Independent College

Applied Project

Submission Form

LEARNER NUMBER	51740117
NAME	Javier Antonio Donoso Navarrete
COURSE	Applied Project 2
REPORT TITLE	IT-Based Inventory Management for Beverage Control in Restaurants
SUPERVISOR NAME	Dr. Daniel O'Sullivan
WORD COUNT	10,426
DUE DATE	12/05/2025
DATE SUBMITTED	09/05/2025

I certify that:

- This project report is all my own work, and no part of this report has been copied from another source: Yes ☒ No ☐
- I understand that this report may be checked by electronic or other means for plagiarism and/or content created by generative AI and may be transferred and stored in a database for the purposes of data-matching/data-analysis to help detect plagiarism and/or content created by generative AI: Yes ☒ No ☐

- This report has not previously been submitted in part or in full for assessment to any other institution: Yes ☒ No ☐
- I consent to the inclusion of my report in the publicly accessible (open access) electronic database maintained by the library:

  Yes ☒ No☐
- I have emailed a back-up copy of this report to locker@independentcollege.ie:

  Yes ☒ No ☐

(Note that if no check boxes are selected, this Project will be regarded as NOT properly submitted, and may be subject to a late submission penalty)

Name: Javier Antonio Donoso Navarrete

Date: 09/05/2025

For the report to count as a valid submission, the student must provide: **1 electronic copy via Moodle**. There is no requirement for a hard copy . Evidence of the Primary Research MUST be included in the appendix of the report. That includes a copy of questionnaires, interview schedules, or observation diaries. One interview transcript should be included as a full transcript and a summary of all other

interviews must be kept as a backup by the student. See template on Moodle for what should be included in all aspects of the report. **All data must be anonymised.**

The text should be double-spaced throughout and single column format (A4) with 2cm for left and right-hand margins and 2.5cm at head and foot. Text should be justified, standard 12 point, footnotes 10 point, and in Calibri. Page numbers should be at the bottom-right. Do not use line and paragraph spacing. Keep formatting to a minimum and avoid underlining.

Harvard Referencing shall apply.

(Insert work here)

IT-Based Inventory Management for Beverage Control in Restaurants

Javier Antonio Donoso Navarrete

51740117

ABSTRACT

This study aims to identify the opportunities and challenges for restaurants implementing IT-based Inventory Management of Beverages in Ireland. This topic is significant due to the rapid growth and adoption of Information Technologies across different industries; hence, it is advantageous for businesses to understand the benefits and difficulties they may encounter while maintaining and increasing their competitiveness in the market.

This study adopted a mixed-method approach, collecting data from the employees of a three-venue restaurant in Dublin through an online survey and four semi-structured interviews that sought to address the six sub-research questions organised into six distinct themes. The data obtained from this primary research was compared to the existing Literature. Ultimately, conclusions were drawn following the analysis of both primary and secondary research.

The findings of this study illustrate primary opportunities and challenges that restaurants may encounter, along with suggestions to be considered in the application of IT-based systems in restaurants' operations. Furthermore, it emphasises that reliance solely on technology is insufficient; other facets of businesses, such as planning, change management, and organisational communication, play a vital role in the successful implementation of a technological approach.

Acknowledgements.

To all the teachers who have been part of my academic journey, especially Dr. O'Sullivan, for guiding and helping me in this study. Thanks also to all the people who voluntarily decided to cooperate and participate in this research.

List of Acronyms

AI	Artificial Intelligence
ERP	Enterprise Resource Planning
IoT	The Internet of Things
IT	Information Technologies
POS	Points-of-sale
SCM	Supply Chain Management
SDLC	System Development Life Cycle
SPC	Statistical Process Control

List of Tables

Table 1 Qualitative stakeholders 34

Table 2 Quantitative stakeholders 35

Table 3 Data Analysis Sample 36

Table 4 Findings 69

Table 5 Questionnaire questions 83

Table 6 Interviews Questions 85

Table 7 Interviews Schedule 85

Table 8 Literature Review Table 102

List of Figures

Figure 1 (Q3c) B01 ..... **Error! Bookmark not defined.**8

Figure 2 (Q3c) B04 ..... **Error! Bookmark not defined.**9

Figure 3 (Q3c) B02 ..... **Error! Bookmark not defined.**9

Figure 4 (Q3c) B03 ..... **Error! Bookmark not defined.**9

Figure 5 (Q2) C01 ..... **Error! Bookmark not defined.**9

Figure 6 Q4 (B01, B02, B03, B04) 43

Figure 7 Q.5 (C01) ..... **Error! Bookmark not defined.**

Figure 8 Q8 - B01 B02 B03 B04 ..... **Error! Bookmark not defined.**7

Figure 9 Q9 (C01) ..... **Error! Bookmark not defined.**

Figure 10 Q11 (B01 B02 B03 B04) ..... **Error! Bookmark not defined.**

Figure 11 Q12 a, b, c. ..... **Error! Bookmark not defined.**

Figure 12 Q15a (C01) ..... **Error! Bookmark not defined.**

Figure 13 Q15b (C01) ..... **Error! Bookmark not defined.**

Figure 14 Q15c (C01) ..... **Error! Bookmark not defined.**

Figure 15 Q16 (B01 B02 B03 B04) 61

Figure 16 Q17 (C01) ..... **Error! Bookmark not defined.**

Figure 17 Q18a (B01 B02 B03 B04) ..... **Error! Bookmark not defined.**

Table of Contents

1. Chapter 1: Introduction 13

1.1. Introduction: Background of research 13

1.2. Rationale 13

1.3. Statement of the research objectives 13

1.3.1. Theme 1. Inventory Control Management in Restaurants. 14

1.3.2. Theme 2. Inventory Technologies for Restaurants. 14

1.3.3. Theme 3. Supply chain for the beverage industry in restaurants. 14

1.3.4. Theme 4. Business planning 14

1.3.5. Theme 5. Use of IT for data analysis and automation 15

1.3.6. Theme 6. Competitive Advantage of Inventory IT Systems 15

1.4. Information gathering & data collection 15

1.5. Expected Outcomes 16

1.6. Chapter by Chapter Overview 16

1.6.1. Chapter 2: Literature Review 16

1.6.2. Chapter 3: Methodology 16

1.6.3. Chapter 4: Findings and Discussion 16

1.6.4. Chapter 5: Conclusions 17

2. Chapter 2: Literature Review 17

2.1. Introduction 17

2.2. Theme 1: Inventory Control Management in Restaurants 17

2.2.1. What are the existing systems and mechanisms of Inventory Control Management used in restaurants for their beverages? What are the benefits and disadvantages of these systems? 17

2.2.2. Benefits of Inventory Management 19

2.3. Theme 2: Inventory Technologies for Restaurants. 20

2.3.1. What challenges and opportunities do Inventory software systems offer restaurants in stock control management? Which are the most popular ones used in Ireland? 20

2.3.2. Opportunities of digitalisation 21

2.3.3. Challenges of digitalisation 22

2.3.4. Popular Restaurant Inventory Management Systems 22

2.4. Theme 3: Supply chain for the beverage industry in restaurants. 23

2.4.1. How are the mechanisms of procurement, supply chain and stock control managed in the beverage industry in Ireland? 23

2.4.2. Digitalisation of Supply Management 24

2.4.3. Supplier selection 25

2.5. Theme 4: Business planning 25

2.5.1. How can business planning be enhanced by the use of IT in the inventory management of beverages? What are the benefits and disadvantages? 25

2.5.2. Benefits 26

2.5.3. Challenges 27

2.6. Theme 5: Use of IT for data analysis and automation 28

2.6.1. How are IT-driven automation and data analysis systems applicable to the area of beverages within restaurants? 28

2.6.2. Benefits 29

2.6.3. Challenges 30

2.7. Theme 6: Competitive Advantage of Inventory IT Systems 30

2.7.1. How can IT tools help increase restaurants' Competitive Advantage concerning Inventory Management Control of beverages? 30

2.8. Conclusions 31

3. Chapter 3: Methodology 33

3.1. Theoretical Philosophy 33

3.2. Method justification 33

3.3. Outline of sampling technique and sample size 34

3.3.1. Qualitative sample 34

3.3.2. Quantitative sample 35

3.4. Data analysis method 35

3.5. Ethical Section 36

4. Chapter 4: Findings and Discussion 37

4.1. Theme 1: Inventory Control Management in Restaurants 37

4.1.1. Primary Research 37

4.1.2. Secondary Research 40

4.1.3. Discussion 40

4.2. Theme 2: Inventory Technologies for Restaurants. 42

4.2.1. Primary Research 42

4.2.2. Secondary Research 44

4.2.3. Discussion 45

4.3. Theme 3: Supply chain for the beverage industry in restaurants. 46

4.3.1. Primary Research 46

4.3.2. Secondary Research 48

4.3.3. Discussion 49

4.4. Theme 4: Business planning 51

4.4.1. Primary Research 51

4.4.2. Secondary Research 53

4.4.3. Discussion 54

4.5. Theme 5: Use of IT for data analysis and automation 56

4.5.1. Primary Research 56

4.5.2. Secondary Research 58

4.5.3. Discussion 59

4.6. Theme 6: Competitive Advantage of Inventory IT Systems 59

4.6.1. Primary Research 59

4.6.2. Secondary Research 62

4.6.3. Discussion 63

5. Chapter 5: Conclusions 65

5.1. Opportunities: 65

5.1.1. Efficient operations and Cost Control: 65

5.1.2. Improved Data Analysis for Decision-Making: 65

5.1.3. Integration with POS: 66

5.1.4. Order automation: 66

5.2. Challenges 66

5.2.1. Resistance to Technological Change 66

5.2.2. Training and ambiguous communication 66

5.2.3. Suppliers' integration 66

5.2.4. Dependence on Internet Connectivity 67

5.3. Findings table 67

5.4. Contribution 69

5.5. Limitations and recommendations 70

5.5.1. Sample size and variety 70

5.5.2. Time constraints and stage of implementation 70

5.5.3. Mixed research, mostly opinion-based 70

5.5.4. Availability of Literature 71

References 72

Appendixes 75

Appendix 1: Informed Letter of Consent 76

Appendix 2: Sample Questionnaire and Interviews 77

Appendix 3: Interview Schedule 85

Appendix 4: Interview Transcript 85

Appendix 6. Literature Review Table 99

Appendix 7: Copy of Ethical Form A 103

1. Chapter 1: Introduction

1.1. Introduction: Background of research

The research area is related to the use of Information Technologies (IT) in Inventory Management of beverages in restaurants, and its opportunities and challenges. It is of personal interest because I have observed that management in my workplace has implemented new technologies that aim to improve how the business controls and oversees inventories. However, some struggles in their processes have been observed. Thus, there is an interest in better understanding how the system works, and with it, its limitations and capabilities.

