CHECK-UP METHODOLOGY OF INFORMATION SYSTEMS IN MANUFACTURING SMEs

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Abstract
This paper presents the information systems (IS) check-up, a new methodology to critically investigate the IS of manufacturing SMEs, with the aim of setting more light on the complex mechanism of value creation and of cost-benefits analysis in the case of information technology (IT) and IS investments.

Moreover, the paper presents the preliminary results obtained by applying the new methodology to 10 manufacturing SMEs in Italy.

Context

Several surveys (Assinform 2006, OCSE, 2003) show a rather low rate of investment in IT/IS among Italian companies. In 2005 the ratio of Italian national IT/IS expenditure on GDP was less than 2%, against USA's 3,83% and 3,1% in Germany and UK. Moreover, the growth of Italian IT expenditure in the period from 2004 to 2006 was also lower than that of other selected countries. In addition, IT spending is imbalanced by dimension among Italian companies: in 2005 the IT expenditure of Italian SMEs was less than 20% of the national grand total (Assinform, 2006), despite the fact that they accounted for 99,5% of the companies, and 51,6% of the turnover within the survey sample.

This extremely low IT/IS adoption in SMEs -as compared to larger companies- is due to a complex mix of factors, mainly connected to a lack of vision on how to leverage on IT/IS to improve business processes efficiency and effectiveness (Salmeron and Bueno, 2005), together with the well known difficulty to clearly assess cost and benefits connected to IS implementation.

Evidence has been cast by many studies (Kraemer & Dedrick, 1999; Tam, 1998) on a positive relation among IT/IS investments and economic development of a country. Likewise, Siegel and Grillriches (1992), Berndt and Morrison (1995) and Lehr and Lichtemberg (1998) all report about a positive relation between IT/IS investment and economic results at industry level. The correlation among IT/IS expenditure and competitiveness is harder to show for a single firm, since competitiveness depends on many factors, such as industry, enterprise dimension, organization structure and culture (Levy et al., 2001). Yet, various authors generally agree on the ability of IT/IS to jointly foster both efficiency and effectiveness at an operational as well as corporate level (Radhakrishnan et al. 2006; Shin 2006; Miragliotta and Perona, 2004). Thus, the lack of investment and expenditure in IT/IS within Italian SMEs can be considered at least a relevant factor in explaining the sharp decrease of Italian competitiveness on international markets experienced in the last 5 to 10 years.

The information systems check-up

The *information system check up* aims at a twofold objective: on the one side, it defines an empirical research path with the objective of investigating at a firm level the relations among the endogenous and exogenous factors, the IT/IS choices and the corresponding results achieved. This, in turn, can gather new evidence on the specific choices connected to value generation in planning, implementing and using IT/IS within manufacturing SMEs. On the other side, each check-up supports the corresponding SME by supplying evidence on its IT/IS policies strengths and weaknesses, and other information useful to address new IT/IS investment, while improving results and users satisfaction.

The check-up methodology consists of three main phases, as follows.

1). Data collection: a ten sections semi-structured questionnaire is used to gather information in field. Each section is dedicated to a specific manager of the surveyed firm: managing director, administration, production, logistics, procurement, sales & marketing, quality, R&D, aftermarket and IS. The following aspects are investigated within each area: the activities carried, aimed at pointing out the amount of information and computation required; the description of the IT structure supporting these activities; the list and description of specific functionalities supported; and the users' satisfaction with the IT/IS context. In addition, the administration section addresses the IT/IS expenditure; the IS section contains questions regarding implemented applications and current and future IT/IS development projects, while the managing director is interviewed about organizational choices regarding IT/IS.

2). Data analysis: gathered data are analysed in order to find out relevant correlations among the main surveyed aspects, such as: the exogenous context (i.e. product range, market and customers, etc.), the endogenous context (e.g. dimension, control structure, cultural climate, etc.); the main IT/IS organizational choices (i.e. degree of activities outsourcing); the IT/IS expenditure (by nature, by resource and by activity); the way IT/IS innovation projects are carried out; the supported functionalities and the implemented applications, together with the connected users satisfaction. To this purpose, functionalities are organised through a new model by assigning them to a macro-process (either buy side, in side or sell side) and to a specific implementation level (from static data sharing to collaboration support).

3). Results sharing: in this last check-up phase, every firm within the sample is critically analyzed and the results are discussed with each company's managers. In order to generate critical remarks, each company can be compared from time to time with the whole sample, similar firms within the sample, or the best in class within the sample. Moreover each firm's functionalities and processes are analyzed in order to find strengths, weaknesses and inconsistencies.

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