Value of maturity models in performance measurement

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Abstract

Over the last 20 years, the field of performance measurement (PM) has evolved from *measurement* to *management*. Investigations demonstrated the relevance of PM in management of organisations' results. Although maturity model concept was widely used, the value of maturity models in PM have not been purposefully investigated. To address this gap, this research formulated three research questions: (1) How do maturity models in the field of performance measurement and management (PM&M) add value in practice? (2) How do such maturity models compliment and/or replicate the value added by an expert? (3) How do maturity models contribute to the development of the organisation's PM&M practices? Using a predefined research protocol, 12 European manufacturing organisations and independent experts were engaged in conducting two separate studies: (1) the experts conducted reviews with 12 companies using a standard business review format; (2) research team adopted one of the available maturity models and facilitated self-assessments with the management teams of the same 12 companies. Results from both the studies were compared and high levels of congruence identified. The analysis demonstrates that the maturity models with certain characteristics, promote organisational learning as well as enabling efficient and effective assessment of the performance management practices of organisations.

Key words: Performance measurement, performance management practices, maturity models, maturity assessment

1 Introduction

For the past few decades, performance measurement and management is a topic that has become important to both academics and practitioners, which is evident from the review presented by Neely in 2005 to the recent review presented by Choong in 2013. Specifically, Choong (2013) suggests that future research should focus on concepts, theories and modelling techniques pertaining to PMS. In support of this view, in this paper, we argue that although the PM literature contains various PM frameworks and models, there is little theoretical understanding of how these models contribute to the performance measurement practices. With this purpose in mind, this paper explores the role and value of performance measurement and management maturity models in creating robust performance management systems, processes and practices.

Over the last 20 years, the field of performance measurement has developed from *measurement* (i.e. what to measure, how to measure and how to report the results) to *management* (i.e. how to use the measures to manage the performance of the organisation) (Amaratunga and Baldry, 2002; Neely, 2005; Folan and Browne, 2005). Throughout this period, several models and methodologies for performance measurement systems design and implementation have emerged. Garengo, Biazzo and Bititci (2005) provide a succinct review of these models and methodologies. Subsequent empirical investigations have demonstrated the relevance of performance measurement in management of organisations' results (Kaplan and Norton 1993; Loch and Tapper, 2002; Kim and Oh, 2002; Lawler, 2003; Folan and Browne, 2005; Bourne, 2005; Mettanen, 2005; Angerhofer and Angelides, 2006; Franco-Santos *et al*., 2007; Becker, Antuar and Everett, 2011; De Leeuw and Van Den Berg, 2011; Vernadat, Shah, Etienne and Siadat 2013; Hsu, Tan, Kannan and Keong Leong, 2009). Over the years, performance measurement systems have developed into balanced and dynamic

systems, translating organisations' critical success factors into a balanced set of measures facilitating communication of critical objectives and decision-making, as well as enabling organisational learning by gathering, elaborating and analysing critical information (Neely, Adams and Kennerley, 2002). Further development of the field demonstrated the importance of performance management practices to key organisational principles, such as quality and human resource management (Soltani, van der Meer and Williams, 2005; Ebrahimi and Sadeghi, 2013), strategy, change and learning (Neely, 2005; Garvin, Edmondson and Gino, 2008; Senge, 2010), which led to emergence of maturity models for performance measurement and management (Medori and Steeple, 2000; Wettstein and Kueng, 2002; Van Aken *et al.*, 2005; Garengo, 2009; Cocca and Alberti, 2010; Bititci *et al.*, 2011). The fundamental underlying assumption underpinning all these works is that higher maturity is associated with better performance. Few authors explicated this relationship by demonstrating the positive relationship between maturity of performance measures (Evans, 2004) and managerial practices (De Leeuw and Van Den Berg, 2011; Bititci *et al.*, 2011) with better performance.

Despite development and availability of a wide range of maturity models in the field of performance measurement, their practical value and usefulness is not widely investigated. Although the literature review, identified a number of maturity models for performance measurement and management, it has not identified a single paper that explicitly focused on exploring and explaining their value and utility. This phenomenon is not limited to the field of performance measurement and management but it seems to be also true for maturity models in other fields such as business process management and information systems (Rosemann and De Bruin, 2005; Röglinger, Pöppelbuß and Becker, 2012).

The purpose behind this paper is to explore the practical value and usefulness of maturity models for performance measurement and management. A literature review on maturity models is presented which results in the formulation of research questions. An overview of the research methodology is presented that employs an exploratory inductive approach based on twelve European manufacturing companies. After initial investigation, one of the available maturity models is adopted and the researchers engage with independent experts (i.e. external consultants) conducting business reviews with twelve European manufacturing organisations. The research team facilitates assessment of each company's performance management practices using the adopted maturity model. The findings of the independent experts, the performance of the companies and the results of the maturity assessment facilitated by the research team are compared. Analysis identifies high levels of congruence between the two approaches, as well as demonstrating the utility of a maturity model for efficient and effective assessment of the maturity of performance management practices of organisations. In addition, findings also demonstrate that use of maturity models promote greater levels of organisational learning. We also note that, in this context, the role of the independent expert (expert) needs to evolve from a consultant who provide advice to a coach/mentor promoting learning and managerial change. The paper concludes with a framework that illustrates the value and utility of performance measurement maturity models.

2 Background Literature – Maturity Models and Performance Measurement

2.1 Origins and development of maturity models in management

The maturity model concept is not new in management research. During the 1970s, the concept first emerged in the information systems literature for managing the performance of the information systems function. Nolan and Gibson (1974) considered the original founders

of this concept with their four-stage (i.e. Initiation, Expansion, Formalisation and Maturity) maturity model that assessed maturity of an information system's function across four different areas (i.e. budget, applications, personnel, management techniques). Nolan and Gibson's (1974) seminal work led the Software Engineering Institute to develop the Capability Maturity Model (CMM), which essentially is a process maturity framework focused on the information systems function, covering processes such as: People Capability Development, Software Acquisition, System Engineering and Integrated Product Development (Humphrey, 1988 and 1989; Moultrie, Clarkson and Probert, 2007). For each process, the CMM model addresses different practices when process maturity is to be incremented from one stage to the next (Paulk *et al.,* 1993). The Software Engineering Institute (Paulk *et al.,* 1995) defines CMM as "*a description of the stages through which software organizations evolve as they define, implement, measure, control, and improve their software processes*".

Since its development, the maturity model concept has been widely adopted and used in a number of management research fields, including process management and performance measurement. For example, in 1996 the Supply Chain Council (www.supply-chain.org) introduced the Supply Chain Operations Reference Model (well known as the SCOR Model). The SCOR Model is a process reference model for supply-chain management; it provides a framework that links supply chain processes and practices to supply chain performance. The basic argument being that the higher the process maturity, assessed through maturity of supply chain practices, the higher the performance outcome is likely to be. The SCOR framework enables users to assess and improve their supply chain management practices (covering Plan, Source, Make, Deliver, Return and Enable processes) with a view to achieving improved performance outcomes. The SCOR framework, although broadly utilised

in practice, is limited to supply chain management processes and performance measures and does not cover broader performance measurement, management practices and processes included in other performance management models (Poluha, 2007).