1.2. Rationale

The expected outcome is to understand and analyse opportunities and challenges for medium-sized restaurants using IT-based Inventory Control Management for Beverages, based on one restaurant that operates three venues in one location in the Dublin city centre

This leads to the Research question, which is: **What are the opportunities and challenges for restaurants using IT-based Inventory Management of beverages in Ireland?**

1.3. Statement of the research objectives

Based on the Research question, the study explores six themes, with their sub-research objectives and questions, as follows:

1.3.1. Theme 1. Inventory Control Management in Restaurants.

To identify systems and mechanisms of Inventory Control Management used in restaurants, their benefits and disadvantages

> *Sub-research question 1:* What are the existing systems and mechanisms of Inventory Control Management used in restaurants for their beverages? What are the benefits and disadvantages of these systems?

1.3.2. Theme 2. Inventory Technologies for Restaurants.

To analyse the challenges and opportunities that Inventory software systems offer to restaurants in stock control management and list the most popular ones used in Ireland.

> *Sub-research question 2:* What challenges and opportunities do Inventory software systems offer restaurants in stock control management? Which are the most popular ones used in Ireland?

1.3.3. Theme 3. Supply chain for the beverage industry in restaurants.

To understand and compare the mechanisms of procurement, supply chain and stock in the beverage industry in Ireland.

> *Sub-research question 3:* How are the mechanisms of procurement, supply chain and stock control managed in the beverage industry in Ireland?

1.3.4. Theme 4. Business planning

To analyse the benefits and disadvantages of business planning in using IT in inventory

management.

Sub-research question 4: How can business planning be enhanced by the use of IT in the inventory management of beverages? What are the benefits and disadvantages?

1.3.5. Theme 5. Use of IT for data analysis and automation

To describe IT-driven automation and data analysis systems applicable to the area of beverages

Sub-research question 5: How are IT-driven automation and data analysis systems applicable to the area of beverages within restaurants?

1.3.6. Theme 6. Competitive Advantage of Inventory IT Systems

To analyse the competitive advantage of IT in the Inventory Management Control of beverages in Irish restaurants.

Sub-research question 6: How can IT tools help increase restaurants' Competitive Advantage concerning Inventory Management Control of beverages?

1.4. Information gathering & data collection

The information has been gathered through two mechanisms, which are semi-structured interviews applied to 4 members of the staff (Managing Director, General Manager, Bar staff, Office staff); and a questionnaire to all members of staff who are involved in any degree in the stock control of beverages process.

1.5. Expected Outcomes

The study expects to unveil an understanding of how prepared firms are to cope with the challenges involved and what role employees have in these tasks.

The main beneficiaries in this research will be management and employees working in the procurement and control of the stock of drinks, so they can think ahead of the challenges involved in using technology in stock control.

1.6. Chapter by Chapter Overview

This is a general overview of the chapters of this study:

1.6.1. Chapter 2: Literature Review

In this chapter, there is a discussion of the secondary research, where the six sub-research questions are answered based on the literature review.

1.6.2. Chapter 3: Methodology

Discussion and justification of the methods applied for this research, as well as segmentation, codification and ethical approaches.

1.6.3. Chapter 4: Findings and Discussion

The triangulation of data obtained from Primary and Secondary research for each theme and sub-research question, including an answer for each one.

1.6.4. Chapter 5: Conclusions

In summary, the answer to the research question. This chapter also includes an overview of the closure of all themes, the limitations and the suggestions.

2. Chapter 2: Literature Review

2.1. Introduction

To understand and analyse the opportunities and challenges for medium-sized restaurants using IT-based Inventory Control Management for Beverages, this study covers six co-related topics based on previous research, relevant to the research objective. These are:

2.2. Theme 1: Inventory Control Management in Restaurants

2.2.1. What are the existing systems and mechanisms of Inventory Control Management used in restaurants for their beverages? What are the benefits and disadvantages of these systems?

First of all, the definition of inventory may be described as “the accumulation of materials, customers or information” (Slack et al., 2022, p.443) going through processes in the business.

Restaurants have very dynamic inventories as they use and need stock constantly. The main focus of this research is related to beverages. However, inventory related to overall conditions in restaurants is also considered.

Previous research on restaurant inventories has tried to uncover whether bars and restaurants understand how important stock control is (Dadić et al., 2020), as well as planning

and control instruments. Furthermore, digital inventory and accounting in restaurant tasks permit one to "differentiate the distribution of stocks on traditionally sold, promotional, preferential or free meals/drinks" (Sadykova et al., 2020, p.484)

From the point of view of inventory Management, how good or bad an establishment does in the industry will be measured by its "ability to maintain stock at a level that ensures the normal course of service" (Dadić et al., 2020, p.79), keeping the costs as low as possible. To keep the costs low, it is necessary to maintain a balance between not-too-low inventories that might affect the normal service of the business or not-too-high inventories that hold the assets tied to inventory and low liquidity. Consequently, the level of the inventories will be determined by the size of the company and different factors, such as the volume of production, season, market dynamics and the kind of goods stocked.

On the one hand, if the stock is too low, there might be interruptions in the service, which can create customer dissatisfaction, and sales might be lost (Dadić et al., 2020). On the other hand, a level of stock that is too high can keep the costs too elevated and cause a slow turnover of goods, hence, lower profits. Stocks need to be maintained at an estimated level, as "insufficient or excessive reserves bring undesirable financial consequences" (Sadykova et al., 2020, p.484)

Slack et al. (2022) also agree that inventories are pricey and sometimes obstruct important amounts of capital. Stored items represent a risk because they could depreciate, outdate, or go missing, and quite importantly, they utilise space within the premises. Nonetheless, they ensure that if customers require them, products are available. This is truly a dilemma for businesses in inventory management.

If a comparison is made between manufacturing and hospitality companies, the latter, in essence, will have faster service production and will manage stock in smaller quantities (Dadić et al., 2020) to avoid products expiring as well as to keep inventory costs low. Furthermore, order frequency is a vital variable to consider (Greene, 2021), bearing in mind that it may be functional to keep a smooth and uniform movement of resources (Slack et al., 2022). “In fact, inventories provide many advantages for both operations and their customers” (Slack et al., 2022, p.445)

Surprisingly, according to Dadić et al. (2020, p.89), even in an era where technologies are available as never before, there are still many businesses that do not use a system that rings a bell when inventory levels are critical. Inventory control is highly representative of a company’s organisation and management's preparedness to respond to customers’ demands. The hospitality sector should be aware of the minimum and maximum stock levels.

2.2.2. Benefits of Inventory Management

There are many benefits of keeping inventory management (Slack et al., 2022, pp.445-48). Some are:

- Inventory can act as a cushion against unpredicted vacillations in supply and demand.
- Physical inventory can respond to inflexibility from customers.
- Allows operations to take advantage of short-term opportunities
- Medium-term volume administration may use inventory to cope with demand capacity
- Sometimes, the products in inventory can rise in value
- Databases are a relatively economical means of stowing information

- Databases of information speed the process

2.3. Theme 2: Inventory Technologies for Restaurants.

2.3.1. What challenges and opportunities do Inventory software systems offer restaurants in stock control management? Which are the most popular ones used in Ireland?

As of today's globalisation, and rapid application of digitalisation through information technology systems and Artificial Intelligence, inventory software systems may be essential for a better functioning and control of stocks. These systems, however, may represent opportunities and threats in the restaurant businesses. Overall, "digitalisation and the use of digital technologies is the most effective way of development for restaurant businesses" (Wang & Krasnonosova, 2023, p.121).

Modern digitalisation can promote more sustainable operations; for instance, internal processes are becoming a reality in many sectors, and so it is in restaurants, although more slowly (Wang & Krasnonosova, 2023). It has also been discussed that "the development of information technology has become a necessity for every company" (Sarafi et al., 2021, p.154), being one the optimisation of the planning in inventory.

Businesses, in general, have to respond rapidly to fluctuations in the markets, especially those unexpected, to stay competitive. Applications of Information Technologies support companies to cope with the demand (Nguyen, 2023). For restaurants, being served by inventory management software is an insightful assistance , ensuring all they need is at hand (Fabregas, 2024). Following this argument, it has long before been claimed (England, 2012)

that the use of software for inventory control in the hospitality sector is a central part of a wide range of processes such as purchasing, electronic point of sale, invoicing, et cetera. Subsequently, different methods and systems are used for inventories, which must be adapted to offer a convenient use to the companies and staff (Wang & Krasnonosova, 2023), which means that each organisation must be able to assess and adapt if choosing a particular software.

On a different aspect of inventory systems, one model used to optimise raw materials order is the Continuous Review Model Method. The use of this method will keep the rightful order size and reorder level value, according to Sarafi, et al. (2021). One weakness of this model, nevertheless, is that materials need to be manually reviewed.

More recently, Information systems have been influenced by the development and improvement of Artificial Intelligence (AI), which has contributed to many areas of industries. Forecasting is one weighty contribution of AI (Nguyen, 2023). While consumers' demands fluctuate at a rapid pace, the task of forecasting future demands is becoming tougher. However, "Thanks to AI, businesses can accurately predict customer behaviour" (Nguyen, 2023, p.424). However, more research should be conducted to have a deeper understanding of its applicability.

2.3.2. Opportunities of digitalisation

The benefits that enterprises can obtain from digitalisation, (Wang & Krasnonosova, 2023, p.124) are:

- Reduction of costs
- Rationalisation of operations

- Decrease in decision-making time
- Optimised management of capital
- Error reduction
- Application of digitalisation in operational tasks.

Fabregas (2024) also uncovers that a properly well-carried inventory management tool will help check everything in real-time, so management and members of staff can know exactly the quantities of the items available and how many are needed to reorder.

2.3.3. Challenges of digitalisation

In the existing and available literature review, little has been researched on information systems for Inventory Management. However, one significant challenge to consider, raised by England (2012), is that no operation should fully rely on software, but operators should learn to understand and interpret the software to fully take advantage of it.

2.3.4. Popular Restaurant Inventory Management Systems

According to Fabregas (2024), the following are the best Restaurant Inventory Management Systems of 2024:

- **Revel Systems**: Best overall
- **Craftable**: Best for large bar and restaurant groups
- **xtraCHEF by Toast**: Best for user-friendly interface
- **LightSpeed**: Best for POS with automated ordering
- **Restaurant365**: Best for operations with a large workforce
- **MarketMan**: Best for adding advanced inventory to a POS

- **TouchBistro:** Best value POS with ingredient tracking
- **CrunchTime:** Best for franchises and multiunit operations
- **Orca**: Best for sales-based cost forecasting
- **Square for Restaurants**: Best for small cafes and food trucks

2.4. Theme 3: Supply chain for the beverage industry in restaurants.

2.4.1. How are the mechanisms of procurement, supply chain and stock control managed in the beverage industry in Ireland?

Supply Chain Management (SCM) is another operational task closely related to Inventory Management because the efficiency of this area will determine an organisation's success or failure in meeting customers' demands. i.e., “managing supply networks is a particularly vital activity” (Slack et al., 2022, p.406).

