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The impact of Net Working Capital on Profitability: Evidence from the Hearing Care market

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INTRODUCTION

A fascinating insight into the world of financial statements is to discover how the three main ones are linked to each other, sometimes in a clear and visible way, sometimes in more hidden ways. The goal of my thesis is to analyse the impact of the behaviour of *Net Working Capital* on the profitability in a specific sector which is the one of the Hearing Care.

The *Net Working Capital*, defined as the difference between current assets and current liabilities, is the capital available in the short term to run the business. It has a known impact on the cash flow statement, so on the liquidity of a company, because a change in its behaviour during the year may increase or decrease the cash available to the firm. Then, to determine a company's liquidity and if it has enough money to pay its short-term debts, net working capital is crucial. Moreover, it reflects how well its operations are running. When it comes to the difference between two periods, working capital and EBITDA are the primary operational drivers that determine whether the company's cash flow is positive or negative. The only outcome of disregarding it during the forecasting stage, failing to manage it in day-to-day operations, and failing to measure it at the conclusion of each reporting period is to push off a financial issue that the business will eventually have to deal with in the hopes that it will still be solvable.

Working capital management involves short-term assets as well as short-term liabilities accounts such as accounts receivable, accounts payable or inventory. The level of investments in each of these accounts varies depending on which type of business the company operates and on industry standards. For example, due to their frequent consumer interactions, retail businesses require less working capital since they may earn short-term money more quickly while manufacturing companies have slower inventory turnover due to their longer production cycles. Thus, additional operating capital may be required.

The idea of my thesis comes from my internship period I spent at "Amplifon S.p.A." where I realised how the topic of working capital is very present in the day-to-day analysis. If this topic is easily associated with liquidity, I would like to also investigate the relationship with profitability. Since *Amplifon* is the global leader in the market, it seemed interesting to make an analysis on the other main firms in this sector. There have been other studies and research on this topic but no one about this growing market.

The starting point of my research will be the analysis on the main components of the net working capital and the useful indicators related. It would be interesting to assess the similarities and differences in the level of operating capital in the sample used to understand which are the influencing factors. Then, the final objective is to evaluate the effects of these metrics on the companies profitability.

The thesis will be divided into two chapters. The first one will go deeply on the net working capital, to get the full picture of this effective business management tool. More specifically, this section will explain what the

net working capital is and what its main components are. Then, we will talk about how these accounts make its way into the financial statements and how some indicators could be helpful in order to assess the financial health of a company. Finally, some common practices will be provided to deeply understand how to assess the level of the investments made in the current assets and current liabilities.

The second chapter regards the analysis and the objective of the thesis. A small summary of the analyses and studies carried out on this topic, even if carried out on different industries or countries, will be useful for our research to find similarities or differences in the research method or results. Then, a description about the hearing care market will be provided in order to get to know better the industry on which I will make the analysis. Further details about the research will be given in the following dedicated paragraphs. At the end, I will provide and comment the results and try to find out some suggestions and good practices based on the analysis.

CHAPTER 1:

NET WORKING CAPITAL IN THE FINANCIAL STATEMENT

In the dynamic landscape of corporate finance, the concept of net working capital (NWC) emerges as a fundamental metric representing a company's liquidity, operational efficiency, and financial health. NWC, which is frequently considered to be an essential part of a company's financial operations, captures the interaction between current assets and current liabilities. This chapter lays the theoretical groundwork necessary to comprehend the intricacies of NWC, delving into its conceptual underpinnings, significance in financial management, and its role in strategic decision-making.

We begin our theoretical trip with a thorough examination of its definition and its components. By dissecting the fundamental elements of each, this chapter clarifies the complex relationship between current assets and current liabilities and how they combine to form the basis of a company's short-term liquidity position. Through this point of view, readers will grasp the pivotal role NWC plays in facilitating day-to-day operations, ensuring solvency, and fostering growth opportunities.

Moreover, this chapter delves into the theoretical frameworks and models that underpin the management of NWC. Various frameworks, such as the Cash Conversion Cycle (CCC) and other approaches like the Gross Working Capital concept, provide distinct perspectives on improving profitability, managing liquidity, and allocating resources optimally. Through an analysis of these theoretical frameworks, what should emerge clearly is a more profound comprehension of the approaches and manoeuvres utilized by companies to maximize their net worth position in the face of constantly changing market conditions and competitive pressures.

1.1 A definition of Net Working Capital

One of the four financial statements that every public company is required to generate is the Balance Sheet. It lists the assets and the liabilities of a company, dividing the statement of financial position into two sides. The right one is made up of the firm’s obligations to creditors, the liabilities, along with the stockholders’ equity while the left one consists of the assets. Both assets and liabilities are divided into current and long-term. Working capital is centered on:

- Current Assets: those assets that could be easily converted into cash within one year. We are talking about accounts receivables, inventories, and other current assets.

- Current Liabilities: the liabilities that will be satisfied within one year that include accounts payable, short-term debt or notes payable.

The difference between current assets and current liabilities is the net working capital, the short-term capital available to run the business.

Net Working Capital = Current Assets – Current Liabilities

Apart from the most common definition provided above, during the years some professors or economists tried to give their definition of working capital. Below the ones attributable to Shubin and Gerstenberg:

- "Working capital is the amount of funds necessary to cover the cost of operating the enterprise."
- "Circulating capital means current assets of a company that are changed in the ordinary course of business from one form to another, as for example from cash to inventories, inventories to receivables, receivables to cash."

It is also interesting to understand the origin of this management tool. An old Yankee travelling merchant who loaded goods onto his chart and was on the way to sell them is the source of the term "working capital". This term was used to describe these goods because he needed to sell them in order to turn a profit. His fixed assets were the horse and the cart that were financed with equity because the merchant owned them. Nevertheless, in order to purchase the items he intended to sell, he had to borrow money. These loans, known as working capital loans, had to repaid following each trip in order to demonstrate the merchant's creditworthiness. The bank agreed to grant the merchant another loan after he was able to repay the first one.

Since both current assets and current liabilities are expected to be realized or settled within one year, the working capital is a measurement of the firm's short-term financial stability considering that it shows if it can fulfil its short-term obligations. Due to his nature, NWC is very important from the standpoint of short-term financing and liquidity analysis. However, working capital is as well crucial for a company's long-term financing as it will affect its capacity to secure favourable long-term financing if it can demonstrate its short-term survival strength and financial health through short-term liquidity. A firm in worse financial shape will probably have a higher cost of capital than a company in better shape because of the increased credit risk.

Working capital is generated during the operating cycle of a business. The time gap between production and realization of cash from sales makes the working capital necessary. The average amount of time that passes between a company's first inventory acquisition and the sale of its product and the cash return is known as the operational cycle of the business. This time frame corresponds to the company's cash cycle if the inventory is paid with cash. The majority of businesses, however, purchase their inventory on credit, which shortens the period of time between the initial invested and the income received from it. The longer a firm's cash cycle, the more working capital it has, and the more cash it needs to carry to conduct its daily operations. Because of the characteristics of different industries, the level of investments in working capital varies significantly.

Anyway, it is important to have an adequate amount of NWC that can allow the firm to afford the day-to-day expenses, salaries, purchase of raw materials and to face unexpected crisis. Some of the good practices to manage this short-term capital will be provided in the next paragraphs.

Working capital often takes on several forms. It is split into permanent and temporary working capital in the operating cycle view, and into gross and net working capital in the balance sheet view:

- Gross working capital represents all the current assets in the balance sheet of a company. If you subtract the current liabilities from the gross working capital, you will obtain the net working capital. It is possible to state that gross working capital is the investment and net working capital the financing of the working capital.

- Permanent working capital is the bare minimum of working capital that has to be committed at all times. The usual mix that is always locked in includes cash, shares, and account receivables. These money come from long-term sources and are essential for the day-to-day operations and survival of the firm. On the other side, temporary working capital varies a lot due to various factors and what the firm needs.

Moving forward, given that net working capital is very essential to maintain the smooth running of a business as it represents a part of total capital which is used for carrying out the regular business operations, a deeper understanding of its main components, how they work and interact with each other, is necessary.

1.2 The main components of NWC

As emerged in the previous paragraph, net working capital revolves around current assets and current liabilities. Examples of the assets that can be turned into cash quickly are marketable securities, accounts receivables, inventories or prepaid expenses while examples of the current liabilities are unearned revenues, accounts payable or notes payable. This paragraph will mainly focus on accounts receivables, accounts payable and inventories.

1.2.1 Accounts Receivables

When a company sells its products to customers or other companies, it usually does not expect to be paid immediately due to the goal of increasing sales and keeping and attracting customers. These unpaid bills that have not yet been turned into revenues are the accounts receivables. When products are sold on credit, the selling company records a short-term asset called accounts receivable, which it anticipates collecting in the near future. Nonetheless, the main goal of accounts receivable should not just be to increase sales but also include optimizing total return on investment because receivables involve a risk component that has to be

properly considered. Transactions made with cash have no risk at all, whereas transactions made on credit carry some risk because the cash payment is still pending.

There could arise some specifical issues if a company does not manage the receivables in a proper way. If these credit towards customers are not paid, a firm may incur a bad guy on the profit and loss statement. When it happens, there's the need to write off the bad debt. When someone owes you money and you are unable to collect on the amount, it is referred to as bad debt that impacts the income statement.

Therefore, some policies and some monitoring tools could be put in place. Regarding the first one, a firm can adopt a policy for offering credit to its customers which is based on three steps:

- Establishing credit standards: Management can decide whether extend the credit to anyone or to those customers who are reliable in terms of credit risk. Then, before choosing whether to extend credit to a customer, it must evaluate that customer's credit risk. If the management adopt a less discerning policy, it will result in having higher sales but also higher receivables while if the policy is restrictive, the investment in accounts receivables will be lower along with fewer products sold.

- Establishing credit terms: The next step would be to determine the amount of time before payment is due and whether to provide a discount to promote early payments.

- Establishing a collection policy: The last action is about implementing a collection policy. This policy can say anything from collecting interest on payments that are made beyond a certain amount of time, to threatening legal action at the first instance of a late payment, to doing nothing at all.

Moreover, a company must keep an eye on its accounts receivable after creating a credit policy in order to assess how well it is performing. Two instruments to track the receivables are:

- Accounts receivable days: The average number of days it takes a business to collect on its sales is known as the accounts receivable days. To assess the efficacy of its credit program, a company might compare this figure to the payment guidelines outlined in its credit conditions, in order to see how many days on average the customer is paying late. Since the accounts receivable is an information which can be found in the financial statement, outside investors frequently use accounts receivable days as a metric to assess a company's credit management policy. However, the fact that accounts receivable days are only one figure that hides a lot of important information is one of its main weaknesses. Depending on when the calculation is made, seasonal sales trends may result in a variation in the number of days that are calculated for accounts receivable.

- Aging Schedule: Accounts are categorized using an aging schedule based on how long they have been recorded on the company's records. It may be created using the total amount of outstanding accounts receivable or the number of accounts. The company should probably review its credit policy if the aging schedule shows higher percentages where the days outstanding are becoming too many. Analysis of the payments pattern, which offers data on the percentage of monthly sales that the company collects in each month after the sale, is occasionally used to supplement the aging schedule.

Failing to collect or late collecting receivables may force the business to take out higher-interest loans, which will seriously impair its liquidity. Consequently, it's important to monitor them in an appropriate way.

1.2.2 Accounts Payable

When a company purchases goods or services without paying in cash up front, it means that it bought on credit and needs to pay back in a short period of time. When it happens, a liability arises which is called "Accounts Payable".

Having payables in the financial statement has different pros and cons. Increasing payables means that the company is not spending cash because the payment is delayed so this situation optimizes free cash flow. Nevertheless, this generally has several drawbacks. Relationships with supplier may suffer, delivery times may lengthen, and unexpected crisis could worsen the short-term financial stability of a firm. Therefore, it is important to manage the accounts payable in a proper way and to understand when it is a health or bad situation for the firm. Analysis on the amount of these debits, the payment terms, cash flow and fees or penalties should be done accurately.

Just like it could do with its accounts receivable, a company has the possibility to keep an eye on its payables to make sure payments are being made at the best possible moment. One way is to figure out how many days are outstanding for accounts payable and compare it to the terms of the credit. Some firms often decide to pay later than the payment due period, following a common practice called "stretching the accounts payable" while others can also decide to pay on the last day. However, since it is a major source of funding for inventory and receivables investments, effective management is essential for a company's short-term finance.

1.2.3 Inventory

As a component of the current assets, inventories are resources that consists of raw materials, work-in-progress, finished goods, consumables, and stores. Planning and creating methods to maintain an ideal amount of these resources is hence the core of inventory control. The inventory is mostly kept for transactional purposes. Tomorrow's consumption comes from today's inventories. Without maintaining an adequate range of inventory, a firm cannot continue to operate at a given level of sales. In the production industry, a company cannot guarantee continuous output unless it maintains a sufficient raw material stockpile. Additionally,

inventory is kept on hand as a safety measure or backup in case lead time or consumption rate rise. There is occasionally a speculative component to inventory holdings. It mainly protects against concerns about pricing or cost fluctuations over time.

When referring to items owned by a corporation, the term “inventory” encompasses all goods intended for sale, as well as those used for manufacturing. When we refer to inventory in the context of the net working capital, we are simply referring to the value of the unsold products that are kept in storage.

Having a lot of inventory doesn't always mean that there are unsold items; it may also mean that there is "stock" on hand. For instance, the corporation may prefer to maintain inventory on hand in anticipation of a period of strong demand. On the other hand, keeping more goods on hand will tie up funds that could be spent on other projects. Thus, it is important to balance both benefits and costs associated with inventories.

What are the benefits of holding inventory? As it was mentioned before, stock-outs, or situations where a company runs out of items, can happen if it has too little inventory, which can result in lost revenue. Customers that are not happy with the company could move to one of its competitors. Secondly, businesses could keep inventories because there could happen seasonality in demand and a bigger part of the sales volume can be concentrated into few months or because of expected problems with the supply chain. Another aspect to consider about increasing inventories is when the company overstocks because it expects increasing prices for raw materials. This represents a good signal.

What are the costs instead? For a company, holding up funds in inventory is expensive. The direct expenses related to inventory can be divided into three groups:

- *Acquisition costs* are the expenses incurred by the inventory throughout the analysis period, which is typically one year.

- *Order costs* are the overall expenses incurred during the analysis time to place an order.

- *Carrying costs* consist of the opportunity cost of the money invested in the inventory as well as storage fees, insurance, taxes, spoiling, and obsolescence.

Companies often concentrate on the last cost group mentioned. For example, if quantity discounts are not offered, a company's carrying costs will decrease as its inventory level decreases, but its yearly order costs would increase as a result of the need to place additional orders throughout the year. Moreover, a firm could acquire inventory precisely when it needs it so that its inventory balance is always zero, or very close to it.

In conclusion, by meticulously balancing inventory levels with demand forecasts and supply chain dynamics, businesses can minimize holding costs, enhance liquidity, and fortify their financial resilience. Achieving a

specific output level at the lowest feasible cost is the aim for businesses. That allows for the minimization of tied-up capital.

Another possible driver of the net working capital not mentioned so far is cash. The traditional concept of working capital includes cash and cash equivalents. In actuality, it could also not be included in working capital for a number of reasons. According to the common definition of working capital, a company's primary function does not always involve the need for cash. There are a few causes. Some businesses may not include cash in their working capital calculations because of the opportunity cost of retaining extra cash, such as using it for investments or other purposes. In these situations, measuring a company's operational liquidity more accurately can be achieved by deducting cash from working capital. The flexibility in finances is another factor. Cash may assist a business in an unpredictable economic climate by helping to pay for unforeseen costs that are not directly related to the business's primary operations.

Industry and business size can also affect the amount of cash and cash equivalents used in working capital calculations. Because it better suits their operational demands, some businesses with highly fluctuating cash flows or unique capital requirements could decide to exclude cash equivalents out of the working capital calculation. Many businesses employ tailored financial indicators that more accurately capture their unique situation. They may employ "net working capital" or "operating working capital," for instance, which subtracts cash and short-term debts. It can also be changed according to the viewpoint of an analyst or investor. To have a more thorough understanding of the company's financial condition, they may examine cash flow analysis, cash ratios, and other data.

