

Accounting Information Systems as Sensemaking Tools in Decision-Making Processes of Small Firms

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Abstract *Considering the relevance of small firms in modern economy, accounting literature has little deepened about the way of decision making in these contexts. Scholars have highlighted the rationality of decision making processes in large firms, asserting how peculiarities of small firms could hinder the diffusion of such rationality criterion. Coherently, scholars agree that small firms are characterized by such unstructured strategic processes, in which accounting information systems are not so widespread and adopted by the entrepreneurs. On this issue, this paper try to investigate how accounting information systems could support decision-making processes of small firms, adopting a theoretical approach that considers reality as socially constructed. We consider how accounting information systems could influence the sensemaking process, which is a way of interpreting organizations: first something happens, then we can try to make sense of it. Even if sensemaking has been largely discussed, it is still unexplored in the accounting literature and in small firms. More research is needed on how accounting could help to interpret how things are done and how they were socially constructed. In this view, we consider accounting information system as a sensemaking tool in decision-making processes of small firms.*

Key words Small firms, sensemaking, decision-making process, accounting information system, rationality

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1. Introduction

Small firms have been largely considered crucial for the modern economy development, however, little is known about their decision-making processes. Focusing on accounting literature, evidences on these firms underlined some factors that could influence the diffusion of the management control tools, such as the national culture (Hofstede, 1980), the internal culture and also the firm size (Chenhall, 2003). In particular, researchers identified the factors which in the small firms could hinder the adoption of management control tools (Garengo *et al.*, 2005), referring to the lack of human resources which are always involved in the operative activities; the lack of managerial capacity; the limited capital resources; the poor strategic planning; the lack of managerial systems and formalized management of the processes (Jennings and Beaver, 1997; Hudson *et al.*, 2000; Broccardo, 2014). Otherwise, some authors underlined how the environmental turbulences in small firms can act as a stimulus to the use of managerial tools (Aram and Cowen 1990; Granlund and Lukka 1998; Anderson and Lanen, 1999; Luther and Longden, 2001).

Focusing on the peculiarity of decision making processes, scholars have mostly focused on the rationality of decisions in large firms (Brouthers *et al.*, 1998; Gibcus *et al.*, 2009), and have highlighted how the decision-making processes in small firms are differently characterized, and that it was difficult to apply the rationality model for explaining decision-making in small firms (Papadakis *et al.*, 1998; Brouthers *et al.*, 1998; Gilmore and Carson, 2000). Busenitz and Barney (1997) asserted that entrepreneurs are more susceptible to the use of decision-making biases and heuristics than managers in large organizations that would imply a distinct decision-making process. Scholars agree that small firms are characterized by such unstructured strategic processes, in which the entrepreneur assumes all the management responsibilities (Gibcus *et al.*, 2009). Even if it is often underlined that the managerial capabilities are strictly tied to the use

of management accounting tools, these tools are not so widespread and adopted by small firms (Aram and Cowen 1990; Broccardo, 2014).

Focusing on the Italian context, the high presence of small firms and the good aptitude of these firms of answering to the recent crisis in the economic and financial markets, bring out the need of investigating how peculiarities of small firms affect their decision-making processes.

On this issue some scholars have argued the ability of small firms to quickly adapt to environmental changes by taking advantage of both their decision making flexibility and their dense network of relationships (Broccardo, 2014). Traditionally, in the literature the rational model has been questioned as basis for social problem solving (Argyris 1971, 1973), because it tends to reinforce the status quo and produces organizational systems in which managers experience a reduced free space of movement, denying the social learning process which must accompany organizational problem solving (Lindblom and Cohen, 1979). On this field, researchers mainly focused on all steps taken from the time a stimulus for an action is perceived until the time the commitment to the action is made (Mintzberg, 1979). Such studies have mostly focused on large firms. Little research has pointed how decision making processes are taken within small firms, traditionally characterized by unstructured decision-making processes.

Starting from this gap, we try to investigate how accounting information tools, such as accounting information systems could support decision-making processes of small firms.

In pursuing this aim, we adopt a theoretical approach that considers reality as socially constructed and then as a subjective and inter-subjective phenomenon (Berger and Luckman, 1966; McCall *et al.*, 1982). From this perspective, knowledge of the social world is not available through mere observation, but only through interaction with others. Thus, the world emerges from interaction and is hence a socially constructed reality (Berger and Luckman, 1966; McCall *et al.*, 1982). These assumptions underlie the so called sensemaking process, which is a way of interpreting organizations: first something happens, and then we can try to make sense of it (Weick 1995, 2001).

Daft and Huber (1987) provided evidences on the role of accounting information systems in the strategic sensemaking processes, claiming that accounting information could assist managers, helping them to reduce ambiguity from strategic issues through the sharing of different points of view and interpretations from different organizational actors (Sutcliffe, 2001). The literature review on the role of accounting information systems in strategic sensemaking shows that it is not sufficient to only focus on accounting information characteristics. Rather, it is necessary to pay attention to the process of producing and delivering information (Macintosh and Scapens, 1990; DeLone and McLean, 1992; Heidmann *et al.*, 2008).