SCM can be defined as the administration of associations and movements between the actors who control operations, and the processes involved that aim to add value, such as services or products, to the consumer. (Slack et al., 2022, p.409)

One of the most dynamic and essential industries in any economy is the food industry, as it is related to the satisfaction of a survival need (Garcia-Buitrago et al., 2024). When these food-related businesses are small organisations, they need to have access to “real-time and updated information” (Garcia-Buitrago et al., 2024, p.2). In other words, SCM is as concerned with administrating information flawlessly as administrating the movement of products and services (Slack et al., 2022), and for restaurants, picking the right supply channel is directly related to getting an extensive series of products of the perfect quality at the right time

(Rasulov, 2024). That is why aliments and beverages Supply Chain Management has converted into a significant gear in the operations strategies worldwide (Olan et al., 2022). This expansion, consequently, has formed challenges in synchronising varied procedures in supply management.

2.4.2. Digitalisation of Supply Management

Supply Management has been growing with the support of digital transformation, not only turning information into digitalised data but also a change in the way employees think and relate to these new technologies (Garcia-Buitrago et al., 2024). Overall, new technological applications have been developed to optimise the connection with suppliers, and as claimed by Slack et al., (2022), not only is SCM concerned with supplying activities, but also with making important decisions. Consequently, not only are consumers' demands englobed, but also the understanding of the shift in today's customers trends (Swink et al., 2022).

Garcia-Buitrago (2024) suggests that in this digitalisation of supply management, ease of use is a factor of users' perception of quality, assessment and feedback of the tools.

Moreover, technologies per se and the competitive market are demanding supply chain departments in the hospitality sector to improve their analytics capabilities (Swink et al., 2022). The widely known Points-of-sale (POS) are, for instance, giving huge amounts of data on consumer behaviour (Swink et al., 2022). Thus, the supply chain area can benefit from technological advancements, and it can be especially embraced by "implementing innovative technologies like AI in supply networks" (Olan et al., 2022, p.4420).

Olan et al. (2022) suggest that AI technologies can drive contributions of supply chain networks providing a sustainable financing flow for the food and drink supply chain.

2.4.3. Supplier selection

Some aspects to consider at the time of selecting the right supplier can be “trends of outsourcing, supply base rationalisation, supplier involvement in new product/service development, and longer-term supplier relationships” (Slack et al., 2022, p.417).

One new trend discovered in the literature has to do with Direct Supply, which shows important advantages for Hospitality businesses, some of which are improved brand loyalty, higher profit, and direct access to high-quality products. (Rasulov, 2024). This method comes as a solution to the old reliance on intermediaries.

2.5. Theme 4: Business planning

2.5.1. How can business planning be enhanced by the use of IT in the inventory management of beverages? What are the benefits and disadvantages?

It is also essential for hospitality organisations to analyse their present position and forecasts of crucial elements to make the right decisions and to follow new approaches and operations to perform successfully (Dadić et al., 2020). With IT, planning can be enhanced if appropriately applied, bringing benefits and disadvantages to inventory management. Whilst the focus of this research is to uncover the specific area of inventory management of beverages in restaurants, general ideas and concepts of business planning are to be extrapolated to explain and understand what the challenges and opportunities for inventory management of beverages are.

From a general point of view, business planning helps put information together to make the right decisions and to inform the involved departments as to when, where and by whom the tasks should happen (Slack et al., 2022).

In the use of software for planning, Enterprise Resource Planning (ERP) is a concept that comes up as a general tool used by companies to manage daily business tasks. This has an impact on calculating the right amount of safety stocks, which is useful for forecasting future demands (Tonetti, 2019), opposite to old manual systems based only on historical statistics and standard deviations. As of today, it can be said that "Restaurants have been transformed by the wave of technological applications produced by information technology" (Dio et al., 2022, p.167) this means that the more prepared restaurants are, the better they can adapt and improve their positioning in the market.

2.5.2. Benefits

There is generally "a positive connection between investment in IT and increased operations effectiveness" (Slack et al., 2022, p.492), even if the benefits are not clear at the beginning.

ERPs are systems that help integrate all the information from different departments and functions (Slack et al., 2022), which helps plan and control. This way, it is easier to coordinate inventory with orders based on sales and forecasts. The use of software assists better in estimating future demands and, consequently, the right orders to have an efficient stock level

The integration of departments such as sales, operations planning and demand management through informatics systems boosts the performance of forecasting, measuring and reporting. (Tonetti, 2019)

2.5.3. Challenges

According to Slack, et al. (2022, p.480), one of the most significant difficulties in planning and controlling is administering the huge volumes of data generated. Another issue noted by Slack, et al. (2022, p.489) is the integration of an ERP system that is not compatible with the current system.

Due to managerial, implementation or organisational factors, there is a high failure rate for IT projects, which varies between 35 and 75 per cent. There is a lack of integration and alignment between the strategies of the organisation and the ones related to IT. (Slack et al., 2022).

The investment in the software per se may be considerable, and so its execution (Slack et al., 2022). Also, it may need a significant change process to coordinate the already established processes.

Regardless of the functionality of an integrated planning software where an organisation can consider, for example, variability of demand, this cannot control issues related to suppliers, such as “changing lead times or unexpected shortages” (Tonetti, 2019, p.32).

2.6. Theme 5: Use of IT for data analysis and automation

2.6.1. How are IT-driven automation and data analysis systems applicable to the area of beverages within restaurants?

As in many other industries, Information Systems are taking over restaurant management. Some programmes have been proposed to help not only in the planning and controlling of restaurants but also in the automation to reorder based on an updated level of stocks.

According to Mulay, et al. (2021), and taking into account how technologies are part of everyone's lives, managers may prefer to monitor the daily data by using their smartphones rather than manually. Hence, technology is there to help managers. From another point of view, technological advances are key to assisting in the service when human resources are overwhelmed during specific peak activities (Fritz Wijaya & Rakhmawati, 2019). One step ahead, other technological advancements such as AI-powered stockpile management would also help diminish over-ordering. "These algorithms can monitor inventories, make purchases, and optimise replenishment. Some systems include demand forecasting and predictive analytics to improve inventory management" (Sabah Salih et al., 2023, p.238).

One example of automation is proposed by Mulay, et al. (2021, p.14), an IoT-based Grocery Monitoring System that elaborates an automatic order based on the stock level. It envisions the future of automation in hospitality. Therefore, advantages like better planning and data-driven decision-making are expected to be obtained, as well as having managers' responsibilities simplified.

Another proposed intervention (Fritz Wijaya & Rakhmawati, 2019) shows the creation of an information system based on the System Development Life Cycle (SDLC) that can assist a restaurant in having control of stock and orders. It consists of an interface to add and retrieve information to keep control of the storage and reorder levels. (Fritz Wijaya & Rakhmawati, 2019, p.23).

These systems are not something novel, even though just in the last few years they have been proposed more openly. “A flexible, Windows-based system, FGS incorporates statistical process control (SPC) techniques to help users manage their inventory and forecast product demand” (Allnoch, 1997, p.50) is how the issue of out-of-stock problems was solved in a fast-food restaurant chain.

Considering that Inventory Management is a key feature in corporate performance regardless of the size or industry, in a different sector (Sabah Salih et al., 2023), an analysis of the experience of Alfa Company, which “is a medium-sized Iraqi distributor of laboratory equipment and supplies” (Sabah Salih et al., 2023, p.238) implementing an automated inventory system has also been identified.

Based on Sabah Salih, et al., (2023) case, it was concluded that small and medium-sized enterprises using an inventory management system with automated characteristics had better control of it, as well as cheaper costs of holding inventory. Thus, better revenues. Some benefits and challenges have been identified in this AI-driven Inventory Management system. (Sabah Salih et al., 2023, pp.239-40)

2.6.2. Benefits

- Real-time stock tracking

- Alfa Company reduced capital and holding expenses by optimising inventory levels.
- The AI system's data analytics and forecasting allowed them to refill inventories to match client demand.

2.6.3. Challenges

- Implementation needed to deal with AI system technicalities.
- Training personnel on a new system was necessary.

Overall, automation is applicable for stock control of beverages in restaurants, as long as the information and the systems are integrated. However, it is necessary to verify that the current systems offered in Ireland comply with these features of automation, as none has been found yet. Last, Artificial Intelligence is a novel disruptive tool that can be utilised in the processes of data analysis and automation.

2.7. Theme 6: Competitive Advantage of Inventory IT Systems

2.7.1. How can IT tools help increase restaurants' Competitive Advantage concerning Inventory Management Control of beverages?

Every business in every industry expects to be competitive, restaurants are no different. According to the last projections, the global market size for Restaurant Management Software will grow by USD 4.50 million between 2023 and 2027 (PR Newswire, 2024), which envelops a huge opportunity.

To be competitive is as broad as making the right decisions to improve the quality of service and keeping costs optimised to maintain profitability (Sadykova et al., 2020). Moreover,

empirical research demonstrates that digital technologies in the management of customer experience generate positive feedback and higher customer return, using automated inventory management in line with digital organisational management. Thus, “the use of digital technologies will provide additional competitive advantages for the company” (Sadykova et al., 2020, p.483)

Digital communication tools such as booking systems and website dynamics are useful to obtain data. Nevertheless, there might not be enough sources of information (Sadykova et al., 2020). Thus, fully deployed and integrated software would offer better opportunities to enhance a restaurant’s competitive advantage.

The use of different technologies has already improved customer service levels throughout history (Allnoch, 1997), and that is how, during the 90s, it was already possible to see improvements in “stock outs” with the assistance of technology. Nowadays, “technological advancements such as AI and IoT are significantly influencing the landscape” (PR Newswire, 2024). Artificial Intelligence projecting analytics for stock control and consumer predilections, foster efficient operations and individualised service. Devices driven by IoT transmit real-time data that is collected and monitored straightaway, refining decisions and diminishing costs. These innovative tools are the pillar of the latest digital systems and help position the organisations as leaders of the industry.

2.8. Conclusions

First of all, technologies for inventories are still in a continuing development in different industries, some of which are not related to restaurants, but the processes and main focus can be extrapolated to this business. An increasing number of firms are incorporating

technologies into their inventory management. However, to fully leverage the potential of IT, there is still substantial progress to be made.

In response to the research questions, it can be said that:

- There are different and varied systems to control inventories in restaurants. In general, for a business to have an Inventory Management system is purely beneficial, as it contributes to fulfilling overall demand capacity, market fluctuations, and cost control, among others.
- The use of an IT-based Inventory system poses opportunities for restaurants, such as reduction of costs and errors, decrease in decision-making processes, and others. Opposingly, the challenges that can be created with a digitalisation process are mainly related to dependency on technology and the training to understand how to take advantage to their utmost.
- The processes involved in procurement are varied for beverages in Ireland, but there is an increasing process of digitalisation that might help businesses coordinate better with suppliers and oversee their SCM.
- ERP is a method to integrate different areas of businesses using technology and can enhance Business Planning by overviewing all tasks interrelatedly. This is beneficial to better coordination between departments, increasing the effectiveness of planning and forecasting. The biggest issue is the lack of integration among varied software and coordination.
- Today's market offers different systems that can help managers control multiple areas. Although not directly created for restaurants, the systems enhance coordination and data analysis. This helps companies to better track and reduce

expenses, as well as to replenish inventories timely and accurate. Negative impacts are related to a lack of training, adaptation and change.