In conclusion, cash and cash equivalents are typically included in working capital calculations as part of current assets. However, some businesses and financial analysts decide to exclude them because of the opportunity cost and other considerations unique to their business and sector. Incorporating cash and cash equivalents into working capital calculations is a decision that must be made based on the analysis's context and goal. In any case, since the net working capital is the short-term capital available to run the business, cash that is needed to run the company on a day-to-day basis can be taken into consideration while the excess cash, which is money that may be invested at a market rate and is not needed to operate the firm, can be taken out from the computation.

Investors sometimes choose to narrow their search parameters when analyzing current assets and liabilities to assess if a company has sufficient cash on hand to cover its short-term obligations. Because some resources and obligations are thought to be less indicative of a company's short-term liquidity than others, investors may choose to leave them out of the calculation. That’s why it is appropriate to introduce the trade working capital, which is the difference between current assets and current liabilities directly associated with everyday business operations. It defines working capital, which takes into account all current assets and liabilities, more narrowly

to determine if a company has enough cash on hand to meet its immediate obligations. The trade working capital is composed of accounts receivable, accounts payable and inventories:

Trade Working Capital = Accounts Receivable + Inventory – Accounts Payable

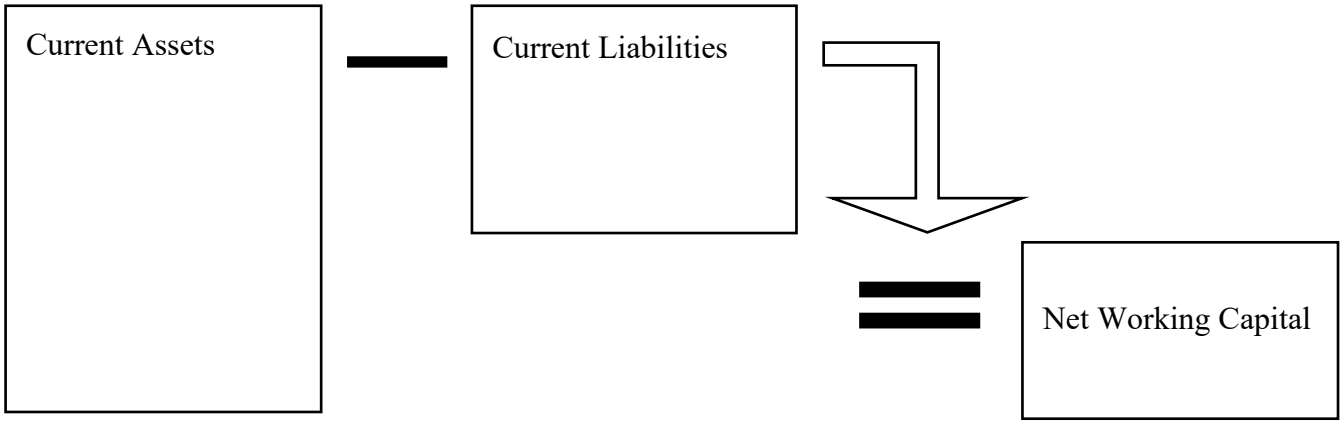
1.3 Change in NWC: the path inside the Financial Statement

When calculating the net working capital, it is possible to use multiple approaches. If we consider the IAS structure, assets, liabilities, and shareholders' equity contained in the balance sheet are represented as shown:

Assets	**Liabilities and Owners' Equity**
Current Assets	*Current Financing*
Cash and Cash Equivalents	Accounts Payable
Short Term Investments	Other short term liabilities and debts
Accounts Receivable	*Long Term financing*
Inventories	Long Term debt
Non Current Assets	Long term debt
Property, Plan and Equipment (Net)	*Shareholder Equity*
Intangibles	Preferred Stocks
Long Term Investments	Common Stocks
	Retained Earnings

Table 1.1

In this case, the division is one of the assets, which are recognised as current and non-current while on the other side of the balance sheet we have liabilities, recognised as current financing and long-term financing and the shareholder equity. Net working capital is simply the surplus of current assets over current liabilities, and it can be easily seen as the image below:



The managerial structure of the balance sheet is another version of it that helps to determine what are the investing, financing or operating activities and informs about the firm's strategy for running he business. In this case, on the right side we have the financing activities, that tells how the company get the money, who provide the resources and if they are still available. On the left side we have the operating activities. The reformulated structured is represented as shown below:

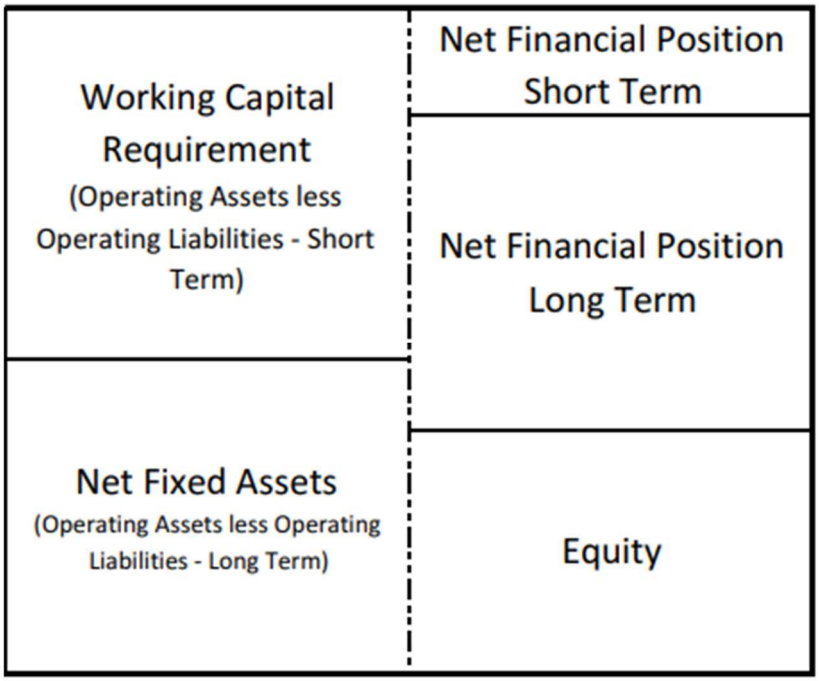
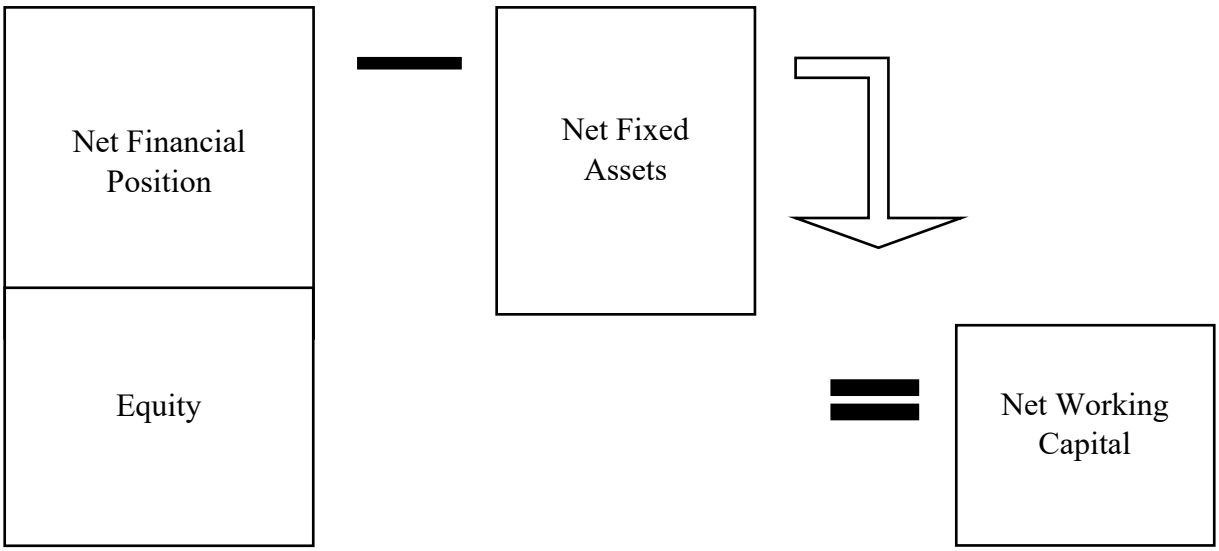


Figure 1.1

As of the managerial structure, it emerges more easily that the net working capital can be seen also as the surplus of the capital employed over the fixed assets.



Even though current assets and current liabilities are contained in the balance sheet, it's crucial to recognize that the financial statements are intricately linked together. Consequently, the income statement and the cash flow statement are both affected by the net working capital. While the most visible impact is reflected in the cash flow statement, it's important to understand that the firm's financial position and performance, as depicted in the income statement, are also influenced by working capital dynamics. The firm's statement of cash flows provides a clear depiction of how much cash the company generated and how it was distributed over a specific time period, drawing data from both the income statement and the balance sheet, thus highlighting the interdependence of these financial statements.

The statement of cash flows is divided into three sections: operating activities, investment activities, and financing activities. Net working capital directly affects the operating part: after having added back to net income the depreciation and the other non-cash expenses, we deduct the changes in net working capital that arises from changes to accounts receivable, inventory and accounts payable. For example, as it has been said before, a company registers revenue as income when it sells a product, even if it might not get paid right away. Alternatively, it can give the client credit and allow them to make a payment later. The amount owed by the client increases the company's accounts receivable and has an impact on the operating cash flow which is adapted for variations in net working capital using the following guidelines:

- Accounts Receivable: We must modify the cash flows by subtracting the increases in accounts receivable when a sale is included in net income even though the customer hasn't paid us yet. This increase indicates that the company is lending more money to its clients, which lowers the amount of cash the company has accessible.

- Accounts Payable: on the other hand, we add increasing in accounts payable. Accounts payable is a symbol for the money the company borrows from its vendors. The company has more cash on hand thanks to this borrowing.

- Inventory: We subtract inventory rises. Increasing inventory has no effect on net income because it is not reported as an expense since the cost of the products is reflected in net income only after they are sold. However, the company must deduct the cost of expanding inventory because it is a cash item.

Thanks to these established rules and principles, we gain a clearer understanding of the dynamics of net working capital. An increase in NWC often correlates with rising receivables or inventories and a decrease in payables. Conversely, a decrease in NWC can result from lower receivables or inventories and an increase in payables. By comparing the balance sheets of the current and previous years, we can easily pinpoint the changes in net working capital items. Generally speaking, when net working capital rises, it indicates that the company is absorbing liquidity. This absorption can be due to factors like increased inventory levels, extended

credit terms to customers, or deferred payments to suppliers. On the other hand, a decrease in net working capital suggests that the company is generating cash. This could be attributed to efficient inventory turnover, prompt collection of receivables, or favourable credit terms with suppliers.

Despite its direct impact on operating cash flow, NWC plays a pivotal role in influencing not only operating activities but also investing and financing activities within a company. A strong NWC position can offer the essential liquidity required to finance capital expenditures, allowing the company to avoid relying on external financing options or depleting its cash reserves. It can also serve as a catalyst for growth initiatives. It can provide the financial flexibility needed to pursue strategic acquisitions, expand market presence, or invest in research and development. This financial strength can give the company a competitive edge and position it for long-term success in its industry. Additionally, maintaining a favourable NWC position can empower a company to proactively manage its financial obligations. It enables the company to repay existing debts or other financial obligations in a timely manner. By reducing outstanding debts, the company can lower its interest expenses, improving its overall financial health and flexibility.

Although it is less visible, we can say that net working capital has an impact also on the profit and loss statement. As a direct impact of accounts receivable on the profit and loss statement, there is bad debt written off. It refers to the portion of accounts receivable that a company determines to be uncollectible and subsequently removes from its books as an expense. When a company determines that it is unlikely to collect payment from a customer, it writes off the specific amount as a bad debt expense, reflecting the financial impact of the uncollectible receivable on its profitability. When a company writes off a bad debt, it recognizes this as an expense on the Income Statement that will reduce the firm’s net income for the period.

Efficient management of NWC, particularly inventory levels, can influence the Cost of Goods Sold (COGS). Maintaining optimal inventory levels helps in minimizing holding costs and reducing wastage, thereby potentially lowering COGS and improving gross margins. Then, operating expenses can be impacted by prompt accounts payable administration and receivable collection. Timely receivables collection enhances cash inflows, while prudent payables management maximizes cash outflows, both of which can affect operating profitability. It’s also true that a favourable NWC position, indicative of strong liquidity and operational efficiency, may reduce the company's reliance on external financing. This can lead to lower interest expenses, as the need for short-term borrowing or working capital loans may be reduced.

We have observed that while net working capital does have a direct and pronounced impact on the cash flow statement, its impact on the profit and loss statement is often more indirect. The goal of my thesis is indeed to analyze in a deeper way the influence of NWC on the income statement which provides a measure of the firm’s profitability.

1.4 Cash Conversion Cycle and other useful indicators

In the realm of working capital management, the cash conversion cycle (CCC) emerges as a pivotal metric that transcends traditional liquidity measures. It offers a comprehensive view of a company's operational efficiency, financial health, and cash flow dynamics. The CCC represents the amount of time it takes for cash to leave a company at the start of the manufacturing process and return after the sale of the finished goods. Initially, a business purchases inventory—either completed items or raw materials—from its suppliers. Typically, these inventory purchases are made on credit, meaning that the company doesn't need to make full payment at the time of acquisition. This practice allows the company to preserve its cash reserves for other operational needs or investments. Even if the inventory is finished items, it could remain on the shelf for a while after being received. Subsequently, the company may give its clients credit when the merchandise is eventually sold, postponing the time it receives the money. The period of time between a company's cash purchase for its initial inventory and its cash receipt from the sale of the goods generated by that inventory is known as the cash cycle of the company. If the cash cycle is positive, also the NWC is positive, while if it is negative, also the NWC is negative. The cash cycle and the operating cycle, already defined previously, could be portrayed as shown below:

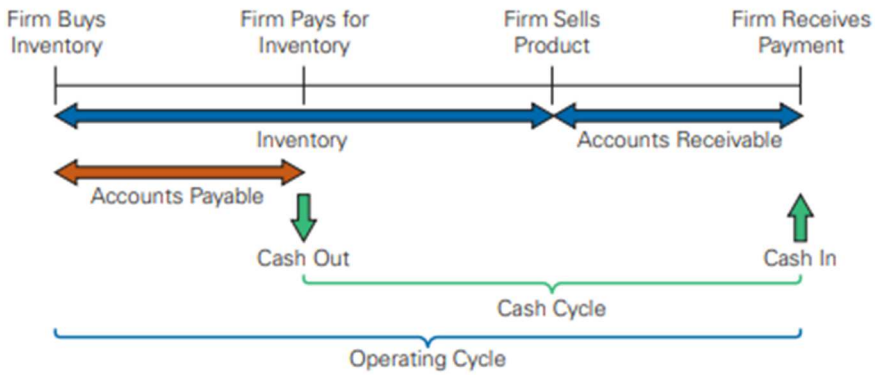


Figure 1.2

From this image, we can distinguish three different periods:

- Payment period: the period in which suppliers are financing the company.
- Collecting period: how long the firm is investing in receivables.
- Inventory period: how long the firm is investing in inventories.

Three ratios are used in practice to symbolize these three time periods:

- *Days of sales outstanding (DSO):* it measures the average collection period, so the number of days before collecting a sale. The formula is:

$$DSO = \frac{Accounts\ Receivable}{Sales} \times 360$$

DSO can be considered as a marketing tool, because if I want to push the sales, I give to the customers a higher delay of payment; but when I do that, I should be aware that this strategy has a financial effect, because if DSO increase the NWC increases as well, and there will be a lower cash flow from operations.