2.2 Performance Measurement Maturity Models

Since popularised by the article entitled *'Relevance Lost – The Rise and Fall of Management Accounting'* (Johnson and Kaplan, 1987), the performance measurement literature has evolved from structural and technical aspects of performance measurement to include cultural and behavioural aspects of performance management (Bourne et al, 2005; Bititci et al, 2012; Melnyk et al, 2014). The structural and technical aspects of performance measurement is primarily concerned with what to measure and include managerial processes such as monitoring operating environment, setting direction, formulating and executing strategy, measuring and reviewing performance (Neely, 1996; Mendori and Steeple, 2000; Evans, 2004). The behavioural and cultural aspect of performance management on the other hand are primarily concerned with how these structures are being used to manage the performance of the organisation and include managerial routines such as communications, facilitating informed decision making, establishing organisational culture, managing change, internal and external communications (Tangen, 2005; Bititci et al, 2011).

As the performance measurement literature developed from the structural and technical aspects of performance measurement to include cultural and behavioural aspects of performance management, a number of frameworks or models started to emerge that attempted to audit or assess the appropriateness and the maturity of measurement and management systems employed. For example, Neely *et al.*'s (1996) performance measurement workbook starts with an audit of the status of an organisation's performance

measurement system. Bititci, Carrie, and McDevitt (1997) developed a reference model for integrated performance measurement systems for auditing the integrity of an organisation's performance measurement system. In a similar vein, Medori and Steeple (2000) proposed a framework for auditing and enhancing performance measurement system. Evans (2004) associated maturity of performance measurement systems with the scope of measures used and suggested that mature performance measurement systems report better results in terms of customer, financial and market performance. Tangen (2005) proposed a procedure for evaluating and improving performance measurement systems by addressing the "how to measure?" question rather than "what to measure?". Their procedure involves selecting a formula that fulfils the measure's purpose, formulating all necessary specifications, identifying the measure's properties and classifying the importance of the measure. Although it could be argued that all these frameworks and models are a form of maturity model, they are largely focused on the design of the performance measurement system. They audit for alignment of measures with organisational goals and objectives, redundancy of measures and gaps in measurement, as well as appropriate definition and formulation of measures. In exceptional cases, they also explore how the measures are used, but this tends to be limited to frequency of reporting, breadth of communication, review and updating policies, rather than the actual managerial practices employed in the process of managing performance. Wettstein and Kueng (2002) argue that the process of managing performance is more than just a group of selected measures, but it includes people, data, software and hardware, as well as managerial routines.

Other works have taken an evolutionary approach to performance measurement and management. For instance, Speckbacher, Bischof and Pfeiffer (2003) defined three types of performance measurement system based on the balanced scorecard, representing the three

evolutionary phases of a performance measurement system. Type I comprises of a balanced set of strategic measures. Type II is as Type I but includes an awareness of the cause-and-effect relationships within the measurement system. Type III is similar to Type II but also includes incentives that link with strategic objectives and plans. Continuing on the evolutionary approach Wettstein and Kueng (2002) proposed, arguably, the first maturity model per se for performance measurement. In their model, they have classified performance management into four stages of maturity (i.e. ad hoc, adolescent, grown-up and mature) across six dimensions (i.e. data collection, data storage, communication of results, use of measures, quality of measurement process and scope of measurement). According to their model, the performance management process matures as it evolves from one stage to the next across all of the six dimensions. On a similar vein, Van Aken *et al.* (2005) proposed an Improvement System Assessment Tool (ISAT) for assessing the maturity and effectiveness of performance measurement systems as part of an overall system for organisational improvement. Their assessment framework is based on other business excellence frameworks - such as Malcolm Baldrige Framework and European Foundation for Quality Management - EFQM (Tummala and Tang, 1996) - and covers assessment dimensions such as: Structured approach for defining metrics; Cross-functional involvement in defining metrics; Deployment of metrics; Clear and consistent communication of metrics; Definition of causal relationships across metrics; Refinement of metrics.

Garengo (2009) proposed a maturity model, to assess the structure of the performance measurement system and some of the managerial practices, that seems to be an adaptation of the models previously proposed (see, for instance, Gibson and Nolan, 1974; Humphrey, 1988; Speckbacher, Bischof and Pfeiffer, 2003; Wettstein and Kueng, 2002). It arranges the performance measurement system into three typologies (base, advanced and excellent) based

on how organisations use measures to manage performances, including: revision, systematic use and integration of the measures and their measurement scope i.e., what companies are measuring. Cocca and Alberti (2010) outline a maturity model to assess maturity of performance measurement system for Small and Medium Enterprises (SMEs). The proposed self-assessment tool consists of a set of maturity grids for performance measurement system requirements that adapts the recommendations available in literature to SME characteristics and covers three categories: performance measurement requirements, characteristics of the performance measurement system, and requirements of the performance measurement process. De Leeuw and Van der Berg (2011), in studying the relationship between operational performance management practices and shop floor performance, implicitly associate higher maturity with the number of normative performance measurement and management practices adopted that deliver enhanced understanding, motivation and improvement activities leading to better shop floor performance. Finally, Bititci *et al.* (2011) introduced a maturity model based on normative practices identified in the literature and practices observed in organisations, classified according to their performance. In their model, they have identified thirty-seven managerial activities that combine to deliver five key managerial processes undertaken for the purpose of performance management. Their model, supported with a maturity assessment tool, assesses the maturity of managerial activities and processes using a nine-point scale mapped against three broad maturity levels (basic, intermediate, advanced).

2.3 Conclusion

The review of literature presented above has led us to two distinct but related conclusions. Firstly, there appears to be terminology haze with terms such as audit frameworks, normative models and maturity models being used interchangeably, with no agreed definitions for what

a maturity model is. Therefore, to clarify this confusion and to provide the basis of the work presented in this paper, we offer the following definitions.

- ***Maturity,*** in the context of performance measurement**,** is defined as the ability to respond to the environment in an appropriate manner through performance measurement and management practices (Adapted from definition of maturity used in the psychology literature - Wechsler, 1950). This response is generally learned rather than instinctive but maturity does not necessarily relate to the age of the firm, it is a reflection of the appropriateness of its measurement and management practices in the context of its strategic objectives and in response to environmental change (Scott and Bruce, 1987; Garengo and Bernardi, 2007).
- ***Maturity model is*** a matrix of practices that define, for each organisational area the level of formality, sophistication and embeddedness of practices from ad-hoc through to optimising. Maturity of an activity is said to increase from ad-hoc to optimising.
- ***Maturity assessment is*** the systematic use of a maturity model to position current practices of an organisation against the maturity scale (i.e. from ad-hoc to optimising).