- Competitive Advantage can be boosted by the use of IT tools, as it enhances the overall functionality of a business, from managerial aspects to consumer satisfaction. The use of IT fosters competitive advantage by integrating and analysing data from different departments to forecast, procure and stock.

3. Chapter 3: Methodology

3.1. Theoretical Philosophy

This research is based on the Interpretivism philosophy with a mixed method to gather information. Its philosophy has a subjectivist approach (Saunders et al., 2016, p.140) and it was created to emphasise that humans are different and, hence, create varied meanings. Consequently, subjects cannot be studied in the same way in the sciences such as physics and the social sciences. It is for the latter, necessary to study people with varied cultures, at different times and on diverse circumstances, because they will express different meanings and diverse insights to research. Therefore, the aim is to create a new understanding and interpretation of the distinct actors participating in this study.

The ontology of the study is meant to be rich, socially built through language, with multiple meanings and realities based on different experiences. (Saunders et al., 2016, p.136).

3.2. Method justification

Firstly, the method used to conduct primary research is mixed, combining positive features of the quantitative and the qualitative methods.

From the point of view of qualitative research, the instrument used is the semi-structured interview (or non-standardised) (Saunders et al., 2016, p.391), because the interview is divided into six topics with their respective questions; however, there is the chance to omit some questions as well as ask other questions not previously planned, depending on the direction and nature of the conversation. Also, some questions may be asked of some but not of others.

Quantitatively, the instrument used is a questionnaire, which is a standardised set of closed-ended questions to be answered by all employees who work directly or indirectly in the process of inventory control or management. This instrument is meant to be useful in the data collection for descriptive and explanatory research (Saunders et al., 2016, p.439).

3.3. Outline of sampling technique and sample size

To fulfil the qualitative and quantitative aspects of this mixed research, the samples used as follows:

3.3.1. Qualitative sample

In the following table, the four interviewees:

Code	Position	Setting	Experience
A01	Managing Director	Office, Dublin	+25 years owner
A02	General Manager	Speakeasy, Dublin	+25 years bartender, 8 years in the position
A03	Office Manager Assistant	Office, Dublin	3 years of administrative position. Waitress experience
A04	Bartender	Restaurant, Dublin	3 years bartender

Table 1 Qualitative stakeholders

All four stakeholders work for the same enterprise, which is a three-floor business with one venue on each floor, plus one office, where administrative employees synchronise purchases for all the venues.

3.3.2. Quantitative sample

To respond to the quantitative sample, a questionnaire was given to all employees with some degree of participation and responsibility for inventory management of beverages, and access to the software or App.

Code	Venue	N of participants out of total	Participation (%)
B01	Restaurant	7 out of 7	100%
B02	Speakeasy 1	3 out of 4	75%
B03	Speakeasy 2	4 out of 4	100%
B04	Office	3 out of 4	75%
C01	**Total**	**17 out of 19**	**85%**

Table 2 Quantitative stakeholders

3.4. Data analysis method

After the data has been collected qualitatively and quantitatively, it needs to be cross-referenced and compared to the literature review to identify patterns and foster interpretations to answer the general and sub-research questions. This is necessary to classify, code, and triangulate the data to further understand the findings.

Themes	Keywords in the interview
1: Inventory Control Management in Restaurants.	**A01:** Marketman, in conjunction with Square, POS system. I do eventually see (improvements) where teams and our staff are being a bit more diligent.
	A02: I'd take any information, whereas **A01** prefers to use Excel spreadsheets and readouts. Whereas I look at a storeroom, I know all I need to order.
	A03: Marketman. We are human, so we have mistakes.
	A04: Inventory control Marketman. Not sure about how Square is related. I wouldn't know because I don't have access to see what we don't have.

Table 3 Data Analysis Sample

3.5. Ethical Section

Ethics is an important variable in this research. The qualitative approach in this study involves the researcher, who has to dive into the data to interpret, make conclusions, and create meaning. Considering this, there might be implications of subjectivity, and hence, the investigator should reflect on oneself within the project.

To avoid the call of bias in this research, I must be reflexive in my participation and my role in interpreting the data collected. Consequently, it is important to mention that my role in this study has merely been to interpret the experiences and opinions, as well as to act rigorously in the following aspects:

All participants have been anonymised. Also, an ethical form has been submitted before conducting the primary research.

Informed consents have been explicitly added to the questionnaire, and personalised ones have been sent out to all and each of the interviewees.

Transcriptions have been sent to all interviewees.

The questionnaire was pilot tested before being sent out, after having been previously checked by my tutor teacher. Interview questions were also checked before applying them.

To avoid bias, I have followed triangulation to analyse primary and secondary collected data to answer each of the research questions.

4. Chapter 4: Findings and Discussion

In this chapter, the reader will be able to observe a triangulation of the data collected in the primary and secondary research per theme, with a description and reflection on the findings. The primary research contemplates what has been uncovered in the interviews (**A01, A02, A03, A04)** and the questionnaires (**B01, B02, B03, B04, C01)**. The secondary research has been discussed in Chapter 2.

4.1. Theme 1: Inventory Control Management in Restaurants

4.1.1. Primary Research

Some of the most relevant quotes given by the interviewees were:

A01: "The main challenge is managing and understanding the stock and ensuring that uh, all teams do what's responsibility of them"

A02: "I'm visual. I look at something, I'd take any information, whereas **A01** prefers to use Excel spreadsheets and readouts."

A03: “Marketman.” “We are human, so we make mistakes.”

A04: “Inventory control, Marketman. Not sure about how Square is related.”

The four interviewees use Marketman for inventory control of beverages. **A01** and **A04** also recognise the POS system Square as part of the inventory control, although they are not fully integrated and give insights separately. The main challenges with the technologies are human-related, either responsibilities (**A01**), department coordination (**A02**), mistakes (**A03**) or lack of access to information (**A04**).

C01: 100% of the respondents from the 4 departments claim to use Marketman as the main software for inventory control of beverages. (Question 1)

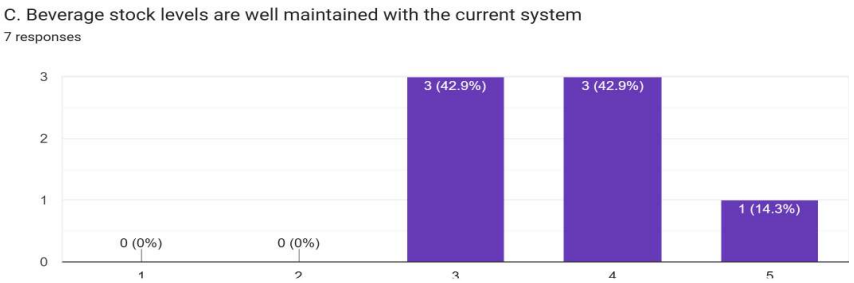


Figure 2 (Q3c) B01

Concerning the different actors involved in stock control, there are a few differences in how they think the stock levels are maintained (Question 3c), where **B01** (Fig. 1) mostly agree that the current system helps keep stock levels well maintained (average 3.71). **B02** respondents

(Fig. 3) have a more neutral point of view (average 3.33). **B03** respondents (Fig. 4) have a more

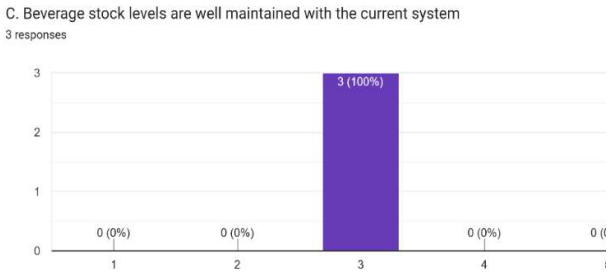


Figure 2 (Q3c) B04

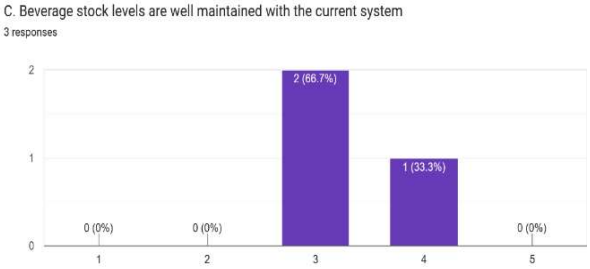


Figure 3 (Q3c) B02

diversified opinion, averaging 3.25. Finally, **B04** respondents (Fig. 2) agree on a neutral answer, indicating an average of 3. The overall opinion of staff using this technology (**C01**) on whether or not stock levels are well maintained is neutral, with an average of 3.32.

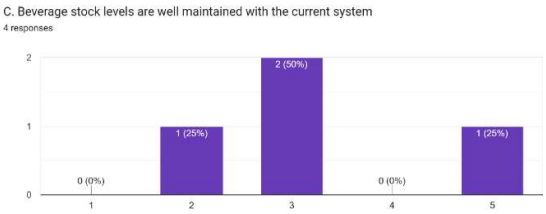


Figure 4 (Q3c) B03

In terms of waste reduction (Question 3a), the average response (**C01**) among the four departments was 3.61 out of 5, which means that, on average, the staff has a neutral point of view, close to agreeing that the use of this technology helps to reduce waste.

Regarding how frequently the actors update their records (Question 2 – Fig. 5), across all 4 departments (**C01**), it is possible to see that everyone, in different

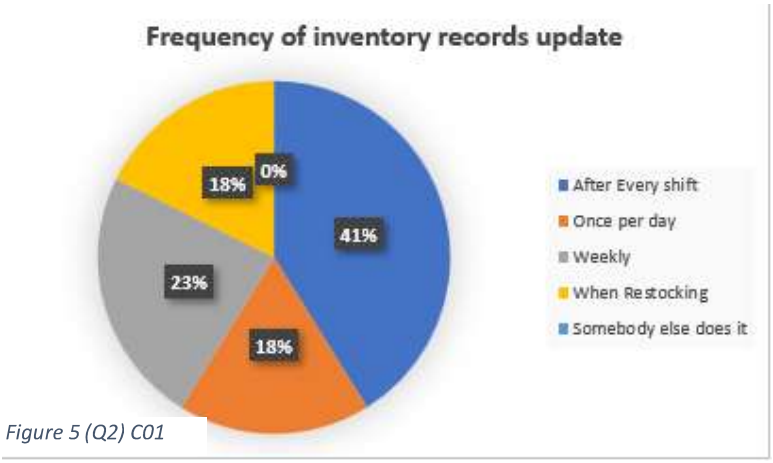


Figure 5 (Q2) C01

frequencies, updates the records of inventories, making it after every shift the most common strategy.

Finally, concerning the ease of accessing inventory data when needed (Question 3b), the average response among the four departments (**C01**) is 3.75 out of 5, which also illustrates a neutral opinion with a tendency to agree.

4.1.2. Secondary Research

The literature introduces in this theme the definition of inventory, concerning "the accumulation of materials, customers or information" (Slack et al., 2022, p.443) going through processes in the business. This concept is assumed to be understood by interviewees and respondents.