- *Average payment period (APP)*: it represents the number of days before paying a purchase on average. The formula is:

$$APP = \frac{Accounts\ Payable}{Purchases} \times 360$$

If it increases the NWC decreases, optimizing cash outflows. However, a significant increase in days account payable may damage supplier relations and encourage late product delivery, which would have an impact on the entire production cycle.

- *Days in inventories (DII):* it represents the average number of days it takes to transform raw material and work in progress. It is quite complicated, in terms that inventories are composed by raw materials, working progress, finished goods; we can calculate it according to different levels of detail: the most general and used is based on inventory at the end (all inventories) divided by the cost of goods sold per day.

$$DII = \frac{Inventory}{COGS} \times 360$$

If it increases, net working capital increases as well. A lower DII indicates that a company is selling its inventory more quickly, which generally reflects lower carrying costs associated with holding inventory.

These three ratios represent the NWC, and they are the ones that the companies look at to manage the NWC and to evaluate its dynamics. With these ratios, we can compute the cash conversion cycle:

$$Cash\ Conversion\ Cycle\ (CCC) = DSO + Days\ in\ Inventories - APP$$

The lower is the CCC the more efficient the firm is. A positive CCC indicates that a company's cash outflows occur before cash inflows while a negative CCC suggests that a company collects cash from its customers before paying its suppliers and other short-term obligations. The conventional understanding of the CCC is that by using the model, a business may become more profitable since working capital is managed more

skilfully. But there are clear drawbacks to adopting the CCC as well. There is a trade-off when the cycle is driven too tight since it might cause issues for some firm divisions, including sales and customer relations. Delivering the same level of customer happiness could not be feasible if the CCC is reduced as a top priority. Therefore, it is not as easy to correlate a shorter CCC with greater profitability as it may seem, and conclusions shouldn't be drawn too hastily. In a research study published in 1998, Shin & Soenen conducted an in-depth analysis of the capital structures of two major American retailers, Wal-Mart and Kmart, by meticulously examining their financial statements. Interestingly, they found that when it came to revenues, assets, equity, and debt, the structures of these two businesses were remarkably similar. However, despite these similarities, the profitability between the two retailers differed significantly. The CCC for the two businesses was found to be 34% different (61 days for Kmart and 40 for Wal-Mart). Due to this, Wal-Mart was 198.3 million dollars a year more lucrative than Kmart (Shin & Soenen, 1998; Nobanee et al., 2011). The primary driver behind this discrepancy was increased expenses, which were associated with a higher level of capital invested in Kmart's business.

The cash conversion cycle could be affected by seasonal fluctuations and business cycles as well as industry trends, thus it is crucial to consider these factors when analyzing the metrics. It should be monitored regularly to identify trends, evaluate the effectiveness of working capital management strategies, and make informed decisions. By analyzing and optimizing the CCC, businesses can enhance liquidity, improve profitability, and drive sustainable growth, ultimately contributing to long-term financial success and competitiveness.

1.5 Positive or negative NWC? Good practices

As the formula suggests, net working capital can either be positive or negative, representing two distinct financial scenarios for a company. A positive net working capital means that a company's current assets exceed its current liabilities, whereas a negative net working capital implies the opposite. These two states of working capital are like two sides of a coin, each carrying its unique implications and considerations for a business. While neither state is inherently good or bad, understanding and effectively managing them is crucial to a company's financial health and success.

When the net working capital is positive, it indicates that it has sufficient current assets that could be easily converted into cash to settle its short-term debts and that all of its current liabilities have been paid off. A good aspect is that maintaining a positive net working capital ensures that the firm is well-prepared to handle unforeseen financial crises or unexpected cash outflows. In such situations, the excess current assets can be utilized to manage these challenges effectively. This capability provides the company with a safety net, promoting financial stability and minimizing the potential risks associated with liquidity shortages.

However, it's important to note that an excessively high positive net working capital can sometimes be a double-edged sword. Such a situation might indicate that the company is not effectively managing its cash resources. This could mean that funds are not being allocated towards new ventures, upgrades, or business expansion opportunities. Additionally, a high positive net working capital might highlight inefficiencies in the company's accounts receivable collection process. It could also suggest that a significant portion of working capital is tied up in inventory or outstanding receivables, which could have been invested more profitably elsewhere.

A prime example of an industry that typically operates with a positive working capital is the manufacturing sector. Manufacturing companies often hold substantial inventories comprising raw materials, work-in-progress items, and finished goods. While this inventory does tie up a considerable amount of cash, it also serves as a crucial buffer. It enables manufacturers to meet customer demand promptly and address any production disruptions that may arise. Investing in inventory represents a substantial commitment to working capital. Furthermore, manufacturers frequently offer credit terms to their distributors or retailers. This practice results in accounts receivable, allowing manufacturers to boost sales volume. At the same time, it offers customers the flexibility to make payments over a specified period. This credit facility enhances the company's market reach and customer base, contributing to its overall revenue growth.

On the other hand, a company with negative working capital has more debts that are coming due soon than cash on hand or assets that can be swiftly converted to cash. Essentially, you’re relying on sales to cover the current liabilities going against the risk of insolvency. Anyway, negative working capital isn't necessarily a symptom of financial trouble, despite what would seem to be the case. Owners of businesses may purposefully keep their working capital negative as part of their overall financial plan. Not every firm will find itself in a predicament where it lacks the working capital necessary to cover expenses or pay employee wages, but it's not a scenario that should be taken lightly. Negative working capital affects certain industries or firms, but not all of them. For instance, although it's not a big danger for them, grocery shops, restaurants, supermarkets and retailer companies may have negative working capital. For instance, supermarkets and grocery stores often collect cash from customers at the point of sale or shortly after through credit card payments. This allows them to generate cash inflows quickly from sales before paying suppliers for inventory. These stores typically have high inventory turnover rates, selling products quickly and replenishing stock frequently. This rapid turnover helps generate sales and cash inflows without tying up significant funds in inventory. Moreover, they often negotiate favourable payment terms with suppliers, allowing them to pay for inventory after selling the products to customers. This creates accounts payable that, combined with low receivables and a high inventory turnover, favours and supports negative working capital. To sum up, for the businesses just mentioned, we do not expect a large inventory, the accounts receivable is very low and suppliers are usually paid after thirty or sixty days so the cash in is quite immediate. This situation would imply that the company has not assets to

cover its liabilities but in this case it's a good aspect instead because it means that someone else is financing the business. Therefore, the perspective is completely different.

The accelerated cash conversion cycle as well as operational flexibility could represent some advantages of having negative working capital. If companies collect cash from sales faster than it makes payment to suppliers, the cash conversion cycle will be shorter and the liquidity will improve, providing cash for strategic investments and growth opportunities without immediate cash flow constraints. The other side of the coin suggests that businesses with negative working capital sometimes have inadequate liquid assets to pay for their operating expenses. This may put them in severe financial jeopardy and force them to look for loans or other sources of money in order to pay their debts. Due to this, companies are more susceptible to unforeseen market downturns or repairs that have an adverse effect on their operations and budget. Because there won't be enough accessible assets for organizations to finance development or new technologies, negative working capital might also limit chances for expansion.

As can be deduced from the examples cited above, net working capital is inherently industry specific. Therefore, it's challenging to generalize whether it would be more beneficial to have a positive or negative net working capital, or to determine the ideal level of investment in working capital. This is because the optimal level of working capital is highly influenced by a multitude of factors, both internal and external. Some of these are:

- Nature and size of the business: the working capital requirements are mostly determined by the type of its operations. Public utilities, for example, have certain characteristics that affect their working capital requirements. The two pertinent characteristics are the cash-based nature of the firm and the sale of services rather than goods. Because of these characteristics, they presumably have the lowest working capital requirements because they don't keep large inventory. At the other extreme are trading and financial firms. Because of the nature of their business, they are required to have adequate cash on hand as well as inventory and record debts. They have to make correspondingly big working capital investments.

- Company's bargaining power: some well-known businesses can negotiate favourable credit terms, discounts, or extended payment terms. This can help in optimizing accounts payable and improving cash flow, potentially leading to a negative working capital. The primary benefit is the break from bank financing; by having suppliers fund existing assets, interest costs are avoided. On the other hand, if a company has limited bargaining power with suppliers, it might need to maintain higher inventory levels or pay suppliers more quickly, resulting in a positive working capital.

- Firm's credit policy: This topic is also correlated with the sales model of a firm. The credit policy of a company influences accounts receivable and payables through the credit terms granted to the customers

and through the payment terms established with suppliers. A firm may be interested in having a higher volume of sales which would lead to the increase of receivables, or it could adopt a strategy of optimizing cash flows, reducing the amount of accounts receivable. On the other hand, especially if the company has a bigger bargaining power, it could extend the payment terms agreed with the supplier in order to have more payables that help improving the cash available. However, it should also keep an eye on the relationships with suppliers.

- Business cycle: Business expands during periods of prosperity and declines during the period of depression. The business cycle influences companies' working capital decisions by shaping market demand, competitive dynamics, and financial conditions. Depending on the phase of the business cycle, companies may choose to maintain a positive or negative working capital to optimize liquidity, support growth initiatives, manage risks, and capitalize on market opportunities.

- Inflation: This could represent a significant factor, especially when considering inventory management. When a company anticipates that suppliers will increase their prices due to inflationary pressures, it may opt to purchase inventory in bulk to lock in current prices and maintain adequate stock levels. By doing so, the company aims to mitigate the impact of future price hikes and ensure uninterrupted supply chain operations. In this scenario, the company may experience a positive working capital position as it holds more inventory than usual to buffer against potential price increases.

In conclusion, although these factors are fundamental, whether a company opts for a positive or negative net working capital strategy depends significantly on the dynamics of its industry. While both approaches have their merits and challenges, industry-specific factors such as cash flow cycles, competitive landscape, and customer/supplier relationships often serve as the primary drivers behind this strategic choice. Therefore, it is imperative for companies to carefully assess industry-specific considerations and align their working capital strategy accordingly, ensuring optimal balance between liquidity, profitability, and operational efficiency.

1.6 Relationship between liquidity and profitability

Profitability and liquidity are two crucial and significant facets of corporate company existence. A firm cannot exist without liquidity as it runs the risk of collapsing quickly and dying but, at the same time, a company that does not make profit might be deemed unhealthy.

First of all, we can say that profitability could be defined as the final indicator of economic success achieved by a company in relation to the capital invested in it. Instead, the ability of an asset or security to be swiftly

purchased or sold on the market without having a substantial influence on its price is referred to as liquidity. It assesses how easily an asset may be turned into cash or used to pay off debt, usually quickly and with minimal transaction expenses.

At its essence, liquidity acts as the lifeblood of a firm, ensuring its survival in the face of day-to-day financial demands. A company's liquidity position is typically measured through ratios such as the current ratio and the quick ratio, which assess its ability to meet short-term obligations using current assets. Cash, marketable securities, and accounts receivable are among the key components contributing to liquidity. Maintaining adequate liquidity is imperative for operational continuity, as it allows firms to honour payments to suppliers, meet payroll obligations, and address unexpected expenses without resorting to costly borrowing or liquidating long-term assets at unfavourable terms. However, liquidity alone does not guarantee financial success; profitability is equally vital. Profitability reflects a firm's ability to generate earnings after accounting for expenses, taxes, and other costs associated with its operations. Key profitability metrics include net profit margin, return on investment (ROI), return on equity (ROE), and earnings per share (EPS). A profitable company not only sustains its operations but also rewards its investors and reinvests in growth initiatives. Profitability is the ultimate gauge of a firm's efficiency in utilizing its resources and capitalizing on market opportunities.

Liquidity and profitability have a complex connection in which one factor influences and is impacted by the other. On the one hand, liquidity makes profitability possible by supplying the funds required to invest in R&D, growth prospects, and operational enhancements. A company with ample liquidity can seize favourable market conditions, expand its market share, and innovate without being constrained by cash flow limitations. Strong liquidity buffers can also protect a company from the negative impacts of unanticipated occurrences or economic downturns, enabling it to weather difficult times and come out stronger. On the other hand, excessive liquidity can result in idle funds that generate minimal returns and reduce overall profitability. Talking about profitability, it impacts liquidity by influencing the flow of funds within the firm. A business that is extremely lucrative produces excess cash flows, which can improve its liquidity situation by boosting cash reserves or lowering the requirement for outside funding. Moreover, profitable firms also enhance a firm's access to capital markets, enabling it to raise funds through equity or debt issuance at favourable terms. However, pursuing high profitability means a requirement of investments that may tie up capital, limiting the company’s ability to cover short-term obligations and affecting the liquidity, especially if there is an inefficient resource allocation or if funds are hoarded rather than invested or distributed to the shareholders. For firms, balancing profitability and liquidity is a never-ending challenge. While an organization focused just on profitability may expose it to financial risks and vulnerabilities, an organization focused too much on liquidity may miss out on possible growth prospects.

The management of working capital is a key driver of this relationship. For example, a high level of liquidity is typically seen as an indication of strong financial standing, but other writers contend that a high level of

liquidity might be just as undesirable as a low one. This would result from the typical situation where current assets are less lucrative than fixed assets. It indicates that there is an opportunity cost since investments in current assets provide lower returns than those in fixed assets. In addition, the quantities used for current assets result in higher maintenance expenses, which lowers the business's profitability. Efficient management of net working capital can enhance both liquidity and profitability. By optimizing the balance between current assets and current liabilities, a company can ensure that it has sufficient liquidity to meet short-term obligations while maximizing profitability. For example, reducing the cash conversion cycle can free up cash flow and improve liquidity, while minimizing inventory holding costs can boost profitability.

Striking the right balance between liquidity and profitability requires careful consideration. Companies must evaluate their cash flow requirements and pursue chances for profitability and growth at the same time. It is crucial to understand that solving this dilemma calls for ongoing observation and modification as market conditions and company circumstances change. net working capital plays a pivotal role in shaping the relationship between liquidity and profitability. Efficient management of net working capital can contribute to both liquidity and profitability by optimizing the balance between current assets and current liabilities. However, changes in net working capital may create trade-offs between liquidity and profitability, necessitating strategic decision-making to achieve the optimal balance between short-term solvency and long-term profitability. The second chapter of this thesis will delve into this relationship, in particular we will try to examine the correlation between the net working capital and the profitability, how the second one react to changes in the behaviour of the first one, in a particular industry.

CHAPTER 2:

NWC IMPACT ON PROFITABILITY IN THE HEARING CARE MARKET

In the first chapter, a theoretical framework of net working capital was provided to get to know better this effective management tool that is very important for a company's financial stability and growth. The aim of the second chapter is to analyse how the firms' profitability reacts to the behaviour of net working capital and if there is a significative correlation.

There have been some previous similar studies made on this topic and carried out on different industries, so I decided to perform this analysis on the hearing care market. The decision to examine the impact of NWC on profitability within the hearing care market stems from a blend of academic curiosity and practical experience. Having undertaken an internship at Amplifon S.p.A., a global leader in the hearing care industry, I was afforded firsthand exposure to the meticulous attention devoted to NWC management within the finance team. It became evident from the outset that NWC was not merely a theoretical concept, but a tangible metric intricately woven into the fabric of strategic decision-making and operational efficiency within the organization.

To sum up, armed with insights gleaned from industry immersion and guided by a synthesis of theoretical frameworks and empirical research, this chapter aims to clarify the complex dynamics governing the relationship between NWC components and profitability metrics, within the context of hearing care providers.

2.1. Literature Review

The relationship between net working capital management and firm profitability, which is the object of this research, has been extensively studied, revealing significant impacts across various contexts. Indeed, I found different studies about this topic, but no one was conducted on the hearing care market even though the net working capital could be a key factor to assess the financial health of a company belonging to this industry. In any case, these studies are really helpful for my research, since it allows me to identify the correct measures and methods to adopt in my analysis.