Secondly, although the preceding paragraphs confirm the relevance of the maturity model concept for business processes in general and performance measurement in particular, the practical value of such approaches for performance measurement remains unexplored. Most of the studies investigating the value of maturity models focus on information systems (see, for instance, Padma, Ganesh and Rajendran, 2008; Shang and Lin, 2009) with only a few authors recently investigating alternative processes such as knowledge management (Chen and Fong, 2012) and new product development (Dooley, Subra and Anderson, 2001; Panizzolo, Biazzo and Garengo, 2010) and supply chain management (Vanathi and Swamynathan, 2013; Meng, Sun and Jones, 2011).

Further, while the relationship between maturity and performance is well understood, i.e. higher levels of maturity leads to higher levels of performance (Dooley, Subra and Anderson, 2001; Bititci *et al.*, 2011; Chen and Fong, 2012), the role of maturity models in enabling this relationship is not so well understood. Traditionally, when an organisation wishes to review the maturity of its practices they consult an expert to advise how these could be developed with a view to improving performance. In this respect, how maturity models add value towards improving practices and organisational performance is not explored and understood well. Also, the existing literature does not explicate whether maturity models replace or compliment the role of the external expert.

There appears to be a growing consensus towards the conclusion that the usefulness and practical value of maturity models, in general, is not well researched and understood (Rosemann and De Bruin, 2005; Wendler, 2012; Röglinger, Pöppelbuß and Becker, 2012). Our review of the literature on maturity models for performance measurement and management also yields similar results with implicit assertions about their value rather than results based on purposeful investigations.

Evidently, although the phenomenon of maturity models for performance measurement and management is well recognised, there is a clear gap in knowledge as to how these models add value in comparison to more traditional ways of diagnosing improvement opportunities. These insights have led us to formulate the following research questions, explored through a qualitative inductive study throughout the remainder of this paper.

- How do maturity models in the field of performance measurement and management add value in practice?

- How do such maturity models compliment and/or replicate the value added by an external expert?
- How do such maturity models contribute to the development of the organisation's performance measurement and management practices?

Figure 1 provides an overview of our conceptual framework that links the performance management process to maturity models, role of the expert and our research questions.

<Insert Figure 1>

3 Research Design

In order to answer the research questions posed and due to the exploratory nature of enquiry, a qualitative research design, involving a multiple case studies, was adopted (Eisenhardt and Graebner, 2007; Meredith, 1998). This approach is particularly appropriate due to the distinct lack of previous research exploring and theorising the value that maturity models bring in the field of performance measurement (Barratt, Choi and Li, 2011). In addition, case studies are considered as one of the most powerful strategies for inductive research (Eisenhardt and Graebner, 2007; Voss, Tsikriktsis and Frohlich, 2002).

Our approach exploited a unique opportunity provided through a European project. Firstly, Bititci *et al.*'s (2011) maturity model is adopted after evaluating the performance measurement maturity models available in literature. Secondly, the maturity model is used to assess the maturity of the performance measurement practices of twelve manufacturing organisations. Thirdly, independent experts conduct business reviews against a predefined structure in the same twelve manufacturing organisations. Finally, the maturity assessment

results (using the maturity model) are compared against the independent expert's assessment of the companies' managerial maturity. The ensuing work first analysed each case study independently (i.e. within-case analysis) followed by a cross-case analysis. This research design, illustrated in Figure 2, is further detailed in the following sections.

<Insert Figure 2 >

3.1 Maturity Model Selection

Many of the maturity models for performance measurement focus on assessing the structural and technical factors of the performance measurement system rather than behavioural and cultural factors. For example, they seek to explore if there is a balanced set of measures and whether these measures are deployed to lower levels of an organisation, but they do not attempt to assess how these metrics are being used, i.e. the managerial practices. In contrast, literature underlines that performance differentials are attributable to differences in practices carried out in each activity rather than the activity itself, i.e. how things are done rather than what is done (Bititci *et al.*, 2011; Pavlov and Bourne, 2011; Raineri, 2011). Furthermore, the maturity models for performance measurement reviewed are mostly based on normative activities and practices deduced from the literature, and do not directly attribute managerial practices to performance outcomes. This rationale, together with a more comprehensive coverage of behavioural factors associated with performance management provided a compelling argument for adopting Bititci *et al.*'s (2011) maturity model that links performance outcomes to managerial practices. It is also publicly available as an MS Excel

based assessment tool[1]. Table 1 summarises our critical evaluation of available maturity models against our selection criteria.

<Insert Table 1>

The selected maturity model assesses 36 different managerial activities against three practice maturity levels (basic, intermediate and advanced) through a nine-point scoring system. In using the maturity model, management teams rate their maturity level by comparing their practices against the practices described in the maturity model, as exemplified in Figure 3a. When all the activities are assessed, a profile is produced that synthesises the companies' overall maturity against key activity area, as well as comparing their maturity levels to the maturities of high and low performing companies within the database (Figure 3b).

<Insert Figure 3a>

<Insert Figure 3b>

3.2 Empirical Study

According to Barratt, Choi and Li, (2011) a well-designed inductive research adopting a qualitative case study approach must fulfil certain criteria. Having previously justified the appropriateness of an inductive case study based approach, we have organised the remainder of this section according to this criteria.

Our ***unit of analysis*** was twelve medium sized manufacturing companies from various European countries. These companies were participating in a wider European project due to

[1] Visit www.strath.ac.uk/dmem/research/researchprojects/manageprocesses and follow the link for Impact Tool on the right hand side of the page.

their uniformity in size, i.e. between 50-250 employees. According to literature (Hakserver, 1996; Voss et al., 1998; Wiele and Brown, 1998), companies employing less than 50 people and more than 500 people are considered to represent different levels of managerial capability. In addition, the participating companies all had independent ownership status, pan European nature and manufacturing focus. All twelve companies have been in existence for over ten years, suggesting that they have developed managerial routines.

Data was collected through two separate and independent approaches. The first approach involved a range of independent experts, as part of the wider European project, conducting structured business reviews with twelve companies. The second approach involved the research team facilitating a self-assessment of the companies' managerial practices using the maturity assessment tool (MAT).

First approach involved the experts conducting business reviews with the twelve companies. Although these experts came from a wide range of commercial or public organisations (such as Ernst & Young in Italy, Manufacturing Advisory Service in the UK, DTA in Turkey, Lean Enterprise Institute in Poland, Tsunami in Ireland), in order to ensure consistency and repeatability they used a predefined protocol to conduct the business reviews in the company's native language. The protocol prescribed the use of semi-structured face-to-face interviews of approximately two hours to encourage senior management teams to talk freely about how they manage performance. On average five members of the management team were interviewed by the independent experts. To ensure consistency, additional supporting data was collected in the form of internal reports and media publications (Eisenhardt, 1989a; Miles and Huberman, 1994).

The business reviews were structured as follows: strategic posture; competencies and capabilities; management and operational tools and techniques; operating model; performance management ; leadership, people and culture; future plans for the business; external support and relationships; market conditions; challenges emerging from the business environment and company performance relative to their competitors. The findings of these business reviews were reported against a predefined template in English. The reports were reviewed and validated with the management teams and the experts before being finalised.