Previous research on restaurant inventories has tried to uncover whether bars and restaurants understand how important stock control is (Dadić et al., 2020). According to the administrative interviewees (**A01, A02**), there are differences in how they organise the inventories and the orders.

Stocks need to be maintained at an estimated level, as "insufficient or excessive reserves bring undesirable financial consequences" (Sadykova et al., 2020, p.484). Although the average insight in the questionnaire respondents regarding their view on how well stocks are maintained is neutral, 31.6% (6 out of 19) agreed at some level with the statement, in contrast to 10.5% (2 out of 19) that disagreed.

4.1.3. Discussion

Based on the primary and secondary research, it is possible to answer the research question for this theme: "What are the existing systems and mechanisms of Inventory Control

Management used in restaurants for their beverages? What are the benefits and disadvantages of these systems?"

Regarding this specific restaurant, the main system and mechanism of Inventory Control Management is Marketman, which is described as robust and easy to access from different devices, such as a smartphone or a laptop.

Everyone working in any of the stages of inventory control is aware of at least some of the aspects of inventory, acting together as different pieces of a whole system.

The benefits of this technological system are:

- Easy to access from different devices
- Easy-to-update information
- Assistance to keep stocks at a desired level, although it still needs improvement.
- The possibility to compare against the POS System, although it needs further planning and application for advancement.

Some of the challenges described by the users are:

- Human errors are the biggest issue, either by indifference or by lack of information.
- Difficulty in coordinating among the four different departments.
- Differences in approaches between the General Manager and Managing Director.
- Lack of access to information, depending on permission on the app.

Overall, the system available is still in a process of application and improvement, with benefits and challenges. Staff of all four departments can coordinate better and more effectively manage the stock control.

4.2. Theme 2: Inventory Technologies for Restaurants.

4.2.1. Primary Research

The four interviewees have different points of view regarding the use of the current technology for stock control, as they all have different tasks in the process. The most important comments from them are displayed next.

A01

“The hardest thing to manage (…) is recipes. You can mess with the recipe, but you allow for that”

A02

“Procurements (…) is handy, you can do everything off your phone, like just look around”

“Recipe and cookbook are a great little application “

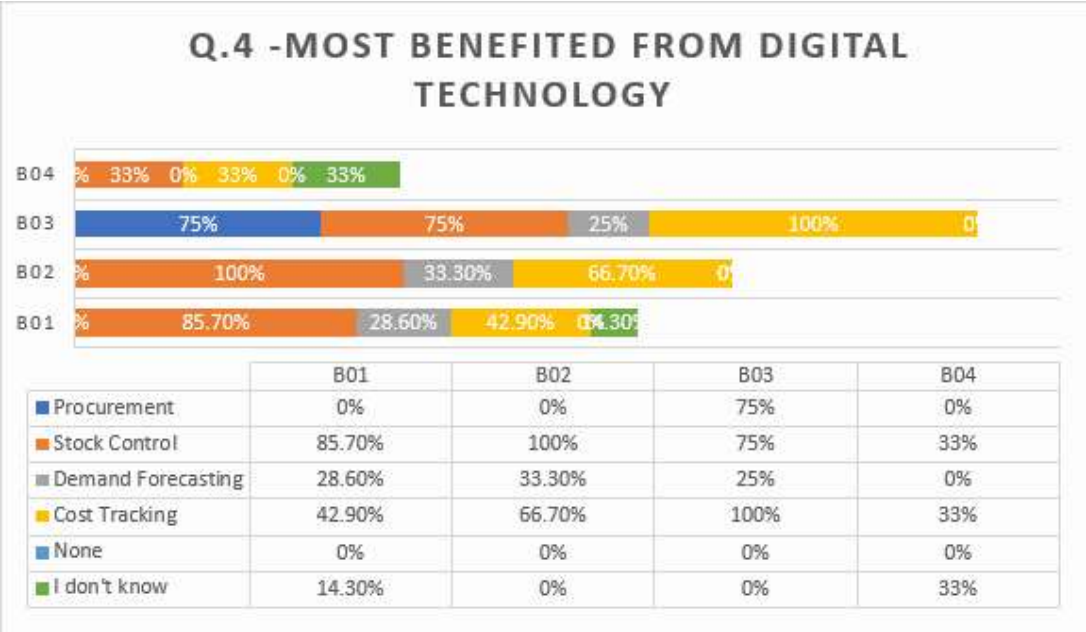
A03

“We are working on merging Square with Marketman, so it is not something that we have to update all the time manually”

A04

“Sometimes this system doesn't work properly, but it's an easy system to manage.”

Concerning the answers obtained in the questionnaires, it is possible to observe that the opinions are varied regarding which areas are most benefited from the digital technology (Fig. 6 – **B01, B02, B03, B04)**, depending on the department the employees work. However, Stock



	B01	B02	B03	B04
Procurement	0%	0%	75%	0%
Stock Control	85.70%	100%	75%	33%
Demand Forecasting	28.60%	33.30%	25%	0%
Cost Tracking	42.90%	66.70%	100%	33%
None	0%	0%	0%	0%
I don't know	14.30%	0%	0%	33%

Figure 6 Q4 (B01, B02, B03, B04)

Control and Cost Tracking are the most voted amongst participants.

To the challenges that employees face while using the inventory technology (Fig. 7), the biggest issue was related to the time consumption using the app, and system errors.

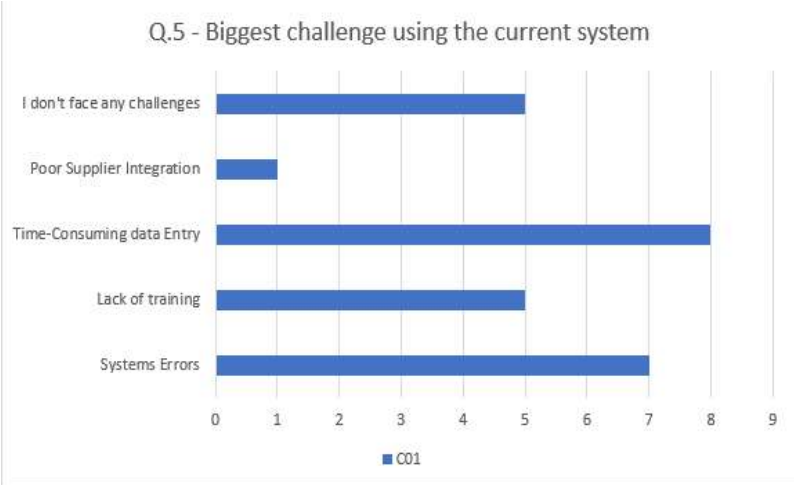


Figure 7 Q.5 (C01)

Overall, the opinions on benefits and challenges are varied, probably because the answers come from the whole scope of staff, working on the four

different departments, which means that each area faces different difficulties and, at the same time, experiences different benefits.

4.2.2. Secondary Research

The review of literature indicates that effective inventory management systems may represent opportunities and threats in the restaurant businesses, especially those oriented to beverage control. All four interviewees agree on how digital technologies can effectively assist with stock control management. However, there are some different aspects to consider to better take advantage of the system.

It has been claimed (England, 2012) the use of software for inventory control in the hospitality sector is a central part of a wide range of processes. It has been observed, as well as claimed by **A02, A03** and **A04**, however, that all these processes have not yet been integrated and are currently working in silos, which demand extra time to integrate.

The benefits observed in the literature are similar to a certain degree to the ones mentioned by the staff, for instance, (Wang & Krasnonosova, 2023, p.124):

- Reduction of costs
- Rationalisation of operations
- Decrease in decision-making time
- Optimised management of capital
- Error reduction
- Application of digitalisation in operational tasks.

However, Fabregas (2024) also uncovers that a properly well-carried inventory management tool will help check everything in real-time. This is what the primary research has uncovered as a challenge, as not everyone has access to the information.

Other challenges mentioned are (England, 2012) that no operation should fully rely on software, but operators should learn to understand and interpret the software. This has been brought up for discussion since the point of view of human errors in the interview with **A03**, and also according to the answers in Q5 (Fig. 7), where there is a noticeable concern regarding system errors. (**C01**)

4.2.3. Discussion

Aiming to answer the research questions of this theme, "What challenges and opportunities do Inventory software systems offer restaurants in stock control management? Which are the most popular ones used in Ireland?". First, it is necessary to say that the challenges and opportunities seen and brought up by the participants of the primary research are varied, in which some situations are more challenging or beneficial to some in front of others.

Consequently, the overall challenges found are:

- Human control of waste and fluctuations from recipe (**A01**)
- Lack of educational training from the system (**A01, C01**)
- Lack of self-education from staff. (**A01**)
- Lack of integration among systems (**A02, A03, A04**)
- Lack of permission access to real-time information (**A04**)
- Unnecessary layout updates that delay operability (**A02**)
- System errors (**A04**)

- Time consumption to add data (**C01**)

On the other hand, the benefits described are:

- Control of detailed recipe and its components (**A01, A02**)
- Overall ease of use (**A01, A02, A03, A04**)
- Smartphone access (**A02**)
- Possibility to merge with the POS system (in plan to be applied) (**A01, A03, A04**)
- Stock control (**C01**)
- Cost control (**C01**)

This company specifically uses one software for Inventory Control Management, which is Marketman, and is planning to integrate it with the POS system, which is Square. Both are mentioned in Fabrega's (2024) list of Popular Restaurant Inventory Management Systems.

4.3. Theme 3: Supply chain for the beverage industry in restaurants.

4.3.1. Primary Research

The most relevant opinions and points of view regarding Supply Chain and the use of Marketman

A01

"Suppliers in general are quite protective (…), it's in their interest too, to be integrated with our systems"

A02

"It happens regularly (delays), (…) you'd have the current information of what they have"

A03

"Everything by email to order directly with them (suppliers), we do it in the app, and the app sends the email to them to get the order."

A04

"There's a person behind who does like the report. See what you need to buy and then contact the supplier. It's not like something automatic."

