WORKING CAPITAL MANAGEMENT AND FINANCIAL SUSTAINABILITY PERFORMANCE ANALYSIS IN SMES

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ABSTRACT

The idea of this research is to find out if the hypothesis about the impact of operating working capital management on business financial sustainability and, eventually, profitability is verified in the market of small and medium Italian companies. This analysis is empirical, being developed through a validation carried out directly on the data of the companies included in the sample. In order to give relevance to the data resulting from this process, 3,272 observations were collected, relating to 409 companies for a period of 8 years. The originality of this research lies both in the country taken as a reference (Italy), but also in the deepening of SMEs, since in most scientific papers about the topic, the focus is on a pool of listed companies. The methodology is based on the analysis of SMEs belonging to three production sectors. This was done in order to avoid that average data did not take account of specificities - something that would have reduced the possibility of producing comments - so to find a measure of synthesis for all the variables of working capital and the business cycle. A scoring mechanism has been created which, on the basis of the main indicators of working capital management, attributes a real evaluation to each company taken into consideration, for each of the years of the time horizon. The statistical correlation analyses are then carried out by comparing the score obtained and the main profitability indicators, i.e. ROA, ROI, ROS, ROE and an indicator of financial sustainability as PFN/EBITDA.

Keywords: Operating working capital management; financial sustainability; profitability, Food industry, SME, Italy

1. INTRODUCTION

Every decision taken within the company has an impact or at least a link with finance (Emmanuel, Otley and Merchant, 1990; Pike and Neale, 2006; Schaltegger and Burritt, 2017). The objective of this area therefore coincides with that of general management, i.e. maximization of value (Jensen, 2001; Yow and Sherris, 2008). To achieve this, three types of choices are made: investment,

financing and liquidity choices (Disatnik, Duchin and Schmidt, 2013), directly linked to economic and financial sustainability of an enterprise (Doane and MacGillivray, 2001).

The investment choices are related to the allocation of resources that the company owns and must be oriented towards activities and projects that can make the business sustainable and profitable (Hart and Milstein, 2003; Achtenhagen, Melin and Naldi, 2013). A distinction is made on the basis of the net present value, which must be positive, i.e. the expected return must be higher than the cost of capital employed. There is the following relationship: the riskier the projects are, the higher should be their yield (Lintner, 1975).

Financing decisions relate to raise the necessary funds for the company and have a direct impact on the financial structure. It must respect the level of risk of the projects to be financed, and their pay-back period while maximizing the value of the investments. Financing and investment choices are strictly related and, although different in nature, must be managed as a whole: the objectives of one activity must not prejudice those of the other. Finally, liquidity management determines how and how much money to mobilize on a daily basis and is commonly referred to "treasury management" (Kaiser, 2011), but even to "dividend decisions"

The finance function plays an intermediate role between the financial markets for raising funds and those for using them. On the basis of strategic planning decisions, it deals with how to meet the needs of funds for real activities, against which there are expected revenues with different deadlines and risk profiles. On a daily basis, there are other activities that fall within this area and are: guaranteeing an effective information system for financial control at the various management levels and optimizing the management of working capital by interacting with the other functions in the management of customer credit and supplier debt and stocks (Hofmann and Kotzab, 2010).

In fact, it is advisable to consider long-term financial decisions in the strategic planning phase, since an active collaboration is needed between executive and financial management, so to create a model for future development which is sustainable from the company's resources (Rauter, Jonker and Baumgartner, 2017). At the same time, in short-term choices, it is necessary that the financial plans and the staff who deal with them, work closely with those who lead the business, so as to ensure that the plans created in the strategic planning are actually consistent with the business situation (Nickols, 2016) and perspectives. In this regard, continuous monitoring and control of what is happening in the company is essential. One of the most useful elements when it comes to the finance function, both in terms of management and control, is working capital (Mathuva, 2015).

The basic idea of the present work is to research if the hypothesis about the impact of working capital management on business financial sustainability and profitability is verified, by analyzing small and medium Italian companies. The research is based on an empirical analysis, being developed

through a validation carried out directly on the data of the companies included in the sample (Remondino and Schiesari, 2019).

In order to give relevance to the data resulting from this process, 3,272 observations were collected, covering 409 enterprises over a period of 8 years.

This type of research was first carried out in 2003 by Marc Deloof (Deloof, 2003) on Belgian firms, but the outcome has been successful mainly in developing countries, gaining little space in the world of Western research. In fact, there are several studies relating to countries such as Pakistan (Raheman and Nasr, 2007), Malaysia (Darun, 2011), Nigeria (Falope and Ajilore, 2009), Jordan (ALShubiri, 2011), Iran (SAREMI, MOHAMMADI and NEZHAD, 2016) and others, there are only a handful of European or American scientific sources, relating to Greece (Lazaridis and Tryfonidis, 2006), Spain (Juan García-Teruel and Martinez-Solano, 2007), Sweden (Andersson and Blomdahl, 2017) and the United States (Cumbie and Donnellan, 2017).

In addition to the reference environment of the study, the originality of this research lies also in choosing SMEs for the analysis, a field investigated by a limited number of papers e.g. (Baños-Caballero, García-Teruel and Martínez-Solano, 2010; Afrifa and Tingbani, 2018), while in most other cases the focus was on a pool of listed companies.

The method also presents elements of differentiation, since it is based on the analysis of SMEs belonging to three specific production sectors. This was done in order to better compare the results of the analysis and to take into account the specificitiess affecting the level of circulation in different sectors. In (Hawawini, Viallet and Vora, 1986) the authors indicate that working capital behavior is industry dependent and even (Hill, Kelly and Highfield, 2010) consider the industry effect. An original scoring mechanism has thus been created which, on the basis of the main indicators of working capital management, attributes a real evaluation to each company taken into consideration, for each year of the time horizon. The statistical correlation analyses are then carried out by comparing the score obtained and the main profitability indicators, i.e. ROA, ROI, ROS, ROE and PFN/EBITDA.

The first part of the work is devoted to a theoretical in-depth overview of the concept of working capital and its optimization in strategical terms. The second part clarifies the objectives pursued in this research, going into more detail on the basic methods. The third part describes the of the analysis itself, with the deepening of the area of investigation and the choice of the time horizon. Consequently, the dynamics of SMEs in general and of the product sectors over the time horizon and the definition of the indicators taken into consideration are described. The last part consists of data collection and statistical analysis, description of the mechanism of scoring and correlation, followed by a synthetic recap of the results of the present research.

