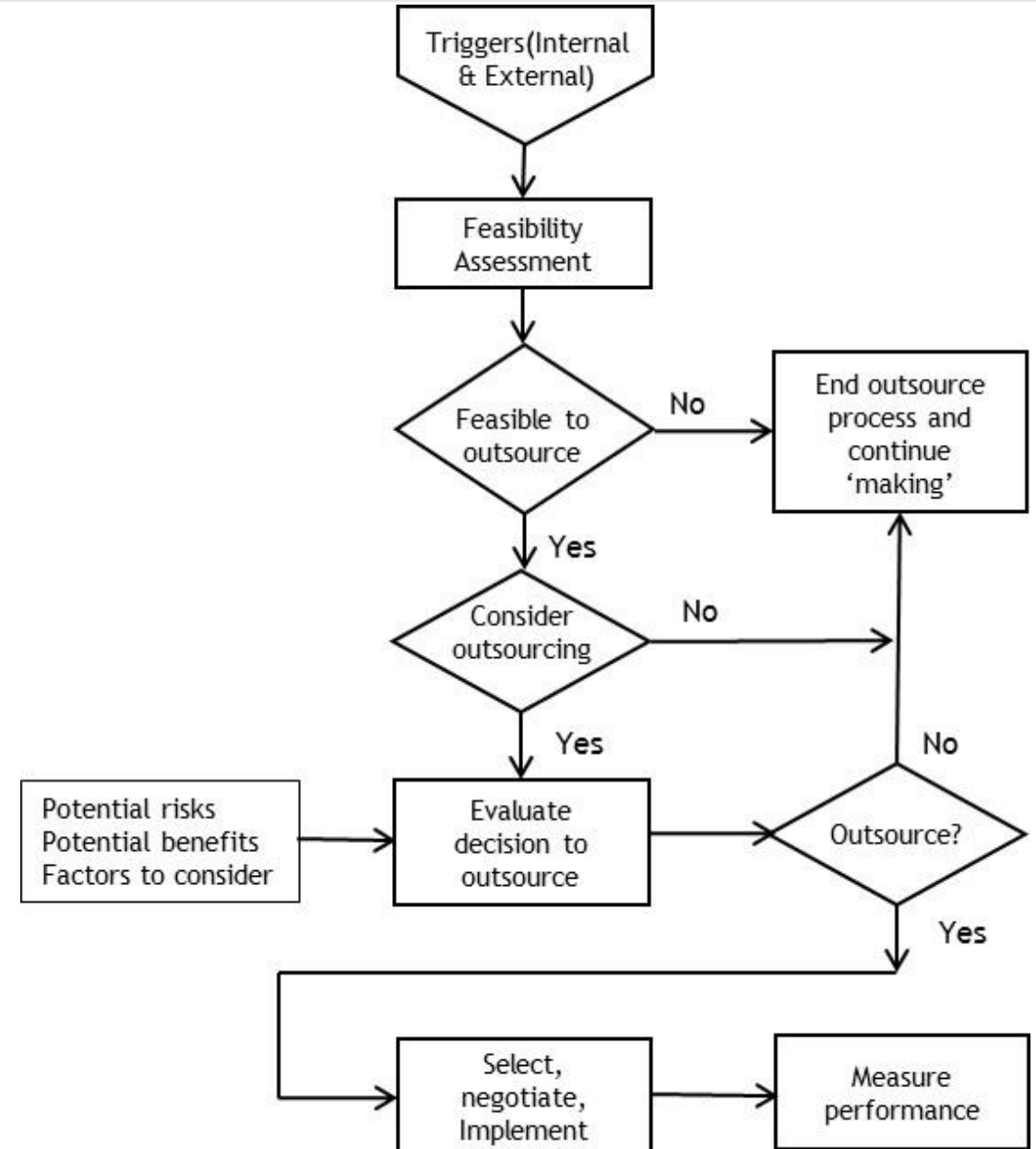


CONCEPTUAL MODEL



Conceptual Model for Outsourcing

- Outsourcing is often triggered by both external and internal environments such as government legislation and increased competition
- The six-step approach by Campbell (1995) for the process to follow before deciding to outsource maintenance provided the basis for the overall conceptual model for the research





METHODOLOGY



METHODOLOGY

- Personnel from three business units (operating hubs) in the processing industry were involved in gathering data on outsourcing
- Twenty one (21) mechanical senior managers and one-hundred and five (105) foremen (or supervisors) from the three regional operating hubs were selected and invited to participate in the study
- The justification for selecting this sample was that senior managers make the final decision to outsource, whereas foremen will work closely with the supplier for which the activity has been outsourced to.
- Some 43 questionnaires, fully completed by the respondents, were returned