The first insight from the questionnaire is a comparison of pie charts (Fig. 8) among the four departments to understand the different issues each one experiences when managing beverage supply. Overall, it is possible to say that in **B01** and **B03** departments, there are users who do not recognise any issue, while the most highly repeated is an inconsistency in stock

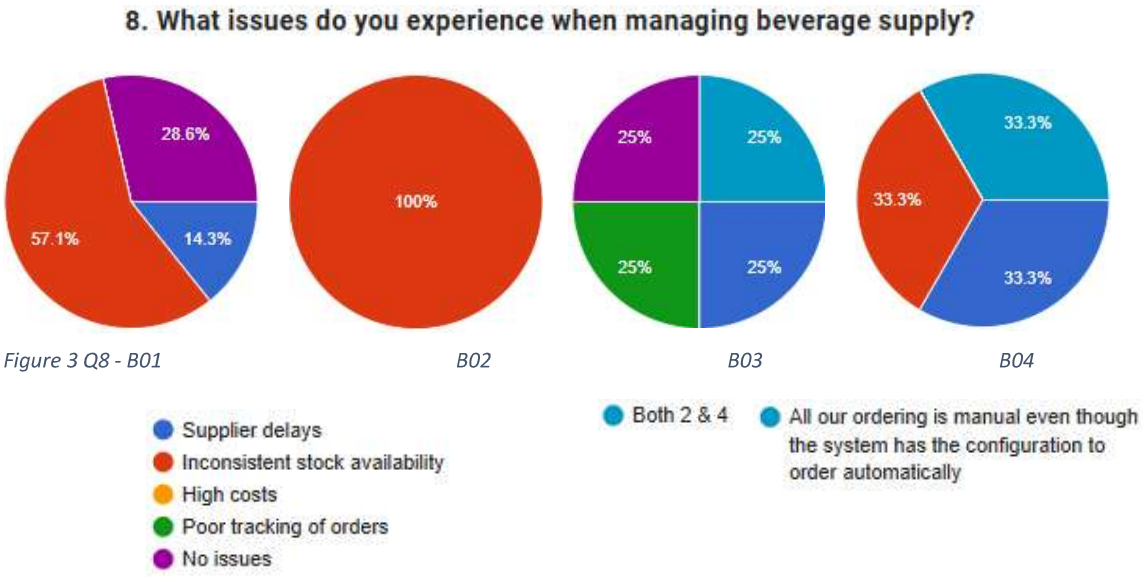


Figure 3 Q8 - B01 *B02* *B03* *B04*

availability, followed by Supplier delays. Moreover, one reply specifies the manual work even though the system has the configuration to order automatically (**B04**)

Figure 9 collects the average answers (**C01**) to the enunciates on question 9a: The current system allows for efficient supplier coordination (top); 9b: Supply chain disruptions frequently impact beverage availability (right); and 9c: The restaurant effectively tracks supplier performance (left). In the three cases, the average tends to show a neutral answer, indicating that the users, on average, have neither a positive nor a negative opinion of the current software in use in Supply Chain Management.

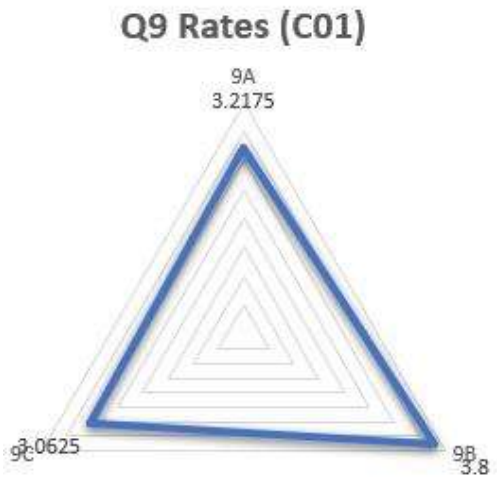


Figure 4 Q9 (C01)

Overall, users acknowledge the capabilities and limitations of the system, some of which vary depending on the function and position, and experience of each employee. Also, there is an issue regarding the business decisions made by the suppliers, which directly affect the company planning and procurement, as it is each supplier not willing to share their inventories with the system (Marketman), meaning at some moments, a delay in the order, track and reception of goods needed.

4.3.2. Secondary Research

Efficiency in SCM will determine an organisation's success or failure in meeting customers' demands. i.e., “managing supply networks is a particularly vital activity” (Slack et al., 2022, p.406). **A01, A02, A03** and **A04** have mentioned the platform is efficient, yet suppliers are reluctant to share their stock information on it, which may result in inefficiency to receive orders. For restaurants, picking the right supply channel is directly related to getting an extensive series of products of the perfect quality at the right time (Rasulov, 2024).

4.3.2.1. Digitalisation of Supply Management

Garcia-Buitrago (2024) suggests that in the digitalisation of supply management, ease of use is a factor of users' perception of quality, assessment, and feedback of the tools, from the point of view of a small restaurant. This is a point that looks controversial in the reality, as the system is easy to use, but the integration of them with suppliers, is not (**A01, A02, A03** and **A04**). That reflects the opinion of staff, who do not have either a positive nor negative vision of the supplier's performance and the business relation with them (Fig. 11, Q9. **C01**).

Moreover, technologies per se and the competitive market are demanding supply chain departments in the hospitality sector to improve their analytics capabilities (Swink et al., 2022). The widely known Points-of-sale (POS) are, for instance, giving huge amounts of data on consumer behaviour (Swink et al., 2022). This fact raises the necessity and benefits of working with integrated information systems that assist restaurants' operational activities, which is what **A01** mentions, making a comparison on how suppliers and Marketman work in other countries.

4.3.3. Discussion

How are the mechanisms of procurement, supply chain and stock control managed in the beverage industry in Ireland?

Taking into consideration the specific circumstances of the restaurant, which comprises three venues organised into four distinct departments, one of which oversees procurement for all three venues, it is acknowledged that, despite the ongoing yet sophisticated process of digitalisation in procurement and inventory management, there exist certain processes that require further enhancement and assessment.

The relationship with suppliers has been longstanding and stable. However, the new system necessitates modernisation that has not yet been fully realised, despite the availability of technological resources. The restaurant and its suppliers utilise a shared platform, known as Marketman, which serves as the channel for restaurants to obtain supplies. Nevertheless, according to the assessment conducted by the restaurant's administrative personnel, the suppliers have opted not to update their stock levels within the system, preventing buyers from having access to fully current information and, consequently, the ability to make informed purchasing decisions. This situation results in the restaurant occasionally ordering items that are unavailable, necessitating direct communication with suppliers to negotiate changes, cancellations, or delays in the delivery of goods.

According to **A02**, suppliers, on behalf of the common platform, have created their own platforms that are not coordinated with Marketman, which adds a larger number of platforms that operate separately and complicate and delay the procurement process. **A03** also claims that, ultimately, the process is usually managed through email threats, despite having a platform that should facilitate it.

Finally, it is observable that the personnel who do not work in the administrative process of procurement and supply chain (**C01**), do not have either a positive or negative overall perspective of the modern systems, because it has not represented a change to their daily tasks beyond keeping control of stock movements in the app.

On the whole, procurement, supply chain and stock control managed through the use of Information Technologies have the potential to enhance the Inventory Management of beverages in Irish restaurants. It is imperative, however, that the businesses involved opt for better and more open collaboration and communication.

4.4. Theme 4: Business planning

4.4.1. Primary Research

A01

“With Square, we're able to understand what we were doing last year, what we were selling last year, what we're selling this year, and sales trends”

A02

“If you're a small business, (…) you can see what's going on and what's happening around in front of you. If you're a small to medium, medium to large, large, extra-large-sized business, then obviously (…) there's no way that you can look at 6, 7 or 10 different”

A03

“I don't know exactly how to answer this”

A04

“You can control better where your money is going because sometimes it happens here that we have overstock”.

Concerning the quantitative data, it is imperative to say that the perception of the impact of

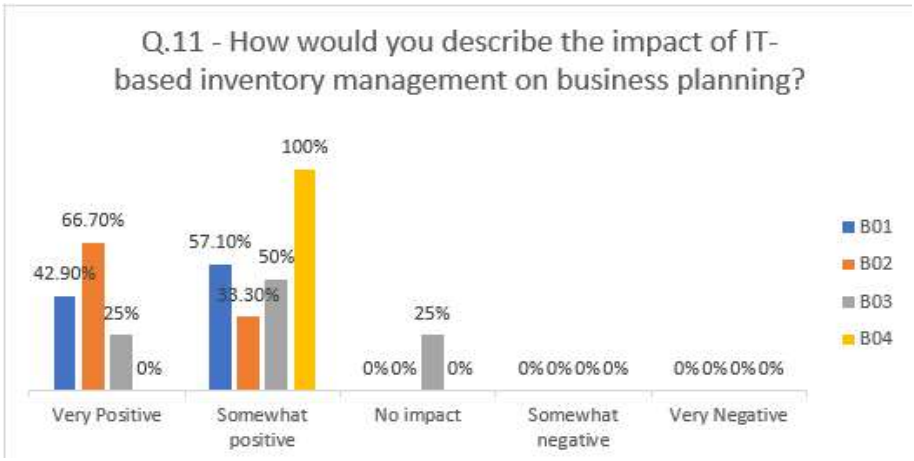


Figure 10 Q11 (B01 B02 B03 B04)

IT-based inventory management is widely positive on Business Planning across the four departments (Fig. 10).

Moreover, staff among the four departments have largely agreed with the enunciates of Q12



Figure 259 Q12 a, b, c.

Enunciates

12c: More training should be provided on how to use inventory systems effectively

12b: IT integration has improved the restaurant's financial performance.

12a: The inventory system helps in making better purchasing decisions

(Fig. 11), as, on average, their response to whether the inventory system is helping make better purchasing decisions was 4.07 out of 5 (Q12a), indicating a good perception of the system. Also, their perception of whether IT integration has improved the finances (Q12b), the average punctuation was 3.48. However, it was largely voted that more training should be provided to use the systems more effectively (Q12c)

To sum up the data collected, it is possible to say that on average, the perception among staff about the current system is positive, and that one way to improve it is through training. Business planning can be enhanced with the right alignments and proper coordination among departments.

4.4.2. Secondary Research

Regardless of the systems used for Inventory Management, businesses must follow structured planning to develop effectively in the market and to follow new approaches and operations to perform successfully (Dadić et al., 2020). **A01** clearly stated that thanks to the actual use of the IT-based system, it is possible to have access to more accurate information of every item, which helps to make predictions and follow trends for purchases, and so, business planning helps put information together to make the right decisions and to inform the involved departments what capacity is being required. (Slack et al., 2022).

As of today, it can be said that "Restaurants have been transformed by the wave of technological applications produced by information technology" (Dio et al., 2022, p.167). This means that Information Systems are a reality in the industry. However, according to **A02,** it is also important to understand the size of the business, as smaller businesses already have direct access to the data, whilst medium to larger enterprises may benefit from this. And in the case of this 3-venue business studied, the access to data generated by the technology is beneficial.

4.4.2.1. Benefits

There is generally "a positive connection between investment in IT and increased operations effectiveness" (Slack et al., 2022, p.492), even if the benefits are not clear at the beginning.

From the point of view of staff, the majority (**C01**) observe improvement for the business with the implementation of IT for inventory management (Figures 10 and 11)

The use of software assists in better estimating future demands and, consequently, the right orders to have an efficient stock level, which is what **A04** also suggests, referring to better control of costs, which also relates to the following statement.

4.4.2.2. Challenges

According to Slack, et al. (2022, p.480), one of the most significant difficulties in planning and controlling is administering the huge volumes of data generated.

Due to managerial, implementation or organisational factors, there is a high failure rate for IT projects; however, it is important to identify one possible issue: the lack of integration and alignment between the strategies of the organisation and the ones related to IT. (Slack et al., 2022). According to some of the staff (Figure 11, **C01**), more training is also important to operate better.

Regardless of the functionality of an integrated planning software where an organisation can consider, for example, variability of demand, this cannot control issues related to suppliers, such as “changing lead times or unexpected shortages” (Tonetti, 2019, p.32), which have been discussed in the previous theme.