2. WORKING CAPITAL AND FINANCE

Net operating working capital (NWC) represents the difference between operating current assets and current liabilities (Yaari *et al.*, 2016).

This amount emerges from the reclassification of the Balance Sheet (Fiechter, 2011) with the criterion of management relevance and has, usually, a positive balance for industrial companies, since inventories and trade receivables generally have a greater amount than accounts payable .. The accounting rules state that an asset or liability is defined as current if it is converted into cash (in the case of assets) or paid (in the case of liabilities) within 12 months.

According to Deloof (2003), the way that working capital is managed has a significant impact on profitability of firms. Such results indicate that there is a certain level of working capital requirement, which potentially maximizes returns. Firms adopt working capital policies to address market imperfections over the operating cycle and incur costs and accrue benefits that affect cash flow and ultimately shareholder wealth (Hill, Kelly and Highfield, 2010)

A popular measure of working capital management is the cash conversion cycle, (CCC) that is, the time span between the expenditure for the purchases of raw materials and the collection of sales of finished goods.

Deloof [17] found that the longer the time lag, the larger the investment in working capital. A long cash conversion cycle might increase profitability because it leads to higher sales. However, corporate profitability might decrease with the cash conversion cycle, if the costs of higher investment in working capital rise faster than the benefits of holding more inventories and/or granting more trade credit to customers

Large inventory and generous trade credit policy may lead to high sales. The larger inventory also reduces the risk of a stock-out. Trade credit may stimulate sales because it allows a firm to access product quality before paying.

A substantial body of research examines individual components of operating working capital in isolation. In (Long, Malitz and Ravid, 1993) and in (Ng, Smith and Smith, 1999) the authors study trade credit policy and find support for the contracting cost motive with receivables used as a product quality indicator. In (Petersen and Rajan, 1997) they demonstrate that receivables are directly tied to profitability and capital market access

In (Shin and Soenen, 1998), the authors researched the relationship between working capital management and value creation for shareholders. They (Shin and Soenen, 1998) used net-trade cycle (NTC) as a measure of working capital management., basically equal to the cash conversion cycle (CCC), where all three components are expressed as a percentage of sales. They examined this relationship by using correlation and regression analysis, by industry, and working capital intensity.

They found a strong negative relationship between the length of the firm's net-trade cycle and its profitability. Based on the findings, they suggest that one possible way to create shareholder value is to reduce firm's NTC.

In (Juan García-Teruel and Martinez-Solano, 2007), the authors collected a panel of 8,872 small to medium-sized enterprises (SMEs) from Spain covering the period 1996 - 2002. They tested the effects of working capital management on SME profitability using the panel data methodology. The results, which are robust to the presence of endogeneity, demonstrated that managers could create value by reducing their inventories and the number of days for which their accounts are outstanding. Moreover, shortening the cash conversion cycle also improves the firm's profitability.

Companies are forced to increase flexibility and efficiency to build a competitive advantage. One of the main levers available to management has been to expand the range of services and products offered (Walters and Knee, 1989). This type of action has an impact in particular on two elements of the assets: credits and stocks, which have therefore grown in importance, to become two of the main components of the company management, not only for their weight in the balance sheet, but also for the strategic importance that they have acquired in this transformation.

If this focus on two components of working capital has influenced international competition since the 1970s, in the last fifteen years, with the spread of an increasingly global market, increased competitiveness and the effects of the economic crisis, these issues have become increasingly the subject of evaluation by all types of companies. In fact, an increasingly urgent need has emerged to control and plan the management of working capital in order to find the right balance between financial and operational choices. At a time like the present, when there are considerable problems for access to credit, it can be very difficult to combine the needs of the financial area with those of the operating area, in turn made problematic by competition and the need to maintain production at the level of quality required, without exceeding in stocks and regulating the delay in payments.

In addition to be an effective control tool, working capital is one of the most delicate elements of the finance function. The choices made with regard to working capital can be considered among the decisions of the financing mix, which have direct effects on the financial structure and, consequently, on the cost of debt and the level of financial risk perceived by the markets. In addition, negative elements linked to the overall profitability of the company may emerge from the management of working capital in the form of past due or uncollectible trade receivables, or losses linked to inventory obsolescence.

Operating NWC originates from the emergence of assets and liabilities in the business cycle (Enqvist, Graham and Nikkinen, 2014), with the additional variable of the loan in terms of delayed payment and higher costs incurred due to deferred receipts. The components influencing payment deferrals therefore have a decisive influence on the determination of the NWC. These include: the nature

of the activity carried out, the decision-making model, the organizational model and, finally, the information system.

As regards the nature of the activity carried out, reference is made to the differences that may arise on the basis of the type of technical-productive cycle and the conditions typical of the industry in which the company operates (Rizzoni, 1991). In some industries, in order to guarantee a certain level of service, it is necessary to keep an adequate variety and a considerable volume of products in one's own warehouse, while in others one is obliged to stock raw materials at specific times of the year due to the seasonal availability of the same. In both cases it is essential to have a large warehouse during most of the activity. The nature of the business, however, does not only affect the dynamics of stocks, but can also change the amount of receivables from customers, because to operate in certain sectors in which customers have a strong position with respect to the seller, it is appropriate to allow very long payment terms. In this way, the customer can finance himself, consequently the days granted become in this way a competitive factor and those who fail in this condition are likely to be replaced soon by other suppliers.

The Net Operational working capital is negatively associated with sales volatility. Increased sales volatility causes firms to reduce their net investment in operating working capital. Plausibly, the incremental cash flow provided by reducing the working capital gap is needed most by firms with volatile sales (Hill, Kelly and Highfield, 2010).

The decision-making model influences the extent to which working capital decisions are not made by a single pool of selected and directly controllable subjects, but are made at all levels of the company hierarchy: from top management to the last operator in charge of invoicing or delivery.

The organizational model is closely linked to the issues of the decision-making process. Also in this case, in fact, it must be considered that the choices are made at all hierarchical levels, causing problems of coordination. It can be difficult to implement a level of control necessary to verify that this plurality of heterogeneous subjects, act following a logic of optimization at micro and macro level. It can be deduced that the less the structure is able to coordinate itself, the more the various decisions will be in conflict with each other and will cause the level of the operative circulating to increase.