According, Tillmann and Goddard (2008) stated that even if sensemaking has been discussed in several organizational studies, it is still unexplored in the accounting literature, outlining as accounting is a means for the organizational actors to order and interpret their experience (Boland and Pondy. 1983). In this view, accounting does not necessarily must be accurate; rather it should foster the cognition and commitment associated with the process of organizational ordering (Swieringa and Weick. 1987).

We suggest that this way of interpreting the use of accounting information systems could help to analyze the decision-making processes of small firms. In particular, we believe that in these firms the way how decision processes flow could be well supported by accounting information systems, that acts as a tool to interpret how things are done and how they were socially constructed. In this view, we consider accounting information system as a sensemaking tool in decision-making processes of small firms. To the best of our knowledge, the sensemaking process within small firms and the use of accounting information systems as sensemaking tools are still unexplored. Thus, we analyze the sensemaking processes that occurred in a small firm that we studied through time.

The analysis conducted highlighted how the interactive interpretation shed lights on how the past actions lead to identify the KPI sensemaking as innovations. In particular, the case shows how the KPI can be acquired and distributed between organizational actors. In this field, the paper contributes to the behavioural perspective of performance measurement systems.

In addition, the paper highlights the constructive use of KPI in fostering innovation. Applying the sensemaking perspective to the analysis of the KPI use, it helps to interpret the innovation process in managing the customer relations.

In what follows we first depict the state of the art in the literature about the peculiarities of small firms and their decision-making processes, then we introduce the cues coming from the literature on sensemaking, and therefore attempt to combine the two streams of studies to better understand how accounting information systems could support decision-making processes of small firms. In the empirical part of the paper, to sustain our viewpoint we discuss evidences deriving from a longitudinal case study in a small firm, in which decision making processes have been described highlighting the role of accounting information systems through their flow.

2. Literature review

Looking at the information flow that sustains organizational behaviours, the research on decision making processes focuses on all those steps taken from the time a stimulus for an action is perceived until the time the commitment to the action is made (Mintzberg, 1979), but too little research on how decision processes flow through small firms have been carried out.

Scholars recognized strategic decisions as guide that shapes the future course of actions in the organizations (Schoemaker, 1993), and identified two perspectives of strategic decision-making: the rationality perspective and the political perspective (Gibcus *et al.*, 2009).

From the rational perspective it is argued that decision-making is a rational process, in which actors know exactly what they want because they have carefully collected information, developed alternatives and selected the best possible alternative to fully maximize their utility (March and Simon 1958; Allison 1971). However, individuals have cognitive limitations and cannot oversee all consequences of their choices, meaning that “people intend to act rationally, but do so only limitedly” (Simon, 1957).

From the political perspective it is argued that multiple actors with conflicting goals enter the decision arena, in which individuals tend to form coalitions to have their interests taken care of (Eisenhardt and Zbaracki, 1992; Schoemaker, 1993).

On this field, Hendry (2000) argued that these streams of research (rational and political) are ‘traditional’ perspectives in which actions follow logically from decisions taken at some point earlier in time, and introduced two divergent perspectives: the action perspective, in which decisions are used to motivate and mobilize resources for actions that have already been chosen (Hendry, 2000) and the interpretative perspective, where decisions are located, articulated and ratified, “bringing it forward to the present, and claiming it as the decision that has just been made” (Hendry, 2000).

Anyway, results coming from the previous described perspectives focused on decision-making processes in large firms, as in small firms there could be less room for politics since the entrepreneur makes the decisions individually and tends to be less rational in her/his decision-making processes (Rice and Hamilton, 1979; Brouthers *et al.*, 1998; Byers and Slack, 2001). On this point, researchers claimed that the context for decision-making processes in small firms clearly differs from the context in large firms for at least three reasons (Gibcus *et al.* 2009). Firstly, small firms face a more hostile or uncertain environment without having access to extensive information sources (Hambrick and Crozier, 1985; Covin and Slevin, 1989). Secondly, the small firm contexts are claimed as more dynamic and complex than those of large firms. For this reason, while large firms develop decision-making routines, small firms often act on the basis of opportunism and of entrepreneur insights that were more suitable than rationality to face dynamism and complexity (Fredrickson, 1984; Fredrickson and Mitchell, 1984; Gartner *et al.*, 1992; Busenitz and Barney, 1997; Forbes, 1999). Finally, entrepreneurs perceive and think about risk differently from managers of large firms. They tend to generalize easier from limited experience and are often overconfident that they will succeed (Brouthers *et al.*, 1998; Mador, 2000; Gibcus *et al.*, 2009).