The second approach involved the research team visiting the same group of companies to assess the companies' managerial practices using the maturity assessment tool (MAT). In order to prevent the results being influenced by the business reviews, the maturity assessments were scheduled after the completion of business reviews by independent experts, but before the companies received feedback from these reviews. The maturity assessments were conducted through a half-day workshop with the management teams where the research team facilitated discussion around each one of the activity areas in the MAT. This typically involved Managing Director/General Manager and his/her direct reports and any other pertinent persons. In a limited number of cases, interpreters were used to ensure accurate translation. In order to avoid the bias/influence, the research team only facilitated the use of maturity model while the management teams were solely responsible for the final decision concerning the level of maturity for each activity. The results of the maturity assessments were fed-back to the management teams but without further changes to their overall maturity scores. The maturity model assessment process comprised of the following four steps:

(1) The research team visits the company representative (usually the general manager/owner or one of his/her direct reports, e.g. operations director, commercial director) to agree time, scope and attendance for the maturity assessment workshop.

(2) Each participant is contacted with a short brief about the maturity assessment process and their expected role in the process.

(3) Maturity assessments are conducted with at least two members of the research team facilitating the discussion. A PC projector is used to project the maturity scale (Figure 3a) and the management team agrees (usually after some discussion) the maturity level that best represents their practices against that activity. The research team uses the software to record the evidence and rationale that resulted in selection of a particular maturity level. During the project, the facilitators (i.e. research team members) refrain from making any judgements but they do provide explanation around the questions asked.

(4) Once all 36 areas are assessed, the overall maturity report is produced (Figure 3b) and discussed with the management team usually revisiting some of the scores while recording additional evidence.

(5) The company performance was evaluated according to the approach described in Bititci et al (2012) using a set of leading (growth in revenue, profitability, value added productivity) and lagging (investment in new products, new markets, people development) indicators. Assessment were conducted on a five point scale (from well below average to well above average) by the managers in relation to the sector in which the company operates. The performance score was determined by averaging the score obtained against each performance measure and then the overall result validated against external publicly available data.

Initially, data was collected over a period of six months during the second half of 2010. However, the companies were encouraged to repeat the maturity assessment process themselves, without external facilitation, in six monthly intervals. During 2011, the research

team visited the companies at six monthly intervals to interview management team members to ascertain their experiences with the use of the maturity model. Figure 4 illustrates an overview of the data collection process whilst Table 2 provides a summary of data collection and analysis protocols used in this research.

<Insert Figure 4>

<Insert Table 2>

3.3. Analysis

In this phase, informed by Platts (1993) framework of feasibility (could the process be followed); usability (how easily could the process be followed); and utility (did the process provide value), the objective was to explore the relationships between:

- Managerial maturity of organisations as assessed using maturity model
- Managerial maturity of the organisations as assessed by the independent experts
- Company performance based on a scoring template (Bititci *et al.*, 2012)

For this purpose, the research team used the interview recordings and notes with management teams and independent experts, finalised business review reports from experts, the maturity assessment reports and their research notes as the key input for analysis. Content analysis (Strauss, 1987; Davies *et al.*, 2003) and causal mapping (Markbczy and Goldberg, 1995) techniques were adopted. Coding of the data in N-Vivo software was considered for conducting pattern analysis. However, with only 12 case studies, it was found more effective to organise all the inputs in a visual format on a wall enabling the research team to manually observe patterns (Mintzberg, 2005). Through several meetings, the research team discussed the potential patterns and meanings that led to the development of initial models in the form of causal maps. These initial models were verified and tested with the management teams and

independent experts involved. Initially this analysis was conducted for each case study and once the findings of each case study were finalised, the team used the same approach to conduct the cross case analysis (Eisenhardt, 1989b; Miles and Huberman, 1994; Eisenhardt and Graebner, 2007). Having collected and analysed data from all twelve companies, six of these cases have been reported in Appendix 1 of this paper representing two cases from each maturity category, i.e. basic, intermediate and advanced.

In summary, the research found high levels of consistency between the three viewpoints, as illustrated in Table 3. The maturity score for each activity for all twelve companies is initially ranked. Then the average rank for each company is computed by taking the arithmetic mean of the ranks achieved against each one of the 36 activities. The data is organised with companies from high maturity (low average rank score) to low maturity (high average rank score) along with the standard deviation of rank scores, corresponding company performance scores and maturity scores as evaluated by the experts.

<Insert Table 3>

4. **Discussion**

The objective of this research is to explore the value of performance measurement maturity models in practice. More specifically, it sets out to seek answers to three research questions. During this research, a number of phenomena were observed that are discussed in the following paragraphs in the context of the research questions.

4.1 Value of the performance measurement maturity models

The adopted maturity model was used in facilitated workshops in twelve European manufacturing organisations. The facilitated assessment required about three to four hours of the management team time. Throughout the process, there were no significant difficulties with

understanding of the concepts and the use of the maturity model. Based on the discussion that will follow, it could be surmised that the maturity model was clear and easy-to-use and enabled the company to assess its performance management practices and identified areas for improvement.

An alternative way of using the maturity model could have been several members of a company each completing the assessment separately and then getting together to discuss the main differences. However, we observed that in addition to the main output (i.e. the maturity assessment results) the management teams found the discussion beneficial, as evidenced by the following quotes.

> "*We have been in business for over twenty years. We have management meetings every month but all we talk about is our sales, profits, problem customers, suppliers, banks and so on. As a team this is the first time we had the opportunity to discuss how we manage. The differences in opinion were staggering. I learned a lot and I am sure others did as well*". Family Member/Commercial Director of AY

> "I believe *the results of the maturity review are accurate and provides us with useful hints towards what we need to do. For me, the most valuable part, was the opportunity to discuss with colleagues what we each think about our processes. It was useful to understand what others were thinking*". Managing Director of LN

This suggests that the process of assessment facilitates learning about the normative practices and contextualisation of this knowledge into their own company situation. It enables the management team to think and reflect together about their performance management

practices. It seems that a facilitator led, maturity model based, assessment process creates an environment free of position-influenced biases and serves to capture a variety of views exploiting the organisation's collective wisdom. This is indeed in line with the recent literature contending that the main purpose of performance measurement should be learning rather than control (see, for instance, Davenport, 2006; Garvin, Edmondson and Gino, 2008; Hamel, 2009; Davenport, Harris and Morison, 2010).

Following the initial facilitated workshops, without the need for an external facilitator the companies were able to repeat the assessment themselves approximately six months later. In 3 out of the 12 cases, the follow-on self-assessment conducted by the management teams proved to be more critical than the original ones. This was reflected in the form of lower maturity scores in certain areas. When quizzed, the management teams attributed this phenomenon to learning. They felt that the initial assessment drew attention on to a particular practice area, which made them think, reflect and look at practices of other organisations in their everyday network. Consequently, during the follow up assessments they were more critical of their own organisations. This is echoed in the following quotes.