Finally, a factor to consider is the corporate information system, i.e. "the set of interconnected elements that cooperate to collect, process, store and disseminate information to support decision-making processes, coordination, control, verification and estimation in an organization. The existence of an information system makes it possible to standardize behavior that would otherwise be the result of extemporaneous choices based on the intuition of the individuals involved, who could consider their work independent of that of others, generating an exponential growth in the components of working capital. These systems, therefore, allow you to improve control over the decisions made and ensure that

everyone has access to the data they need to make choices consistent with their tasks and business planning.

Taking these factors into account, two objectives should be achieved (Ang, 2014): to combine the management of the individual elements of the circulating currency with each other, but also with other company investments; and to analyze the tools available to the management for the management of monetary flows, both as a final balance and in a preventive manner.

Working capital has been addressed by a wide range of sources of economic literature, starting with the main accounting and corporate finance manuals. However, it has been relatively little taken into account by business realities, despite the fact that a large proportion of failures were due to inadequate decisions in the management of business working capital. However, the literature also tended to deal with the issue of working capital mainly in relation to reclassifications of the balance sheet, calculations of indicators, as well as a component to construct cash flow and financial statements, while today it has acquired a new importance.

Different authors (Meyer, 2007; Nazir and Afza, 2009; Nuhiu and Dërmaku, 2017) support the importance of working capital management with particular reference to the importance of short-term needs and the management of capital reserves.

Since the financial crisis of 2008, companies have seen a deterioration of their operating environment, with managers forced to apply strict measures, cut costs and postpone investments so as to be able to respond to decreases in demand and consequent reductions in production. As a result, liquidity and working capital have become two variables under very close observation, and therefore under continuous monitoring and control. Working capital management has changed a lot and the most common and widespread policies have been adapted to the new economic conditions. Due to the rapid changes in the economy, companies are renewing themselves and finding new ways to compete and working capital is becoming increasingly important among these. Even the recent economic crisis caused by Covid-19 outlined the crucial role of the operational working capital for the company risk and sustainability.

3. OBJECTIVE OF THE RESEARCH, ANALYZED COMMODITY SECTORS AND CONSIDERED VARIABLES

The main objective of this analysis is to verify if there is a link between the optimization of operating working capital and the profitability of the company. This concept, which instinctively seems obvious, since any optimization should result in a better performance, had never been the subject of analysis with regard to the sector of small-medium Italian companies. It was therefore

considered important to check whether this relationship exist, especially considering that the SME is the most common type of firm in Italy.

The analysis includes an in-depth analysis of Italian SMEs belonging to three different sectors of the food industry. In order to proceed with a meaningful analysis, it was considered appropriate to analyze, in addition to SMEs, large companies in each sector to use them by benchmark and variable more sensitive, as it consists of a smaller number of companies, more solid and global and therefore less sensitive to the effects of the crisis. This was done considering that the time horizon had to be as close as possible to the present, therefore certainly including years in which the effects of the 2008 crisis and its consequences were an important exogenous factor that greatly influenced company performance and variables.

The chosen survey area is therefore Italian SMEs. According to the "User's Guide to the definition of SMEs" (European Commission 2015) In Europe in 2013, nine out of ten companies are one SME, accounting for more than 21 million. They have provided 88.8 million jobs, creating 2 out of 3 jobs. It follows that this type of enterprise and its mechanisms are very important to investigate if only for the relevance that comes from such a spread. The basic criteria for assessing whether a company is an SME are clearly based on size. It is important to distinguish SMEs from other types of companies, because they face a number of problems related to market failures and structural barriers that lead them to need special assistance, provided in the form of EU programmes.

A factor to consider is the anomalous increase, but consistent with the general situation, of companies with at least one bankruptcy or liquidation procedure, as it is symptomatic of the difficulties of companies in a context of poor access to credit and tight price competition. As shown in the Figure 6, starting from 2008 the number of companies in bankruptcy or in serious difficulty has grown at a fast pace, with a peak during 2013, followed by a continuous decrease during 2014 and 2015, bringing the values back to those of late 2008 - early 2009.

This fact has a great influence on the analysis, because if a company is in a precarious situation, it is unlikely that, even with an excellent management of the working capital, it will be able to achieve good performance. The SME conglomerate is therefore made up of very solid companies that have managed to grow despite the difficulties and that have remarkable results, and companies in crisis, in a much larger number than in the past, which instead lower the sector and global averages. It is a decidedly heterogeneous whole, but it represents the majority of the Italian entrepreneurial activity, and therefore it is considered valid of an in-depth analysis.

There are many variables that can affect the company's profitability. The most important is the trend of the economy, which affects all companies operating on the national territory. In order to

assess the effects of the crisis on productivity at national level, data were extracted for a summary indicator, GDP, the value of which is issued quarterly by ISTAT.

GDP is a macroeconomic measure sensitive to changes in output and hence in demand at the national level. The figure 7is expressed in percentage values, in which 2007 is taken as the base year, which is therefore worth 100. It can be seen on the same graph that during 2008 there was a collective collapse at the level of the European Union, but recovered completely (or almost) in 2011 by the other countries, primarily by Germany.

On the contrary, the Italian situation is still very critical, as evidenced by the fact that GDP has not yet returned to pre-crisis levels, even though it shows a slight growth in the data for 2017, then stable for 2018.

Other elements to consider before proceeding with the analysis are data on differences in productivity trends according to the size of the enterprise. It is important to underline the differences between large enterprises and SMEs, especially as both categories will be used in the analysis, one as a variable in question and one as a control variable.

Production levels have not yet returned to the levels of 2007, prior to the outbreak of the crisis, confirming the adequacy of macro data such as GDP to judge the performance of each size category. It is interesting, however, to evaluate how the category of medium-sized enterprises managed to exceed the 2007 standards in 2014, the only positive note of the data under examination. It can also be seen that the average values, regardless of the year, are much higher in large companies than in SMEs, with a difference of around 20,000 euros of added value per employee.

This difference is physiological, as large companies can benefit from economies of scale and have fewer barriers to entry, as well as greater production and distribution capacity. The figure presented in the Figure 8 becomes even more important if we consider that the number of employees in recent years has gradually decreased in the SME segment.