The study carried out by Marc Deloof examines the impact of Working Capital Management on the profitability of Belgian non-financial firms. Using data from 1,009 firms from 1992 to 1996, the study specifically analyses the effects of accounts receivable, inventories, and accounts payable on corporate profitability. Deloof used the profitability, measured by gross operating income divided by total assets minus

financial assets, as a dependent variable and the number of days of accounts receivable, inventories and accounts payable, thus the cash conversion cycle, as independent variables. First, he carried out a correlation analysis to initially examine the relationship between the profitability and the components of working capital using Pearson correlation coefficient. Then, he ran a regression analysis in order to see how days of receivables, payables, and inventories individually and combined affect profitability. Deloof discussed the potential causality directions, acknowledging that while NWC components could influence profitability, profitability might also affect how firms manage their working capital. He found a significant negative relationship between the number of accounts receivable and inventories days, and the profitability of firms. Essentially, companies that quickly convert their receivables and inventories into cash tend to be more profitable. The study also noted that less profitable firms tend to delay paying their bills longer than more profitable ones. This delay in settling accounts payable could negatively impact profitability, possibly due to lost discounts for early payment. Moreover, he found out that a shorter cash conversion cycle is associated with higher profitability. This suggests that managing cash conversion cycle efficiently is crucial for enhancing firm profitability. For managers, the results imply that there is potential to create shareholder value by reducing the number of days for these variables.

Mian Sajid Nazir and Talat Afza investigates the effects of aggressive versus conservative working capital management policies on firm profitability in Pakistan using data from 1998 to 2005. The study applied panel data regression analysis to examine the relationship between working capital management policies and profitability metrics. Control variables such as firm size, growth, and financial leverage were included to isolate the effect of working capital management. The aggressive investment and financing policies were measured using ratios of current assets and current liabilities to total assets while the analysis focused on two main profitability measures: Return on Assets (ROA), which is the ratio between net profit and the book value of assets, and the Tobin's Q which compares the value of a company given by financial markets with the value of a company's assets, calculated as follow:

$$Tobin's\ Q: \frac{Market\ Value\ of\ Firm}{Book\ Value\ of\ Assets}$$

The study finds that aggressive working capital policies, characterized by lower current assets and higher current liabilities relative to total assets, negatively affect profitability as measured by ROA. Conversely, these aggressive policies are viewed positively by the market, as indicated by a higher Tobin's Q. Aggressive investment policies, which entail maintaining lower levels of current assets, are associated with lower profitability. In contrast, aggressive financing policies that involve higher levels of current liabilities are linked to higher market valuations. The market seems to reward firms that adopt aggressive working capital financing policies, possibly perceiving them as having better liquidity management.

Amarjit Gill, Bigger and Mathur investigate how effective working capital management (WCM) impacts the profitability of 88 American manufacturing firms listed on the New York Stock Exchange from 2005 to 2007. The analysis included more or less the same variables as Deloof, such as the cash conversion cycle components, firm size, financial debt ratio and fixed financial assets ratio. They employed nearly identical measurements and methods. In this study, descriptive statistics were also used to provide basic insights into the data. The research found a significant positive relationship between cash conversion cycle and profitability.

Another interesting study was conducted by Greg Filbeck and Thomas M. Krueger who examined the effects of working capital management on financial efficiency across various industries, utilizing data from CFO magazine's annual surveys which detail firm performance on working capital metrics from 1996 to 2000. The study utilized classical analysis of variance to explore industry differences and Kendall's coefficient of concordance as well to assess changes over time within industries. Key metrics involved in this analysis included cash conversion efficiency (CCE), computed as the ratio between the cash flow from operation and sales, then days working capital (DWC), and other components such as days sales outstanding (DSO), inventory turnover and days payables outstanding (DPO). In its survey, CFO magazine also ranked the entire working capital of the companies using the following formula:

$$Overall\ ranking = \frac{Highest\ overall\ CCE - Company\ CCE}{Highest\ overall\ CCE - Lowest\ overall\ CCE} \times \frac{Lowest\ overall\ DWC - Company\ DWC}{Lowest\ overall\ DWC - Highest\ overall\ DWC}$$

Significant differences were found in working capital measures across industries and also within industries over time. Industries like petroleum and electric & gas utilities demonstrated better working capital efficiency, while industries such as textiles and apparel showed poorer performance. The study also noted that firms with efficient working capital management typically had higher cash conversion efficiency and lower days of working capital. This reflects quicker turnover in receivables and more efficient inventory management. Another interesting topic mentioned in this analysis is the application of Six Sigma methodologies in managing working capital. According to some reports, this methodology notably improved metrics like days sales outstanding and overall cash flow, although the improvements translate into moderate financial gains with return ranging between 1.2 to 4.5 percent.

J.H.C. Linderhof explored the impact of various working capital management components on the profitability of Dutch listed firms. The analysis covers a sample of 67 Dutch firms over nine years, using a balanced panel dataset. The study uses return on assets (ROA) and Gross Operating Profit as dependent variables to measure profitability. Independent variables include the average number of days in the three components of the cash conversion cycle. The relationships are tested using Pearson correlation and regression analysis and additional factors like firm size, sales growth, current ratio, debt ratio and GDP growth are controlled for to isolate the impact of WCM components on profitability. Results and findings say that a longer period of inventories and accounts receivable negatively affect profitability and, contrarily, longer payment terms with suppliers are associated with higher profitability. To sum up, an extended cash conversion cycle is found to be detrimental

to profitability, highlighting the importance of minimizing the cash conversion cycle to optimize financial performance. Overall, the study conclusively shows that efficient working capital management, characterized by shortened cycles of receivables and inventory and careful management of payables, is crucial for enhancing the profitability of Dutch listed firms. The findings are robust and align with prior research suggesting the significant role of Working Capital Management in financial performance.

These studies collectively emphasize the importance of efficient working capital management. They utilize sophisticated econometric models to parse out the effects of individual components of working capital on firm profitability. The consistency of findings across different studies underscores a universal principle in financial management: efficient liquidity management, as evidenced by shorter cycles of receivables and inventories, is crucial for enhancing profitability. This conclusion is not only relevant for financial managers aiming to optimize operations but also for investors and policymakers who seek to understand the levers of corporate profitability.

2.2 Hearing care market

The specialized hearing market is an intriguing and diverse industry that combines consumer requirements, healthcare, and technology. There are many exogenous factors projecting the hearing care sector towards a more inclusive and technologically advanced future. Some of these factors are:

- Life expectancy: Because the auditory system naturally ages, those over 65 are more likely to have reduced hearing. Approximately 1.5 billion individuals worldwide are estimated by the World Health Organization (WHO) to already have hearing loss. One definite tendency is the increase in life expectancy. The population over 65 will quadruple by 2050, and in the next four years, more people over 65 will live than children under five for the first time in human history.

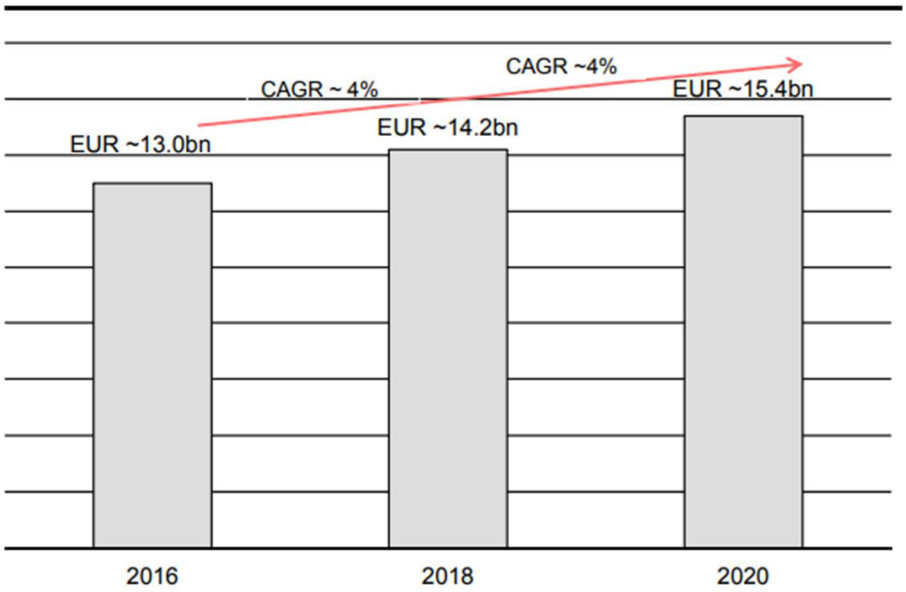
- Technological advances: Technological advancements have also played a pivotal role in reshaping the hearing care market. The industry has seen a dramatic shift from traditional analogue hearing aids to highly sophisticated digital devices. Entrepreneurs in the field must stay at the forefront of these innovations, as consumers now expect cutting-edge solutions that cater to their hearing needs with increased precision and functionality. These innovations are continuously evolving, offering improved sound quality, connectivity features, and user-friendly interfaces.

- Consumer behaviour and stigma: People have a much longer life perspective than previous generations, as well as a better one: they want to live life actively. Moreover, previously, people were reluctant to wear a hearing aid because of its large size. In fact, one of the most significant advances in hearing aid

design is the relentless search for smaller, more discreet devices. This shift has significantly reduced the psychological barriers associated with hearing aid use, encouraging more individuals to seek help for hearing impairments without the fear of judgment.

- Digitalization: The spread of smartphones and tablets is increasing rapidly also among seniors, providing the opportunity to offer value-added, customised, and interconnected services through new touch points such as phone apps.

According to research made by UniCredit on Amplifon S.p.A., as of 2020, the global hearing-care retail market had an estimated value of around €15 billion in 2019 with an expected CAGR (compound annual growth rate) of 4% as a result of demographics and an increase in penetration rates, as it is shown below:

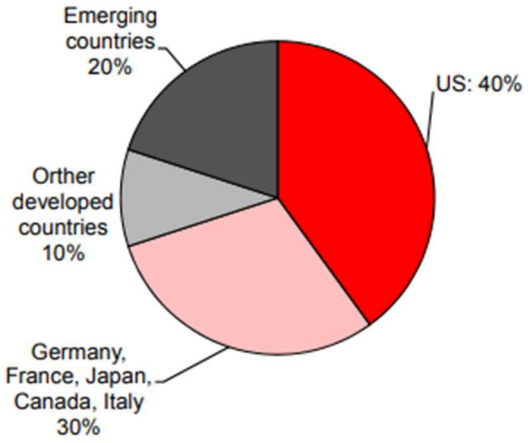


Source: Amplifon, UniCredit Research

The hearing aids market faced a downturn in 2020, primarily attributed to cautious consumer spending amidst the uncertainties of the pandemic. However, the subsequent rebound in 2021, fuelled by pent-up demand, marked a remarkable resurgence for wholesalers, albeit setting a high bar for 2022. Post-pandemic, the market underwent a corrective phase, projecting a steady annual growth rate of 4-6% by volume, albeit with a modest reduction in average selling price (ASP). This decline in ASP was influenced by adjustments in the geographic mix, notably towards burgeoning markets like China. Factors such as inflation and the prevalence of fixed incomes among consumers led to a delay in the purchase or upgrade of hearing aids. Recognizing this trend, hearing aid companies shifted their focus towards expanding market penetration, particularly targeting younger generations. This strategic shift aims to tap into a broader consumer base and mitigate the impact of economic uncertainties on purchasing behaviour. Looking ahead, the global hearing aids market is poised for continued growth, with an estimated compound annual growth rate (CAGR) of 4%, reaching a size of €17 billion. This growth trajectory is underpinned by significant market potential, with approximately 1.5 billion

people experiencing some degree of hearing loss and 430 million individuals in need of rehabilitation. Furthermore, projections indicate that these figures could double by 2050, highlighting the increasing demand for hearing assistance solutions and the evolving landscape of hearing healthcare globally.

The global retail market for hearing aids exhibits a notable concentration in developed countries, with key players like Amplifon providing insights into its distribution. According to estimates from Amplifon, the United States emerges as a significant player, representing nearly 40% of the total value of the worldwide retail market. Following closely behind are prominent nations such as Germany, France, Japan, Canada, and Italy, collectively contributing an additional substantial portion, accounting for roughly 30% of the market value. While emerging-market countries showcase faster growth rates compared to their developed counterparts, their contribution to the global retail market for hearing aids remains relatively limited. Despite their rapid economic development and increasing healthcare awareness, these countries have yet to attain significant relevance in this sector. The concentration of the hearing aids market in developed nations underscores several factors, including higher disposable incomes, advanced healthcare infrastructure, greater awareness of hearing health issues, and established distribution networks. However, as emerging-market countries continue to progress economically and invest in healthcare infrastructure, they hold the potential to become increasingly influential players in the global hearing aids market in the future.



Source: Amplifon, UniCredit Research

However, the retail market is extremely fragmented:

- Amplifon is the global leader in retail hearing care with around 13% of the world market.
- Less than 50% are independent operators with few outlets or very small chains.
- More than 25% are specialised companies including players with an international presence such as vertically integrated hearing aid manufacturers (Sonova, Demant, GN Store Nord, WS Audiology and Starkey), and the so-called national champions, players with a presence limited to one or two countries (such as Kind in Germany, Neuroth in Austria, and Rion in Japan).

- More than 10% are non-specialised operators such as pharmacies, supermarkets, and optical shops.
- Less than 3% is made up of online retailers, playing a marginal role.

Having seen how the hearing care industry is composed, we can intuit and deduce a particularity that has an important impact on the net working capital. This sector is made of retailers and manufacturing companies that could trigger a double relationship between the firms. For example, a retailer company can buy the hearing aids from a manufacturing company within this industry which becomes both its supplier but also its competitors, because the manufacturer sells its own products to the final consumer but also to the retail companies. This double relationship makes the working capital decisions very important for the hearing care companies that should manage well accounts receivable, inventory and payables to improve their financial health and to unlock new liquidity and profit that are needed to grow organically, investing in new products, people, and technologies, or to make acquisitions in such a way that they could gain a competitive advantage.

2.3. Objective of the research and methodology

As detailed in the initial chapters of my thesis, the management of net working capital (NWC) emerges as a pivotal element within the finance teams of companies. This insight has sparked my curiosity for two main reasons:

- Firstly, the journey of NWC through the financial statements is an intriguing aspect of financial management. NWC plays a critical role here as it links the balance sheet and cash flow statement. Alterations in balance sheet items from one fiscal year to the next are reflected as changes in working capital in the cash flow statement. This transition highlights the liquidity generated or used by the business during the period. Although these shifts prominently influence the company's liquidity, as repeatedly noted throughout my thesis, their impact on profitability is often subtler and less direct. Understanding this dynamic is essential for grasping how internal operations and external conditions influence a company’s financial health.

- Secondly, the industry-specific nature of NWC management holds particular interest. Despite the consistency in the basic formula for calculating NWC (current assets minus current liabilities), the approach to managing these elements must be meticulously adapted to meet the unique needs and challenges of each industry. The components of working capital—ranging from types of receivables and inventories to the structure of payables—differ significantly across sectors due to distinct operational demands and market conditions. Consequently, it is impractical to suggest universal best practices for managing working capital effectively. Instead, by focusing on a specific industry, one can

identify and advocate for effective practices that are both insightful and applicable within that particular context.

Putting these two aspects together, my analysis aims to study whether there is a significant correlation between the metrics related to net working capital and those related to profitability, to also have a clearer view of the impact of NWC not only on the liquidity but also on the ability of a company to generate profits. Since it is industry-specific and there is no similar analysis carried out on the hearing care market, I chose to conduct this research on the last industry mentioned as net working capital plays an important role.

Using a quantitative methodology, my thesis gathered official and public data from listed firms on the stock exchange operating in the hearing care sector. I have included about 35 to 40 percent of the global market in my analysis, choosing nine companies: Amplifon S.p.A., Sonova Holding AG, Demant A/S, CostCo Wholesale Corporation, Cochlear Limited, GN Store Nord A/S, Medtronic PLC, WS Audiology, Nuheara Limited and Knowles Corporation. For these companies, I have collected financial statements data from Orbis for the last 10 years, from 2013 to 2023, except for WSA, which is a company created five years ago following a merger and except for Nuheara, which went public in 2016.