> *"I believe this project helped us to learn about how to manage at a higher level. Before, we were consumed by performance and business results. Now we have learned to review how we manage"*. Owner/Partner of DK.

> "*I thought we all had the same views about the company. I was surprised at the diversity of opinions on why we do what we do and how it works. In fact, the second time we did this [assessment] we came up with even more diverse opinions and views. I think we have been more aware of our weaknesses and we have been looking at other*

organisations and learning from them so the second time our opinions were more critical" Co-Owner and Managing Director of FT.

Clearly, the assessment process facilitates organisational learning by not just focusing on correction of mistakes and solving current problems but by facilitating: open discussion along predefined and structured paths (as directed by the content of maturity model); reflection on current practices and introducing new ideas (i.e. normative practices); communication and dissemination of gaps and needs for change; awareness of and learning from practices of other companies. This is consistent with the current literature on organisational learning (Garvin, Edmondson and Gino, 2008; Senge, 2010).

The output of the process delivers a consistent analysis of the company's performance management practices against normative practices. This supports a more reliable approach to improvement and organisational change as it provides the basis for clear and concise dissemination and communication, i.e. from the current practices and behaviours towards the normative practices and behaviours.

These results support the proposition that use of a maturity model based assessments serve to develop the managerial capabilities of SMEs. The performance measurement literature characterises SMEs as predominantly operationally focused with low managerial capability, limited human and capital resources, reluctance to engage external support, short-term orientation, reliance on tacit knowledge and little effort on formalisation of processes and misconception of performance measurement as a bureaucratic control mechanism (Franco and Bourne, 2003; Fuller-Love, 2006; Garengo and Bititci, 2007; Garengo, Biazzo and Bititci, 2005; Hudson-Smith and Smith, 2007; Turner, Bititci and Nudurupati, 2005; Wiesner,

McDonald and Banham, 2007). Therefore, we would contest that the engagement of SME management teams in a discussion about the maturity of their performance management practices will serve to develop their knowledge and understanding of performance measurement in the context of their performance measurement practices.

4.2 Role of the expert

Based on the discussion, so far it is evident that maturity models not only facilitate the diagnosis of an organisation's performance management practices, but also enable organisational learning. Our research demonstrates high levels of agreement between the assessments conducted using the maturity model and the expert opinions. This suggests that such a maturity model maybe used to provide an initial overview of the organisation's managerial maturity. However, evidence suggests that assessments using the maturity model approach are more valuable than the experts opinion as they result in greater ownership of the assessment results, as supported by the following quotes.

> *"[During the interviews] it was difficult to take in what the consultant was trying to get to, maybe I was just sceptical, the discussion we had with the team [the research team] about the maturity of our processes helped me to understand what the consultant was trying to say*". General Manager of BP

> *"I could see what the consultant was trying to do during his interview but it did not really hit home until we sat down and discussed our practices amongst the group [management team]. Now that I have thought about it I do not think she was critical enough".* Managing Director of HD

In this case, the experts interviewed each management team member individually and then analysed their findings and came to a conclusion. This process took them three to four man-days, in contrast to half-day of elapsed time for maturity model based assessment. Furthermore, with maturity model based assessments the results were immediately available, but it takes the expert approximately one week (or more in some cases) to prepare his/her report and feed it back to the company. In fact, significant differences are observed in the acceptance and ownership of the reports emerging from the two approaches. The management teams had much greater ownership of the model based maturity assessment results compared to the experts' reports. Hence, it can be inferred that this phenomenon is directly attributable to the involvement of the management team in the assessment process, which facilitates discussion, reflection and learning, as discussed above. The potential benefits of this are reflected in the following quote.

> *"I did not appreciate how much efficiency we could be gaining using this [maturity model] technique. I have over twenty account managers in my team. Each conducts several, perhaps five or six, business reviews with our account managed companies. We budget six man-days for each business review and still get some kick-back [disagreement] from the management. With this, we could do more business reviews each year. This is a key measure for me. My challenge will be to get our account managers to accept this way of working, they like going in telling companies what they need to do, they are not very good at coaching people"* Business Director of a national SME support agency.

However, it is not suggested that the model based maturity assessment approach can replace the external expert entirely. Rather, it is proposed that the role of expert should evolve from someone who conducts analysis, identifies gaps in practice and formulates recommendations

to someone who facilitates the management team to discuss, reflect and learn. In this new role, they should lead the management team towards formulating a collective view on the maturity of their performance management practices and identify improvement opportunities and priorities for change. The expert's knowledge could then be engaged more constructively to guide the organisation through the change process. Indeed, these findings confirms the current debate in the management consulting literature, often criticised for their mystery and ambiguity (Walsh, 2001; Belkhodja, Karuranga and Morin, 2012; Belkhodja, 2013).

4.3 Management style and the use of maturity models

Concerning the *use of the maturity model*, the empirical data highlights a relationship between management style, performance management practices and long-term performance. The low performing companies with low maturity levels seem to demonstrate a more closed, command and control management style. In contrast, the high performing firms with high maturity levels demonstrate a more open and empowered management style. For example, in NS, one of the low performing companies, there is a well-defined mechanistic process for managing employee performance, but the social/human aspects are missing. In AY, another low performing company, there are some KPIs but performance is largely managed through informal processes by the family members in a command and control environment, i.e. how to reward individuals. In contrast, FT, one of the high performing companies, has an open development process that is linked to financial rewards, and everyone gets a financial reward based on the company's overall performance. Similarly, in BP, the second highest performing company, there is a well-defined process where everyone gets a salary increase to coincide with inflation, plus a bonus where 50% of the bonus is based on the company's overall performance, 25% on peer evaluation and 25% on personal objectives.

In fact, this relationship between performance measurement and management style has been previously recognised and discussed in the 1960s and 1970s with Tannenbaum (1968) and Child (1973, 1972) introducing the concept of organisational control. They suggest two contradicting approaches to organisational control: *Rational control*, focusing on bureaucratic and structural elements of the organisation; and *cultural control*, focusing on personal interaction and social forces. Nandan (1996) argues that the performance measurement literature has taken a rational approach to control and concentrate on the structural mechanisms to secure effective co-ordination and control in organisational interaction. However, more recently there is growing support emerging in the literature for cultural control based approaches to performance management. Authors such as Johnson and Broms (2000); Ghoshal (2005), Hamel (2009) and Pink (2009) criticise the fundamental principles of today's management theories. In particular, Hamel (2009) suggests that control has to come mostly from organisational norms and not from rigid and bureaucratic processes. He goes on to argue that the performance management approach needs to be reinvented to take into account of critical human capabilities that drive success in the creative economy. Pink (2009) provides evidence that people, particularly knowledge-workers, are less motivated by performance rewards, rather they are motivated by *autonomy*, i.e. the desire to direct our own lives, *mastery*, i.e. the urge to get better and better at something that matters, and *purpose*, i.e. the yearning to do what we do in the service of something larger than ourselves.