This is probably due to both technological innovation and the continuous drive to reduce costs, whether fixed or variable. This trend has not been so strong in big business and could lead to further discrepancies in the results of the two categories.

A final point that should be mentioned in relation to SMEs in recent years is the suffering. Although the impact of debt has already been considered in terms of bankruptcies or liquidations, it requires further attention, as it is not certain that the presence of impaired debts of companies will only lead to such consequences. Even those companies that have managed the situation and survived the crisis may have had difficulties leading to late payments, the need to restructure loan conditions (which has seen truly exceptional growth) or the overrunning of exposures.

On the basis of the elements that characterized the SME, a time horizon was chosen starting from 2008, the first year in which the effects of the crisis occurred, in order to produce an analysis on the basis of a set of homogeneous values. Taking into account the data for 2007 would have meant creating significant distortions, given the evolution of the Italian market over the last decade, very different from what were the previous standards.

By monitoring the data of a large number of companies in the period 2008-2016, it should be possible to verify whether the hypotheses of correlation between a correct management of working capital and performance exist in reality.

3.1. Sectors used for the analysis

As far as the scope of the survey is concerned, it was decided to investigate the food industry, one of the largest and most important realities of Italian production. The three clusters chosen reflect some interesting areas and relevant realities of the productivity of Italy: the production of milk, its derivatives and cheeses, namely the dairy sector (the first Italian food sector); the production of sweets, a reality worthy of note especially for the Piedmont region, hence the confectionery sector; the production of flour and bakery products, which is a clear symbol of Italian identity in the world.

These three areas have been considered because at the level of production and supply cycle they should be considered as similar, all having to interact with local production, legislation related to the agricultural sector and a deterioration of products in the short term. For these reasons, the results of the analysis could be different, but the variables to be affected are more or less the same, making it possible to look for reasons in a very narrow range of variability.

It is also necessary to consider how, in the years 2008-2015, consumption expenditure for food and non-alcoholic beverages in Italy has suffered a decline, as evidenced by the processing of ISTAT data.

It is clear that until 2006 the growth of average monthly household expenditure grew at a high rate, as evidenced by the two-period moving average (red) and that from 2008 onwards this growth not only stopped, but returned to much lower levels. The sum of 462.33 euros on average for 2008 has never been reached again, despite the recovery underway since 2014. This external dynamic cannot but influence the company's performance and it will be necessary to take this into account when commenting on the results produced by the analysis.

3.2. Variables relating to dynamics of operating cycle

To carry out the analysis, it is advisable to construct two sets of variables: the first set contains the symptomatic indicators of the management of net working capital, and the second set contains the

profitability indicators, to measure the company's performance. The first category relates to the dynamics of the operating cycle; they are:

- Days Sales Outstanding (DSO)

It measures the average number of days before customers settle their claims on the company in question after a sale. Irrespective of the extension period granted by the company, creditors may pay before or after that period. There are no standard values within which it can be considered "good". In order to assess this, it is necessary to compare with the average of the companies in the same sector.

- Days Inventory Outstanding (DIO)

This value represents the average number of days the stock is in stock before it is renewed Even in this case there are no standard values. It is therefore necessary to make an assessment on the basis of the average of the days of rotation of stocks in the sector to which the company belongs, even if the business model adopted can influence it.

- Days Payable Outstanding (DPO)

The result of this indicator is equal to the average number of days before the company pays the debts it has contracted with suppliers. In this case, it is the nature of the company's activity that has an impact, but above all the size of the company: a known and large company will have more bargaining power and will be able to manage the dynamics of its trade debts at will. This consideration is important, because a longer delay on trade debts corresponds to the company's ability to finance itself.

Therefore, even if a value higher than the average could seem a negative signal and of difficulty in payments, in the presence of a solid financial situation, it is a sign that the company is financing itself in an alternative way. Again, there are no established values and the results have to be compared with the industry average.

- Average Business Cycle Duration (Cash Conversion Cycle - CCC)

This value is the summary of the three previous ones, since it is obtained by adding the number of days of credit extension to that of average stockpile, from which the number of days of debt extension must be subtracted. It is therefore a synthetic measure that expresses the number of days that a company needs to convert incoming resources into cash flows.

The operation required to calculate such an indicator implies that it measures how quickly a company is able to convert liquidity into inventory and trade debts, through the system of sales and receivables, and consequently back into liquidity. Being made up of a combination of these indicators of the state of the company's activity, the CCC indicates how skillful management is in managing short-term assets and liabilities in order to generate liquidity. Also in this case the entity must be measured on the basis of the averages of the sector to which the company belongs and the lower the value of the CCC, the more dynamic the company is and therefore the more it is a good result.

- Net working capital/ turnover

This indicator is the result of the ratio between the value of the net working capital and the turnover recorded in the same year. This ratio is useful to compare different companies but even to measure how the sales growth (or decrease) affects working capital behavior.

- Working capital / turnover

The result of this indicator is obtained by the ratio between the components of working capital assets, i.e. inventories and account receivables, and turnover for the same period. In this case, too, the main aim is the comparability of the results between different years and companies investigating how the ratio changes between companies of different sizes and with different growth rates and if there is positive correlation with profitability.

As with the previous one, the interpretation of this value is subject to the action of different forces. Mathematics suggests that an increase in the denominator, i.e. in turnover, which is a positive signal for the company, would lead to a decrease in the result.

3.3. Variables relating to performance

The performance variables taken into consideration are the main profitability indicators plus an element that concerns the sustainability of the company.

- Return on assets indicator (ROA)

The ROA expresses the rate of return on the company's total assets. It is an indicator of efficiency in the use of the resources present in the assets in order to produce a profit. The ROA is obtained from the product of the ROS and the rate of rotation of the asset. ROA is also one of the factors that must be multiplied to obtain ROE. This indicator can be used to determine whether assets are best managed in such a way as to ensure profitability or not.

- Return on investment (ROI) indicator

ROI is the return on investment offered by the company. It is one of the most commonly used indices obtained by a ratio where the numerator represents the result of normal operations, while the denominator is made up of investments in the core business net of accumulated depreciation and any provisions. The ROI is an indication of the degree of efficiency in the use of the resources available to the company to produce profits through its characteristic activity. ROI is also obtained from the product of ROS and the sales turnover rate. ROI can also be used as a factor in obtaining ROE.

