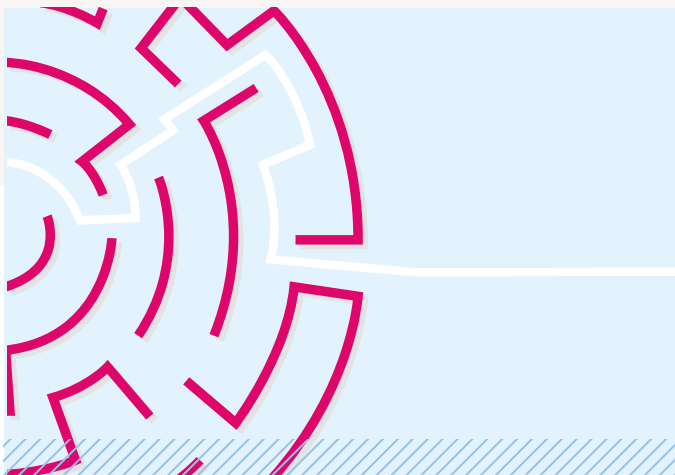


DEALING WITH THE UNKNOWN:

*Leading in uncertain times by rethinking the design
of management accounting and reporting systems.*



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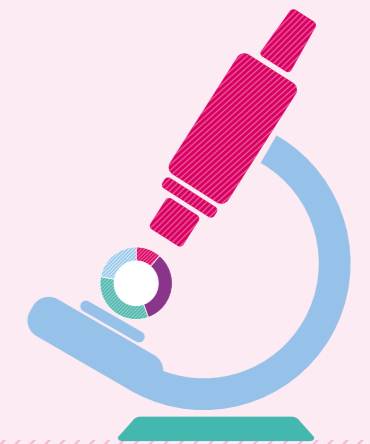
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KEY ASSUMPTIONS & FINDINGS

1. In a complex world, uncertainty is an intrinsic and irreducible feature of any decision.
2. Trying to eliminate or reduce this uncertainty can be counterproductive as it makes managers focus only on what can be measured, thus creating blind spots when making decisions.
3. We need to rethink management accounting and reporting systems to make sure accounting figures help to raise the right questions about what cannot be measured rather than providing reassuring but faulty or irrelevant numerical answers.
4. Management accounting should force the exercise of judgment and scrutiny by generating debate and productive tensions around doubt rather than alignment and shared fallacies around certainty.
5. Management accountants can regain the centre stage in organizational contexts if they mediate tensions, facilitate debate and generate innovative solutions when dealing with complex-decision making. This can be achieved through the appropriate design of management reports and processes which thus return to be central in governing organizations.
6. We propose new principles to build management accounting systems that achieve this goal.
7. We label as a 'maieutic machine' any management accounting and reporting system that works as (1) a visual space for interaction; (2) a method of ordering and scrutiny; (3) a platform of mediation; and (4) a motivating ritual of engagement.

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INTRODUCTION

What would help you and your organization to navigate a complex and uncertain world? What does it mean to make good decisions, given the constant lack of information that contributes to the complexities of markets, economy and society at large?

A conventional answer to these questions would be a call for greater amounts of data. The more data, the better.

However, there is no data that can make 'unknown unknowns' known and when measuring non-financial performance one encounters the same (if not bigger) complexities than are faced when measuring financial values. Believing that more data will automatically lead to better decision-making is unrealistic.

Given that uncertainty cannot be reduced, in order to deal with it we propose instead that it be embraced. This implies a different relationship with accounting data and its role in aiding decision-making.

Our research suggests that neither increasing the quantity of information or enlarging the range of metrics (financial and non-financial) leads to better decision making. It suggests instead that management accounting information and management reports prove effective in generating good decisions when they prompt debate and productive tensions around the figures to be discussed. Using supposedly objective accounting numbers to make people agree on a course of action is less productive than using figures to make them discuss what cannot be represented through financial numbers.

Through a series of case studies spanning different industrial sectors (from pharmaceuticals to oil & gas), we conceptualize four features that should result from good design and functioning of management accounting reports and practices. These four features reconceive a management accounting report as a:

1. **Visual space for interaction.** Visualizations are key as they shape how users understand, perceive and connect to organizational challenges and build a companies' history and strategic vision of the future. Management accounting reports should facilitate such visualizations.
2. **Method of ordering and scrutiny.** To deal with problems of uncertainty, organizations require defined toolkits and methods that order complexity and create opportunities for debate and tensions to scrutinize and interrogate 'unknown unknowns'.
3. **Platform of mediation.** Situations of uncertainty and complexity require management accounting tools that facilitate mediation between different users, conflicting interests and views, that manage interfaces with other organizational systems and that leverage the incompleteness and ambiguity of the representations they provide.
4. **Motivating ritual of engagement.** It is important that organizations ritualize and broaden participation in management accounting processes to stimulate opportunities for questioning, generate productive tensions amongst representatives from different business functions, raise doubts and stimulate engagement and motivation.

We label management accounting practices that incorporate these four features as a '**maieutic machine**', where 'maieutic' is a term from Greek philosophy that indicates how knowledge emerges in a process of inquiry that is guided by the formulation of the right questions along some key defined procedures of questioning.

In this report we provide practical guidelines and examples from industry of what features a maieutic machine should have, how it should be designed and implemented and why management accountants would find it useful in regaining a key position in the governance of decision-making processes within organizations.