Looking at the peculiarities of information flow that sustains organizational behaviours, research on decision making processes differently categorized these processes distinguishing decisions as operating, administrative, and strategic (Mintzberg 1978). Operating decisions are taken rather routinely in processes that are typically programmed and executed quickly, almost automatically, by operators or low-echelon support staffers working individually. In these processes, recognition is clearly defined, there is little diagnosis, and all the phases of the decision making process are predetermined. Administrative decisions may be considered as coordinative or exceptional. Coordinative decisions guide and coordinate the operating decisions. Many of the decisions in the administrative levels of the regulated system fall into this

group, including planning, scheduling, and budgeting decisions. These decision processes are typically routinized, made on fixed schedules, and are sometimes even rather programmed, although typically less so than the operating decision processes. Exception decisions are those made on an ad hoc basis but with minor overall consequences. These are non-routinized and less programmed than the first two types of decision processes. As such, they involve a distinct recognition step, and their steps of diagnosis, search, and selection are typically more elaborated than for the operating and many of the coordinative decisions. Strategic decisions are also exceptions, but by definition they are significant in their impact on the organization. Strategic decisions are the least routinized and programmed of all the decision processes, typically taking years and involving many members of the organization. A strategic decision may be evoked by a change in the environment, as when a new technical system is developed.

Despite these evidences, there has been too little research on the important question of how decision processes flow in small firms. There is still the need to better understand how decision-making processes run in small firms, distinguishing between operating, administrative, and strategic decisions.

Whereas the traditional approaches to decision-making processes tailored for large firms do not well fit with peculiarities of decision-making processes of small firms, we suggest that small firms could be considered as socially constructed reality in which all organizational actors are strictly embedded through values and actions. In this view, organizational actors interpret the real world and are influenced by their previous experiences and values (Leotta *et al.*, 2017). When something happens, they try to make sense of it. This way of interpreting organizational actions and the nature of the social world has been largely defined as the sensemaking process (Weick, 1995, 2001). Through sensemaking members of organizations extract cues to action from the changing environment where the organization works (Seal and Mattimoe, 2017).

Weick (1995, 2001) sustained that organizations are embedded in a continuous stream of experience as they interact with their environment. His view started from interaction and moves toward its subsequent understanding by the actors. Through interaction they enact the raw data of their experience. These enactments are at first equivocal and they must make sense of them. The environment is not presented to them as objectively knowable, but is created by them through the continuous process of enactment, or their stream of experience. Sense-makers do not know what they have done until after they have done it and can retrospectively impose a structure on their equivocal enactments.

Scholars agree that sensemaking occurs in response to disruptions in organizing processes (Weick 1995, 2001; Fiebig and Kramer, 1998; Weick and Sutcliffe, 2001; Dougherty and Drumheller, 2006).

Sensemaking has been discussed in several organizational studies, but it is still unexplored in the accounting literature. In particular, assuming accounting as a means for the organizational actors to order and interpret their experience, it should foster the cognition and commitment associated with the process of organizational ordering (Boland and Pondy, 1983; Swieringa and Weick, 1987; Tillmann and Goddard, 2008; Nouri and Kafeshani, 2014).

Following rational-analytic approaches to social problem solving, objectives are assumed to be external to the social world. Knowledge of the social world should precede action and then it is available to the decision maker through observation. Observation and analysis provide the decision maker with a model of his/her situation. Considering social reality as a subjective and inter-subjective phenomenon, knowledge is not available through mere observation, but only through interaction with others. The social world emerges from interaction and is hence a socially constructed reality (Berger and Luckman, 1966; McCall *et al.*, 1982).

On this issue, Macintosh and Scapens (1990), noted that “human beings draw upon interpretive schemes in their daily interactions, which are the cognitive means by which they make sense of what others say and do, and which also serve the communication of meaning and understanding. Thus, accounting information systems provide managers with a means of understanding the activities of their organisation and allows them to communicate meaningfully about them”.

Daft and Huber (1987) provided evidences on the role of accounting information systems in the strategic sensemaking processes distinguishing two orders of problems: interpretation and logistic ones. The interpretation issue is linked to the misunderstandings deriving from strategy definition that requires the spreading of shared values among all the actors involved. In this case, sensemaking favors the learning processes of individuals (Daft and Weick, 1984), while accounting information system acts as “learning

machines”, contributing to learning through strategic sensemaking (Burchell *et al.*, 1980). This view of accounting information systems is coherent to the interactive use of accounting suggested by Simons (1991), who argued that accounting information can guide organizational learning and influence the process of sensemaking (Simons, 1991). On this point, Abernethy and Brownell (1999) highlighted the ability of accounting information of fostering information flows across all organizational actors.

The logistic issue regards the process of acquisition and distribution of information (Sutcliffe 2001). In this view accounting information assists managers, helping to reduce ambiguity from strategic issues through the sharing of different points of view and interpretations from different organizational actors (Sutcliffe, 2001; Ruggeri and Rizza, 2017). The literature review on the role of accounting information systems in strategic sensemaking shows that it is not sufficient to only focus on accounting information characteristics. Rather, it is necessary to pay attention to the process of information production and delivery (DeLone and McLean, 1992; Heidmann *et al.*, 2008).

To the best of our knowledge, the sensemaking process within small firms and the use of accounting information systems as sensemaking tools are still unexplored. Thus, it could be interesting to investigate how accounting information systems perform in decision-making of small firms through sensemaking processes. In our opinion, while the traditional approaches to study decision making processes (mainly the rational one) cannot fit with the peculiarities of small firms, the sensemaking approach could better grasp these peculiarities marking the social processes that involve all organizational actors in this kind of firms. So, we aim to study how accounting information systems could facilitate the learning processes performed during the decision-making.