- Return on sales (ROS) indicator

ROS provides an indication of sales profitability. It is one of the most significant indexes to obtain information about the efficiency of a company. It is a ratio where the numerator is composed of the Earnings Before Interests and Taxes, i.e. the result of the operating area before the deduction of interest and taxation. By multiplying the ROS by 100 one gets the income produced by the operational

management for every 100 euro of sales volumes. Being so closely linked with turnover and business operations, it is one of the most useful indices for the analyses that will be produced, along with the ROA.

- Return on Equity (ROE) indicator

ROE expresses the profitability of equity capital and is used to verify the rate of return on risk capital. It is a global index, which provides a summary of the overall economy of the company, assessing how own resources have been managed in order to increase profits. This indicator is perhaps the least sensitive to the dynamics related to working capital, but it should be taken into account because it offers an overview of the performance of the company.

- Indicator of a financial sustainability (PFN/EBITDA)

The index derived from the ratio between the net financial position and the Earnings before Interest, Taxes, Depreciations and Amortization expresses the amount of time it would take for the company to use the entire EBITDA for the sole purpose of repaying financial debts. The greater the result of this indicator, the greater the financial risk of the company, as it demonstrates that it does not have sufficient flows produced by the operating area to allow a short or medium-term coverage of financial liabilities. On the contrary, the smaller the result of the relationship, the greater the ability to produce wealth and therefore sufficient financial resources to meet its commitments. Usually this index is used together with the index "Net financial interests/EBIT" to measure the financial risk.

A major difficulty with this indicator is that some components of NFP and EBITDA are not clearly indicated looking at the balances, without supplementary information or a due diligence (i.e. overdue debts, amount of factoring and financial leasing, extraordinary revenues). Nevertheless, this indicator gives a quick signal of the company's riskiness and seemed to be a valid means of comparison for the analysis of working capital.

4. RESEARCH METHODOLOGY

The survey is the main tool used for the data collection and is structured on three levels and on the basis of three questions:

1. Does Working Capital Management affect short-term profitability?

2. Is this impact the same in SMEs and large enterprises?

3. Does this impact depend on the sector in which the companies operate?

By verifying these three hypotheses, we investigated by this research, for the first time, an important sector of the Italian SME using the size and product sector of the companies taken into consideration as additional filters, with a span of time that allows reports to be made on the basis of different intervals.

In order to ensure that the survey basin is large enough to be meaningful, quantitative data were collected from an online database, AIDA, for the duration of the previously established time horizon (2008-2015). These data are collected for all database holdings in the dairy, confectionery, flour and bakery industries.

Once the companies were divided between SMEs and large companies, a descriptive statistical analysis was carried out, which provides a framework of the sector averages for each of the indicators chosen as determining factors and serves to give an overview of the trends of the period.

Subsequently, the indicators relating to working capital management were collected and a score assigned to each company for each year on the basis of these indicators. At this point, the presence of a statistical correlation between the variables related to the NWC and the main profitability indicators previously selected can be verified.

The results produced should be able to give an answer to the three questions mentioned above regarding the Italian SME in the years after 2008.

AIDA, an online database, was used to collect the data. AIDA is a tool of Bureau van Dijk, a company specializing in the production of products containing company information at national and international level. AIDA (Computerized Business Analysis) is a factual database containing structured information on more than 700,000 companies operating in Italy. The data are in historical series, up to a maximum of 10 years and the information is constantly updated. The contents are the complete financial statements, in accordance with the format of the Fourth EEC Directive, the sectors of economic activity, the complete personal data and a plurality of other information of Italian capital companies.

The research carried out was carried out using ATECO codes, which serve to classify economic activities, to allow the results to be filtered by type of business activity. This classification is adopted by ISTAT for national economic statistics and is optimal for this analysis as it is based on the type of activity carried out by the companies and not on what they produce. In this way, companies grouped under the same code can be considered homogeneous in terms of production processes and therefore the need for supply, production cycle and type of plant. Consequently, this subdivision makes it possible to consider the data of each sector as pure exogenous variables, since they are all subject to the same influences from the external environment.

With regard to this analysis, in particular, the sectors covered by the whole of code 10, which groups together food businesses, were examined. Specifically:

- Code 105 (dairy industry) has been used as a filter for the dairy sector;

- Codes 1072 (production of rusks and biscuits; production of preserved pastry products) and 1082 (production of cocoa, chocolate, candies and confectionery) were used to group companies in the confectionery sector;

- Codes 1071 (production of bread; fresh pastry goods) and 1073 (production of pasta, couscous and similar farinaceous products) were used to select enterprises for flour and bakery products.

In addition to the codes, two conditions have been used as additional filters to search for data relating to each sector: the first is represented by the availability of the balance sheets, the second by the presence of known values relating to the NWC. Table 1 depicts a summary of collected data.

Table 1. Sample of available data and search criteria

Terms and conditions		DAIRY		SWEETNESS		FLOUR AND BAKERY PRODUCTS	
		Total availability	progressive search results	Total availability	progressive search results	Total availability	progressive search results
Years with available budgets: 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015	1.	1.247.546	1.247.546	1.247.546	1.247.546	1.247.546	1.247.546
ATECO: 1072 - Production of rusks and biscuits; production of preserved pastry products, 1082 - Production of cocoa, chocolate, candies and sugar confectionery	2.1	2.247	1.961				
ATECO: 105 - Dairy industry	2.2			908	781		
ATECO: 1071 - Manufacture of bread; fresh pastry goods and cakes; 1073 - Manufacture of pasta, couscous and similar farinaceous products	2.3					5.271	4.061
Business Cycle Duration (days): All companies with a known value 2015, 2014, 2013, 2012, 2011, 2010, 2009, 2008. For all selected years	3.	44.380	215	44.380	101	44.380	101
Total		215		101		93	

Not all the companies have data on the annual financial statements of all years on the database, and for the present study it was necessary to maintain a constant number for the whole period under review. In this way you it is guaranteed to have all the data available for the study to be complete. Out of a total of 1,247,546 companies with data on financial statements for the period 2008-2015, only 44,830 have the value of the NWC for all the years under consideration. The results therefore include an analysis of 93 companies for the confectionery sector, 215 for the dairy sector and 101 for flour and bakery products.