Having access to various pieces of literature that study the impact of net working capital on profitability in different markets or countries, I decided to apply their methodologies to a greater or lesser extent, adapting them to my own analysis. The aim was to better understand how net working capital affects profitability in the context of the companies I am examining.

First, I started by downloading the financial statements of the companies under consideration. From these, I calculated all the key ratios and metrics related to net working capital and profitability for each company and for each year included in the analysis. This allowed me to gain an initial understanding of the significant similarities and differences between the companies, helping me to interpret the data in a meaningful and coherent way. This preliminary step was crucial in identifying potential patterns and anomalies within the dataset, and it set the foundation for more detailed analyses.

Second, I calculated Pearson's correlation coefficient to determine whether there was a significant correlation between Return on Assets (ROA) and the various working capital metrics. To perform this analysis, I took the average values of each ratio for each company across the years and calculated the correlation coefficient by using the covariance between the two variables and dividing it by the product of their respective standard deviations. This allowed me to quantify the degree of linear association between ROA and working capital components, helping to reveal any underlying relationships that could influence profitability.

Third, I conducted a multiple regression analysis to examine how the dependent variable, ROA, was influenced by the independent variables related to net working capital. By setting ROA as the dependent variable and using metrics like the current ratio, quick ratio, and working capital turnover as the independent variables, I

aimed to assess the extent to which fluctuations in these indicators impacted profitability. This regression model helped to clarify whether changes in working capital management had a statistically significant effect on company performance, thus providing valuable insights into the relationship between operational efficiency and profitability.

2.4. NWC and Profitability Measures

The initial phase of our research involves the comprehensive collection, assessment, and analysis of specific financial metrics concerning net working capital and profitability for each of the companies under study. In terms of net working capital, the key metrics we will consider include the ratio of current assets to total assets, the ratio of current liabilities to total assets, the ratio of current assets to current liabilities, the quick ratio, and the cash conversion cycle. The cash conversion cycle further encompasses days of sales outstanding, the average payment period, and days in inventories. Regarding profitability, the most reliable metric for our analysis is the return on assets, which provides a consistent measure of a company's profitability relative to its total assets.

2.4.1. Current ratio

The ratio of current assets to current liabilities, commonly known as the current ratio, is a key financial metric used to assess a company's ability to meet its short-term obligations with its short-term assets.

$$Current\ Ratio = \frac{Current\ Assets}{Current\ Liabilities}$$

This ratio directly measures a company's liquidity by comparing its current assets to its current liabilities. A higher current ratio indicates that the company has more current assets relative to its current liabilities, suggesting better capacity to pay off its short-term debts. A current ratio of 1 or higher generally suggests that a company should be able to cover its short-term liabilities without needing to secure additional financing or sell long-term assets but when it is significantly higher than 1, it means that long-term financing is the main source of the current assets. On the other hand, a current ratio below 1 may indicate that a company might struggle to meet its short-term obligations, which could lead to financial stress or potential liquidity issues. However, the adequacy of a current ratio can vary widely by industry. Industries that have fast inventory turnover or quick receivables collection may operate effectively with lower ratios, whereas industries with slower cycles might require higher ratios to be considered healthy.

As it shown in the table below, there is a noticeable variability in current ratios across firms and over time. For instance, Medtronic has consistently high current ratios along with Nuheara which shows a mix of upward and downward trends while Amplifon has significantly lower ratios. Some firms show relatively stable current ratios over the years, like CostCo Wholesale or WS Audiology, while others exhibit more fluctuation, as in the case of Demant, which might be indicative of changes in their operating conditions or financial strategies. The overall average current ratio across all firms and years is 1.73, suggesting that, on average, firms have adequate liquidity to cover their short-term obligations, but this varies widely between companies because there are other factors that impact this ratio, such as the size of the company or if the firm is manufacturer or only retailer.

Current Ratio	*2023*	*2022*	*2021*	*2020*	*2019*	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	**Average per firm**
GN	0,65	0,80	1,95	1,30	1,25	1,40	1,49	1,38	1,55	1,47	1,67	1,36
Sonova	1,37	1,10	2,09	1,11	1,27	1,74	1,87	2,00	2,16	1,94	2,36	1,73
Demant	1,37	0,87	0,72	0,91	0,78	0,80	0,94	0,88	0,94	0,78	0,82	0,89
Amplifon	0,53	0,50	0,53	0,57	0,74	0,74	0,79	0,79	0,78	0,75	0,76	0,68
Medtronic	2,39	1,86	2,65	2,13	2,59	2,28	1,75	3,29	3,36	3,82	4,57	2,79
CostCo	1,07	1,02	1,00	1,13	1,01	1,02	0,99	0,98	1,01	1,22	1,19	1,06
Cochlear	2,36	2,52	3,06	1,81	1,77	2,03	1,69	2,16	1,21	2,48	2,11	2,11
Knowles	2,61	3,66	2,29	1,41	2,56	2,57	2,60	2,20	1,92	1,64	2,39	2,35
WSA	1,03	1,08	1,03	1,05	1,23	-	-	-	-	-	-	1,08
Nuheara	2,59	0,90	4,67	2,13	3,93	5,71	2,57	-	-	-	-	3,21
Average per year	1,60	1,43	2,00	1,35	1,71	2,03	1,63	1,71	1,62	1,76	1,99	**1,73**

Table 1. Current Ratio

2.4.2 Current assets to total assets ratio

This ratio indicates what proportion of a company's total assets is made up of current assets. Current assets are those assets that are expected to be converted into cash within one fiscal year or operating cycle, whichever is longer. These include cash and cash equivalents, marketable securities, inventory, and accounts receivable. A higher ratio suggests that a company has a greater proportion of assets that can quickly be converted into cash. A higher current asset to total assets ratio might imply that the company is financially stable in the short term, capable of covering its liabilities and other operational needs without needing to secure additional funding. This ratio can also provide insights into how a company manages its asset base. For instance, a very high ratio could indicate excessive investment in inventory or receivables, which might not always be efficient. Conversely, a low ratio might suggest underinvestment in current assets, which could lead to cash flow problems.

$$Current\ assets\ to\ total\ assets\ ratio = \frac{Current\ Assets}{Total\ Assets}$$

Some firms show great variability in their ratios while others are more stable, but the overall average ratio is 0.34, indicating a general tendency towards maintaining about a third of assets in liquid form. In general, firms with higher ratios are generally better positioned to meet short-term obligations without needing to secure additional financing and this ratio is also important to investors and creditors as they assess the risk associated with the firm's ability to cover short-term liabilities in fact comparing these ratios can provide insights into how conservatively or aggressively firms are managing their liquidity. GN, Sonova, Medtronic and Demant show a closer value to the overall average, even though Sonova and Demant exhibit relatively stable ratios with slight fluctuations in some cases while GN and Medtronic might have met some fluctuations due to specific events or strategic shifts. On the other hand, CostCo, Nuheara and Cochlear show higher liquidity ratios while Amplifon has the lowest ratios among the other firms.

Current assets/Total Assets	*2023*	*2022*	*2021*	*2020*	*2019*	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	**Average**
GN	0,33	0,31	0,51	0,39	0,37	0,33	0,31	0,26	0,30	0,29	0,30	0,34
Sonova	0,27	0,30	0,44	0,27	0,31	0,32	0,29	0,36	0,39	0,40	0,40	0,34
Demant	0,31	0,34	0,32	0,30	0,32	0,33	0,33	0,33	0,33	0,36	0,37	0,33
Amplifon	0,17	0,11	0,11	0,11	0,13	0,15	0,17	0,17	0,17	0,17	0,18	0,15
Medtronic	0,24	0,25	0,24	0,24	0,24	0,25	0,25	0,24	0,29	0,56	0,51	0,30
CostCo	0,52	0,51	0,50	0,51	0,52	0,50	0,48	0,46	0,51	0,53	0,52	0,50
Cochlear	0,53	0,54	0,51	0,57	0,46	0,50	0,52	0,57	0,56	0,53	0,53	0,53
Knowles	0,29	0,31	0,22	0,25	0,23	0,24	0,25	0,19	0,20	0,24	0,23	0,24
WSA	0,12	0,11	0,11	0,11	0,10	-	-	-	-	-	-	0,11
Nuheara	0,62	0,52	0,68	0,55	0,53	0,69	0,64	-	-	-	-	0,60
Average	0,34	0,33	0,36	0,33	0,32	0,37	0,36	0,32	0,34	0,39	0,38	**0,34**

Table 2. Current assets to total assets ratio.

2.4.3. Current liabilities to total assets ratio

This ratio measures the proportion of a company's total assets that are financed by short-term obligations, which are due within one year. A higher ratio suggests that a larger share of the company's assets is claimed by creditors in the near term. A high level of current liabilities to total assets ratio might signal potential liquidity problems. If too much of the company's asset base is tied up in meeting short-term obligations, it may struggle to fund its day-to-day operations or face difficulties in managing cash flows effectively.

$$Current\ liabilities\ to\ total\ assets\ ratio = \frac{Current\ liabilities}{Total\ Assets}$$

Companies like Medtronic and Sonova tend to have lower average ratios, potentially indicating a stronger financial position with respect to liquidity or lower reliance on short-term debt. In contrast, Demant and CostCo show higher averages, which could reflect a different financial strategy involving higher levels of current liabilities. Even though the companies belong to the same market, this ratio could be driven by the fact that they could be retail or manufacturing companies, and this can have an impact on their strategy. In general, as it is shown in the table below, the trend suggests that the firms adopt a quite low ratio.

CL/TA	*2023*	*2022*	*2021*	*2020*	*2019*	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	**Average**
GN	0,51	0,38	0,26	0,30	0,30	0,23	0,21	0,19	0,20	0,20	0,18	0,27
Sonova	0,20	0,27	0,21	0,25	0,24	0,18	0,15	0,18	0,18	0,21	0,17	0,20
Demant	0,22	0,39	0,44	0,34	0,41	0,42	0,35	0,38	0,36	0,46	0,45	0,38
Amplifon	0,32	0,21	0,20	0,19	0,18	0,21	0,21	0,22	0,22	0,23	0,23	0,22
Medtronic	0,10	0,14	0,09	0,11	0,09	0,11	0,14	0,07	0,09	0,15	0,11	0,11
CostCo	0,49	0,50	0,50	0,45	0,51	0,49	0,48	0,47	0,50	0,44	0,44	0,48
Cochlear	0,23	0,21	0,17	0,32	0,26	0,25	0,31	0,26	0,46	0,21	0,25	0,27
Knowles	0,11	0,08	0,10	0,18	0,09	0,09	0,10	0,09	0,10	0,14	0,10	0,11
WSA	0,12	0,10	0,11	0,11	0,08	-	-	-	-	-	-	0,10
Nuheara	0,24	0,58	0,15	0,26	0,13	0,12	0,25	-	-	-	-	0,25
Average	0,25	0,29	0,22	0,25	0,23	0,23	0,25	0,23	0,26	0,25	0,24	**0,24**

Table 3. Current liabilities to total assets ratio

2.4.4. Quick Ratio

The quick ratio, also known as the acid-test ratio, refines the concept of the current ratio by assessing a company's ability to meet its short-term liabilities with its most liquid assets. Unlike the current ratio, which includes all current assets, the quick ratio excludes inventory from the numerator. This focuses on cash, marketable securities, and accounts receivable, basically assets that can be quickly converted to cash. A higher quick ratio indicates that a company has enough highly liquid assets to cover its current liabilities immediately. A quick ratio of 1 or more is typically considered a sign that a company can meet its short-term obligations without relying on the sale of inventory or receiving additional financing. This can be important especially in situations where selling inventory quickly may be difficult or undesirable. The quick ratio provides a conservative perspective on a company's liquidity by measuring how well current liabilities are covered by the most liquid assets only. This ratio is particularly useful for evaluating companies in industries where inventory cannot easily be converted into cash or where market conditions make certain assets less liquid. The formula for the calculation of the quick ratio is:

$$Quick\ ratio = \frac{Current\ Assets - Inventory}{Current\ Liabilities}$$

The average quick ratio for all companies each year shows variability, with an overall average of 1.29. This suggests that, on average, the companies can cover their immediate liabilities more than once, which is a positive indicator of liquidity. There is a visible trend in the aggregated data showing fluctuations in liquidity over time, which might correspond to broader economic conditions, changes in industry practices, or specific company events, in particular from 2018 onwards the ratio is way lower than the previous years considered with the exception of Nuheara, that in 2018 and 2021 showed periods of significant liquid assets. In general, it seems there are varies degrees of liquidity pressure across different economic cycles.

Quick Ratio	*2023*	*2022*	*2021*	*2020*	*2019*	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	**Average**
GN	0,48	0,50	1,64	0,95	0,99	1,09	1,20	1,08	1,22	1,17	1,30	1,06
Sonova	0,99	0,83	1,85	0,87	1,00	1,40	1,45	1,52	1,67	1,56	1,91	1,37
Demant	0,95	0,62	0,50	0,64	0,57	0,58	0,70	0,66	0,68	0,55	0,57	0,64
Amplifon	0,46	0,39	0,43	0,46	0,60	0,59	0,66	0,67	0,65	0,63	0,62	0,56
Medtronic	1,81	1,49	2,14	1,72	2,15	1,92	1,51	2,81	2,98	3,51	4,13	2,38
CostCo	0,57	0,46	0,52	0,64	0,52	0,46	0,43	0,40	0,48	0,63	0,60	0,52
Cochlear	1,82	2,00	2,52	1,53	1,22	1,45	1,23	1,55	0,85	1,72	1,43	1,57
Knowles	1,41	1,95	1,37	0,97	1,63	1,59	1,78	1,51	1,24	1,08	1,68	1,47
WSA	0,79	0,80	0,79	0,87	1,02	-	-	-	-	-	-	0,85
Nuheara	1,90	0,46	4,23	1,99	2,47	4,57	2,05	-	-	-	-	2,53
Average	1,12	0,95	1,60	1,06	1,22	1,52	1,22	1,27	1,22	1,36	1,53	**1,29**

Table 4. Quick ratio

2.4.5. Cash Conversion cycle

To have a complex ratio analysis, it is really important to estimate and evaluate the cash conversion cycle for these firms, composed of the days of sales outstanding, average payment period and days in inventories. Compared to the ratios estimated so far, the cash conversion cycle has a different approach. While the measures like current or quick ratio give us an overview of the short-term financial health and liquidity by focusing on the firm's balance sheet, the components of cash conversion cycle evaluate the efficiency of accounts receivable, accounts payable and inventory and the ability of the company to manage them well by focusing also on the operations and the efficiency in the income statement.

The first element of cash conversion cycle is days of sales outstanding (DSO). It is a measure of the average number of days that a company takes to collect revenue after a sale has been made. A lower DSO value indicates that a company is able to collect its receivables more quickly, which is beneficial for cash flow and overall financial health. It is measured by dividing the account receivables and sales, multiplying by 360 days.

The overall average DSO for each company provides a good indicator of their typical collection period over the decade. For instance, companies with averages significantly above the industry average, like GN, Nuheara and Cochlear, might need to review their credit and collection policies. On the other hand, the group average DSO shows a slight decrease over time, suggesting a trend towards more efficient receivable management across these companies as a whole. However, we can notice that in this sector the days of sales outstanding measure is very volatile because, for example, Amplifon and CostCo have a very low DSO compared to the industry average. This is due to the business model since they are both retailer companies and they can count on immediate payments. It is crucial to keep in mind that high DSO values can tie up capital in receivables that might otherwise be used for investment or paying down debt, affecting overall financial stability.

