



# **Management Control Systems in the Greek Shipping Industry**

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## Introduction

- Few studies investigate the choice of MCS in the service sector (Auzair & Langfield-Smith, 2005)
- Greek Shipping Industry (Shipping Magazine, 2007)
  - 8,5% of the total number of vessels worldwide
  - 16,5% of the international DWT
  - 24% of the international tanker fleet
  - 21% of the international dry-bulk carriers fleet



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## ➔ Contribution

- Literature Review & Hypothesis Development
- Sample Description
- Research Method
- Field Study on MCS
- Value Based Categorization of MCS
- The Choice of MCS
- Performance Implications of the Choice of MCS
- Conclusions



## Contribution

- Importance of service sector
- Identification of MCS for shipping companies
- Development of categorization of these MCS
- Selection of MCS due to time and management attention restrictions
- Role of strategy and other organizational variables
- Link of the choice of MCS with performance implications
- Guidance to practitioners



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## Literature Review & Hypothesis Development (H1)- Hypothesis Description

- **Hypothesis 1:** The Choice of Management Control Systems (MCS) differs across shipping companies contingent on management's preferences for information. The information varies across the dimensions of
  - **Information to learn vs. information to monitor**
  - **Tight vs. flexible information**
  - **Internal vs. External Information**
  - **Financial vs. non- financial information**



## Definition of Management Control Systems

For the purpose of the study, MCS are defined as “*any formal, information-based procedures and statements used by managers to monitor and influence the behavior and activities in a firm*” (Simons, 1994)



## Literature Review & Hypothesis Development (H1)

- Firms following differentiation strategies use measures related to their competitors more intensely than other firms (Simons, 1987; Guilding, 1999; Kaplan & Norton, 2004)
- Cost leaders decide to use MCS in order to gain financial information about their companies while differentiators focus more on non-financial control systems (Simons, 1987; Dent, 1990; Chenhall & Morris, 1995; Van der Stede, 2000)



## Literature Review & Hypothesis Development (H2)

- **Hypothesis 2:** The strategy pursued by shipping companies will be a significant determinant of which Management Control Systems to introduce and implement.



## Literature Review & Hypothesis Development (H2)- Strategy Categorization

- Porter's categorization of strategy:
  - **Differentiation**
  - **Cost Leadership**
- **Quality Shipping**
  - **Quality of services**
  - **Safety of services**
  - **Environmental Protection**
  - **Investment on new technologies**
  - **Personnel training**
- **Non- quality shipping**



## Literature Review & Hypothesis Development (H2)

- **Hypothesis 2a:** Shipping Companies following low cost strategies emphasize more the use of MCS focused on tight, financial and budget information, as well as information to control the firm's quality, costs and operating goals, more intensely than those not following low-cost strategies.
- **Hypothesis 2b:** Shipping Companies following differentiation strategies emphasize more the use of MCS that focused on flexible information that allow them to respond rapidly to the environment more intensely than those not following differentiation strategies.



## Literature Review & Hypothesis Development (H2)

- Emphasis of MCS in companies following cost leadership strategies
  - **Tight cost controls, budget controls, output monitoring**
  - **Inventory controls**
  - **Centralization**
  - **Bureaucratic forms of MCS**
- Emphasis of MCS in companies pursuing differentiation strategies
  - **Decentralized controls**
  - **Flexible structures**
  - **Customers preferences and needs**
  - **Long-term perspective in decision making**
  - **Sales and marketing controls**



## Literature Review & Hypothesis Development (H3)

- **Hypothesis 3:** Shipping Companies with a better fit between their MCS and strategy experience superior performance.
- Companies that adopt MCS according to their strategy outperform companies that do not associate their control systems with their strategies (Kaplan, 1990; Nanni et al., 1992; Meyer, 1994; Sandino, 2007)



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## Sample Description

- Population: 190 Greek-owned, ocean going, merchant marine shipping companies, owning more than 4 vessels at the time of study (not listed on a stock exchange market)
- Age of firms: between 2 and 110 years
- Average age: 23 years old
- Average number of vessels: 16 vessels/ company



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## Research Method

- Exploratory, semi-structured interviews with thirty experts of the industry
- Survey data from 75 companies (40% of the population)
- Controls for non-response bias
- Early vs. Late Respondents (size and age)



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## Field Study on MCS

- **Hypothesis 1:** The Choice of Management Control Systems (MCS) differs across shipping companies contingent on management's preferences for information. The information varies across the dimensions of
  - Information to learn vs. information to monitor
  - Tight vs. flexible information
  - Internal vs. External Information
  - Financial vs. non- financial information



## Field Study on MCS- Examination

- Interviews: participants characterize their MCS in terms of the purposes they fulfill
- Identification of 29 MCS introduced and implemented in the Greek shipping companies



## Field Study on MCS- Examination

- Factor analysis (principal axis factoring with Promax rotation) of the dimensions of information results on two dimensions of information:
  - **To externally orient information**
  - **To minimize costs and achieve operating efficiency**
- Results are consistent with answers by management
- Canonical Correlation confirms that the linear combination of the two dimensions of information explains almost 50% of the variance in a linear combination of the choices of MCS



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## Value Based Categorization of MCS- Examination