RESEARCH METHODOLOGY

Between 2012 and 2014 we visited the head offices and divisions of 13 large, medium and small companies based in Europe, the US and the Middle East. From these organizations we selected seven case studies most suitable to developing our design principles.

Using semi-structured interviews, we explored the contributions of management accounting, reporting practices and performance measurement systems in processes of innovation and change within these organizations. A list of the selected case studies is provided below:

- **Boehringer Ingelheim** is a leading pharmaceutical group. With its headquarters in Ingelheim, Germany, it operates globally with 142 affiliates and more than 47,400 employees.
- **Eni** is a major integrated energy company, operating in Milan, Italy, it employs more than 82,000 people worldwide and operates in approximately 85 countries.
- **General Electric (GE)** is a diversified technology, media and financial services global company. From its headquarters in Fairfield (US), GE operates in more than 160 countries and employs more than 300,000 people worldwide. The oil & gas group (GE Oil & Gas) of GE is part of GE Energy – one of the major GE businesses.

- **ITSol¹** is a start-up Research & Development (R&D) company operating in the healthcare and IT sectors.
- **UK-Con²** and the construction of the National Laboratories (NL). In December 1991, the UK Department of Trade and Industry decided to upgrade the NL buildings and facilities. UK-Con was one of the partners in the construction of the new NL.
- **MEGOC³** is a large Middle East-based corporation in the oil & gas industry. It has over 55,000 employees and approximately 60,000 outside contractors, organized into seven major divisions.
- **Monnalisa** is a medium-sized company located in Arezzo, Italy, which operates in the fashion industry. Founded in 1968, Monnalisa designs and sells garments and accessories for children and is a pioneer in implementing Integrated Reporting.

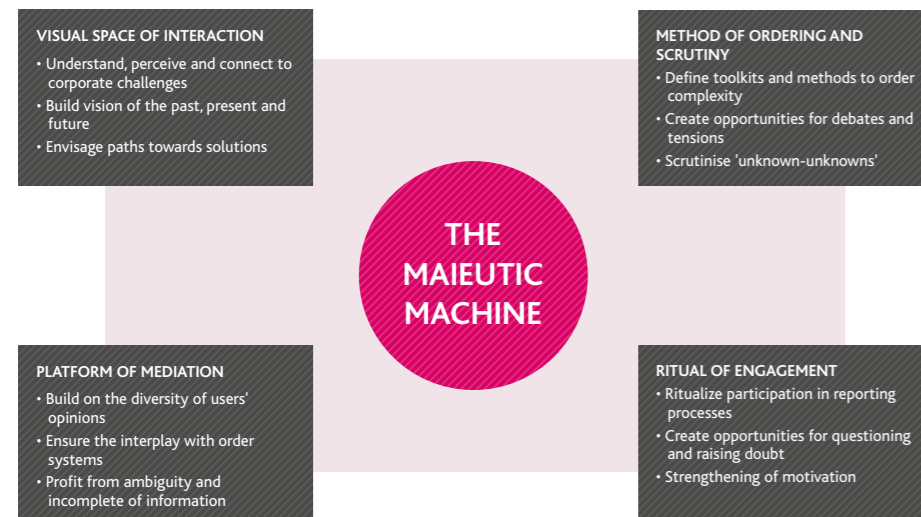


KEY OBSERVATIONS

Maieutic machines: four features that help to raise the right questions

Evidence collected from our cases studies indicates that there are **four key features** that can allow management accounting and reporting practices to become maieutic machines, that is, effective tools for enabling managers to ask the right questions and search for solutions.

FIGURE 1. THE FOUR FEATURES OF MAIEUTIC MACHINES



1. MANAGEMENT ACCOUNTING REPORTS AS A VISUAL SPACE FOR INTERACTION

- Understand, perceive and connect to corporate challenges/goals
- Build visions of the past, present and future
- Envisage paths toward solutions

Innovative responses to corporate challenges require management accounting and reporting practices to help envision corporate challenges/goals, the space for engagement and the possible paths toward solutions. The role of these visualizations is important because they shape how users perceive, understand and relate to organizational challenges and/or goals.

Strategy maps and balanced scorecards provide good examples of the visual power of management accounting and reporting practices. Figure 2 illustrates the way in which processes of value creation and organizational integration were visualized at MEGOC.

For this company, the problem was to think innovatively about how their business, the national economy and society could be linked together.

The space for interaction is visualized in the strategy map illustrated in Figure 2: The horizontal axis comprises the four typical balanced scorecard perspectives (Financial, Customer, Internal and Learning and Growth); and the vertical axis displays strategic imperatives. A Manager at MEGOC pointed out during an internal training session that "Like any good map, it has coordinates for both longitude and latitude!" He concluded: "And now *it is up to you* and to your department leaders to find the proper objectives and measures to make sure you can orient yourselves, and show how you can add value on the strategic map".

FIGURE 2 – THE HORIZONTAL AXES OF THE STRATEGY MAP IN MEGOC (BUSCO AND QUATTRONE, 2015)



Financial
Improve the bottom line

Customer
Partner for results

Internal
Do it right the first time

Learning and growth
Improve the bottom line

Preparing Workforce for the future

2. MANAGEMENT ACCOUNTING REPORTS AS METHOD OF ORDERING AND SCRUTINY

- Define toolkits and methods that order complexity
- Create opportunities for debate and tensions
- Scrutinize and interrogate 'unknown unknowns'.