DSO	*2023*	*2022*	*2021*	*2020*	*2019*	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	**Average**
GN	88,21	77,66	75,08	71,09	80,42	81,25	79,29	84,15	96,51	93,60	80,49	82,52
Sonova	50,52	50,76	57,71	47,16	67,72	61,00	61,96	61,10	61,41	64,72	68,12	59,29
Demant	57,25	64,62	62,71	69,87	77,29	71,37	70,23	73,19	74,36	76,81	73,53	70,11
Amplifon	36,80	32,63	31,17	39,13	42,65	44,78	37,76	40,44	38,90	44,19	45,11	39,41
Medtronic	68,79	63,07	65,29	57,84	73,30	70,32	67,75	69,45	90,66	80,68	80,64	71,62
CostCo	3,12	3,55	2,80	2,80	3,28	3,64	3,38	0,27	0,28	0,21	0,85	2,20
Cochlear	71,01	67,09	61,76	54,57	73,63	78,38	79,70	83,08	90,17	88,01	94,14	76,50
Knowles	68,84	63,41	60,79	61,89	67,22	61,08	66,61	60,21	69,36	92,97	66,55	67,18
WSA	43,96	46,78	50,51	59,00	70,30	-	-	-	-	-	-	54,11
Nuheara	141,50	14,71	9,42	324,21	109,51	77,12	127,15	-	-	-	-	114,80
Average	63,00	48,43	47,72	78,75	66,53	60,99	65,98	58,99	65,21	67,65	63,68	**63,77**

Table 5. Days of sales outstanding

The second component of CCC is the average payment period (APP). It measures the average amount of time it takes a company to pay off its accounts payable. It is an important metric for understanding how a company manages its cash outflow and creditor relationships. A higher APP can indicate that a company is taking longer to pay its suppliers, which could be a strategy to use cash more effectively elsewhere in the business, but it could also strain supplier relationships or indicate cash flow issues. It is calculated as the ratio between the accounts payable and the purchases of a firm multiplied by 360 days.

The overall averages indicate varying strategies or operational conditions across the companies. The group average shows slight fluctuations but a general increase over time, which could reflect broader economic conditions or changes in how companies manage their payables. The sharp increase in APP for companies like Cochlear and the gradual increase for Sonova may need further analysis to understand the implications on supplier relationships and overall liquidity management. However, it is easily observable how most companies show an increase in APP from 2020 onwards, when the pandemic began, which could reflect a broader trend

of companies stretching their payables to conserve cash during uncertain times. This might have been due to disrupted supply chains, fluctuating demand, and the overall economic uncertainty caused by the pandemic.

APP	*2023*	*2022*	*2021*	*2020*	*2019*	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	**Average**
GN	75,89	51,02	64,11	69,25	72,53	80,19	62,23	72,81	93,80	92,67	63,59	72,55
Sonova	78,91	82,69	66,72	59,36	52,91	47,51	58,12	44,95	40,19	48,77	49,99	57,28
Demant	50,40	57,00	58,96	67,06	62,79	53,28	59,25	64,73	67,52	48,72	50,67	58,22
Amplifon	74,69	73,41	59,01	54,07	46,96	56,39	47,00	50,25	46,61	48,65	48,36	55,03
Medtronic	93,93	81,74	82,60	78,90	80,92	72,03	74,51	74,98	74,29	71,36	62,73	77,09
CostCo	27,85	31,59	29,02	29,85	28,81	28,26	26,41	24,19	28,51	23,68	23,44	27,42
Cochlear	229,10	208,08	200,24	193,13	155,67	141,09	141,00	130,46	137,37	131,77	146,69	164,96
Knowles	44,40	35,60	69,76	60,47	66,83	59,64	71,62	66,11	97,01	150,00	79,87	72,85
WSA	89,60	78,38	93,70	85,88	106,47	-	-	-	-	-	-	90,81
Nuheara	273,90	154,28	42,51	(1106,45)	119,72	89,13	107,01	-	-	-	-	-45,70
Average	103,87	85,38	76,66	-40,85	79,36	69,73	71,91	66,06	73,16	76,95	65,67	**63,05**

Table 6. Average Payment Period

The final component of the cash conversion cycle is the days in inventories (DII). It measures the average number of days a company holds inventory before selling it. A lower DII indicates a faster turnover of inventory, which is generally positive as it suggests efficient inventory management and lower holding costs. Conversely, a higher DII may indicate overstocking or less efficient sales processes, which can tie up company resources. The formula is represented by the ratio between inventories and cost of goods sold, multiplied by 360 days.

DII	*2023*	*2022*	*2021*	*2020*	*2019*	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	**Average**
GN	106,03	134,67	100,74	103,18	95,91	86,68	73,03	80,97	95,93	97,39	79,82	95,85
Sonova	175,15	214,67	204,49	150,92	151,71	137,49	144,75	136,34	147,17	133,93	147,17	158,53
Demant	177,41	212,19	187,82	169,78	188,61	191,49	157,60	162,67	192,89	175,62	166,90	180,27
Amplifon	18,25	17,05	15,17	17,25	17,06	19,62	12,62	11,98	11,90	13,73	15,08	15,43
Medtronic	196,00	181,20	162,35	178,75	163,57	156,25	143,84	151,49	217,34	162,06	169,41	171,12
CostCo	26,20	32,64	25,60	25,77	28,29	28,03	27,09	28,54	28,61	23,69	23,60	27,10
Cochlear	275,46	287,79	212,85	301,87	200,35	166,84	176,07	184,86	214,27	209,10	255,94	225,95
Knowles	181,76	151,68	123,55	108,87	108,45	111,71	114,33	85,06	129,12	145,73	82,85	122,10
WSA	64,98	73,16	71,26	60,54	62,65	-	-	-	-	-	-	66,52
Nuheara	265,97	383,06	86,67	87,66	538,45	539,20	160,08	-	-	-	-	294,44
Average	148,72	168,81	119,05	120,46	155,51	159,70	112,16	105,24	129,66	120,16	117,60	**135,73**

Table 7. Days in inventories

This ratio is very volatile for the sample used, with an overall average of around 135 days. Companies like Cochlear and Sonova show higher and more variable DIIs, which may reflect specific challenges or different business models compared to companies like CostCo and Amplifon, which demonstrate more consistent and lower DII values. Retail operations like CostCo and Amplifon tend to move inventory quickly due to consumer demand, while companies that produce hearing aids might hold inventory longer due to specialized demand and manufacturing processes. The changes observed from 2022 to 2023 in many companies might reflect adjustments in inventory strategies post-COVID-19 pandemic, focusing on improving cash flows and reducing holding costs.

As explained in the first chapter, the combination between days of sales outstanding, average payment period and days in inventories give us the cash conversion cycle (CCC). It is a financial metric that quantifies the time, measured in days, it takes for a company to convert its investments in inventory and other resources into cash flows from sales. This cycle encompasses the duration of time businesses need to sell their inventory, collect receivables, and pay their bills without incurring penalties. A shorter CCC is generally preferred as it indicates a quicker turnover of inventory into cash and suggests efficient management of assets and liabilities. Conversely, a longer CCC can indicate that a company's capital is tied up for longer periods, which might affect its liquidity.

The overall averages and individual company trends reflect various operational strategies and business model characteristics. For instance, CostCo and Amplifon show values of 1,88 and -0,19 days, situation resulting from the fact that they are two retail companies with excellent standing. CostCo diversifies its business and is a very large company representing about 3% of the market while Amplifon is the leader in this industry with up to 13%. In the case of Amplifon, it has negative cash conversion cycle, meaning that the company pays its suppliers after it receives cash from its customers, indicating a favourable cash flow situation allowing them to essentially use supplier financing to fund operations. The other companies have a quite high cash conversion cycle indicating that a significant amount of capital is tied up in the process of manufacturing, holding inventory, and collecting receivables. This can impact their liquidity and financial flexibility, requiring them to manage their resources carefully to maintain operational efficiency and financial health. On the other hand, high CCC values could reflect strategic decisions to prioritize market reach, by extending credit to more customers in order to have a bigger volume of sales, or product availability, by keeping inventory stocks, over short-term cash flow efficiency.

CCC	*2023*	*2022*	*2021*	*2020*	*2019*	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	**Average**
GN	118,35	161,31	111,71	105,02	103,81	87,74	90,08	92,31	98,64	98,32	96,73	105,82
Sonova	146,76	182,74	195,47	138,72	166,52	150,98	148,59	152,49	168,39	149,87	165,30	160,53
Demant	184,27	219,80	191,57	172,58	203,11	209,58	168,58	171,13	199,74	203,71	189,76	192,17
Amplifon	-19,60	-23,74	-12,66	2,31	12,76	8,01	3,38	2,18	4,19	9,27	11,84	-0,19
Medtronic	170,87	162,53	145,04	157,69	155,96	154,54	137,08	145,96	233,72	171,37	187,31	165,64
CostCo	1,47	4,61	-0,61	-1,28	2,76	3,41	4,06	4,61	0,39	0,22	1,01	1,88
Cochlear	117,37	146,80	74,37	163,31	118,32	104,13	114,77	137,49	167,06	165,34	203,39	137,48
Knowles	206,19	179,50	114,59	110,29	108,83	113,15	109,32	79,17	101,48	88,69	69,52	116,43
WSA	19,33	41,56	28,07	33,66	26,48	-	-	-	-	-	-	29,82
Nuheara	133,57	243,50	53,58	1518,31	528,24	527,19	180,22	-	-	-	-	454,95
Average	107,86	131,86	90,11	240,06	142,68	150,97	106,23	98,17	121,70	110,85	115,61	**136,45**

Table 8. Cash conversion cycle.

2.4.6 Return on Assets

Return on Assets (ROA) is a financial ratio that indicates how effectively a company can convert the money used to purchase assets into net income or profits. It provides an insight into how efficiently a company is at using its assets to generate earnings. A higher ROA value generally indicates more efficient management of assets. The formula is the following:

$$ROA = \frac{Net\ Profit}{Total\ Assets}$$

The average per year shows significant variability, indicating changes in economic conditions, company performance, and possibly shifts in industry dynamics. Higher ROA in companies like Sonova and Cochlear suggests better capital efficiency, potentially due to higher-margin products or more effective cost management. In contrast, companies with lower ROA like GN and Amplifon might need to reassess asset utilization strategies or consider operational improvements to boost profitability. Fluctuations in ROA year-over-year can also reflect changes in strategic investments, and operational adjustments, as seen with the negative ROA in Cochlear in 2020 or in Knowles in 2022, likely influenced by external market disruptions like coronavirus or other business operations. Extremely low or negative ROA figures, as seen in Nuheara and WSA, may indicate operational risks or inefficiencies that could impact long-term sustainability. In general, if we momentarily exclude Nuheara from the picture, it seems that the overall ROA decreased more than 3.5% on average after coronavirus effect from 2019 to 2020.

ROA	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	Average per firm
GN	0,87%	1,86%	7,60%	7,61%	8,80%	9,58%	9,56%	8,05%	7,20%	7,75%	8,20%	7,01%
Sonova	11,86%	11,88%	9,88%	10,91%	10,72%	9,47%	9,05%	12,57%	13,68%	13,39%	4,18%	10,69%
Demant	5,89%	6,98%	10,17%	5,17%	6,73%	10,20%	10,84%	9,42%	10,00%	11,83%	12,66%	9,08%
Amplifon	4,20%	5,54%	5,09%	3,91%	4,14%	4,90%	7,75%	5,46%	4,50%	4,69%	1,41%	4,69%
Medtronic	4,16%	5,56%	3,90%	5,30%	5,18%	3,39%	4,03%	3,55%	2,51%	8,08%	9,95%	5,06%
CostCo	9,91%	9,22%	10,14%	8,72%	8,70%	9,13%	8,83%	7,98%	8,18%	8,34%	9,01%	8,92%
Cochlear	11,70%	11,73%	13,35%	-9,25%	20,06%	21,25%	19,68%	19,73%	16,66%	11,88%	17,32%	14,01%
Knowles	4,95%	36,33%	8,67%	0,18%	3,00%	3,29%	1,58%	1,31%	1,03%	5,98%	4,88%	-0,13%
WSA	-0,08%	-3,98%	-1,23%	-3,56%	-4,25%	-	-	-	-	-	-	-2,62%
Nuheara	-63,94%	-81,29%	-45,61%	-78,55%	-65,97%	-40,41%	-55,63%	-	-	-	-	-61,63%
Average per year	-1,05%	-6,88%	2,20%	-4,96%	-0,29%	3,42%	1,74%	8,51%	7,97%	8,99%	8,45%	**-0,49%**

Table 9. Return on Assets.

2.4.7 Control Variables

To improve the accuracy and reliability of the analysis, it's important to establish some control variables. In the regression analysis that will be run, when you leave out important variables that influence the dependent variable, the effect of those omitted variables can be mistakenly attributed to the variables you are studying. This leads to biased and misleading results. As control variables, I chose indebtedness, size and sales growth rate.

Indebtedness	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	Average per firm
GN	1,97	3,35	1,78	1,90	2,08	1,43	1,34	1,25	0,92	0,78	0,65	1,59
Sonova	1,30	1,05	0,50	0,99	0,65	0,51	0,67	0,27	0,23	0,23	0,37	0,62
Demant	2,14	2,34	1,97	1,52	1,75	1,45	1,09	1,13	1,11	0,93	0,97	1,49
Amplifon	2,18	2,22	2,45	2,34	2,90	2,57	1,28	1,19	1,18	1,35	1,53	1,92
Medtronic	0,61	0,53	0,59	0,57	0,59	0,58	0,71	0,67	0,64	0,22	0,27	0,54
CostCo	1,15	1,57	1,68	1,31	1,36	1,62	1,84	1,35	1,51	1,09	1,23	1,43
Cochlear	0,15	0,09	0,08	0,43	0,79	0,79	0,93	0,97	1,26	1,23	1,01	0,70
Knowles	0,33	0,14	0,14	0,16	0,22	0,22	0,27	0,44	0,62	0,57	0,09	0,29
WSA	3,11	3,18	2,83	2,71	2,30	-	-	-	-	-	-	2,83
Nuheara	1,09	4,96	-0,22	0,19	-0,14	-0,42	-0,19	-	-	-	-	0,75
Average per year	1,40	1,94	1,18	1,21	1,25	0,97	0,88	0,91	0,93	0,80	0,77	1,22

Table 10. Indebtedness

The indebtedness has been calculated as follows:

$$NFP\ /\ Equity\ = \frac{(Tot\ financial\ debt - Cash\ and\ cash\ equivalents)}{Equity}$$

The size has been computed as the logarithm of the sales while the sales growth rate through this formula:

$$Sales\ growth\ rate = \frac{Sales(t) - Sales(t-1)}{Sales(t-1)}$$

where t is financial year of reference.