The observations, throughout this research suggests that the use of maturity models, such as the one adopted in this research, are more effective when used in an open management environment where people are empowered with high degrees of trust, openness, conflict resolution, collaboration and joint problem solving.

Finally, concerning the characteristics of the maturity model adopted for this research in Table 1, we observed that having maturity model that linked maturity levels to performance outcome in a credible way together with a user friendly assessment tool significantly facilitated the acceptance of the maturity model by the management teams. We also observed that managers spent more time discussing and reviewing their management practices in comparison to their measurement practices. These observations serve to validate the relevance of the criteria adopted.

5. **Conclusions**

We started this paper with the objective of addressing the gap in the literature concerning the value of performance measurement maturity models. We have observed extensive use of maturity models in different areas of management research and practice. However, the distinct lack of purposeful research in to the value of maturity models in general and performance measurement in particular somewhat surprised us. Through this paper, as well as contribution towards a better understanding of the feasibility, usability and utility (i.e. value) of maturity models in performance measurement, we also contribute to broader management literature by providing some definitions and offering some insights in to the value of maturity models in general. Reflecting on Platts (1993), we demonstrated that the use of performance measurement maturity models are *feasible*. This confirms current knowledge as we already abserved wide use of maturity models in the field. Concerning *usability*, the research demonstrates that the performance measurement models can be easily used in a facilitated mode or in a self-assessment model once the management team have gained sufficient understanding and experience of suing such models. Concerning their *value*, our first research question, the framework that emerged from our results and ensuing discussion (Figure 5) suggests that maturity models add value in two ways.

Firstly, the maturity model approach provides a framework that enables discussion amongst the management team, moderated by initial facilitation. This discussion increases buy-in and ownership of the outcome of the assessment, thus enhancing and facilitating organisational learning. This, in turn, serves to enhance the managerial capabilities of the organisation and makes the management team more critical about their practices, which further reinforces organisational learning.

Secondly, the maturity model approach enables faster production of assessment results, making reviewing of organisational practices more efficient. This, in turn, encourages the frequency of regular reviews, thus further reinforcing organisational learning and continuous development of managerial capabilities.

<Insert Figure 5>

In the context of our second research question, the role of the expert should evolve from an expert consultant to a facilitator and a coach whose role is to guide the organisation through the logical framework presented by the maturity model. He/she is there to make the management team think in a critical way about their business and not to pass judgement on the organisation's practices, i.e. judging is done by the management team under careful guidance of the expert. In this way, there are greater levels of ownership and organisational learning leading to higher levels of managerial capability.

Concerning our third research question, *how maturity models contribute to the development of the organisation's performance measurement and management practices,* the answer appears to be through enhanced organisational learning. As demonstrated in our first and second points above the maturity models, together with facilitation, provide a safe framework for

self-criticism. This, coupled with awareness of normative practices and the ownership of the gaps, results in initiatives that develop an organisation's performance measurement and management practices. Finally, it is also evident that the framework emerging from the research is more likely to be realised in an open managerial environment where there is a degree of psychological safety, tolerance to different views and time for reflection.

The implication for further research is that the framework provides a number of further research opportunities. Firstly, the propositions that emerge from the framework would need to be tested and verified under different contextual conditions using deductive approaches. Further inductive, fine-grained longitudinal case studies will also serve to reinforce and challenge some of the assertions made. Secondly, and perhaps more significantly, where previous works largely position performance measurement either within the organisational control systems theory (Otley 1999; Henri, 2006) or contingency theory (Chenhall 2003; Garengo and Bititci 2007; Hoque, 2004), the findings of this research suggest that performance measurement and management should be studied also from organisational capabilities and organisational learning lenses. Thus going back to Choong (2013), we would suggest that performance measurement is a discipline that sits in the juxtaposition of different theoretical lenses and that if we are to develop an in-depth theoretical understanding of performance measurement we need to find new ways or theories to integrate these viewpoints.

A practical implication of the conclusions is that the continual use of such models for self-assessment should result in growth in the maturity levels of performance management practices that should lead to improved levels of performance. With experience, the need for external facilitation should reduce and, in time, a management team should be able to use the

model to conduct self-assessments without the need for an external facilitator. However, expertise may still be required to guide the organisation through the change.

Concerning the repeatability and reliability of the research presented in this paper, the findings and conclusions are based on three qualifications. First, the research adopted and used a certain maturity model with specific characteristics as outlined earlier. It is therefore possible that the research findings and conclusions are limited to performance measurement and management maturity models displaying similar characteristics. Second, the research is based on twelve fine-grained case studies. Although it is not possible to claim universal generalisability, it can be argued that the conclusions and findings should be applicable to a wider group of organisations as the twelve case study companies operated in different sectors across seven European countries (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). However, it is appreciated that similar studies conducted in other parts of the world using different maturity models may yield different results due to a variety of contextual factors, including cultural differences. Third, the assessments and scores used to conduct this research are largely based on expert opinion and judgement, even though these have been rigorously validated where practically possible, there may be certain degree of subjectivity in the findings presented. Thus, these findings, observations and conclusions should be read and interpreted in this light.