4.1. Statistical data analysis

The first operation carried out on the collected data was to subdivide, using the selection criteria for SMEs of the European Commission to separate large enterprises from SMEs. Since the figures for eight years had to be taken into account, a choice had to be made as to the number of years that the limits had been exceeded, so that the company could no longer be regarded as a SME. The criterion adopted is as follows: if the company exceeds the SME criteria for more than three years, then it is considered as a large enterprise; if there is an excess for less than three years, it is considered as an SME. The result is depicted in table 2.

Table 2. Breakdown of large enterprises and SMEs

	DAIRY	SWEETNESS	FLOUR AND BAKERY PRODUCTS
Large E.	35	24	15
SME	180	69	86
total	215	93	101

For each category of each sector, the basic elements of the descriptive statistics were calculated: average, maximum, minimum, median and standard deviation, with reference to the main indicators of both circulating and profitability. For the sake of synthesis, only the arithmetic mean is described in this paper, considering that the other elements do not play a key role in modifying the results of the analysis. These data are depicted in the following table 3.

Table 3. Arithmetic mean of collected data

	DAIRY		SWEETNESS		FLOUR AND BAKERY PRODUCTS	
	Big	SME	Big	SME	Big	SME
Turnover/million EUR	180.323	16.238	291.083	20.052	258.858	12.947
CDT	66,34	84,07	114,85	111,45	67,86	96,39
ToS	50,67	64,39	38,87	39,75	27,80	26,50
DTD	76,55	97,65	118,94	112,45	106,21	114,31

BCD	59,66	74,43	78,43	86,51	10,98	36,26
ROA	5,30%	3,37%	5,00%	4,35%	5,32%	3,03%
ROI	6,66%	5,31%	8,70%	6,94%	8,63%	5,97%
ROS	3,84%	2,30%	4,47%	3,68%	5,30%	2,75%
ROE	6,66%	4,50%	5,50%	4,63%	6,05%	1,99%

In terms of turnover, the confectionery sector has the highest sales in SMEs, averaging around 20 million, followed by around 16 million for milk and almost 13 million for flour products. As far as large companies are concerned, the same order is not followed, but it is urgent to underline the presence of two enormous companies in the confectionery sector (Ferrero) and in the flour products sector (Barilla), which bring their averages to be higher than in the dairy sector, where the largest companies are not so global and known (e.g. Granarolo and Parmalat).

Credit deferral times (CDT) are particularly efficient for dairy companies, although they show that large companies are reimbursed almost 20 days earlier than small to medium sized companies. The same dynamic is found in flour products, where SMEs have to wait 96 days, almost 30 days longer than large companies. While the two sectors offer similar values for the latter (66 and 68), the same cannot be said of SMEs, which receive payments in the milk sector more than ten days earlier than the flour sector. The confectionery segment, in which both large and small companies have to wait more than 110 days for loans to be repaid, should be treated separately, with a reversal of the trend whereby larger companies have longer times than SMEs. Being such a substantial difference with respect to other sectors, but with constant values despite the size of the companies, it can be assumed that it is a physiological factor of the type of activity.

Paying attention to the timing of stockpiles (ToS) we can see that for the confectionery and flour sectors, the differences between SMEs and larger companies are minimal (39 and 40 days for confectionery and 28 and 27 for flour) and particularly small, which is not surprising if we consider the fact that they are industries that produce perishable goods. On the contrary, the dairy sector again has similar timescales between SMEs and large companies, but much longer. This is mainly due to the nature of the output of these companies: they are mainly cheeses, a product that allows a longer-term preservation than other food products.

As far as the time required to defer trade debts (DTD) is concerned, it can be seen that for confectionery and flour products the number of days is essentially the same between large companies and SMEs (119 and 112 for confectionery, 106 and 114 for flour products), always around four months. It is very interesting to point out that in the confectionery industry, the times of larger companies exceed those of SMEs, as the former use bargaining power to their advantage, so as to establish longer delays and self-finance through them. It is also true that in the confectionery sector, the days of credit deferment and those of debt are practically the same (115 and 119 for large companies, 111 and 112 for

SMEs), while in the other sectors, the timescales for debts are considerably longer, allowing all types of company to finance themselves in this way.

In terms of business cycle duration (BCD), the flour products sector emerges as the most efficient, with a value of 11 days for large companies and 36 days for SMEs. The other two segments show very different results, ranging from 60 days for large dairy farms to 87 days for SMEs in the confectionery sector.

The first of the profitability indicators, ROA, shows a picture of homogeneity in terms of distribution, in fact, SMEs in all three segments have values lower than the large ones, and the values of larger companies (5.3% for milk, 5% for confectionery and 5.3% for flour). The behavior of SMEs in the milk and bakery sectors is broadly similar (3.4% and 3%), while in the confectionery sector the value is higher and closer to that of the benchmark (4.4%).

The ROI shows very different results: the trend of the confectionery industry to have excellent performance is confirmed, especially with regard to SMEs (6.9%, compared to 5.3% for milk and 6% for flour), while for large companies it is practically equaled by the performance of flour (8.7% and 8.6%). The dynamics of dairy products deserving a more in-depth analysis, which have the same profitability for large companies as for SMEs in the other segments (6.7%), well two percentage points lower than for other larger companies. Dairy SMEs also show a low return on investment, albeit at a shorter distance from the others considered.

The analysis of the results offered by ROS confirms the trend of lower profitability of dairy products compared to other sectors, with lower averages for both SMEs and large companies. In this case, the performance of the larger companies in the farinaceous sector is better than that of the confectionery sector (5.3% and 4.5%) and the trend is the opposite for SMEs (2.8% and 3.7%). This type of index is one of the most interesting in relation to our analysis and so low results for dairy products will have to be considered in the interpretation of the final results.

ROE reverses the analyses made so far, seeing dairy products as the best performance for large companies (6.7% compared to 6% for flour and 5.5% for confectionery) and a result for SMEs on the same level as those of confectionery (4.5% and 4.6% respectively). It can be inferred that this index, which is more global in nature, compensates for the reduced performance of return on investment and sales by taking advantage of other sources. For the other segments, yields for large companies are sufficiently similar, fluctuating over a period of one percentage point. For SMEs, on the other hand, the result for bakery products companies is very low, at just 2%, less than half that of other sectors. This is certainly due to low profitability of assets (ROA was 3%) and sales (ROS was 2.8%), but it is also clear that there is a gap in the overall result not included in the calculation of other indicators, such as the degree of erosion of operating income and the leverage ratio.