Below there are the remaining two tables:

Sales growth	*2023*	*2022*	*2021*	*2020*	*2019*	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	**Average per firm**
GN	-3,20%	18,26%	16,55%	8,74%	17,99%	10,37%	2,49%	11,04%	14,51%	8,48%	8,45%	10,33%
Sonova	14,54%	32,17%	-10,26%	11,67%	9,48%	0,57%	17,73%	-2,50%	22,23%	8,73%	9,65%	10,36%
Demant	13,36%	9,79%	27,12%	-2,33%	6,74%	5,39%	9,73%	12,56%	14,05%	1,93%	7,67%	9,64%
Amplifon	6,65%	8,78%	25,23%	-10,19%	27,15%	7,60%	11,73%	9,59%	16,06%	7,68%	-2,27%	9,82%
Medtronic	-4,92%	20,60%	-6,23%	-2,40%	7,35%	-6,65%	7,50%	39,70%	47,42%	-3,54%	3,93%	9,34%
CostCo	6,76%	15,83%	17,49%	9,21%	7,86%	9,73%	8,68%	2,17%	3,16%	7,12%	6,07%	8,55%
Cochlear	9,48%	13,55%	13,08%	-3,95%	2,17%	3,89%	7,72%	19,97%	14,23%	11,71%	-19,56%	6,57%
Knowles	-7,47%	-11,91%	13,58%	-10,59%	3,37%	11,11%	-1,52%	0,28%	-17,64%	-24,68%	8,66%	-3,35%
WSA	5,14%	14,52%	17,95%	3,85%								10,36%
Nuheara	-45,05%	-64,01%	240,95%	-28,59%	-44,01%	60,71%						19,99%
Average per year	-0,47%	5,76%	35,55%	-2,46%	4,23%	11,41%	8,01%	11,60%	14,25%	2,18%	2,83%	9,16%

Table 11. Sales growth rate

Size	*2023*	*2022*	*2021*	*2020*	*2019*	*2018*	*2017*	*2016*	*2015*	*2014*	*2013*	**Average per firm**
GN	6,39	6,40	6,33	6,26	6,22	6,15	6,11	6,10	6,05	5,99	5,96	6,18
Sonova	6,57	6,52	6,39	6,44	6,39	6,35	6,35	6,28	6,29	6,20	6,17	6,36
Demant	6,49	6,43	6,39	6,29	6,30	6,27	6,25	6,21	6,16	6,10	6,09	6,27
Amplifon	6,35	6,33	6,29	6,19	6,24	6,13	6,10	6,05	6,01	5,95	5,92	6,14
Medtronic	7,46	7,48	7,40	7,42	7,44	7,40	7,43	7,40	7,26	7,09	7,10	7,35
CostCo	8,38	8,36	8,29	8,22	8,18	8,15	8,11	8,07	8,07	8,05	8,02	8,17
Cochlear	6,08	6,04	5,99	5,93	5,95	5,94	5,92	5,89	5,81	5,75	5,71	5,91
Knowles	5,85	5,88	5,94	5,88	5,93	5,92	5,87	5,88	5,88	5,96	6,08	5,92
WSA	7,26	7,24	7,18	7,11	7,10							7,18
Nuheara	3,29	3,59	4,03	3,24	3,35	3,60	3,39					3,50
Average per year	6,41	6,43	6,42	6,30	6,31	6,21	6,17	6,49	6,44	6,39	6,38	6,30

Table 12. Size

2.5. Correlation Analysis

Pearson's correlation analysis is a statistical method used to measure the strength and direction of the linear relationship between two continuous variables. It is represented by the Pearson correlation coefficient, often denoted as r, which ranges from -1 to 1. When the coefficient is closer to 1, it means that there is a positive linear relationship between the two variables and that when one variable increases, the other also increases

proportionally. Conversely, when the coefficient is closer to -1, it means that there is a negative linear relationship and thus if one variable increases, the other decreases proportionally and vice versa. The Pearson correlation coefficient can be expressed as the ratio of the covariance of two variables to the product of their standard deviations. Here is the formula:

$$r = \frac{Cov\ (X,Y)}{\sigma X \sigma Y}$$

To assess the relationship between the variables, I utilized the Pearson correlation matrix using the software Gretl, incorporating all relevant metrics considered in the ratio analysis. This approach allowed me to examine the strength and direction of linear relationships between the various financial ratios and metrics. By including all the key variables, the Pearson correlation matrix provides insights into potential correlations, both positive and negative, which can help identify trends or patterns that might otherwise go unnoticed. The analysis is essential for determining whether any strong correlations exist between the metrics, thus offering a deeper understanding of how they interact with one another. This preliminary step is crucial in financial analysis as it can guide further investigation, helping to highlight areas that may require more in-depth study or validation through additional statistical methods.

The table 13 below shows the correlation analysis between all the variables included in the research. A closer eye should be turned to the first column because it covers all the relationships between the Return on Assets (ROA) and the metrics related to the net working capital:

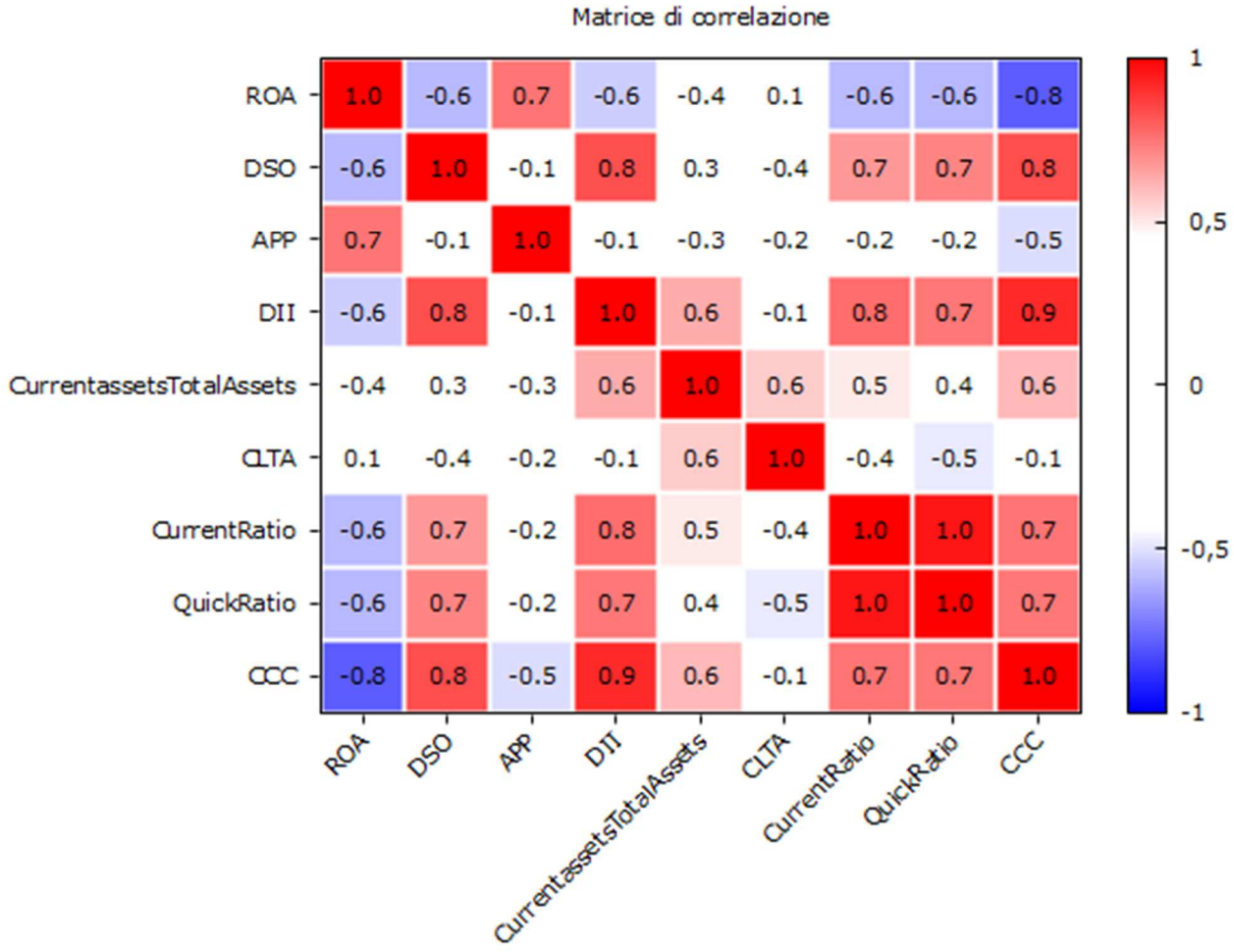


Table 13: Person's Correlations Matrix estimated with Gretl Software

The correlation analysis conducted has brought several significant findings. For instance, we observe a fairly notable negative correlation between the current ratio and return on assets (ROA). This relationship suggests that an increase in the current ratio is associated with a decrease in ROA. One possible explanation for this could be that holding too much cash or unutilized resources reduces the efficiency with which the company employs its assets to generate profit. Essentially, excess liquidity, if not actively utilized, may obstruct asset productivity and overall profitability. Similarly, the correlation between the quick ratio and ROA is also negative, reinforcing the idea that excess short-term liquidity can have an adverse consequence on profitability. In essence, companies that maintain higher liquidity levels in the form of current or quick assets might experience reduced returns on their assets due to underutilization of these resources.

On the other hand, no significant relationship was found between the ratio of current assets to total assets or the ratio of current liabilities to total assets and profitability measure, meaning that these two measures do not appear to have a direct impact on the company's ability to generate profits. Therefore, while liquidity ratios such as the current and quick ratios can negatively influence profitability, the proportion of current assets or liabilities in relation to the company's total assets does not show a clear connection to profitability.

Another interesting aspect is that there is a moderate positive coefficient between current or quick ratio with DSO which suggests that companies with higher levels of liquidity tend to have longer collection times. It could indicate that having more liquid resources allows companies to tolerate longer periods for debt collection.

Furthermore, the analysis reveals significant correlations between ROA and two other key financial metrics: days sales outstanding (DSO) and the average payment period (APP). The correlation between ROA and DSO is negative, indicating that as the time taken to collect receivables increases, the company's return on assets tends to decrease. This suggests that companies that take longer to collect their receivables may experience lower asset efficiency and profitability. On the other hand, the relationship between ROA and the average payment period is positive, implying that companies with longer payment periods for their debts tend to have higher ROA. This could indicate that companies optimizing their payment schedules can retain more cash for longer periods, which enhances their ability to generate returns from their assets.

Perhaps the most significant finding is the strong negative correlation between ROA and the cash conversion cycle (CCC). The cash conversion cycle represents the time it takes for a company to convert its investments in inventory and other resources back into cash through sales. A higher cash conversion cycle, indicating a longer time to complete the sales-payments cycle, is strongly associated with a reduction in ROA. This is expected and logical, as a longer cash conversion cycle implies that capital is tied up for an extended period, reducing the overall efficiency of the company. In other words, the longer it takes for a company to turn its resources into cash, the lower the returns it can generate from its assets, thus negatively affecting its profitability.

However, there are some limitations to this analysis. It is necessary to consider that it is a growing market, and I took as a sample nine listed companies included in the hearing care sector. In particular, Nuheara, listed on the Australian Stock Exchange (ASX), showed significant losses over the years which obviously led to a negative ROA. The reason behind these repeated losses could be found in a failed partnership with an important company and high operating costs. However, we also have to consider that the company is expanding geographically in the US, which is the region with the most potential for growth. Similar to Nuheara but with a definitely less severe situation from an economic point of view, WSA showed negative ROAs throughout the years. WS Audiology was loss-making in part due to the challenges associated with the merger between Widex and Sivantos accomplished in 2019, which created complexities in the integration of the two companies. This merger entailed high restructuring costs and the optimisation of operations on a global scale, as well as facing synergies that were not fully realised. The company showed significant revenues but registered little losses also because of R&D costs. These two companies could be considered as outliers, which are data points that deviate significantly from the other observed data points, and can affect Pearson's correlation coefficient, as this is sensitive to extreme values. Despite these possible outliers, the results are more or less in line with the expectations.

2.6. Regression Analysis

In the previous paragraph, Pearson's correlation analysis was employed to assess the strength and direction of the linear relationships between the variables under consideration. The results revealed some intriguing insights, particularly in terms of both statistical significance and alignment with initial expectations. However, it is important to note that while correlation analysis indicates whether two variables tend to move together, it does not establish a causal relationship, nor does it define the precise nature of their interaction. That's the reason why a regression analysis could be a valuable tool in this research, because it provides a more nuanced view of how changes in the independent variables influence the dependent variable. Through this approach, linear or multiple regression becomes especially useful, as it not only quantifies the strength of these relationships but also allows for the prediction of future outcomes based on observed data.

I run three different regressions, always choosing as dependent variable the profitability measure, ROA. The first regression was carried out with DSO, APP and DII as independent variables, the second one with only CCC as independent variable while the third one with current ratio and quick ratio. Each regression was carried out considering three control variables: Indebtedness, sales growth rate and size. Control variables in a regression analysis serve to consider other factors that might influence the dependent variable, but which are not the main object of the analysis. They make it possible to see the 'pure' effect of the independent variables of interest separating their effect from that of other variables that might influence the outcome.

In tables 14, 15 and 16 below, it is possible to see the results of the three regressions, where:

- The coefficient represents the estimated effect of the independent variable on the dependent variable.
- The standard error measures the precision of the coefficient estimated.
- The t-statistic is the ratio of the coefficient to its standard error. It is used to assess whether the coefficient is significantly different from zero.
- The p-value is a measure of the probability that the estimated coefficient is different from zero by pure chance. The p-value tells you how likely it is that the effect of the independent variable on the dependent variable does not really exist.
- R^2 is a statistical measure used in linear regression analysis to assess the goodness of fit of a model. It tells you how well the independent variable explains the variation in the dependent variable.

	Coefficients	*Standard Error*	*t Stat*	*P-Value*
Days Sales Outstanding (DSO)	-0,002	0,003	- 0,659	0,546
Average Payment Period (APP)	0,003	0,001	2,381	0,076
Days in Inventories (DII)	- 0,001	0,001	- 0,775	0,482
Indebtedness	-0,089	0,100	-0,893	0,422
Sales growth rate	0,447	1,409	0,317	0,767
Size	0,021	0,021	1,028	0,362
R-Squared	0,846			

Table 14. Regression analysis estimated with Gretl Software with DSO, APP and DII as independent variables.

	Coefficients	*Standard Error*	*t Stat*	*P-Value*
Cash Conversion Cycle	-0,001	0,001	-2,145	0,076
Indebtedness	-0,085	0,087	-0,981	0,364
Sales growth rate	- 0,233	1,320	-0,176	0,866
Size	0,045	0,016	2,784	0,032
R-Squared	0,745			

Table 15. Regression analysis with CCC as independent variable.

	Coefficients	*Standard Error*	*t Stat*	*P-Value*
Current ratio	-0,356	0,150	-2,368	0,064
Quick ratio	0,257	0,193	1,330	0,241
Indebtedness	- 0,134	0,072	-1,861	0,122
Sales growth rate	-1,321	0,843	-1,567	0,178
Size	0,088	0,020	4,435	0,007
R-Squared	0,872			

Table 16. Regression analysis with Current ratio and quick ratio as independent variables.

In line with the findings from the correlation analysis, the regression output also shows a negative coefficient for days sales outstanding. This suggests that an increase in the number of days a company takes to collect payments from its customers is associated with a decrease in profitability. However, the coefficient is relatively small, and the p-value is 0,546. This indicates that, based on this particular analysis, DSO does not seem to be a significant driver of profitability in the firms studied. The absence of statistical significance in the model does not allow this effect to be confirmed with certainty in the available data.

A similar scenario can be observed with the DII metric, which also shows a small negative coefficient. This indicates that an increase in the time a company holds inventory is slightly negative correlated with

profitability, but much like DSO, the not significant p-value suggests that DII is not a major determinant of profitability in this dataset.

Conversely, in line with expectations, the regression output for the APP exhibits a positive coefficient. This indicates a positive relationship between APP and Return on Assets (ROA), implying that companies which take longer to pay their suppliers tend to enjoy higher profitability. Additionally, along with this positive relationship, the result is close to being statistically significant, as demonstrated by the p-value of 0,076, which is very close to the critical threshold required for significance. Extending the accounts payable period could act as a form of interest-free financing, enhancing liquidity and reducing the need for external financing. This result suggests that optimizing payables management may offer potential for increasing profitability.

With regards to the first regression, the R-squared of 0.846 indicates that approximately 84.6% of the variability of the dependent variable (ROA) is explained by the independent variables (DSO, APP, DII) and the control variables (Indebtedness, Sales growth, Size). This is a relatively high value, which suggests that the model explains the data well. However, we must be cautious when considering this and check the reliability of the model.

The second regression analysis has only the cash conversion cycle as independent variable while the dependent variable and control variables are the same as in the first regression. In this regression, CCC had a coefficient of -0,001 and a p-value of 0,076. This result suggests a negative relationship between CCC and ROA, meaning that as the cash conversion cycle lengthens, profitability declines. This is a significant finding, especially since the p-value is marginally below 0,10, making it statistically significant at the 10% level. The t-statistic of -2,145 is near the critical value of ±2, further supporting the significance of the result. The entire model, taking into consideration also the control variables, showed an uncentered R-squared of 0.745, indicating that approximately 74.5% of the variance in ROA is explained by the independent variables included in the model. However, the overall model approached marginal significance, with an F-statistic p-value of 0.0539, slightly above the critical threshold of 0.05. This result highlights the critical importance of efficient working capital management, as firms that can effectively shorten their cash conversion cycle are more likely to achieve better financial performance. Consequently, optimizing the CCC can be seen as a key lever for improving profitability, emphasizing the need for firms to prioritize efficient cash flow management as part of their overall business strategy.