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Appendix 1

Two High Performing Cases

	Case: FT	Case: BP
Company Overview	FT is based in Turkey, manufacturing various industrial and commercial heat exchangers. It employs around 240 people.	BP is located in Poland and it produces and distributes ink cartridges and toners for laser printers. It employs around 210 people.
Company Performance	Well above industry average.	Well above industry average.
Maturity Model Assessment	High score across all areas with maturity scores just below benchmark companies. The few areas that showed some potential for improvement included definition of improvement activities and setting of short term goals. Overall, the maturity of FT's performance management practices was ranked as 2.78 and rated as *Advanced*.	High score across most areas with maturity scores being just below the benchmark companies. The key areas required management of change with particular weaknesses in the communication of performance gaps and change. Overall, the maturity of BP's performance management practices was ranked as 3.32 and rated as *Advanced*.
Expert Report Overview	FT is a high growth firm that is privately owned and managed by an independent professional general manager. Although the owner still has a managerial interest in the business, almost all aspects of management are delegated to a professional management team. The business is built around a clear and compelling value proposition that focuses on efficient, robust and reliable products, backed up with solid customer service. This philosophy is then consistently articulated and communicated across all parts of the business. There is evidence of continuous investment towards development of products, processes and systems in support of this value proposition, such as - investment of 5% of revenue on research and product development, implementation of an enterprise resource planning (ERP) system, investment in new production facilities, exploration of lean and the quick response manufacturing (QRM) principles, investment in marketing, strategic market positioning and corporate social responsibility (CSR) activities. There is also evidence of consistent use of management concepts, tools, techniques and technologies, such as benchmarking, quality management systems, SWOT analysis, competitor analysis, employee appraisal and development systems, ERP and barcoding technologies, voice of the customer (VoC) surveys and so on. Even though the management team did not consciously recognised managerial processes, but they managed them as processes and demonstrated high levels of maturity across all levels of managerial activities. This is exemplified by a recent strategy planning and management study they have undertaken as a step towards formalising their strategy management process.	A company that is managed by a professional management team, that has been successful in dominating its target market in Eastern Europe, and is actively trying to increase its presence in Western Europe. The business is built around a clear value proposition that is "*more capacity for the same price as the OEM with equal quality*", thus offering its customers a reduced unit cost when compared to OEMs without compromising on quality. The management team clearly recognises the critical factors for success and continuously strives to develop them. These factors include investment in new product development to keep up with OEM's tactical product and specification changes, establishment and exploitation of clear routes to market supported with appropriate distribution strategies for ensuring a continuous supply of critical raw materials (blank cartridges). In fact, some years ago the company acquired another company in order to control supply of critical blank cartridges, which serves to demonstrate strategic thinking and willingness to invest in future of the company with confidence. The company makes use of policy deployment, balanced scorecard and process management concepts and have developed their internal strategic management process based on these concepts. In addition, they have made significant strides towards implementation of lean manufacturing principles, supported by visual management techniques and backed-up by information systems as deemed appropriate. There is also clear evidence that the key weaknesses of the business, and particularly its vulnerability to increasing competition from low cost economies, is well recognised. The strategy management process provides some evidence of this recognition and how the company is planning to mitigate against these threats and develop competencies that would ensure continuing competitive advantage.
Overall expert assessment	A well-managed company that is purposeful and focused. It displayed high levels of managerial maturity with conscious and well-executed decisions. The fact that the company has gained 30% of market share across Europe in the face of stiff competition from low cost economies providing ample evidence to back up the high levels of managerial maturity and performance of the business (see Table 1).	A well-managed company with high levels of managerial maturity that is exemplified with very well sorted strategic management and communication processes. It recognises key weaknesses and threats and have plans in place that deal with them in a systematic way. Further investment in visual management methods could make a significant difference in the company's ability to monitor progress towards achieving targets and to manage change.

Two Medium Performing Cases

	Case: HD	Case: LN
Company Overview	Founded in 1988 to offer co-packing and bonded warehousing services to the Scottish drinks industry. Currently employs 63 people.	LN is located in the UK and it specialises in design, manufacture and worldwide marketing of home entertainment systems currently employing 185 people
Company Performance	Above industry average.	Above industry average.
Maturity Model Assessment	Across most areas the maturity score for HD was average with weaknesses in management of communication and culture. More specifically management of staff performance, rewards and feedback were identified as areas requiring particular attention. The maturity of HD's performance management practices was ranked as 6.31 and rated as *Medium*.	Across most areas the maturity score for LN was average compared to benchmark companies with weaknesses in management of change and culture with a particular weakness in managing and resourcing of change. Overall, the maturity of FT performance management practices was ranked as 7.4 and rated as *Medium*.
Expert Report Overview	The company is privately owned by four shareholders and it is governed by the management board of shareholders, presided by a chairman. This board determines the strategic direction and plans for the company. The operations director then implements this with his management team and effectively leads the company. The chairman takes quite an active role in the organisation and has been the catalyst for the move towards a customer relationship management focus. The strategy is regularly reviewed and objectives and targets changed, if necessary, in consultation with the management board. A bonded warehouse management system (Bondmaster) allows the company to meet the legal obligations. The company also uses an ERP system for production planning and accounts. However, the capability of these two systems are not fully utilised and are not compatible (so they work independent of each other). In terms of *performance management*, the majority of 'formal' measures are financial, with some operational KPIs recorded, such as cases per man hour and profitability per order. Although other measures are informally monitored (such as on-time delivery and customer satisfaction), there is no process for managing them. The speed of the lines and infrequency of issues would make the investment for in-line measurement of productivity, breakdowns, etc., unnecessary. The performance of individual people is not measured as there is a 'work hard' culture in the organisation and the management believes that their staff does a good job in that regard. Staff development is seen to be an area of concern in the company along with communication at all levels. Strategy management was considered to be a strength. Spreadsheets are a common mechanism for capturing and presenting performance data. Recently the company has developed standard operations procedures and it has introduced lean and six sigma techniques.	The recently constituted management team is not yet working as a team to develop strategic or long-term goals. The focus seems to be on day-to-day tasks and performance to return the company to profit. The new management team has changed its approach to planning and targets. It realised that a number of legacy measures existed and information was not being used in a constructive way, and so slim-lined the key performance indicators to reflect what is actually important to the business. The MD gives a monthly 'town hall' talk to all employees, and presents current performance of the business and any planned changes. Daily meetings give managers the opportunity to communicate the vision and objectives of the company. The decisions are made in a participative way. An ERP system provides the backbone for information management, however some of the functionality is under-utilised and the system contains lots of redundant information. The company is currently working to update the system to ensure that all data is reliable and consistent. The documentation system is robust and well-structured and the team has introduced a degree of standardisation of basic parts, in line with the platform approach. Performance is managed in a fairly balanced way, with standard financial production efficiency, customer and supplier-related performance indicators. Daily production meetings review the previous day's performance and decisions are made as to how to improve or maintain the results. Customer satisfaction is measured informally through online forums, blogs and talking to distributors and the sales team. Rewards are informal and training opportunities are limited to what is needed for the job. The purchasing function measures suppliers against quality, cost and delivery targets. Although staff appraisal scheme no longer exists, staff performance is incorporated with team performance and measured against production targets. Within the R&D function, metrics are in place to measure efficiency, and each project has agreed delivery timescales to ensure that resources are being used effectively. There are no targets for new innovations or new product introductions. The external environment is regularly scanned to gather information relating to the supply and purchase of its components and raw materials. It would seem important to have a more formal measurement system to understand customer behaviour and perception.
Overall expert assessment	The maturity of the majority of the management processes lies just above the medium line. The current economic climate had no impact on the business (so far). The biggest external impact comes from legislation on taxation, bonded warehousing and the disposal of waste. Key factors are the company's position as a virtual extension to the customers' business, and a flexible, responsive company that has long experience and thorough understanding of the Scottish drinks industry.	This organisation's maturity is medium. Although the MD has a clear vision and purpose for the business and he shares this with his management team, the real meaning of this vision and purpose is being interpreted in different ways in different parts of the organisation. There is a clear need for aligning the organisation behind a common vision and purpose. The management policies, processes and systems are generally well developed but were disjointed at places with informal, ad-hoc practices emerging. The management team clearly care and try to nurture respect for people at all levels. It is important that the company builds upon this strength to develop an open and empowered organisation working towards a common vision.