To this aim, in what follows we discuss results deriving from a case study in which we retrospectively describe how accounting information systems act during such decision-making processes that were differently managed due to their importance (operating, administrative, and strategic).

3. Methodology of research

In order to improve our understanding of the roles of accounting information systems on the decision-making processes of small firms, we discuss a longitudinal case-study (from 2013 up to 2017) at a global logistics provider that offers a multitude of services in the transport sector, reaching the most important world markets.

The company under study has operated since 1969 in the logistics market recording a turnover of 64 mil euros and employing about 100 people. Its main business consists in customizing business requirements, creating personalized solutions along the entire supply chain, offering, in national and international markets, integrated transportation services (by road, rail, and sea) and intermodal transportation of freight, without any handling of the freight itself when changing modes. In addition, the company provides both distribution services, offering a wide variety of options for warehousing customer products, and logistics services, optimizing the management of the workflow to satisfy high quality standards thanks to computerized systems.

The aspects that conditioned our choice of this company can be summarized on its workflow flexibility, professionalism, cooperation, problem solving and experience that allow the company to be an example of best practice in their business.

The case research followed a retrospective approach, intended to grasp subjects’ perceptions of the decision-making processes described (Scapens, 2004) by collecting field data through twenty semi-structured interviews (lasting an hour and twenty minutes on average) conducted during the year 2016 and 2017 with the general director, the controller, and the main functional managers (purchasing manager, customer/sales manager, logistic manager, distribution manager, storehouse manager, information technology manager). The interviews focused on the description of how two distinct decision-making processes happen and how these were differently perceived by all organizational actors. Simultaneously, we attempt to grasp how the accounting information systems interacted in these processes (Kajüter and Kulmala, 2005), and were conducted in an informal style; all were written down in a draft-report and shared with the interviewees. Following Yin (2003) interview data were analyzed to explain how organizational actors had been involved in the decision-making. We also formed our own perception

drawing on archive data, considering performance reports, customer reports and other internal documents relevant for analysing the decision-making processes followed.

The limit of relying on retrospective approach consists of asking interviewees to describe, explain and reflect on events they had experienced (Nor-Aziah and Scapens, 2007) as respondents may misreport their past choices in order to appear more consistent with their current choice (Shachar and Eckstein, 2007). We do not see such as a limit to the validity of this study, because we try to contain it through data triangulation, and also because we see the retrospective approach consistent with the theoretical perspective we adopt to interpret the case evidence.

4. Key performance indicators roles in decision-making processes of a small firm: evidence from a case study

The small firm under study boasts a strong experience in the transport market, guaranteeing an integrated transportation services to its customers, connecting different geographical areas and obtaining good levels of profitability. In this case the entrepreneur used to make decisions individually supported by his insights and information gathered from all organizational actors involved.

In 2013 the firm faced a substantial decrease of its bargaining in customer relationships. Then, the entrepreneur decided to pay more attention to managing these relationships by introducing new key performance indicators (KPI). In particular, the new KPI focused on the efficiency and service quality provided in such relationship. Given that each transportation service was performed through two main chains of activities: the logistics and the transportations. The entrepreneur had the intent to be more conscious of how such transport happened in terms of delivery times of each stage of the transports carried out, highlighting where delays arisen from and what were the reasons of them.

Indeed, the accomplishment of such intermodal transportation services was strongly affected by the climate changes and by other external factors that could not be under control (i.e. transport strikes). In this issue, the entrepreneur noticed the need to be more informed about the time spent for each delivery by each vector, and to know how logistics activities were fulfilled. Simultaneously, the entrepreneur needed to be more conscious of the service quality provided for each delivery in terms of order quality conformity, identifying the typology and the reason of non-conformity.

Starting from these needs new KPI were introduced to monitor delivery times and service quality provided in customer relationships.

In this way KPI created a new accounting space where the information was produced through the calculative practices required by the entrepreneur to improve the firm's decision-making processes. The KPI jointly identified by the entrepreneur and the managers through brainstorming activities were related to particular aspects of logistics and transportation services, and were intended to make visible the economic and non-economic effects of decision-making processes.

The KPI identified (Table 1) were automatically generated through a portal in which each actor involved in a transportation service accomplishment had to insert in real time data on time and quality. For example, each vector had to tick the delivery time and quality of his route. This information was directly processed to generate the KPI on time and quality that could be visualised on line through the portal by all the actors involved (i.e. the entrepreneur, the vectors, the customers etc.).

Differently, logistics KPI focused on time, quality and costs related to the logistics activities managed before the order shipment. In this case the employees involved were responsible for ticking in the portal data on the time spent in order arrangement, the conformity of each order arranged, the % of service capacity employed for each customer, the number of orders processed every day and their homogeneity, specifying whether particular devices were necessary (i.e. refrigerator, packaging, etc.). In this case the information processed through the portal was visible to the entrepreneur and to all the actors involved in the logistic process.

The entrepreneur's decision of introducing such KPI in 2014 was gathered from his strong belief that the related calculative practices should have really supported the effective and efficient management and control of interfirm relationships.