The third regression model present the current ratio and the quick ratio as independent variables. This analysis produced interesting results, since the current ratio shows a negative coefficient while the quick ratio reveals a positive one. The negative coefficient of -0.3564 suggests a potential inverse relationship between the current ratio and profitability, with a p-value of 0.064, approaching statistical significance. This indicates that a higher proportion of current assets is linked with lower profitability. This finding may

support the idea that while liquidity is crucial for maintaining operational stability, an overemphasis on liquid assets may come at the expense of profitability, as resources that could be deployed in more productive, long-term investments are instead held in less profitable, short-term assets. On the other hand, the positive coefficient of 0.2572 indicates that higher quick ratios may be associated with improved profitability, although the result was not statistically significant. The fact that the current ratio has a negative coefficient while the quick ratio shows a positive coefficient might seem counterintuitive at first glance, given that both measure a company's liquidity. However, this can be explained by considering some important differences between the two indicators and their impact on profitability. If a company has a high current ratio due to high inventories, it could indicate that a large part of the company's liquidity is tied up in assets that cannot be immediately sold or converted into cash. This could signal inefficiency in inventory management, with a consequent negative impact on profitability. The quick ratio, excluding inventories, measures only the most rapidly liquid assets. Therefore, a positive ratio may indicate that the company is maintaining a healthy level of liquid assets, such as cash and receivables, that can be readily used to meet short-term obligations without relying on assets that take longer to sell or liquidate.

Moreover, in each of the regression analyses, indebtedness showed a consistently negative coefficient, suggesting that higher levels of debt are generally associated with lower profitability. Although the results were not statistically significant in any of the models, the negative relationship aligns with the widely accepted theory that debt increases financial burden through interest payments and financial risk. The effect of sales growth was inconsistent across the three regressions, with coefficients alternating between negative and positive, but none of the results were statistically significant. Firm size, on the other hand, consistently showed a positive coefficient, and it was statistically significant in two out of the three models. This indicates that larger firms tend to have higher profitability. The inclusion of these control variables helped to isolate the effect of the main independent variables.

The coefficients observed in this analysis are relatively low, and this may be due, at least in part, to the presence of outliers or multicollinearity phenomena within the data. In a previous section, potential outliers were discussed, and it was noted that these outliers can have a significant impact on regression analysis. Specifically, outliers can distort the estimation of regression coefficients, skewing the results and making them less reflective of the general trends or relationships that exist within the dataset. When extreme values disproportionately influence the analysis, the model can yield coefficients that are either larger or smaller than they would be if the outliers were removed or properly accounted for. As a result, the overall interpretation of the data becomes less reliable, as these distorted coefficients may not accurately represent the broader patterns present in the dataset. Beyond the issue of outliers, multicollinearity is another key factor that can affect the reliability and stability of the regression results. Multicollinearity arises when two or more independent variables in the regression model are strongly correlated with one another. This can create problems in the interpretation of regression coefficients because it makes it difficult to distinguish the

effect of one variable from the other. Furthermore, multicollinearity makes the coefficients unstable. It can significantly increase standard errors, thus reducing t-statistics, and leading to higher p-values even if there is a strong relationship between the independent and dependent variables. In our specific case, days sales outstanding, average payment period and days inventory outstanding are metrics that, while designed to measure different aspects of working capital management, are inherently related to one another. These variables each capture different elements of the working capital cycle, yet they are all interdependent to some degree. DSO tracks the time it takes a firm to collect payments from its customers, DII measures the time inventory is held before it is sold, and APP represents the time a company takes to pay its suppliers. Although they focus on different areas, these variables are all connected through the broader framework of working capital management, and it is reasonable to expect that changes in one metric may influence the others Additionally, all three of these variables are directly related to the cash conversion cycle which is an aggregate measure of the time it takes for a company to convert its investments in inventory and other resources into cash flows from sales. Given the relationships between DSO, APP, DII, and CCC, the presence of multicollinearity is plausible. If multicollinearity exists within the data, it could provide an explanation for why statistical significance has not been detected in some of the regression models, even though, conceptually, these variables should logically have an impact on corporate profitability.

Overall, the regression analysis conducted on the financial data produced useful and indicative results of the relationships between operational independent variables and corporate profitability, as measured by Return on Assets. The results so far are consistent and offer valuable insights, particularly on the importance of the cash conversion cycle or on the negative correlation between current ratio and profitability. Net of potential outliers and multicollinearity, the overall direction and conclusions of the analysis remain valid. Additionally, this research could be a starting point for more accurate analysis in the future, with the availability of a greater number of companies and data, since the specific sector is growing, already having a solid base on which to add new metrics or new components.

2.7. Results

The analysis yielded some intriguing insights, which, when combined, can help paint a more comprehensive picture of the overall situation. The ratio analysis revealed significant variability across the firms, largely driven by the financial instability and volatility exhibited by Nuheara. Despite posting financial losses in recent years, Nuheara was included in this analysis because of its distinctive market position and innovative approach. The company stands out for its pioneering technology, offering a more affordable alternative to traditional hearing aids. This cost-effective positioning makes Nuheara's products more accessible to a broader segment of consumers, which is particularly appealing in the United States market, where regulatory changes have

facilitated the sale of over-the-counter hearing aids. The company's strategic positioning in the U.S. market places it in a competitive stance within this growing segment, allowing it to capitalize on the increasing demand for affordable hearing solutions. WS Audiology also displayed minimal losses over the five-year period, yet it continues to generate substantial revenues. Its ongoing investment in research and development (R&D) and its vast distribution network, spanning over 130 countries, further signal the company's forward-thinking strategy. These factors reflect a strong business model that appears to be built for long-term sustainability and continued growth, making its financial performance more trustworthy.

Turning back to the results of the three types of analysis conducted, the liquidity measures—specifically the current and quick ratios—produced mixed results in terms of their relationship with profitability. While one might expect higher liquidity to correlate with better performance, the findings from correlation analysis suggest otherwise. Companies with greater liquidity did not necessarily outperform in terms of return on assets. In fact, the analysis suggests that excess liquidity may impede the efficient utilization of assets. Interestingly, the average current and quick ratios across the firms exceeded 1, indicating that the companies, on average, possess more current assets than current liabilities. This points to a situation where firms have a positive net working capital, providing them with a buffer to meet short-term obligations. On the other hand, the correlation and regression analysis indicated a negative relationship between liquidity, measured by the current ratio, and profitability, measured by ROA. As one measure increased, the other tended to decrease. For example, Amplifon, the global leader in this sector, exhibited a current ratio below 1, which translates into negative net working capital. Amplifon employs this strategy because it operates as a retail company, unlike most of the other firms in the analysis that are primarily manufacturers. In retail companies, where customers pay immediately but suppliers grant long payment terms, negative working capital can improve corporate liquidity. Having a negative net working capital may indicate that the company is able to pay its suppliers after collecting from customers. This means that the company is financing its operations with credit provided by suppliers, reducing the need for external financing or using its own cash resources. Additionally, since the company does not need to finance large cash resources to maintain day-to-day operations, it can devote more capital to other strategic activities, such as growth investments or acquisitions. In fact, this seems to be a winning strategy for the global leader company, that registered a several numbers of acquisitions in the last years that help the company expand into new markets. In contrast, manufacturing companies typically face longer production cycles. During these periods, production costs are incurred well before the company collects revenues from customers. A positive NWC ensures that the company has sufficient resources to finance operating costs, such as raw material or labour, throughout the production cycle, maintaining stability and business continuity. Nevertheless, there is another interesting finding from the regression analysis, regarding the quick ratio. Unexpectedly, the quick ratio enjoys a positive relationship with ROA. Although the results seem at odds with each other, the strong presence of inventories in manufacturing companies probably influenced this result. The

combination of a negative current ratio and a positive quick ratio may indicate that the company has problems with inventory management or that it is holding too much liquidity without using it efficiently.

Linked to this topic, it is worth examining the proportion of current assets relative to total assets on the firms' balance sheets. On average, the firms analyzed had approximately one-third of their assets in current form, meaning these assets are expected to be converted into cash within a short period of time. In this case, there are companies with higher ratios, that suggest a conservative approach to managing short-term obligations, ensuring these companies are well-positioned to cover liabilities and meet operational needs without the risk of liquidity issues. Conversely, companies that exhibit lower ratios adopt a more capital-intensive approach, with greater investment in long-term assets. This could imply a focus on growth or operational expansion, potentially sacrificing short-term liquidity for long-term profitability.

The Cash Conversion Cycle proved to be a critical metric as significant findings were found in both the analysis. Through the ratio analysis, we observed that retailer companies, such as Amplifon and CostCo revealed a shorter cash conversion cycle, with an average value close to 0. This can be attributed to their business model, where payments are collected from customers before payments to suppliers are made. As retailers, these companies typically receive cash upfront from their customers, allowing them to settle their obligations with suppliers later. On the other hand, manufacturers tend to have significantly longer cash conversion cycles. This is because they maintain higher levels of inventory to ensure production continuity, and they typically operate in a B2B environment, often granting deferred payment terms to their customers. These factors extend the time needed for manufacturers to collect receivables, thus lengthening the CCC. As a result, manufacturers face greater challenges in managing their working capital efficiently compared to their retail counterparts, where cash flows are more immediate and predictable. As previously discussed, the CCC is composed of DSO, APP and DII. Our analysis also tried to assess the impact of each the single components of the CCC on the ROA. A notable observation is that the average days in inventory for most of the companies analyzed is substantially higher than both the DSO and APP. This is unsurprising given that the majority of the companies in our sample are manufacturers. In the manufacturing industry, maintaining a high level of inventory is essential to ensure continuous production and to meet future demand. However, from the correlation and regression analysis it looks like the APP has a higher capacity to influence the ROA compared to DSO and DII, and it was slightly unexpected because inventories play an important role in the manufacturing firms, which are the majority of the companies included in the analysis. In the correlation analysis, the CCC exhibits a strong negative correlation with Return on Assets suggesting that a longer CCC leads to reduced profitability. This negative correlation highlights the importance of minimizing the time it takes for capital to cycle through inventories, receivables, and payables. Essentially, firms that take longer to turn over their working capital are less able to use their assets efficiently, resulting in lower profitability. The regression analysis further confirms these results, showing that the CCC is one of the most significant variables impacting profitability. A negative coefficient for CCC in the regression model indicates that as the cash

conversion cycle increases, the ROA decreases. This relationship is statistically significant, with the regression model with CCC as independent variable explaining approximately 75% of the variance in profitability and with a p-value and t-statistic close to the statistically significant threshold. Firms like Amplifon and CostCo benefit from quicker capital turnover and higher liquidity, allowing them to operate with less reliance on external financing. On the other hand, companies with higher CCC values, such as Cochlear and Sonova, need to carefully manage their working capital to avoid liquidity constraints and improve profitability.

CONCLUSIONS

The research just conducted aimed to analyse the impact of the behaviour of net working capital components on profitability for listed companies in the hearing care sector, trying to find some common patterns and good practices together with meaningful relationships between the variables taken into consideration. The study was structured around three main types of analysis that, together, offer a comprehensive understanding of the subject matter.

The first part of the analysis focused on individual financial metrics to identify general trends and highlight both similarities and anomalies across the companies over a defined period. This part of the study was essential for understanding the broader landscape of working capital management in the sector. As expected, the ratios fluctuated considerably over the years, largely due to external challenges, particularly the financial disruptions caused by the COVID-19 pandemic in 2020. However, these fluctuations also revealed notable differences between retail and manufacturing companies in how they manage their receivables and inventories, contributing to distinct behaviours in their respective cash conversion cycles.

A key insight from this first analysis is the critical role of current assets—those assets that can be quickly converted into liquidity. For example, while maintaining high levels of liquidity can be a sign of financial security, excessive liquidity can indicate inefficiencies. In such cases, it may mean that capital is being unnecessarily tied up in short-term assets rather than being allocated toward growth or long-term investments. This was particularly evident when comparing companies like Amplifon and Sonova, which displayed varied liquidity strategies, each reflective of their distinct business models. The first part of the study highlights the two different approaches we have in this sector: On one hand, we have the global leader Amplifon, which is a retailer company, that relies on a fast collection of receivables, a lower level of inventories and it also has the ability to stretch the payment terms in an optimal way. By doing so, its cash conversion cycle will be very low, obtaining liquidity that can be used to fund the daily operations and to invest excess cash pursuing organic growth or strategic acquisitions. In this way, it’s good to have a negative working capital since the firm is financing their operations thanks to the stretched accounts payable, reducing the need for external financing or using its own cash resources. On the other hand, if we take an example of a manufacturing company, since they need a high level of inventories that has not a very fast turnover and since they sell their hearing aids both to final consumers and retail companies, having deferred collecting terms, they usually experience longer cash conversion cycle. This situation results in higher levels of current assets, such as receivables and inventories. This situation implies a positive working capital that, even if it gives the company more financial stability since it has the short-term assets that could cover and meet short-term liabilities, it could also result in capital that could be invested in more profitable long-term

projects, such as new plants, R&D or expansions, but gets stuck in unprofitable activities, undermining the company's ability to grow.

Here, the correlation and regression analysis come to the aid of the study because, based on our data, they allow to evaluate and assess how the net working capital should work in order to improve the profitability. Overall, the analysis reveals that an efficient CCC is key to enhancing profitability in the hearing care market. The regression and correlation analyses clearly underline the importance of efficient working capital management for firms looking to maximize their financial performance in this sector. In fact, the findings suggest that companies should focus on shortening their CCC to unlock capital and generate higher returns on assets. Specifically, firms with shorter cash conversion cycles, lower accounts receivable days, and better inventory management often perform better financially, especially those companies that better control the average payment period. From a practical standpoint, the results suggest that hearing care companies can benefit from continuous monitoring and optimization of their working capital components to enhance profitability.

Despite the valuable findings, the study is not without limitations The analysis was restricted to nine listed companies, largely due to the availability of financial data. While these companies represent a substantial portion of the global hearing care market, the exclusion of non-listed companies limits the generalizability of the findings. Furthermore, the regression analysis yielded low coefficients and some high p-values, indicating that not all the observed relationships were statistically significant. Future research could address these limitations by expanding the scope of the study to include smaller, non-listed companies. This could provide additional insights into how different types of businesses in the hearing care sector—whether large or small, listed or private—manage their working capital. Given the projected growth of the hearing aids market, with more people expected to need hearing assistance in the coming years, further research in this area could prove especially beneficial. The future prospects for the hearing care market are particularly promising. With an aging global population and increasing awareness of hearing health, the demand for hearing aids and related services is expected to rise substantially. As a result, the companies that successfully manage their working capital today will be well-positioned to capitalize on future market opportunities. In this sense, the findings from this thesis could serve as a valuable foundation for further research. Future studies might examine how external factors—such as inflation, market volatility, or shifts in consumer behaviour—influence the relationship between NWC and profitability. Additionally, a more in-depth analysis of smaller, non-listed companies could reveal new insights into the working capital strategies of firms that operate under different constraints or market conditions.

From a personal perspective, the decision to focus on the hearing care market stemmed from my internship experience at Amplifon, where I was part of the finance procurement controlling team. This role gave me firsthand exposure to the financial and operational intricacies of the company, particularly regarding its working capital strategy. I was intrigued by the dual relationship Amplifon has with other companies in the

sector, as both a supplier and a competitor, and how these dynamic influences its receivables and payables management.

In conclusion, this thesis has contributed to a better understanding of the financial dynamics of working capital management in the hearing care market. The findings underscore the importance of efficient working capital strategies for improving profitability, especially in a sector that is characterized by both retail and manufacturing activities. However, as the hearing care market continues to evolve, driven by technological advancements and demographic shifts, companies must remain agile and continuously adjust their NWC strategies to stay competitive. By maintaining a strong focus on managing receivables, payables, and inventory turnover, hearing care firms can maximize their financial performance and position themselves for long-term success in an increasingly competitive and rapidly advancing industry.

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