Management accounting and reporting tools need to constitute a method for ordering the complexities management faces and provide a means for scrutinizing unknown unknowns in innovative ways when responding to corporate challenges.

At Monnalisa, for example, the research, design and development process of the collection is extremely iterative. Fabrics, accessories and patterns are constantly reassessed in light of new information generated throughout the various phases of the process or collected from other internal and external sources.

Notably, as the creative process unfolds, the Design Department constantly interacts with Sales and Marketing, Production, and Finance, which in turn participate in the development of the collection by monitoring the impact of what is being developed on the company's operations and performance.

The main financial tool used to support the creation of the collection and monitor its overall development is the *Provisional Budget* (see Figure 3).

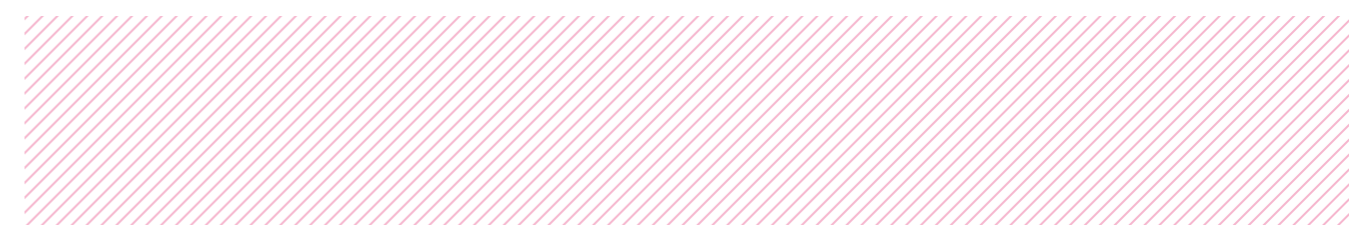
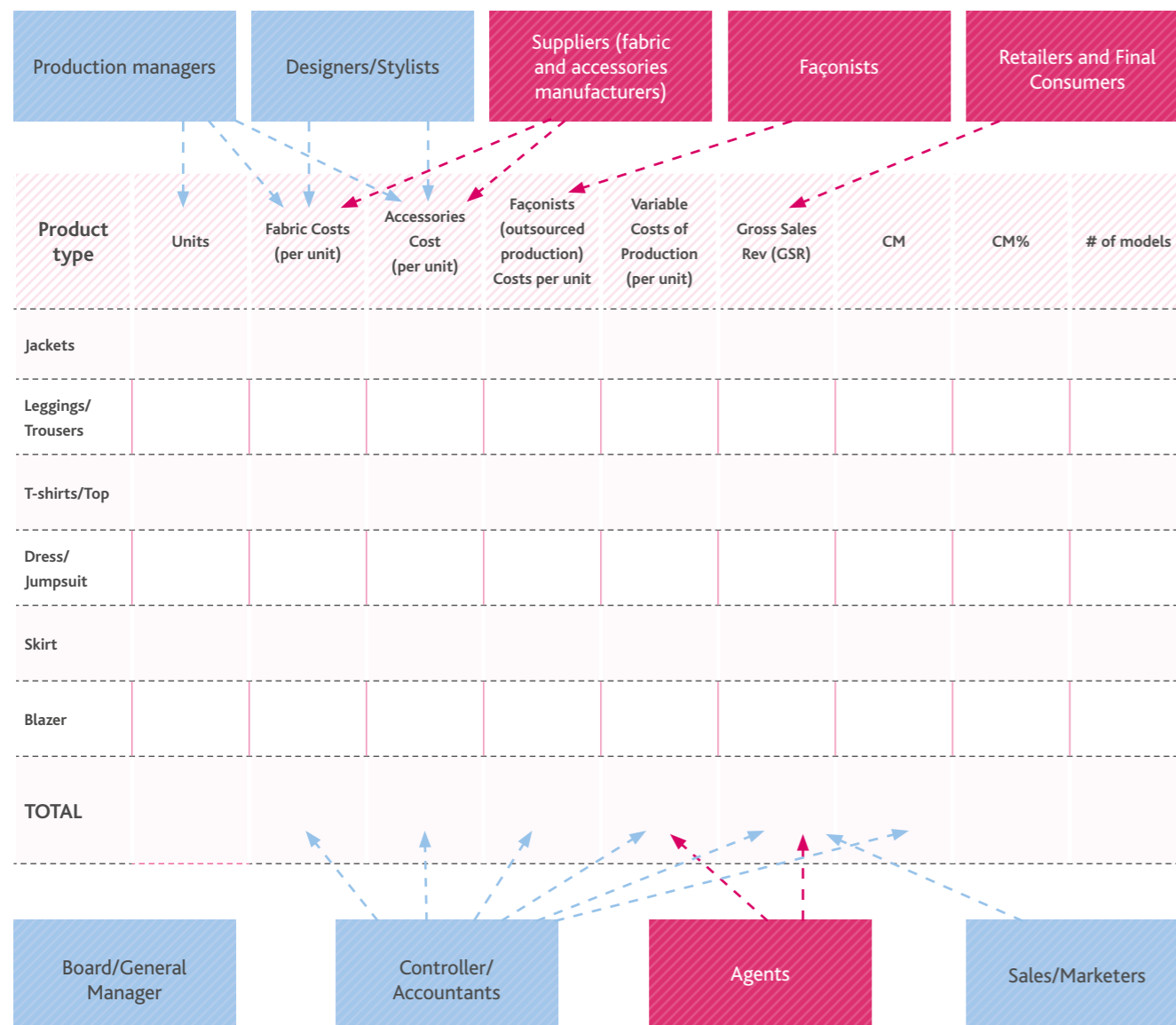