Two Low Performing Cases

	Case: NS	Case: AY
Company Overview	Based in the Czech Republic it develops and produces security systems and central monitoring stations. Since 2005, the company has also been present in the market for monitoring of mobile objects, such as people and vehicles. Employs 197 people.	AY is a family owned business based in Turkey operating in the plastic housewares sectors with a worldwide market. It employs 235 people.
Company Performance	Industry average	Industry average
Maturity Model Assessment	Across most areas the maturity score for NS was well below average compared to benchmark companies. Planning and resourcing of change; planning and resourcing of short term improvements along with training and external engagement were highlighted as areas for urgent attention. Overall, the maturity of NS's performance management practices was ranked as 9.56 and rated as *Basic*.	Across most areas the maturity score for AY was well below average compared to benchmark companies. Particular weakness was complete absence of KPIs as well as any significant business and performance improvement planning. Overall, the maturity of AY's performance management practices was ranked as 9.63 and rated as *Basic*.
Expert Report Overview	The firm is owned by three shareholders with 75% (the MD), 20% and 5% shares. The MD is a very influential person in defining the business direction and strategy. The competitive advantage of the company lies in its strong products coupled with excellent customer service. This know-how is in the head of the MD mainly and the management team. Since the company is relatively small, communication is pretty informal and open among staff. Due to the informal and limited strategic conversation within the company, one of the issues the company faces is change management where there has been significant resistance to change from operational staff. This situation is possibly being exacerbated by having two different value propositions (price minimiser and brand leader) in the same business, which possibly is the main cause of confusion and resistance due to poor communication. Moreover, there is some evidence of the management team having different views of the company's strategic posture and how it competes in the market place, which may further fuel the confusion. There is also some evidence that the difference in opinion between senior managers extends to operational areas of the business as well as strategic areas. There is a system to encourage development of new innovative ideas to improve performance of production processes or business in general. There also seems to be a formalised approach to staff performance evaluation that is based on bi-annual reviews and is tied to financial reward. Other key performance indicators, such as number of products, stock shortages, delays, cycle times, quality, etc., are related to operational efficiency of the organisation. It appears that performance management in the company is largely based on structured and mechanistic processes with little recognition of the social aspects of performance management, e.g. routines such as mentoring and coaching do not seem to feature in the company's approach to performance management.	AY is a traditional family business that is informally managed by a management team comprising of mainly family members, all of whom are educated to degree standard or above. In this firm, there is little or no use of commonly used management tools and techniques. Business priorities are mainly in the heads of the management team and communicated across the business in an ad-hoc basis. The company relies on rudimentary information systems (such as MS Excel) to manage its operations and finances with no integrated planning and control systems (such as ERP). Although there is awareness of waste and continuous improvement, there is little evidence of systematic attempts at continuous improvement. Strategically, the company understands that it is operating in a low value market and is trying to move to a higher value position. However, there is no concerted plan as to how they are going to achieve this objective. Any initiative seems to be anecdotal and opportunistic, driven mainly by one director. There is little or no evidence of process thinking and management in the business (both at operational and at strategic levels). One strength of the business is its networking ability due to the enthusiasm of one of its directors (the same one as above), who seems to drive all the strategic and innovative initiatives. Although he is given a free hand to pursue these initiatives, there is little evidence of engagement from the remainder of the firm towards team wide strategic or operational improvement.
Overall expert assessment	A low maturity organisation. Know-how is still with few people rather than processes as people in key roles do not seem to share their knowledge, experiences and capabilities. The management seem to have a mechanistic and structured approach to performance management with the social and human aspects being largely ignored. This is mainly due to the technical background and focus of all of the managers in the business. Effectively they treat and manage the organisation like a machine.	The company has low managerial maturity but with average performance that could be under threat due to global changes and shift of low value manufacturing towards emerging economies. The fact that the company is based in Turkey, with its relatively low cost base, is probably a key factor that enables the company to achieve an average performance level.

Table 1. Evaluation of the available maturity models (✓= full; ☑= partial; ×=not)

Criteria		Bititci et al 1997	Medori & Steeple, 2000	Wettstein & Kueng, 2002	Speckbacher, 2003	Tangen, 2005	Van Aken et al, 2005	Garengo, 2009	Cocca & Alberti, 2010	Bititci et al, 2011
Includes structural factors	Scan environment	✓	☑	☑	☑	×	☑	✓	☑	✓
	Set direction	✓	☑	☑	☑	☑	☑	✓	☑	✓
	Formulate, deploy and review strategy	☑	✓	✓	✓	×	✓	✓	✓	✓
	Measure and report performance	✓	✓	✓	✓	✓	✓	✓	✓	✓
Includes behavioural factors	Share purpose and barriers	×	×	☑	☑	✓	×	☑	☑	✓
	Establish organisational behaviour	×	×	×	×	×	×	×	×	☑
	Manage change	×	×	×	×	×	×	☑	☑	☑
	Facilitate informed decisions	☑	×	☑	☑	✓	☑	☑	☑	✓
Reflects normative practices from the literature		☑	☑	☑	☑	☑	☑	✓	☑	✓
Links maturity levels to performance outcomes		×	×	×	×	×	☑	×	×	✓
Available as an assessment tool		×	×	☑	×	☑	☑	×	☑	✓

Table 2. Data collection protocol

Phase	Business Reviews	Maturity Assessment	Analysis
Unit of analysis	• 12 European manufacturing organisations		• Initially within case analysis of the 12 organisations • Finally cross-case analysis
Data collected by	• Independent experts	• Research team with two researchers to minimise bias	• Research team
Data source	• One to one interviews with management team members conducted by independent expert • Company documentation • Observations of the independent expert	• The management teams through the maturity assessment workshops facilitated by the research team • Observations of the research team	• Documented interviews with Management teams and Independent experts • Finalised business review reports from experts • Maturity assessment reports • Research notes
Data collection structure	• Predefined business review protocol	• Maturity assessment against 37 activities contained in the MAT	• Visual organisation of all data sources organised for manual analysis.
Analysis	• Expert opinion based on data collected and observations.	• Discussion amongst the management team agreeing the appropriate level of maturity	• Manual content analysis • Observations of data and manual pattern analysis
Output	• Report compiled (in English) by the independent expert	• Report produced from the MAT • Research notes of the research team	• Causal maps and associated notes
Verification and Refinement	• Experts review and finalise report with the management teams	• Discussion of the output with the management teams	• Discussions with management teams and independent experts • Refinement of the causal maps

Table 3. Overview of empirical results (The cases shaded are described in Appendix 1)

Company	FT	BP	CS	DK	NB	HD	LN	IT	PF	RE	NS	AY
Maturity	Adv	Adv	Adv-In	Adv-In	Adv-In	Int	Int	In-Ba	In-Ba	In-Ba	In-Ba	Basic
• Rank	2.78	3.32	3.92	4.54	5.72	6.31	7.40	7.90	8.18	8.75	9.56	9.63
• Std. Dev.	1.40	1.57	2.43	2.98	2.45	3.40	2.22	2.40	2.52	1.57	1.91	2.82
Maturity by Expert	High	High	Med.	High	Med.	Med.	Med.	Med.	Low	Low	Low	Low
Performance	Well above av. 4.4	Well above av. 4.2	Above av. 3.6	Well above av. 4.1	Above av. 3.9	Above av. 4	Above av. 3.9	Above av. 3.9	Av. 3.2	Av. 3.5	Av. 3.1	Av. 3