Table 1. KPI used to monitor customer relationships

▪ Logistics	▪ Time	▪ Time spent in logistics for each customer
	▪ Quality	▪ Conformity index of logistics ▪ Liability about non-conformity
	▪ Costs	▪ % of service capacity employed for each customer ▪ N. of orders processed every day ▪ Homogeneity of the orders processed every day
▪ Transports	▪ Times	▪ Time spent in the transport for each customer ▪ Time spent for transportation for each stage of the transport (i.e. vector)
	▪ Quality	▪ Conformity index of logistics ▪ Conformity of transportations ▪ Liability about non-conformity

“When we decided to introduce these performance indicators, I was strong convinced that the decrease of revenues registered in 2013 could be better analyzed through formalized information on the results reached in each customer relationship. I believed that such standardized information on quality and costs should support my decision-making processes in identifying where the problems arose from” (The Entrepreneur).

KPI results for each customer relationship supported at first the entrepreneur in managing these relationships, by clearly showing where such problems arose from. However, the KPI results, making visible performance dimensions to all organizational actors, increased their awareness of the decisions taken by the entrepreneur. Even if decision-making processes were managed individually, all organizational actors involved in each process participated, through KPI, in the decisions taken by the entrepreneur. In this view, KPI were embedded in such operating and administrative decisions related to customer relationships.

Managers referred that KPI were recognized as a solution for the problems which had previously arisen along the supply chain process.

“The KPI results helped us to understand events and to be more reactive in the day-to-day making...We were aware of how things were going on” (Purchasing manager).

In this view, all organizational actors actively participated to socially construct the reality which was shaped and re-presented by KPI. Thus, the logistics manager and his team were able to reduce the lead time thanks to the weekly reports that they were able to elaborate supported by the new accounting information system.

“Before the introduction of KPI, delays in shipping the customer’s products were a weakness that led our company, day by day, to lose competitiveness... After the KPI introduction we immediately noticed where delay came from and have the chance to quickly solve it” (Logistic manager).

In this view, KPI reports actively contributed to realize a platform where all actors were easily able to share information. The accumulation of information was used by the entrepreneur for planning the corrective actions to improve quality services of customer relationships. More specifically, the reports on transportation costs highlighted some inefficiencies relating to the acceptance of the transport of products characterized by low weights: when the capacity of each van was not fully used, transportation costs were unsustainable for the company. Furthermore, the report on customer orders underlined the lack of uniformity in the order list that the company daily processed. The KPI reports helped the logistics manager and his team to optimize the delivery plan, reducing transportation costs. On this point the entrepreneur argued:

“When the capacity of the vans was not fully exploited, we reduced our transportation costs by outsourcing transport services to our suppliers, given their experience and their deeper knowledge relating to some specific geographic areas”.

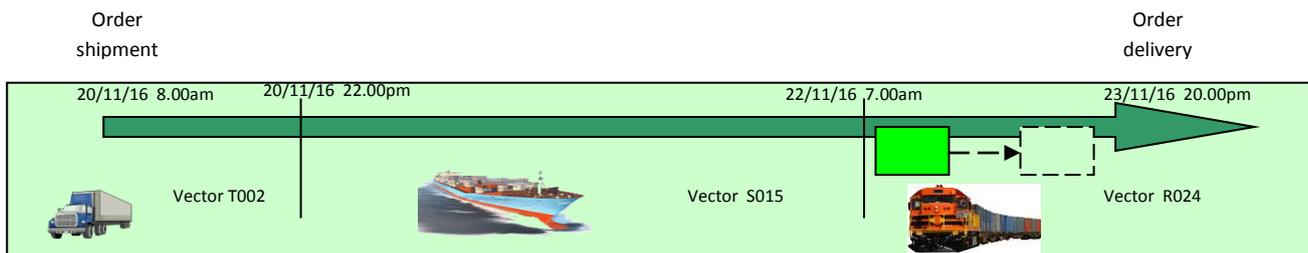
Moreover, the entrepreneur’s decision of sharing the time and quality KPI results with their customers activated further learning processes through which customers learnt immediately the way how their services were accomplished.

The knowledge produced by KPI reports activated a learning process about customer relationships, fostering a better interpretation of these realities. Thus, KPI acted as a means for the organizational actors

to order and interpret their experience, promoting the cognition and commitment associated with the process of organizational ordering. In particular, considering the sensemaking process in the interpretation issue, the new KPI clarified the intents of such decisions, avoiding misunderstandings, and favouring the learning processes of all organizational actors. Similarly, considering the logistic issue of sensemaking, KPI supported the entrepreneur’s decision-making and reduced ambiguity deriving from strategic issues through the sharing of different points of view and interpretations from different organizational actors.

In the figure 1 it is shown an example of KPI report available for each order. This report will be fully completed only when the order is fulfilled, however it can be browsed during all the steps of the transportation for monitoring how it is coming. As illustrated in the example, the report shown the real state of the order n. XX5 at 9.00 am of 22/11/16, by representing how order’s delivery times and quality were social constructed by the three vectors.