4.4.3. Discussion

After understanding what the previous studies have discovered, and what the staff working in this particular business reflect, to respond to the question “How can business planning be

enhanced by the use of IT in the inventory management of beverages? What are the benefits and disadvantages?" it is possible to conclude that:

Business Planning can be enhanced with the use of IT because it helps to better monitor current and previous sales and trends. Consequently, businesses can prepare and plan ahead. With more accurate and more organised inputs, the enterprises are more agile in making informed and accurate purchases.

Also, by organising and planning better, there is a control of costs that translates into a more stable financial performance.

Benefits from this situation are:

- Increased effectiveness in operations
- Interdepartmental coordination and integration of stocks and purchases
- More efficient forecasting
- Better control of costs
- Overall performance of the business

On the other hand, some challenges are:

- Effectiveness and usefulness of large quantities of data
- Difficulties in aligning company strategies with IT among departments
- Training, or the lack of it.
- High investment
- Little inference on suppliers' effectiveness.

To sum up, IT-based Inventory systems can be beneficial for an organisation's Business Planning if they are applied and structured properly. It will not bring immediate success to

the business, but it will contribute to coping with the future under preparedness and informed decisions.

4.5. Theme 5: Use of IT for data analysis and automation

4.5.1. Primary Research

Below are extracts to reflect the most relevant opinions from the interviewees

A01

“I think automation would be positive for business, particularly in and around inventory, because we could be carrying over 1000 different mini parts here”

A02

“So he's dedicated solely to that purpose and looking after that, and that is their job (…) while somebody who's doing something else, they're having to do a second or third or fourth job”

A03

“I always check the app to see how much we sell, how much we have, and how much we need”

A04

“It would be one person behind to check if everything is going like being inputted to see if things are accurate”

In some cases, there are different opinions about what automation could help (**A01**) or reduce productivity and increase workload (**A02, A04**) if they are not appropriately developed, or the specific position is not created.

Considering automation is a feature that is not fully in practice, as learnt from the interviewees, it was asked in the questionnaire whether participants thought they would benefit from automation to reduce their workload (Fig. 12). The highest responses were a neutral answer (3) and in second place, the strongly agree option (5).

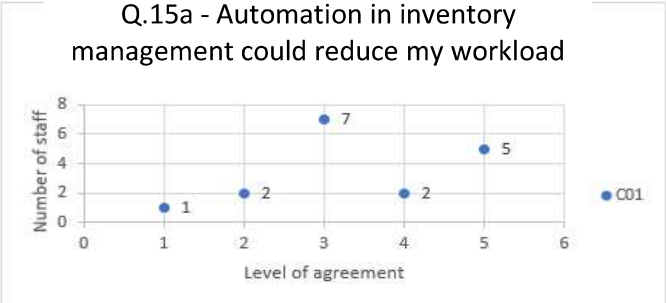


Figure 5988 Q15a (C01)

Similarly, participants were asked to give their opinion on how they agreed or disagreed with the sentence “Data analysis tools improve inventory accuracy” (Fig. 13), having varied inputs between strong disagreement and strong agreement, concentrating the biggest number of answers in neutrality towards agreement and strong agreement. This means that staff trust the data analysis tools available.

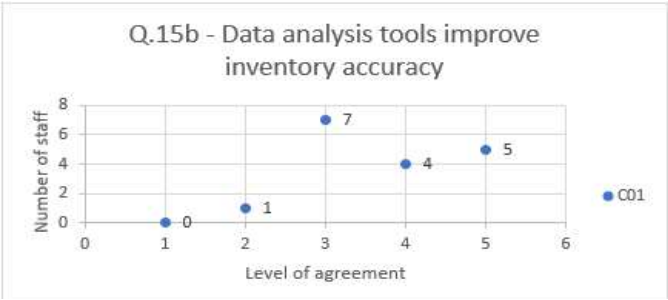


Figure 6244 Q15b (C01)

However, in the last statement, participants have shown an almost equal tendency to agree or disagree. This statement, which looked to determine the trust staff have in the recommendations for stock reordering (Fig. 14), shows that the opinions are varied, although with a positive tendency towards trust in the system, with 8 answers over neutrality, against 5 under.

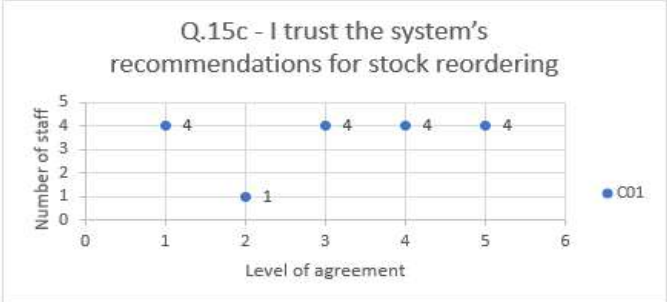


Figure 11108 Q15c (C01)

4.5.2. Secondary Research

As in many other industries, Information Systems are taking over restaurant management. Current literature and proposals focus mainly on restaurants in general.

Technological advances are key to assisting in the service when human resources are overwhelmed during specific peak activities (Fritz Wijaya & Rakhmawati, 2019). This way, with automated technology for stock control or reordering, the staff may have fewer tasks to be concerned about and so claims **A01** and **A03.** However, **A02** and **A04** think it may if well implemented, but, as, according to their experience, it may incur a heavier workload for the current employees, unless one is hired for the specific functions related to this. This can also be compared to Figure 12, where opinions are varied as well, having some who strongly disagree that automation in inventory management could reduce their workload, in front of others who strongly agree.

Last, Artificial Intelligence is a novel disruptive tool that can be utilised in the processes of data analysis and automation.

4.5.3. Discussion

Based on the primary and secondary research, it is possible to answer the question “How are IT-driven automation and data analysis systems applicable to the area of beverages within restaurants?”

For the particular case of this restaurant, the current system does allow automation. However, it has not been fully developed, because the automation is only based on repetitive same-quantity orders, and it is not yet possible to automatically connect it with forecasts or based on the POS system, which works under a different software (Square) from the inventory software (Marketman).

The integration of the POS and inventory systems is essential for the business to conduct a comprehensive analysis of purchases, sales, and waste. Currently, while the existing POS system can generate reports from prior years for forecasting, this process is carried out manually by a single office staff member. As a result, this function is in the process of being implemented, but it faces challenges related to human involvement, including manual operations, potential errors, and the diligence of personnel. An integrated system will enable automation, leading to enhanced insights into sales trends and needs, as well as more precise forecasting.

4.6. Theme 6: Competitive Advantage of Inventory IT Systems

4.6.1. Primary Research

A01

“From a manager's point of view, if you see the same items consistently on a stock count that aren't selling should be his intuition to try to get that sold and then take it off the menu.”

A02

“I haven't (seen improvements), we keep the same availability of fishing, yeah, if anything”

A03

“We are in a business where we never know how much we sell, so automatic orders are not saving money”

A04

“Digital inventory management contributes to reducing costs and increasing profitability (…) you're not overordering, or overstocking or doing something more than you need”

Once again, the opinions from our interviewees are varied in depth and tone, because while some mention the positive aspects of digitalisation and the competitiveness that they bring to the company (**A01**), emphasising how at the end of the day managers’ decision and understanding of the data collected are also important; others seem more worried about keeping the status quo of how things have been done for the last 20 years (**A02**), with an emphasis on the amount of work added to the already loaded managers’ shoulders.

From a general point of view of staff across the three venues and the administrative staff, the vast majority have not observed changes in aspects such as customer service and order accuracy related to the implementation of IT-based inventory management software (Fig. 15).

It is also important to mention that in this situation, 33.3% of the responses from **B04** indicate

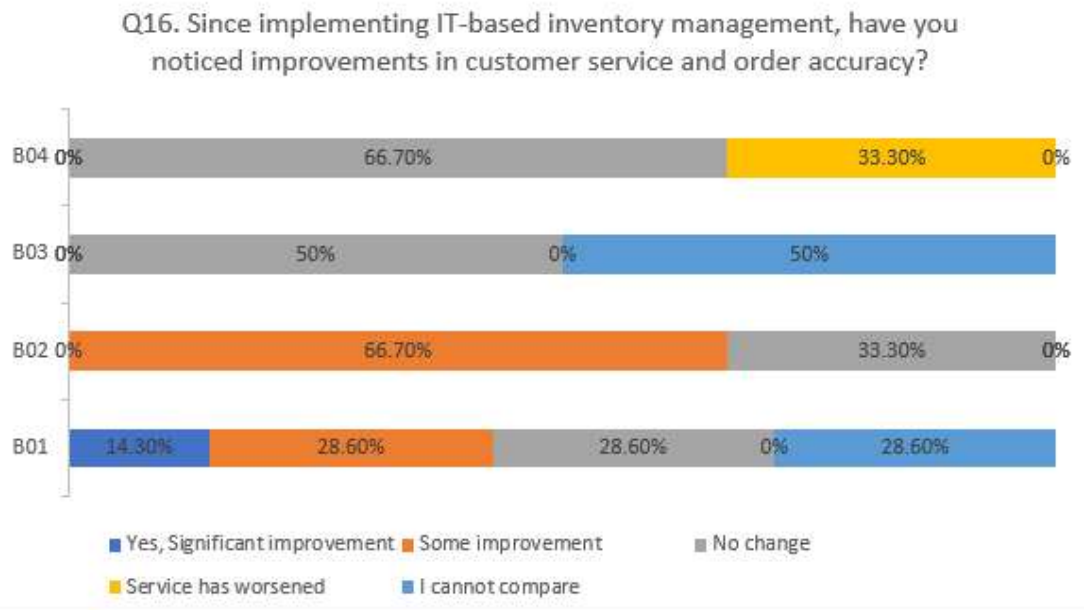


Figure 13604 Q16 (B01 B02 B03 B04)

that indeed, the service has worsened, while 14.3% of answers in **B01** indicate a significant improvement, as well as 28.6% of some improvement compared to the 66.7% observed by **B02.**

In terms of competitive advantage and its relationship with advanced inventory system (Fig. 16), more than half of the entries illustrate the belief that it poses a positive effect on competitiveness, and that ongoing improvements and investment are necessary.