5. SCORING AND DISCUSSION

The objective of this analysis is to produce clear and concise results from the correlation between the trend in operational working capital and the main profitability indicators. Although it has selected six main variables on which to base its examination of the trend of working capital and five performance indices, the correlation of this plurality of data would produce a very high number of results, making the comparison infra-dimensional and infra-sectoral. Consequently, a way was sought to modify the process in order to make the mechanisms in place more complex, but an output that would allow conclusions and comments to be drawn on the subject.

The solution we have chosen to use is to create a scoring system for the elements of the circulating currency, through which to assign a real "vote" to each company for the value of each indicator for each year. The sum of these scores should be symptomatic of the company's ability in working capital management.

First of all, an Excel file was produced for each dimensional category of each sector, with a sheet for each year of the time horizon. In each of these sheets, the data of each company relating to the circulating indicators have been collected.

Once the data had been prepared in this way, the average, maximum and minimum values were calculated. These terms will be used for the construction of the scoring system.

The requirements underlying the choice of the number of possible votes for each indicator were those of containing the computational burden at levels manageable by Excel, while providing a sufficiently sensitive assessment that could be a good measure of the ability shown by the company in optimizing the circulating. It was therefore decided to divide the amplitude of the range of values into eight, keeping the average as the needle of the balance. Constant incremental factors were then calculated, one positive and one negative, which added (or subtracted) four times to the average.

Eight intervals are thus created which correspond to an evaluation expressed by integer values 1 to 8. Not for all the variables taken into consideration is the assumption that the closer the data is to the maximum, the better is working capital management. As a result, a case-by-case evaluation was carried out, which determined for which variables to follow an increasing order in the scores and for which to follow a decreasing order. The first category includes the degrees of net working capital and of working capital receivable on turnover, together with the deferral times in the payment of trade payables. In the second there are the remaining ones, i.e. the deferral times of receivables from customers and stock in stock and the average duration of the commercial cycle.

Once this part was complete, it was enough to have an automated Excel formula assign the score according to the interval in which each piece of data fell, thus creating a timely evaluation. At this point it was assumed that all the indicators had the same importance, so we applied a unit weighting

weight to each and created the final score for each year of each company by simply adding the votes

obtained on the result of each indicator, as in table 4.

Table 4. Score assignment to large flour and bakery companies (year 2008)

	Active circ.	NWC	CDT	ToS	DTD	BCD	SCORE
Company 1	2	3	7	4	3	5	24
Company 2	4	3	5	8	1	1	22
Company 3	5	8	2	8	1	8	32
Company 4	7	5	8	4	6	3	33
Company 5	4	2	7	5	2	7	27
Company 6	5	6	8	7	8	6	40
Company 7	1	6	6	1	5	6	25
Company 8	5	4	2	1	4	1	17
Company 9	5	5	3	7	4	5	29
Company 10	2	6	3	6	4	5	26
Company 11	7	2	8	4	3	1	25
Company 12	5	4	1	6	8	5	29
Company 13	8	4	2	1	5	2	22
Company 14	1	7	3	6	5	5	27
Company 15	3	1	4	2	8	7	25

The operation was carried out for the whole time horizon and for both the dimensions of each

sector, thus creating summary sheets such as the one in Table 5, here given as an example.

Table 5. Total Scores on Large Enterprises in Flour and Bakery Products (2008-2015)

	2008	2009	2010	2011	2012	2013	2014	2015
Company 1	24	21	24	28	30	31	22	24
Company 2	22	30	34	23	24	20	38	22
Company 3	32	26	34	31	24	24	24	23
Company 4	33	39	21	18	22	20	23	18
Company 5	27	26	28	31	36	31	29	28
Company 6	40	37	36	36	26	28	26	31
Company 7	25	27	29	24	31	27	27	32
Company 8	17	35	25	17	21	19	18	16
Company 9	29	24	22	22	23	20	29	21
Company 10	26	29	24	20	26	25	42	29
Company 11	25	23	34	27	33	34	19	18
Company 12	29	32	30	30	29	31	31	30
Company 13	22	27	26	24	22	28	26	25
Company 14	27	33	26	29	25	25	27	26
Company 15	25	25	25	27	27	26	23	27

5.1. Correlation

The correlation indicates the degree of the relationship between variables, for example X and Y (Taylor, 1990). If Y tends to grow as X grows, the correlation is positive or direct, if Y tends to decrease as X grows, the correlation is negative or reverse. If a variation of X corresponds to a variation in equal entity and direction of Y, the two variables will have a perfect correlation, with a correlation coefficient of Pearson ϱ = +1. If instead to a variation of X corresponds a variation in equal entity but opposite of Y the two variables will still have a perfect correlation, but with a correlation coefficient of Pearson ϱ = -1. If the two variables have two distributions such that there is no relation between the points generated by one and the other, they are said to be in-correlated and Pearson's correlation coefficient will be ϱ = 0. The Pearson-Bravais correlation coefficient is calculated as the ratio between the covariance of the two variables and the product of their mean squared deviations, or standard deviations.

The calculation of the correlation was iterated to calculate the relationship between the NWC score and the various profitability indicators, using the individual data of each company as a distribution, over time horizons of 1, 2 and 3 years at a time.

Table 6 shows an example of the results of the correlation between the NWC score and the ROA over a one-year time horizon for large flour and bakery companies. It should be noted that the values in bold have a statistical significance, so they are positive correlation index, the numbers in red are negative correlation index and the rest show in-correlation.

ϱ one year	ROA						
	2009	2010	2011	2012	2013	2014	2015
NWC 2008	-0,22	-0,15	0,08	-0,17	0,04	-0,22	-0,19
NWC 2009		-0,44	-0,44	-0,42	-0,33	-0,54	-0,35
NWC 2010			0,44	0,45	0,31	0,20	-0,02
NWC 2011				0,29	0,40	0,19	0,10
NWC 2012					0,11	0,27	0,30
NWC 2013						0,20	0,10
NWC 2014							0,01

In order to be able to comment on the results obtained, a summary document was produced which gave the possibility to examine, for each time horizon, the correlations between the profitability indicators and all the sectors taken into consideration. This document is too large to be inserted here as a table, so only synthetic discussion will be reported. The behavior of the variables in the various cases examined was not homogeneous and standardized, but peculiar in each of the elements

examined. Consequently, we are going to observe the results of the correlations for each dimensional category of each sector.