FIGURE 3 – THE PROVISIONAL BUDGET OF THE COLLECTION AND THE MULTIPLE INTERESTS TO BE MEDIATED

Provisional Budget*: contribution margin by product type

(Real data have been disguised)



* Monnalisa's budget is based on "variable sales related costs" equal to 15% of GSB

During the prototyping phase, a significant number of discussions are centred on trade-offs between the aesthetic aspirations of the stylists, the cost of finalizing a garment, the complexity of production, the ethical concerns, as well as the promises made by sales managers to agents and clients. The Provisional Budget offers inputs and opportunities for conversation and confrontation as the collection develops. "It is like a magnet; it is a tool that attracts everybody's attention", claims a member of the Sales and Marketing Department.

Within the collection ritual, accounting and performance measurement tools, such as the Provisional Budget, the related Balanced Scorecard and Cost Cards are used.

The Provisional Budget represents both a method of ordering and a material grid of empty cells. It is a method because it offers a way to 'figure out' what topics to discuss when creating sustainable collections. It is also a material grid of empty cells, which enables the multiple and diverse parties involved to identify their topics (it is not by chance that 'topic' come from ancient Greek, topos, i.e. 'space) and generate knowledge about their view of the ideal *sustainable collection*, despite not yet knowing what it might actually be. The cells of the material grid are populated by categories such as the number and type of units to be produced, the variable costs for fabric and accessories, the costs associated with the internal and external production phases, as well as the budgeted gross sales revenues, and the contribution margin by collection or by product type - which are progressively filled in as the garments materialize. Used in this way, the Provisional Budget becomes both a process and a carefully designed report which forces users to speculate about, question and search for the unknown. Which in the case of Monnalisa is the sustainable collection and the perfect garment.

3. MANAGEMENT ACCOUNTING REPORTS AS PLATFORMS OF MEDIATION

- Build on the diversity of users' opinions
- Ensure the interplays with other systems
- Profit from the ambiguity and incompleteness of information

The complex nature of the challenges facing contemporary corporations requires management accounting and reporting tools which can mediate between different users, manage the interplays with other organizational systems, and leverage the incompleteness of the representations they provide.

For example, within MEGOC the deployment of the balanced scorecard and the associated strategy maps relied on a number of means of communication, ranging from technology-driven ERP systems (SAP in this case) to the formal budgetary system, internal newsletters and an informal Café Process. The Café

Process is a technique for fostering collaborative dialogue *within* large groups. This process creates focused networks of conversation around critical questions and the ability of small groups to focus on, think together, and come up with creative possibilities and collective action. In 2003, over 900 employees came together inside an airport hangar to have wide-ranging conversations about the future direction of MEGOC. These conversations were mediated by the strategic imperatives, objectives and measures included in the balanced scorecard.

Within MEGOC, the *Café* was not intended to convey an objective or unchangeable message. It was, instead, a way for participants with different views and interests to develop and rearrange relationships between texts (the six strategic imperatives and the four perspectives of the balanced scorecard) and images (the normal visual design of the balanced scorecard with the corporate strategy at its core and various scorecards surrounding it), and ultimately to identify performance measures. The incompleteness of representation offered by balanced scorecards informed a process of reflection on, and exploration of, the best way to address corporate challenges and goals. The strategy maps and the balanced scorecard were at the centre of the process. However, how best to pursue the organization's objectives was left to the users.