Data Collection

- Section 1 of the questionnaire collected demographic information such as geographic location, and position (senior manager or foreman).
- Section 2 requested respondents to indicate the extent to which they agree or disagree with 21 decision factors that were provided
- Section 3 required respondents to select 5 benefits and 5 risks from the list of ten, and then rate these on a scale of 1 to 5, with 1 being most importance, and 5 being least important
- Section 4 required respondents to rate the level of importance of 8 quantitative and 8 qualitative performance factors that were provided



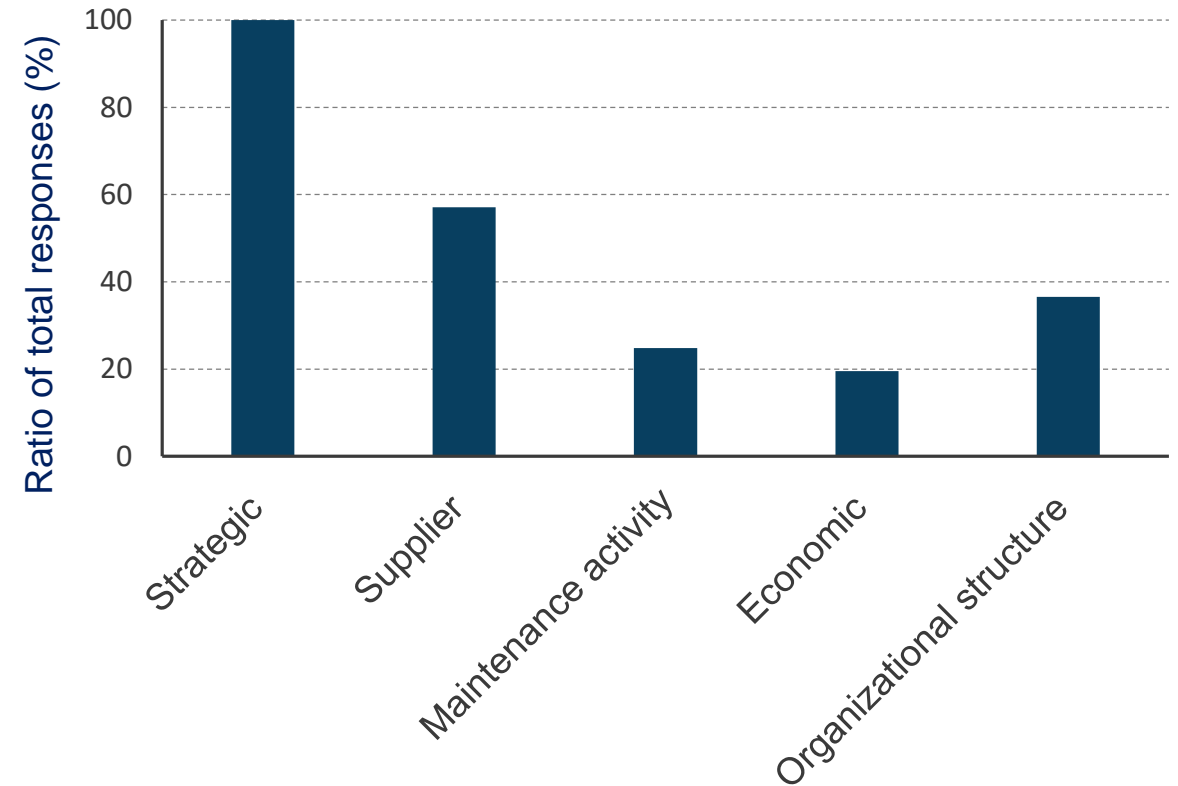


RESEARCH FINDINGS

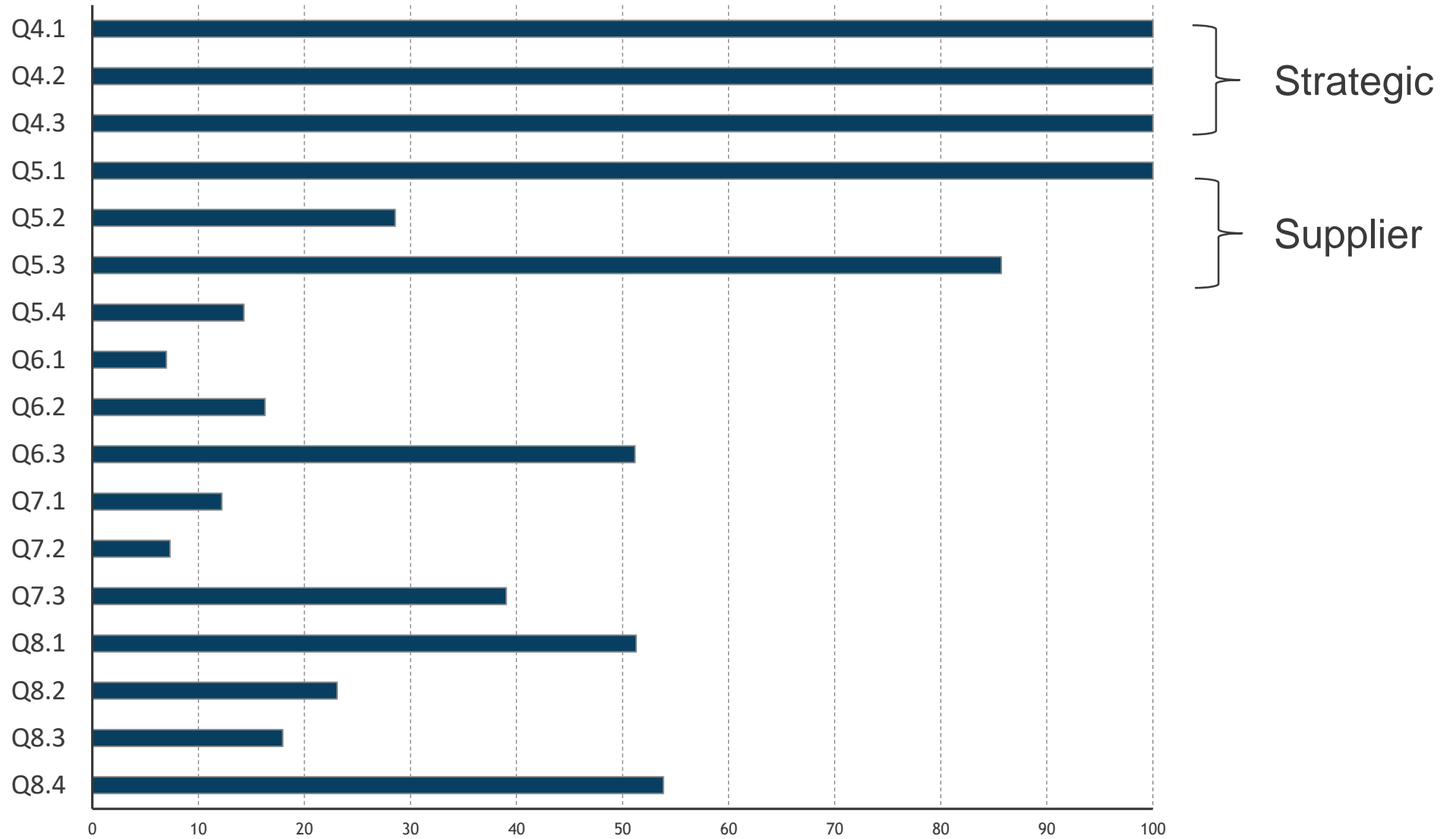


Factors that influence outsourcing decision

- The 21 decision factors of the questionnaire were grouped into seven categories and the total scores of all respondents were determined for each category
- ‘strategic’ and ‘supplier’ categories are the most important to consider when making the decision to outsource maintenance activities