- Value Based Categorization of MCS
  - Examination of correlations between information dimensions and use of MCS
  - Logistic Regressions
- A given MCS is assigned to an information purpose only if that purpose is significantly associated with the implementation of that particular MCS across the two analyses conducted



## Value Based Categorization of MCS

**Basic Systems:** Set standards and support basic operations.

- Externally oriented information systems
- Capital budgeting controls
- Quality standards' controls
- Sales productivity standards
- Credit rules and controls
- Off-hire analysis (e.g. off-hire ratios, profit/ship ratios).
- Information systems' controls (IT services)
- Check of bids for repairs
- Check of bids for spare parts
- Controls on selection criteria for the purchase of second hand vessels
- Control for investment in long-term assets



## Value Based Categorization of MCS

**Externally oriented Information** : Collect information about Avoiding internal risks, Protecting asset integrity, Financial Data available to cargo owners

- Compliance with cargo owners' requirements
- Inventory control systems to optimize stock levels and replenishment
- On board inspections
- Budget controls
- Planned Maintenance System (computerized)
- Controls on employee behaviour and development (turnover, training, etc)
- Internal audits, transactions' record, information control



# Value Based Categorization of MCS

## Externally oriented Information (cont.)

- Code of business conduct
- Procedures (specified and recorded)
- Key Performance Indicators (KPIs)
- Statement of Purpose/Mission/Credo
- New buildings control
- Reports for the performance of each department
- Risk assessment Procedures



## Value Based Categorization of MCS

- Information to Minimize Cost : Collect information related to cost minimization
  - **Cost controls**



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### **The Choice of MCS**

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## The Choice of MCS

- Hypothesis 2a: Shipping Companies following **low cost strategies** emphasize more the use of MCS focused on **tight, financial and budget information**, as well as information to control the firm's **quality, costs and operating goals**, more intensely than those not following low-cost strategies.
- Hypothesis 2b: Shipping Companies following **differentiation strategies** emphasize more the use of MCS focused on **flexible information** that allow them to respond rapidly to the environment more intensely than those not following differentiation strategies.



## The Choice of MCS-Examination

- **Univariate Tests**
  - **Split sample into Low Cost and No Low Cost companies**
  - **Contrast in terms of information dimensions**
  - **Contrast in terms of MCS assigned to each category**
  - **Repeat by splitting the sample into Differentiation and no differentiation shipping companies**



## The Choice of MCS- Examination

- Multivariate Tests

- Strategy Model of MCS

$$Pr \left( CHOICEMCS_i = MCS\_category \right) =$$

$$f \left( LOWCOST_i, DIFFERENTIATION_i, CONTROLVARIABLES_i \right)$$

### Control Variables:

- Decentralization
- Search Strategy
- Vertical Diversification
- Subsidiary
- Regulations



## The Choice of MCS- Results

- Shipping Companies following a Low Cost Strategy place more emphasis on Cost MCS than External Information MCS (Basic Controls already include important controls that support low cost strategies)
- Shipping companies that are in the process of defining their strategies are significant predictors of whether to adopt a Cost MCS (learn more about the business, conservative approach)
- Weak relationship between Differentiation Strategies and External Information MCS (they include external information controls as basic MCS)



## The Choice of MCS- Results

- Decentralization leads shipping companies to place more emphasis on the use of Cost MCS versus External Information MCS.
- Shipping companies that apply vertical diversification to their activities are more likely to adopt External Information MCS in order to provide communication between the diverse activities of the organization.



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## Performance Implications of the Choice of MCS

- Hypothesis 3: Shipping Companies with a better fit between their MCS and strategy experience superior performance



## Performance Implications of the Choice of MCS- Examination

- Classification of shipping companies in two groups based on whether or not the choice of MCS deviates from the optimal choice predicted from the Strategy Model of MCS
- Univariate Tests
  - **Comparison of the two groups in terms of**
    - Perceived Performance
    - Perceived Usefulness



# Performance Implications of the Choice of MCS-Examination

- Multivariate Tests
  - Ordinal Regression
  - Ordinary Least Square Regressions

- Performance =  $\left( FIT_i, CONTROLVARIABLES_i \right)$

- Control Variables
  - Experience
  - Size
  - Age



## Performance Implications of the Choice of MCS- Results

- Shipping companies that adopt MCS according to their strategy experience superior business performance and a higher perceived usefulness of MCS.



## Performance Implications of the Choice of MCS- Results

- EXPERIENCE and SIZE are both positively associated with PERCPERFORM.
- EXPERIENCE is negatively associated with USEFULMCS, meaning probably that usefulness of implementation of MCS exists independently of managers' experiences.
- AGE is positively associated with PERCPERFORM but negatively associated with USEFULMCS suggesting that mature companies rely more on systems other than formal MCS in order to ensure viability (such as informal MCS, interpersonal relations, everyday routine etc.)



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## Conclusions

- Shipping companies implement three categories of MCS based on their desired informational purposes
  - **Basic MCS**
  - **Cost MCS**
  - **External Information MCS**
- Choice among the categories of MCS depends on the shipping company's strategy and structure
- Performance implications: Sample firms with the highest performance seemed to have a clear idea of how to use their MCS to support their strategy



## Conclusions- Discussion

***“Controls need to be customized for the company in order to respond to its specific needs and conditions...management of the company should go first and control systems should support the business”***

CEO of large shipping company, Athens