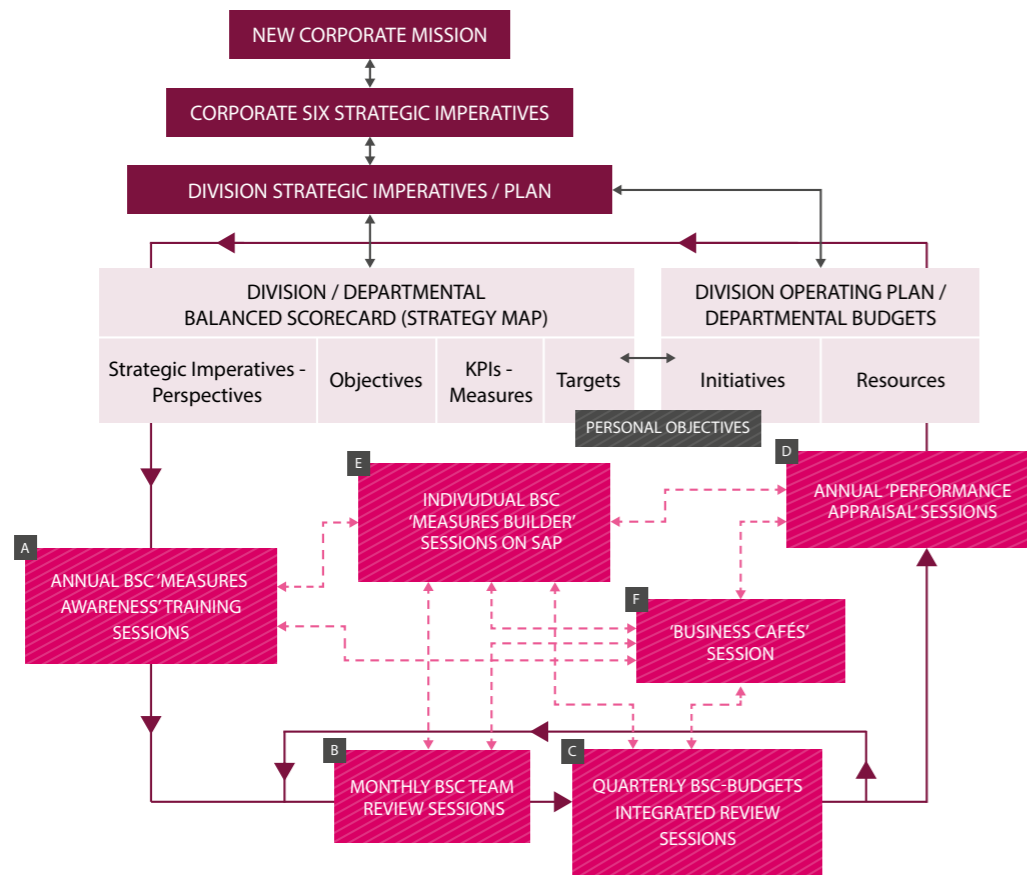
4. MANAGEMENT ACCOUNTING REPORTS AS RITUALS OF ENGAGEMENT

- Ritualize participation
- Create opportunity for questioning and raising doubts
- Strengthening of motivation

For management accounting and reporting tools to be sustained over time, they need to be repeatedly practised. This means that participation in the practice, opportunities for questioning, and strengthening of managers' motivation need to become a regular practice – a 'ritual'. By performing rituals, participants can both imagine and engage with practical solutions.

Figure 4 sketches the architecture of the new management systems in MEGOC. In this system, the balanced scorecard provides the link between the corporate mission and strategic imperatives on the one hand, and budgets, resource allocation and initiatives on the other. The architecture includes a cycle of recurrent training, meetings and review sessions. Together these various meetings, sessions, etc. provide numerous opportunities for discussions between managers. They provide the rituals through which the use of the balanced scorecard can create an environment in which issues can be identified, questions raised and solutions identified.

FIGURE 4 – THE MANAGEMENT SYSTEM IN MEGOC (BUSCO AND QUATTRONE, 2015)



THE MAIEUTIC MACHINE

These four key features (Visual space for interaction, Method of ordering and scrutiny, Platform of mediation and Motivating ritual of engagement) comprise what we call a 'maieutic machine'. While the word machine comes from the Latin machina, which is used in rhetoric to refer to the construction of new knowledge, the word maieutic refers to the Socratic method of eliciting knowledge through a series of questions.

WHAT DOES THIS MEAN?

A spreadsheet is normally viewed as a tool to display data representing financial transactions and other dimensions of the business to inform (assist) decision making.

For example, when showed an excel sheet to make a decision on whether to invest or not on the Airbus A380⁴, most of our students give a green light for the investment because their attention is focussed on the variables (including number of and price per plane, CAPEX, risk premium, interest rate, working capital) accounted for in the spreadsheet but not on those that are not included and which threaten the viability of the programme.

Using an excel sheet in a maieutic form would enable a different kind of user engagement with the financial numbers. It would force users to explore what cannot be represented but is still relevant. This will increase the scrutiny of the decision making process and possibly increase the quality of the decision made.

In the old Jesuit colleges, for example⁵, cash boxes had two keys – one held by the procurator (the equivalent of today's CFO) and one held by the rector (in today's terms, the CEO). Only by talking to each other and mediating competing interests could they open the cash box and appropriate funds as agreed. They used the record of cash transactions (which could be recorded on accounting books) to explore and scrutinize non-financial matters, including religious and political issues which could not be represented on accounting records but clearly also had a financial dimension.

London Heathrow Airport's project team, when constructing Terminal 2, used a similar model to ensure decisions balanced frictions between difficult to align risk, safety, cost and schedule considerations.

In these contexts, a maieutic machine does not construct new knowledge by giving answers (like an 'answer machine'); instead it provides a means for eliciting new ideas from the people who engage with the machine through a dialectic of questions and answers.

HOW TO DESIGN A MAIEUTIC MACHINE?

Instilling doubt and the role of financial allowances

Rather than expecting accounting numbers to tell us the 'truth', accounting and reporting systems should be designed in such a way as to invite scrutiny. Ticking boxes, meeting targets, and taking numbers at face value when making business decisions can lead to disaster.

UK-Con failed to deliver temperature-controlled rooms for the new National Physics laboratory because they trusted their mathematical models and their past experiences too much and there was no system in place to ensure debate about their ability to meet the stringent specifications for temperature and noise levels within the laboratories and thus the over all feasibility of the project. The former CEO of UK-Con commented that "You would have thought someone would have asked the question: can we do this? Could it work?" He went on to say: "It didn't get asked. It was kind of arrogant [...]. Our problem was: 'we are [UK-Con], we can do anything!'"

Accounting figures must prompt managers to tackle challenges head-on and prudently. The bottom line needs to be replaced with, or at least thought of, as a financial allowance, that is, as a number in a state of flux which could potentially fluctuate within a range. What this range is and how to position the financial situation of a project or an organization in this range is subject to matters that financial numbers cannot represent. These are those that create risk and uncertainty.

Accounting figures can instead help to scrutinise this uncertainty by prompting discussions instilled by doubt rather than making people seek for reassuring certainties. We should stop blaming complexity for failure and realize it's our search for certainty that's at fault.