Individual Factors for Outsourcing



Ratio of number of 'agree & fully agree' responses vs. total number

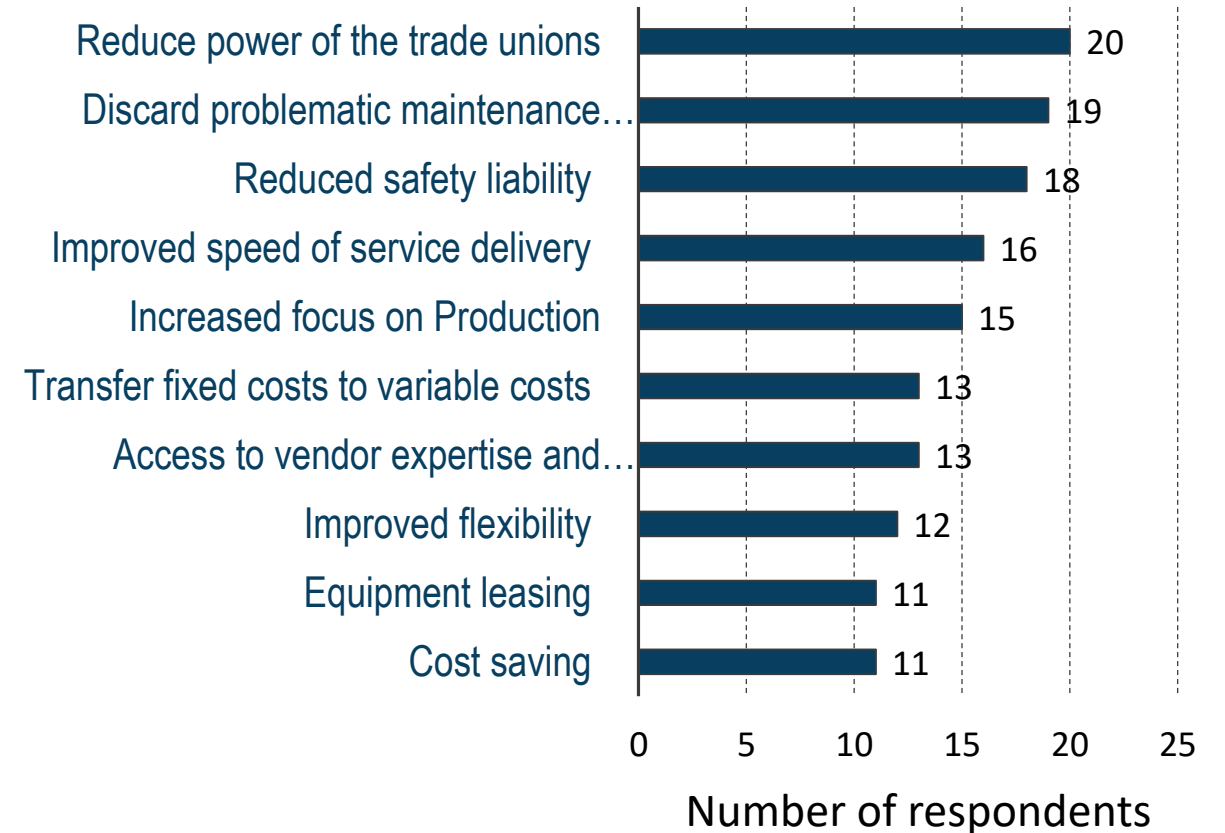
Most Important Decision Factors to be Considered

- The following five factors were deemed to be the most important in the outsourcing decision
 - The maintenance department forms part of the BU's core competency (Q4.1)
 - The maintenance department is aligned with the overall strategy of the BU (Q4.2)
 - The maintenance department in the BU is flexible enough to meet changing customer requirements (Q4.3)
 - The type of maintenance contract that is established between the company and service provider is critical to the success of the outsourced maintenance activity (Q5.1)
 - A performance contract, where the supplier is paid based on achieving key performance indicators set by the client, is sufficient to manage the outsourced maintenance activity (Q5.3)