Figure 1. An example of transports KPI report for each order (22/11/16 9.00am)



Order N. XX5	Vector T002	Vector S015	Vector R024	Tot.
Transportation times	14 h	33 h		
Conformity of transportations	✓	✓		
Liability about non-conformity	None	None		

KPI reports influenced also strategic decision-making processes as those regarding the re-organizing of the logistic process, allowing the entrepreneur to learn more about possible alternatives that would contribute to transforming strategy into something new and unexpected. In particular, these KPI results revealed a gap of efficiency, highlighting the causes of this gap and the way or actions that would reduce it, as follows:

“Such analytical KPI showed that there has been a high occurrence of both loading lists and shipping orders in the lowest weight groups, a high percentage of costs per quintal and the lack of optimization in delivery planning” (Controller).

The emergence of these inefficiencies in the logistic process stimulated top management to evaluate such changes in the way how transportation, handling, distribution and storage activities were done. Therefore, in 2015 it was launched a project of warehouse reengineering.

“The recognition of our weakness encouraged us to identify new actions able to solve our problem and to reveal new opportunities... In this view, through recurrent meeting with managers responsible for warehouse activities, managers of IT solutions and the controller, we agreed on the introduction of the following innovations: a new ERP system for storage activities, new equipment for picking activities; training courses, the reorganization of workers based on the quantities to be worked and the hourly requirements, a new WMS (warehouse management system) to monitor storage activities, or expand the use of RFID technology, a new devices with radio frequency for all storage activities, to measure the hourly yield of storekeepers and to assess whether the operators are performing, the redefinition of responsibilities for warehouse activities, and the reengineering of the storage layout” (The entrepreneur).

In addition to these innovations, there was the design and implementation of an APP and a corporate cloud portal that allowed greater cohesion and integration of information flows among all organizational actors and also among the external actors directly engaged in the real time geographic outcomes of deliveries that may be of concern. As referred by the manager responsible for IT:

“The implementation of the corporate cloud portal offered three different types of access and display. At first it allows the entrepreneur to enjoy at any time Dashboard KPI, querying the database for time intervals by customer, by geographic area, etc. Thus, the implementation of this new technology allows the entrepreneur to monitor the performance of the core business and its performance dimensions; to monitor the progress of deliveries, any abnormalities, the accounts of the pallets, etc... Secondly, it allows vendors to get an update on the portal deliveries if the sub-carriers are not continuative and therefore do not have the APP to check them in real time; to control the geo-location and the progress of their shipments if they have installed the APP. Finally, on the customer side, it enables them to obtain the geographic location of deliveries in real time, to extrapolate statistics and indices such as the ratio between trips delayed and trips awarded in a given time interval etc...”

Summarizing, the information drawn from KPI allowed the entrepreneur to better define the actions and the directions that should contribute both to maintain and to sustain the company’s competitive advantage, as he stated:

“The business process reengineering activated by KPI allowed us to improve the effectiveness and efficiency in the activities of the logistics office, distribution and storage through training, specialization and re-definition of roles; to free up the personnel previously devoted to manual calculation of indicators thanks to innovative automatic dashboard indicators and dedicate this personnel to other innovative project activities; to measure the hourly yield of employees and to encourage continuous improvement in productivity and corporate profitability through the use of radio frequency technology and the implementation of an incentive scheme; to retain current customers, to increase our market share and win new customers by providing additional services that meet the increasingly pressing needs of customers or by enabling the customer to benefit from real-time flow APP informative and enterprise cloud portal”.

The previous described evidences on strategic decision-making processes confirm the multidirectional and regenerative relationships between calculative practices and decision-making processes, highlighting the process of knowledge accumulation enabled through the accounting information systems.

The accounting information system was able to involve all actors in socially constructing the reality which was shaped and re-presented by KPI reports. Firstly, KPI reports supported the improvement of services quality and cost management of customer relationships (operating and administrative decisions); secondly, KPI reports sustained the re-engineering of the logistic process disclosing to the entrepreneur such new opportunities for its business (strategic decisions). In doing so, accounting information system was able to allow all actors to make sense of their experience, supporting them in interpreting how things were done and how they were socially constructed.

5. Discussing the case

5.1 Making sense of the business problems as needs for performance information

The case discussed in the previous section refers to a small firm where the entrepreneur is accustomed to make his choices individually, by only relying on his insight. In such a firm, the introduction of a managerial information system needed to convince the entrepreneur of the ability of the system to produce in advance standardized information that could support his operating and administrative decisions (Mintzberg, 1978) and thereby increase his control over all the business events. However, the complex context of the global transport market, where the firm operates, the provision of an inter-modal transportation service, did not make the production of information in advance a credible solution to support neither operating nor administrative decisions. Indeed, the performance of the transportation service accomplished by the firm was affected by a combination of natural factors, such as climate changes, social and political factors, such as transport strikes, unpredicted car and train crashes, and problems due to the political instability of some geographical areas and so on. Thus, no information could be available in advance to standardize the timeliness and the actual cost of the transportation service and, consequently no operating decision could be programmed, and among administrative decisions, no coordination could be taken in advance. In such an environment, the main strategic decisions are taken individually by the entrepreneur who relies on his insight. Hence, the rational-analytical approach to decision making could not be a valid guide. According to this approach, as we have discussed in the theoretical part of this paper,

knowledge of the word is objective and is assumed to precede action (March and Simon, 1958; Allison, 1971). This means that all the possible business problems that may cause a delay or an increase in the cost of the service are supposed to be observable in advance before an action is made. However, the case just described refers to a business context where the main problems affecting the performance of the service are recognized by accomplishing the service itself. Action is thus necessary as a source of experience that helps the entrepreneur to make sense of the business problems. It is through its continuous stream of experience that stems from the interaction with its environment that the firm can produce the raw data that allow the entrepreneur to make sense of his experience (Weick, 1995, 2001)