Design divisions, create tensions and mediate them by building on symmetry

Businesses are usually divided into different areas, units, functions, etc. These 'divisions' can create tensions. Although these foster creative problem-solving and innovation, they must be mediated to ensure that power is distributed evenly. Management accounting and reporting practices should therefore be designed to promote such symmetry and mediate tensions.

For example, GE uses Six-Sigma as it enables managers to address tensions between different performance dimensions, such as quality, process improvement and financial performance.

One Six-Sigma project leader explains, "Although quality has always been about improving processes, products and services by removing defects and the root causes of these defects, through Six-Sigma quality management has moved forward to strengthen ties among process improvements and their consequences in financial terms". However, quality, process improvement and financial performance often involve tensions and trade-offs. For example, improving quality can create time delays and reduce financial performance. Six-Sigma can therefore help to manage such tensions. Before a Six-sigma project is initiated, the potential financial costs and benefits of prospective process improvements are quantified, and then used to prioritise and select individual projects. The financial benefits realised are verified once the project enters the control phase.

Build on simplicity

If a reporting system is too complex, it may convey the 'wrong' idea that it is comprehensive and does not need to prompt further search for data and scrutiny. In contrast, the principle of simplicity means reducing data in a way which invites interrogation and discussion. Reporting systems can reduce data more meaningfully by using, for instance, visual devices such as diagrams, flow charts and tables.

In MEGOC, the simplicity of the strategy map offered a tool with which to invent new solutions to old and new problems. Through having to translate qualitative information (strategic imperatives, perspectives and objectives) into quantitative information (measures and targets), users become more focused on their strategic objectives.

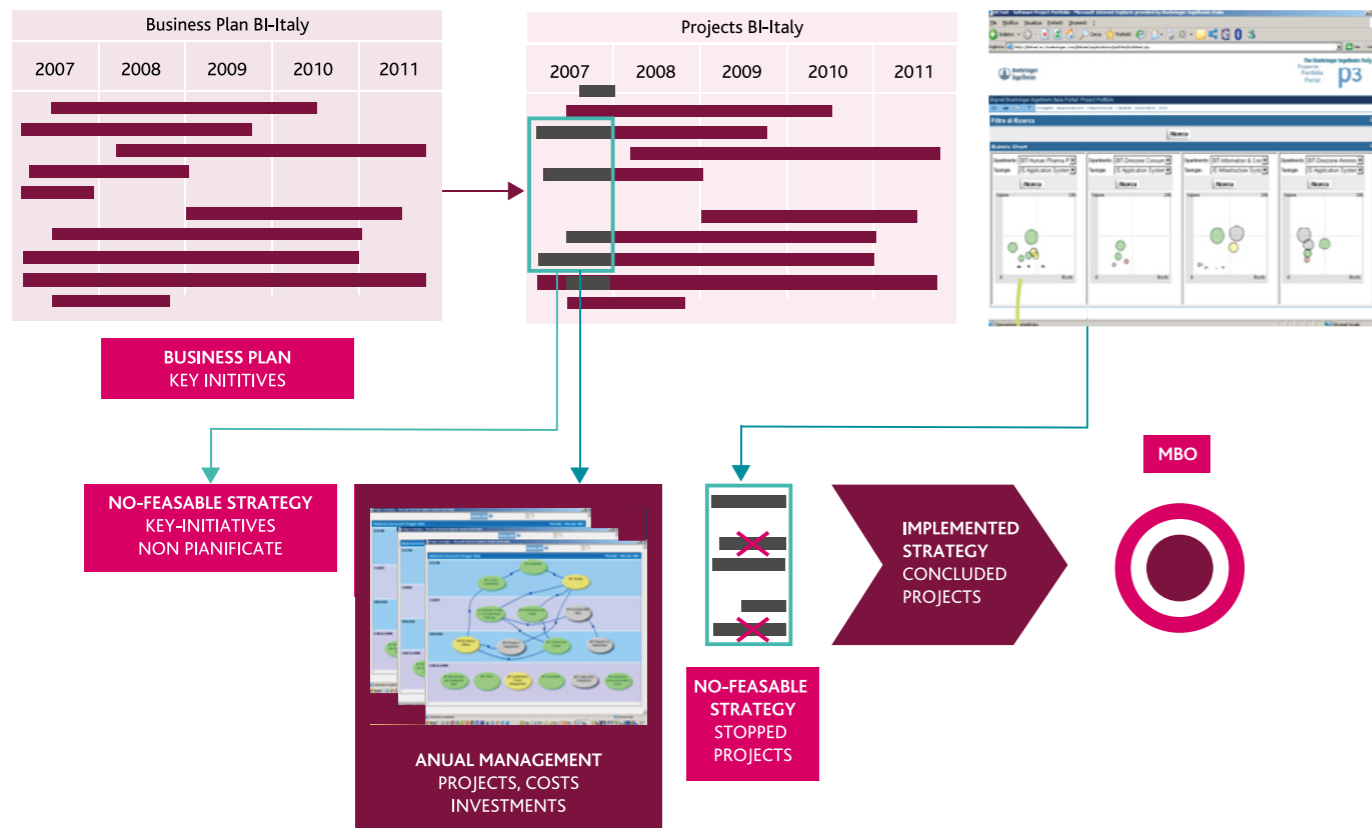
Build on Diversity and allow redundancy

Diversity within reporting systems refers to the need to use not just one system for one purpose but many different systems for many different purposes. This implies a certain amount of redundancy.