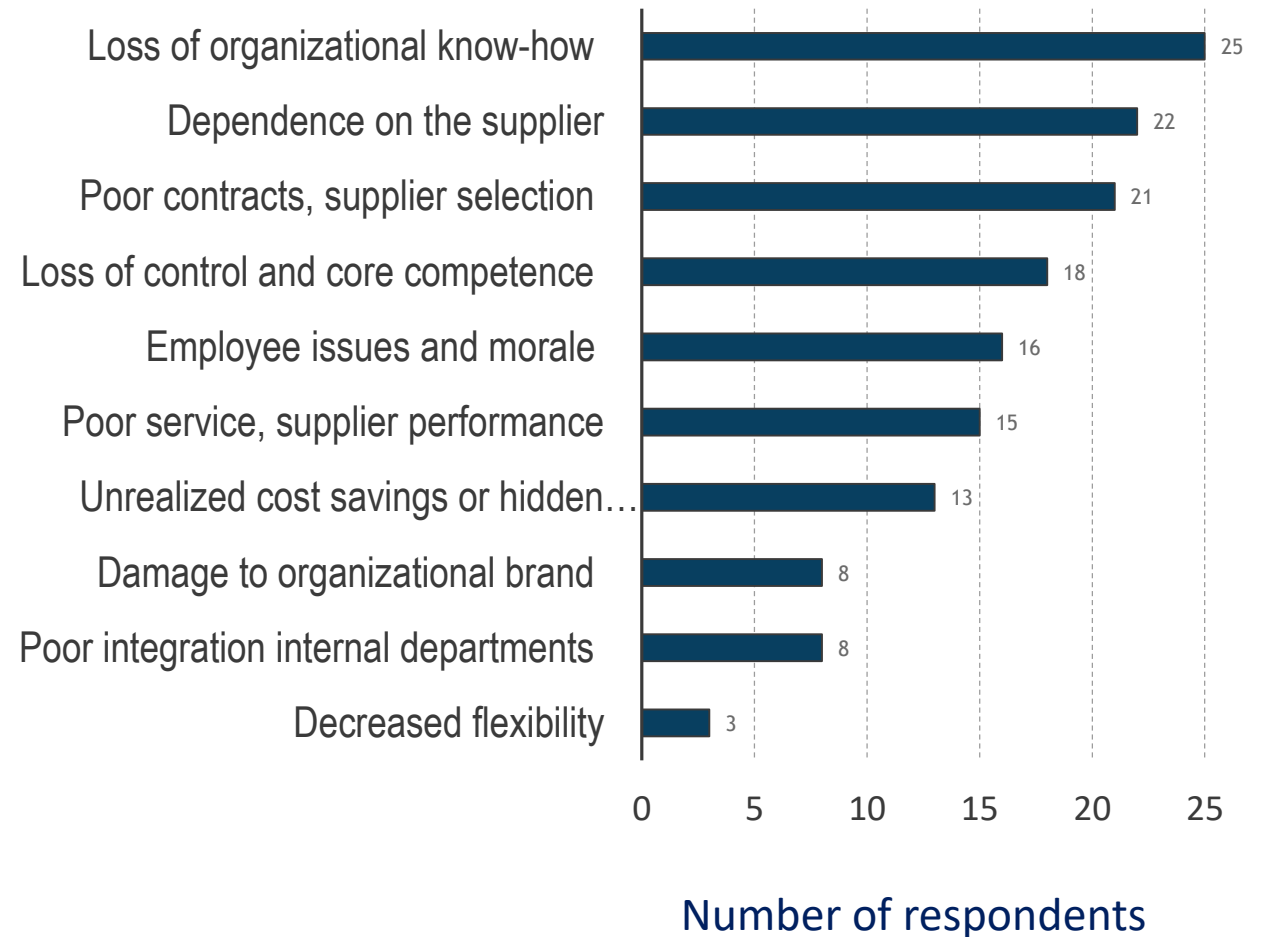
Potential Benefits of Outsourcing

- Respondents were requested to select the five most important benefits of outsourcing from a list of ten benefits.
- The total number of respondents that selected a benefit was calculated
- The most important benefits were:
 - Reduction in the power of trade unions
 - Discarding of problematic maintenance tasks
 - Reduced safety liability



Potential Risks of Outsourcing

- Respondents were requested to select the five most important risks of outsourcing from a list of ten risks.
- Highest perceived risks to outsourcing were:
 - Loss of organisational knowledge'
 - Dependence on supplier
 - Supplier selection
- Risk of loss of know-how can be reduced by outsourcing those activities that require non-core competencies