The decrease in bargaining the firm experienced in 2013 helped the entrepreneur to learn about the main critical factors for the success of his firm. He thus became more conscious of what had to be monitored and how. The administrative decisions were thus not routinized, being the output of the experience the entrepreneur interpreted with the help of other managers. The individual attitude of the entrepreneur was, in this case, overcome in the administrative decisions of designing the new KPI. In doing so, the entrepreneur interacted with the main managers responsible of the logistics and transportation services through brainstorming meetings. The new KPI were thus the output of a sensemaking process and interaction. Knowledge of the word was then subsequent to action and experience, being an exit of a sensemaking inter-subjective process. It was such a process that managed strategic uncertainty (Daft and Huber, 1987) by supporting the interpretation of the information, by sharing the different views of the various organizational actors, by sharing the acquisition and distribution of information through the design of a portal which automatically generated the KPI needed by each actor. For the acquisition of information about the logistics service, the portal was accessed by each employee who was responsible for ticking in the portal data on the time spent in order arrangement, the conformity of each order arranged, the % of service capacity employed for each customer.

Thus, the main business problems recognized through the experience of a decrease in bargaining enacted a process of sensemaking through an interaction both in the interpretation and in the acquisition of information. This made the business problems a socially constructed reality, represented through the new KPI and their platform.

5.2. Making sense of performance information as means for re-constructing organizational decision making and inter-organizational relations

The first effect of the use of KPI was to overcome the individual approach of the entrepreneur in the decision making process regarding the management of logistics and transportation services. By making visible where the main problems arose from, the introduced KPI made the various managers aware of the critical performance dimensions. Their participation in the decision making process become necessary since each manager, responsible for a specific area of logistics and transportation services, could bring his or her competence and experience in the KPI interpretation. The decisions on inter-organizational relations and their performance management become the exit of participative and interactive processes.

The interpretation of KPI dealt with the misunderstandings deriving from strategy definition that requires the spreading of shared values among all the actors involved (Daft and Huber, 1987). In this case, sensemaking favours the learning processes of individuals (Daft and Weick, 1984), while accounting information system acts as “learning machines” (Burchell *et al.*, 1980). Thus, the interpretation of KPI was an inter-subjective process where the various managers contributed with their technical competences. This was the case in the use of the report on transportation costs. Such a report highlighted that when the capacity of each van was not fully used, transportation costs were unsustainable for the company. The decision to satisfy customers’ orders in these conditions was made thanks to the insights of the logistics manager and his team, who applied their competences to optimize the delivery plan, reducing transportation costs. The solution they found, namely the outsourcing of transport services, was the exit of an inter-subjective process of sensemaking coming from the collective reading and discussion of KPI reports. Therefore, KPI acted as a sensemaking tool that promoted organizational learning and communication between the entrepreneur and the main managers involved, acting as a learning machine.

Another opportunity given by the interpretation of a transport KPI report was related to the content and the interactive character of this report, as visualized in figure 1. The figure shows an example of KPI

report available for each order, paying attention to the process of information production and delivery (DeLone and McLean, 1992; Heidmann *et al.*, 2008) as a necessary condition to understand KPI as a sensemaking tool. This report will be fully completed only when the order is fulfilled, but it can be browsed during all the steps of the transportation for monitoring how it is coming. (DeLone and McLean, 1992; Heidmann *et al.*, 2008). Through the use of this report the entrepreneur learnt more about possible alternatives that would have contributed to transforming strategy into something new and unexpected, namely into an innovation. Thus, the decision of reorganizing the logistic process was a process innovation that emerged from the use of the report shared between the entrepreneur and the other managers. All the organizational actors learnt about a high occurrence of both loading lists and shipping orders in the lowest weight groups, a high percentage of costs per quintal and the lack of optimization in delivery planning. These inefficiencies brought the actors to introduce some relevant changes in the ways how transportation, handling, distribution and storage activities were done. The result was a package of innovations such as: a new ERP system for storage activities, new equipment for picking activities; training courses, the reorganization of workers based on the quantities to be worked and the hourly requirements, a new WMS (warehouse management system) to monitor storage activities, or expand the use of RFID technology, a new devices with radio frequency for all storage activities, to measure the hourly yield of storekeepers and to assess whether the operators are performing, the redefinition of responsibilities for warehouse activities, and the reengineering of the storage layout, as reported by the entrepreneur. As evident, the described package of innovations was the outcome of the use of a report that made visible the performance of the service process, enabling both the entrepreneur and other managers to make sense of the past actions. Thus, the described package of innovations could not be realized without the new KPI report that acted as a sensemaking tool.