Dairy SMEs, except in very rare cases, show in-correlation with all profitability indicators, this result is evident both graphically by looking at the correlation tables. Another useful tool, however, may be the dispersion graphs, in which it is noted that the variables of this cluster are particularly widespread and do not make it possible to find a trend line that expresses a link between their NWC score and performance indicators. Evidence of all this is found in the Chart19, which shows the dispersion of the values of the score of the NWC for the year 2009 and the ROA for 2010. This group of values was chosen because it shows one of the correlation coefficients closest to zero in the study, i.e. 0.004. This representation clearly shows a flat trend line documenting that the two variables are not correlated. For comparison, let's create the same representation in Figure 20 for the category with the highest correlation, the large confectionery companies, which between the NWC 2008 and 2013 and the ROA of the following years have a coefficient of respectively 0.444 and 0.516. The differences are considerable in the width of the dispersion and in the inclination of the trend lines. It should be stressed, however, that the in-correlation at the statistical level, does not imply that there is independence, but simply that there is no direct relationship between the two variables.

Large dairy companies have a negative correlation with ROA and ROI over all time horizons considered. The behavior towards ROS and ROE is almost always in-correlation, but not in longer-term comparisons, where they confirm the negative trend. There is an indirect correlation, however, also towards NFP/EBITDA in most cases, a factor that seems to demonstrate a slight link at least from the debt point of view.

The SME in the confectionery sector offers more satisfactory results than in the previous sector, in fact, in many of the cases examined, there is a direct correlation with ROI and an indirect correlation with NFP/EBITDA. This result is not equaled in the cases of ROA, ROS and ROE, with which it sometimes emerges in-correlation, or even a significant and negative result, as in the case of one-year ROE.

The large confectionery companies, on the other hand, represent the success of the assumptions underlying this study, as they have a strong correlation with the main profitability indicators. This relationship is evident from the observation of the Graph20, in which the linear trend lines have a clear positive inclination.

As regards SMEs in the last segment, flour and bakery products, there is a strong negative correlation with ROS at all-time horizons considered. The other indicators also offer unsatisfactory results, as they show clear signs of in-correlation or indirect relation. The only positivities found refer

to NFP/EBITDA, a variable that is characterized by a different logic, according to which a higher value is higher than a negative signal, therefore it is confirmed what has already been seen in other cases.

For the first few years of operation, large flour companies have strong negative correlations with all profitability indicators and positive correlations with NFP/EBITDA. However, there is a change from 2010, when all indicators change radically, giving results in close relation with the changes in the NWC. This trend ceases to provide significant signals in the medium-term observation, based on a time horizon of three years. It follows that the influence of the NWC on performance exists, but only in the short term.

6. CONCLUSIONS

The main objective of this analysis was to verify whether Working Capital Management has an influence on the performance of Italian SMEs, focusing in the food sector.. In more detail, the research was based on these three questions, corresponding to as many levels of investigation:

1. Does Working Capital Management affect short-term profitability?
2. Is this impact the same in SMEs and large enterprises?
3. Does this weight depend on the sector in which the companies operate?

To satisfy these questions, an analysis was carried out based on the data collected by the AIDA database, which features the financial statements of Italian companies, relating to the variables of working capital, business cycle and performance. This information has been filtered to create six clusters, representing SMEs and large companies in each of the three sectors considered: dairy, confectionery, flour and bakery products. Through a scoring operation and a statistical correlation, results were obtained, which represent the Pearson-Bravais correlation indices between NWC and profitability indicators over different spans of time (one, two and three years).

It is now possible to give answers based on the results obtained. Surely the NWC has a correlation with short-term profitability, as is evident from the fact that in many cases there is some kind of significant relationship, whether direct or indirect. Also with regard to the impact of the dimension on the size of this link, it can certainly be said that it has an impact, since within all sectors large enterprises and SMEs behave differently. Finally, it has been shown that the result of the correlation depends on the sector, since each of the segments of the food industry considered behaves in its own right.

Unfortunately, if it is undeniable that the NWC has an influence on the profitability of the company by observing the complete sample, as far as SMEs are concerned, there is often an in-correlation between the trend in working capital and the business cycle and the main performance indicators. This unsatisfactory result may be due to the particular conditions of the macroeconomic

environment in the years under consideration, in particular the reduction in consumption and average family expenditure, which have aggravated a condition already made precarious by an exponential increase in suffering and, as a result, bankruptcies and liquidations. These conditions are due to the crisis that has affected global markets since 2008, and the resulting credit crisis in subsequent years. It should also be considered that in-correlation results may be due to the typical characteristics of data dispersions. In fact, a greater variability in values can invalidate the result of correlation studies, providing results of in-correlation even where there is no independence between indicators.

Other factors that may have limited the study are without recourse and the availability of complete data on the database used. With regard to the management of without recourse, reference is made to a type of factoring that "lightens" the quantity of receivables in the company portfolio, thus affecting the correctness of the data relating to working capital. It has been used extensively during the years within the time horizon, as this has ensured a better valuation of the company by banks and lenders, making the business situation seem more prosperous. Unfortunately, the data on the use of without recourse would have to be requested individually from each of the companies included in the sample, through questionnaires or direct queries, which would have taken much longer and would have reduced even more the number of companies taken into account. On the other hand, as far as the completeness of the database used is concerned, of the 8,426 companies operating in the three sectors considered, only 409 had data relating to the entire time horizon and with available values of the size of the business cycle. This sample, however large, corresponds to about 5% of the total and may not represent the totality of the data distribution.

Consequently, we can conclude by stating that, despite the fact that in the period 2008-2015 the results relating to the SME are mainly in-correlation, with different market conditions, this result may vary, since the environment has suffered very specific shocks that are unlikely to be repeated in identical ways within another time horizon. A further factor that

The fact that large companies in all the sectors concerned have produced significant direct or indirect correlation results contributes to the formulation of this observation. These implications, once it has been established that large companies are characterized by greater solidity, brand image and bargaining power and therefore greater resistance to the crisis, suggest that even SMEs in a context different from that observed can achieve the same results.

Future researches can investigate even the relations between NWC and volatility of turnover and /or its growth or decrease in the same or other sectors.

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