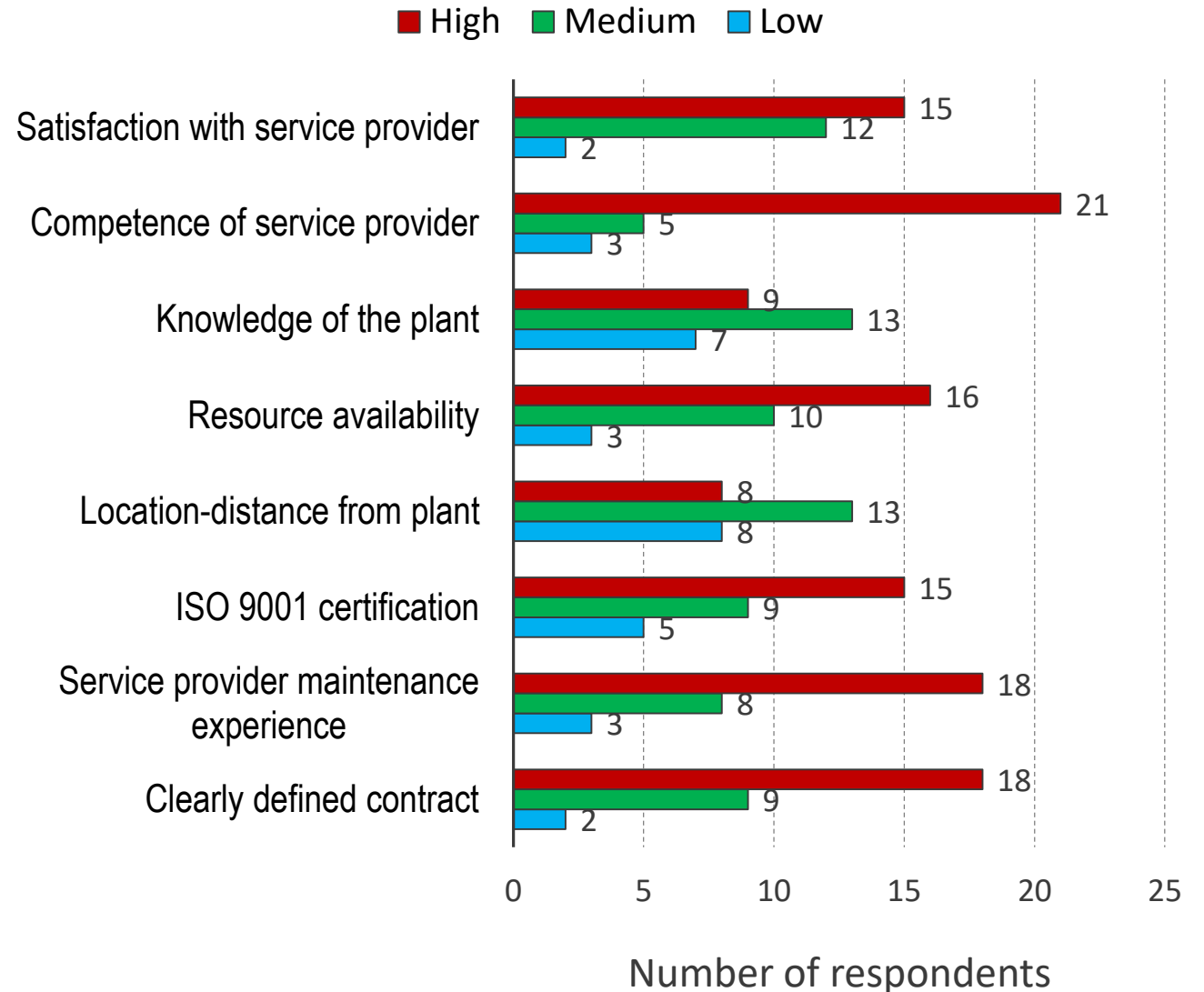
Quantitative Performance Measures

- Respondents were asked to rate the importance of each of seven quantitative performance measures as low (not essential), medium (essential) and high (critical)
- Most important quantitative measures were:
 - Equipment reliability
 - Safety & environmental
 - Price of service
- In an asset intensive petrochemical plant, reliability of the equipment is an important contributor to the organisation's bottom line



Qualitative Performance Measures

- Respondents were also asked to rate the importance of each of eight qualitative performance measures
- The most important qualitative measures were:
 - Competence of the service provider
 - Clearly defined contract
 - Service provider experience
- In the petrochemical environment, an incompetent service provider can lead to cost overruns, delays, damage to equipment, and increased risk of injury





CONCLUSIONS



Conclusions

- The aim of this research was to explore the current perceptions that maintenance managers and supervisors within the South African petrochemical industry have towards the deciding factors, expected benefits and risks, and performance measures towards outsourcing.
- The study showed that economic factors were not considered to be the most important when making the decision to outsource.
- Respondents indicated that the **'strategic'** and **'supplier'** categories are the key decision factors
- The biggest risk to outsourcing was perceived to be **'loss of company-specific knowledge'**



Conclusions

- The biggest benefits of outsourcing as perceived by the respondents are the **'reduction of union powers'** and a **'solution to problematic maintenance tasks'**
- Most important quantitative performance measure is **equipment reliability**
- Most important qualitative performance measure is **supplier competence**





RECOMMENDATIONS



Recommendations

- This study was performed in the process industry and similar studies in other industries could provide more insight into the outsourcing relationship
- The results for managers, foremen and planners were not compared due to small numbers and a larger sample from industry might reveal differences
- The study was only performed for the company and not the contractors whose views could also be valuable for improving the relationship





Chevron refinery, Houston

QUESTIONS