For example, within Boehringer Ingelheim, the balanced scorecards and the strategy maps engaged a variety of employees and systems in an attempt to support value creation. In particular, the balanced scorecard and the strategy map were integrated upstream in the management system with the business plan, midstream with project management, and downstream with performance management and management-by-objectives (see Figure 5).



FIGURE 5 – REPORTING SYSTEMS IN BOEHRINGER INGELHEIM (SOURCE: DOCUMENTS FROM THE COMPANY)

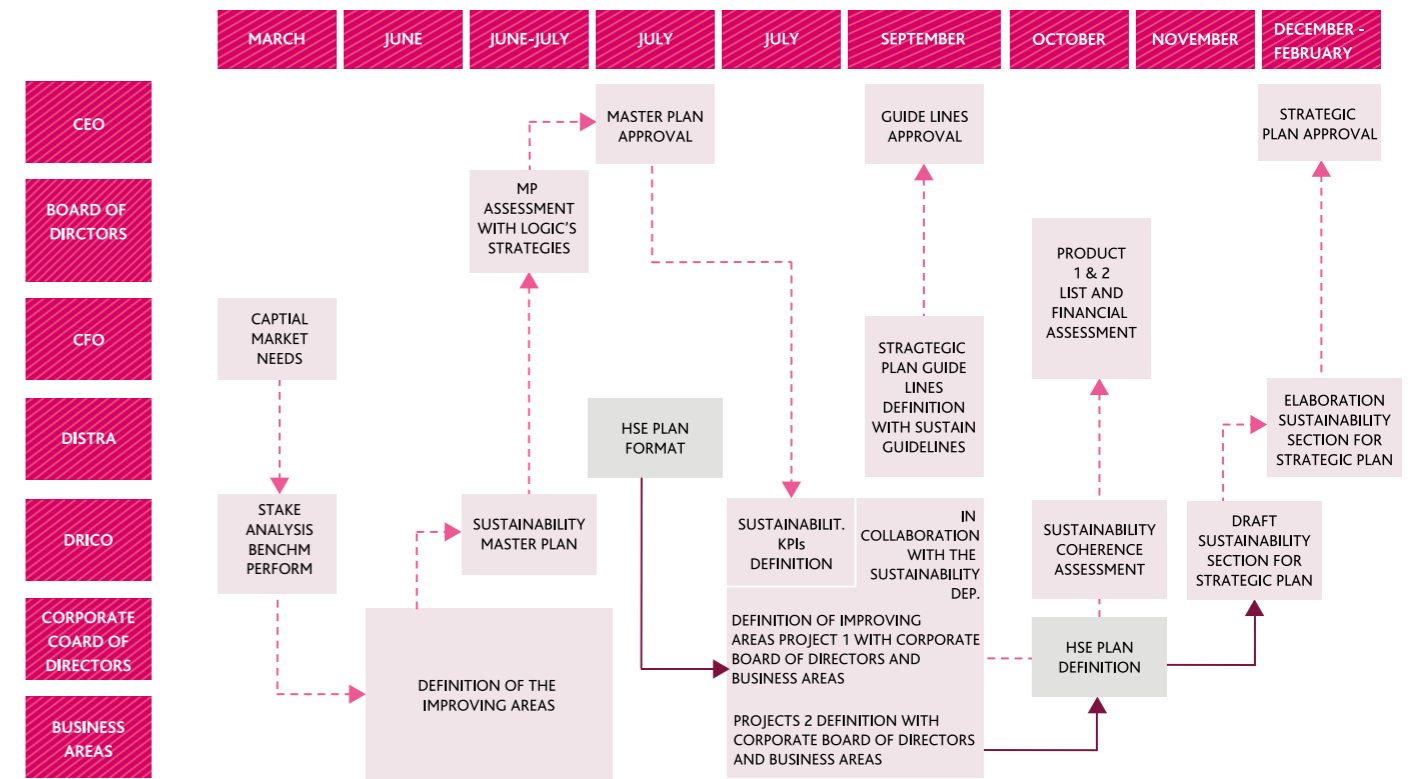


Defining tangible opportunities for engagement: temporality, rhythm and motivating paths

The materiality of the reporting system (i.e., its visible and tangible elements, not to be confused with the principle of 'materiality' in financial reporting) provides users with the opportunity for ongoing engagement. The ritualization of accounting practices can be stimulated by the temporality and rhythm of the reporting system. Together these two design principles define the succession of past, present and future phases (temporality) and their duration (rhythm).

Eni's planning processes comprise a recurrent succession of phases of different duration and are marked by various moments of discussion and interrogation. At the beginning of every planning cycle, all of the company's functions are required to identify areas for improvement and new objectives for the future four-year plan. This process is based on an analysis of the external context, the evolution of sustainability internationally, a consideration of stakeholders' expectations and the outputs of integrated risk assessment and related mitigation plans (see Figure 6). At the end of this preliminary process, Eni's CEO issues specific operational and economic guidelines for sustainability. Issues are therefore addressed regularly and thoroughly.

FIGURE 6 – STRATEGIC PLANNING IN ENI (TRANSLATED FROM COMPANY DOCUMENTS)



WHAT CAN WE GAIN FROM MAIEUTIC MACHINE?