Considering the logistic issue of how KPI was acquired and distributed among all the relevant actors, the sharing of KPI on time and quality with the customers allowed further learning processes through which customers learnt about the way how the services they had requested were accomplished. Such a learning helped to reduce ambiguity from strategic issues through the sharing of different points of view (Sutcliffe 2001). This is a very important point that offered both the firm and its customer performance information on the transportation service that could have been of support for future bargaining. This is another example of how the sharing of KPI between the firm and its customers can realize a learning machine (Burchell *et al.*, 1980) that makes the actors more aware of the effects of their past actions. Moreover, the relevance of the logistic issue for this episode is evident since it highlights the opportunity to disclose KPI to all the relevant actors in order to use such information as a basis for justifying future actions that those actors should accept. Hence, the KPI report was used as a tool of sensemaking for future bargaining between the firm and its customers.

From this discussion, while the interpretation issue, entailing a process of inter-subjective interaction, involved different organizational actors that contributed with their different competences to enrich the interpretation of the KPI, the logistic issue, implying a process of distribution of KPI, sharing it with relevant customers, involved inter-organizational actors and represented an inter-organizational space where customer relations were reconstructed.

Furthermore, the above discussion highlights the link between the interpretation and the logistic issues related to KPI. All actors involved in the use of KPI and the way how KPI is acquired and distributed influenced how the actors made sense of it. Furthermore, as discussed above, this sensemaking process constructed the bases for defining organizational changes and innovations and reconstructing inter-organizational relations. In playing such roles, in the case just discussed, KPI created the bases for the entrepreneur learning the effect of his past actions and thereby justifying the strategic decisions involving the other organizational and inter-organizational actors that have made sense from using KPI.

6. Concluding remarks and direction for future research

The present paper has moved from the peculiarities of decision-making processes and on the role of accounting information systems in small firms. Specifically, the study has dealt with how accounting information system and KPI could be of support for decision making processes in small firms. From the literature review has emerged a low diffusion of formal accounting information systems among small firms.

This might be due to the specificity of decision-making processes that, within small firms, are far from being described through the rational model. However, in the extant management accounting literature, some scholars (Burchell *et al.*, 1980) have highlighted different roles played by accounting information systems that differ from rational decision support. Considering accounting calculation, this can be intended as a learning machine, which helps its users to justify the past choices and make sense of the past actions and events. This is very relevant when entrepreneurs or managers have to make sense of the strategic uncertainty of their business. Moreover, the conceptualization of accounting roles that overcome the mere rational analytic perspective gives room for examining the roles of formal accounting information systems in small firms, where most decisions are intuitive. The case evidence has highlighted how complex can be the decision making context of a small firm operating in the transportation markets. Such a complexity is reflected on a low programmability of strategic, administrative and operating decisions. In such a setting the new KPI has supported non-programmed decisions through a learning process that involved all the relevant actors, namely through acting as a learning machine.

Thus, the main finding of the case study have highlighted how a formal accounting information system has supported a decision making process based on interpretation and sensemaking. More specifically, the case evidence and its discussion show that the introduction and design KPI and the related accounting information system were the outcome of the past actions. The entrepreneur became aware of the main KPI needs only after experiencing some events, such as the decrease in bargaining during 2013, the trends in the service performance and inefficiency that was noticed by the entrepreneur. Knowledge came after making sense of actions. This process of sensemaking was favoured by interactions. The introduction of KPI created a space of organizational interaction among the entrepreneur and the managers responsible of the main organizational areas. It is in this space that the entrepreneur had overcome his individual approach to decision-making taking advantage of the competences and the experiences of the other managers and thereby his enriching KPI interpretation. It is in this space, in fact, that the use of KPI can make sense from the past results leading the actors to the future. This process of interactive interpretation has made evident to the actors the main problem underlying past actions leading them to emergent solutions in terms of process innovations. The innovations described in the case evidence suggest viewing the link between KPI use and innovation as the exit of a sensemaking process, where innovation is an outcome of KPI sensemaking and interpretations.

Moreover, the case evidence has highlighted some implications from the way how KPI has been acquired and distributed. Specifically, the sharing of KPI by means of a cloud portal required the collaboration of inter-organizational actors and allowed the customers to access the portal. This made possible a use of KPI in future processes of bargaining that may constitute a further field of KPI impact and sensemaking.

Analysing KPI sensemaking from organizational interaction, the paper contributes to the behavioural perspective of performance measurement systems, highlighting how the sensemaking of KPI derives from a participative style of control. A further contribution stems from the evidence showing how the package of the process innovations implemented in the customer relations was the exit of a sensemaking approach to KPI. This suggests that the constructive use of KPI in fostering innovations can be better understood following a sensemaking perspective. Moreover, the case evidence, investigating the participation of the customers in the use of and the access to the KPI cloud portal, has contributing to the literature of inter-organizational control adding the worthiness of the sense-making perspective.

The last two points deserve further inquiry in the future. How accounting information sensemaking can favour innovations, and how interactions among the relevant actors can enrich KPI sensemaking to boast innovations is a worthy issue. Moreover, how the KPI sensemaking can be drawn in interactions between a firm and its customers is another point that merits investigation in the future.

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