What is the purpose of a maieutic machine? What actions does it aim to prompt and what benefits can it generate for organizational dynamics and stakeholder management?

WISDOM AND BALANCE

Tensions between competing categories (such as between different dimensions of performance) can be mediated by searching for a 'wise balance' between them using diverse management and accounting tools.

For example, within ITSol, the business plan is used to manage the financial performance of its products (to meet the expectations of existing and potential investors).

Simultaneously, agile practices (and particularly Scrum methods⁶) are used to promote technological innovation in ITSol's social products to improve their outcomes for customers and other beneficiaries (i.e healthcare institutions, patients and their families).

MEMORY BUILDING AND STORYTELLING

Within ITSol, a bespoke agile-based control system is used as a project management technique to translate customers' 'stories' (about their needs, experiences and problems) into a list of project requirements and targets. Project team members translate customers' stories into causal maps. This translation enables team members to address customers' problems. Their solutions are then translated into formalised reports like 'product backlogs' and 'sprint backlogs'.

Management accounting and reporting tools can also help memory building, not only regarding the decisions taken (such as decisions about products and tasks recorded in the product backlog and the sprint backlog of ITSol) but also about the rationale for these decisions.

CONSIDERATION OF THE PROCESS NOT THE OUTCOME

In the past, the process of producing an income statement was more important than the actual results, where as today we tend to look at an income statement for the results it produces. Such reports are expected to (re)produce the 'truth', or at least get close to it, but it is the process of producing the numbers in an income statement that is most useful in inviting scrutiny and analysis.

For example, Integrated Reporting is not about 'truthfully' measuring sustainability but is instead about a process of questioning and interrogation, which the design of the integrated report facilitates.

In the case of MEGOC, the balanced scorecard users found strategy maps useful, not necessarily for the outcome it produced (see Figure 4), but for the space it offered to question business perspectives and strategic imperatives, as well as the relationships between them (figure 2).

CONTROL BY VERSUS CONTROL OF MANAGERS

In recent years, management accounting has become associated with the control of managers rather than control by managers, although both are needed. However, can we design a system that allows users to deploy different pieces of information in different ways according to their evolving needs?

Within ITSol, an agile-based control system is used to control the activities of team members in the short run in order to ensure that they perform the tasks in the sprint backlog and realise the solutions planned for the customer. Simultaneously, the business plan is used as a long-term tool for engaging with potential investors and thereby co-creating with them the business model for social products. In so doing, the agile-based control system and the business plan function as two separate practices which achieve both control of team members (the agile-based control system) and control by them (the business plan). These two separate practices can come together to mediate tensions between short-term and long-term requirements.

RECOMMENDATIONS AND CONCLUSIONS

Informed by current debates on reporting practices, project management and performance measurement systems, as well as on studies in rhetoric and design thinking, together with the insights provided by a series of case studies, this research makes the following main recommendations:

Management accounting and reporting practices should:

1. **Not be expected to work as 'answer machines' that produce 'objective' data on what course of action to pursue but rather make sure users raise the right questions to be debated when facing complex situations.** Management accounting and reporting practices should instead be thought of as a visual space for interaction that helps managers to define, understand, perceive and connect to organizational challenges in order to be able to always be in tune and anticipate uncertain and volatile environments and construct markets for product and services.
2. Offer robust methods and procedures for ordering complexity to scrutinize unknowns and make decision-makers exercise judgment, given that in a complex world data are always ambiguous, incomplete, and often outdated.
3. Build on the inherent ambiguities that accounting numbers generate in order to create, and then mediate, fruitful tensions among different organizational functions and business stakeholders.
4. Return to being a cross-functional means of users' engagement and motivation by forcing different stakeholders to take part in decision-making processes to overcome the silos mentality which has relegated the finance function to a mere provider of information rather than an active player in such processes.

We propose to re-conceive of management accounting and reporting as a 'maieutic machine' composed of four features (**visual space for interaction; method of ordering and scrutiny, platforms of mediation, rituals of engagement**), that accountants should design and then drive and provided insights on how and why to design such machine.

In order for management accountants to again become key orchestrators in decision making-processes they will have to become skilled in various matters that range from design to negotiation and cultural mediation skills.

If rethought as we propose, management accounting, management accountants and management accounting reports could regain their relevance and centrality in decision-making processes.

Nowadays accounting is supposed to provide data for decision-making but other managers are not involved in the production of this data and its validity. The result is that accounting data has lost its relevance and significance (again). By making reporting processes central to the preparation of accounting data for decision-making and by considering reports as platforms of mediation amongst different stakeholders, management accountants can regain the central stage in organizations by designing and operating these platforms for value creation.



FOOTNOTES

- 1 TSol is not the Company's real name.
- 2 UK-Con is not the Company's real name.
- 3 MEGOC (Middle East Gas and Oil Company) is not the Company's real name.
- 4 See Benjamin Esty, Airbus A3XX: Developing the largest commercial Jet (A). Harvard Business School, Case number 9-201-028.
- 5 See Quattrone (2015)
- 6 Agile methodologies are project management practices, which are widely used to manage software development projects (www.agilealliance.org) as well as other projects which require a high level of customisation. 'Scrum' is one of the most well-known agile practices. Within ITSol, all projects utilise Scrum methods (www.scrumalliance.com).

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DISCLAIMER

The views and opinions presented in this report are those of the individual authors and do not necessarily reflect or express those of CIMA, the publisher and sponsor of the report.

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