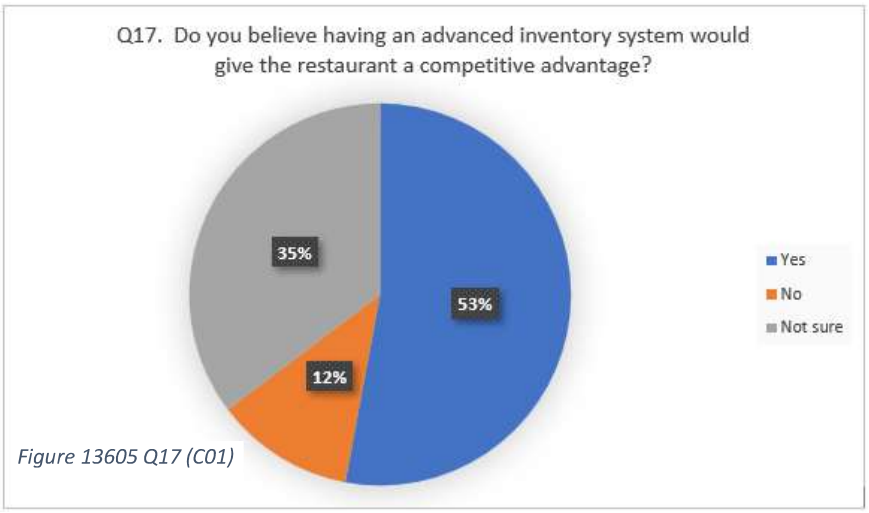


Figure 13605 Q17 (C01)

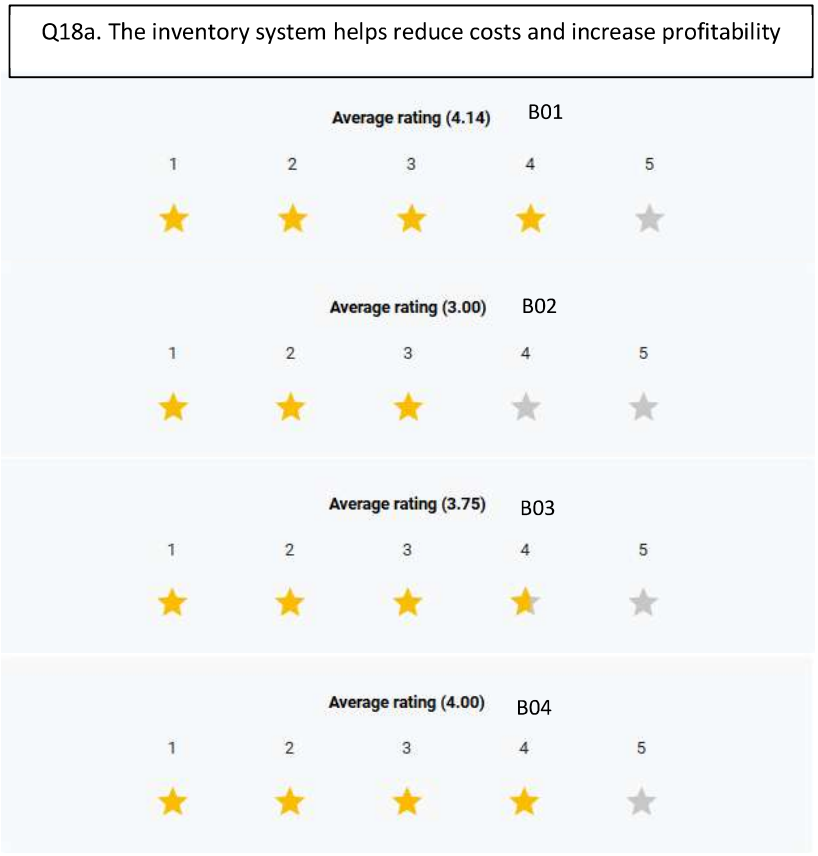


Figure 14039 Q18a (B01 B02 B03 B04)

Finally, how staff relate the inventory system to a reduction of costs and an increase in profitability (Fig. 17) across all departments shows, overall, neutral to positive acknowledgement of this correlation. **B01** seem to be the most positive thinkers with an average of 4.14 out of 5, while **B02** shows the least with a neutral 3 points out of 5.

In this theme, as in most of the already discussed themes, the opinions and perspectives vary according to experience, job position, responsibility and other factors. In general, staff seem to have a positive opinion and expectations of how an IT-based Inventory Management system poses an opportunity to enhance a competitive advantage.

4.6.2. Secondary Research

To be competitive is as broad as making the right decisions to improve the quality of service and keeping costs optimised to maintain profitability (Sadykova et al., 2020). **A01** and **A04** indicate they have seen improvements by better understanding the profitability and stocks. This is also reflected in the results of question 18a (Fig. 17 - **B01, B02, B03, B04**), where the

overall opinion is towards an agreement that the inventory system helps reduce costs and increase profitability. Moreover, empirical research demonstrates that digital technologies for the management of customer experience generate positive feedback and higher customer return, using automated inventory management in line with digital organisational management. Thus, “the use of digital technologies will provide additional competitive advantages for the company” (Sadykova et al., 2020, p.483)

Digital communication tools such as booking systems and website dynamics are useful to obtain data that can be used for forecasting stocks. Fully deployed and integrated software would offer better opportunities to enhance a restaurant’s competitive advantage. In the current system, everything is done manually, and due to the dynamic fluctuations in sales and trends of this particular business, **A03** claims that so far, there is no competitiveness yet due to the manual search and analysis for forecasting.

Nowadays, “technological advancements such as AI and IoT are significantly influencing the landscape of restaurant management software” (PR Newswire, 2024). These innovative tools are the pillar of the latest digital systems and help position the organisations as leaders of the industry. **A02** and **A03** suggest that the use of AI may be beneficial to read the data available and create better prompts for forecasting, although it is something that is not included in the current IT in use.

4.6.3. Discussion

The facts about Competitive Advantage within the restaurant are varied, and staff perceive it differently depending on the position each one holds. Notwithstanding these different

perspectives, it is possible to answer the question “How can IT tools help increase restaurants’ Competitive Advantage concerning Inventory Management Control of beverages?”

From a financial point of view, IT is useful and generates competitiveness because it helps accurately control costs, sales, purchases, and the overall economic situation of the business. These results are also linked to a better understanding of consumer behaviour, and they generate more specific data to analyse. Regardless of how the analysis is made, either manual or automatic, it gives more specific assistance to forecast and make better business decisions.

From an operational perspective, IT can either enhance or diminish competitiveness, contingent upon the degree of organisation and communication in the execution of processes. Should the implementation of IT impose an increased workload on managers or other employees, it would adversely influence their performance, potentially resulting in tasks being performed inadequately, unfinished, or incorrectly. Conversely, if the deployment of IT is methodically planned, well-informed, and accounts for the allocation of additional responsibilities- or, more effectively, the recruitment of an employee to oversee the new processes- the outcomes will positively contribute to the competitive advantage of the business, thereby achieving the desired competitiveness across all departments and within the organisation as a whole.

To sum up, the correct use of IT for Inventory Management of beverages can enhance the Competitive Advantage of a restaurant. As with any other change in a business, it needs planning, organisation, and clear objectives and Key Performance Indicators. On the contrary, it may result only in overwhelming employees.

5. Chapter 5: Conclusions

Having a detailed analysis of the literature review, the primary mixed research and the main outputs obtained through data triangulation, it is feasible to answer the Research question and sub-questions presented as the core of this study. Regarding the research question, **what are the opportunities and challenges for restaurants using IT-based Inventory Management of beverages in Ireland?**

IT-based Inventory Management applications have significant transformational potential in the beverage control practices in Irish restaurants, as detailed in this study. Nonetheless, whilst technologies offer varied advantages in operations, finance and overall strategies, adopting them may bring new challenges that must be analysed and strategically managed.

5.1. Opportunities:

5.1.1. Efficient operations and Cost Control:

Systems, in this case Marketman, enhance the tracking of beverage stocks. When fully implemented, software enables restaurants to automate orders, monitor wastages and spillages, and prevent shortages and overstocking. By being efficient, there is enhanced control of operational costs.

5.1.2. Improved Data Analysis for Decision-Making:

These technologies create significant data insights, such as consumer trends, supplier response, demand fluctuation and consumption. Managers or decision makers in restaurants can utilise this data to adjust strategies and menu offerings, consequently, align inventories with customer preferences and reduce waste or unsold stocks.

5.1.3. Integration with POS:

Advanced inventory tools offer the feature to integrate with POS systems and supplier portals, enhancing seamless operations. Integration allows for synchronised stock updates

5.1.4. Order automation:

The possibility of automation minimises human error, provides more accurate forecasting and enhances financial control over beverage inventories. It can also facilitate replenishment strategies with suppliers.

5.2. Challenges

5.2.1. Resistance to Technological Change

The data collected in this research indicated a resistance to change, which poses a cultural challenge, where some employees prefer traditional methods. This resistance can deter or delay implementation, especially when staff are not familiar with digital tools or do not believe in their benefits.

5.2.2. Training and ambiguous communication

Inadequate training and ambiguous communication regarding changes may hinder successful implementation, given that technologies must be operated effectively by staff. If personnel do not know how to manage the software, it can lead to human errors in both data input and the application of the technologies, a prevalent issue identified in this study.

5.2.3. Suppliers' integration

Platforms such as Marketman offer suppliers to share their stock data with restaurants. However, suppliers prefer to work on their platforms, making it impossible for restaurants to

automate orders with suppliers. Consequently, it affects the accuracy of orders made and stocks received, and it also impedes the timely reception of goods.

5.2.4. Dependence on Internet Connectivity

Most platforms operate on cloud-based systems. Any disruption to the internet connection negatively affects the operations and order accuracy, as well as limited access to real-time inventory data.

In summary, IT-based inventory management systems offer strong potential to optimise beverage control in Irish restaurants by improving efficiency, cost control, and enabling data-informed management. Nevertheless, challenges related to adaptability and digital literacy, as well as supplier integration and dependency on internet connectivity, must be evaluated for effective adoption. Strategic planning, training, communication and investment in reliable systems will be key to overcoming these barriers and executing the full value of IT in restaurant beverage management.

5.3. Findings table

To summarise the main findings for each question, a summary:

Themes	Answer to Sub research questions
(1) Inventory Control Management in Restaurants	The system is still in a process of application and improvement, with benefits and challenges. Staff of all four departments can coordinate better and more effectively manage the stock control.
(2) Inventory Technologies for Restaurants	Challenges: - Human control of waste and fluctuations - Lack of educational training from the system and lack of self-education. - Lack of integration and permission access. - Unnecessary layout updates. - System errors and time consumption to add data. Benefits: - Control of detailed recipe and its components. - Overall ease of use and Smartphone access. - Possibility to merge with the POS system. - Stock and cost control.
(3) Supply chain for the beverage industry in restaurants	Procurement, supply chain and stock control managed through the use of Information Technologies have the potential to enhance the Inventory Management of beverages in Irish restaurants. It is imperative, however, that the businesses involved opt for better and more open collaboration and communication.
(4) Business Planning	IT-based Inventory systems can be beneficial for an organisation's Business Planning if they are applied and structured properly. It will

	not bring immediate success to the business, but it will contribute to coping with the future under preparedness and informed decisions.
(5) Use of IT for data analysis and automation	The integration of the POS and inventory systems is essential for the business to conduct a comprehensive analysis of purchases, sales, and waste. Currently, this process is carried out manually by a single office staff member. However, it faces challenges related to human involvement, manual operations, potential errors, and the diligence of personnel. An integrated system will enable automation, leading to enhanced insights into sales trends and needs, as well as more precise forecasting.
(6) Competitive Advantage of Inventory IT Systems	The correct use of IT for Inventory Management of beverages can enhance the Competitive Advantage. As with any other change in a business, it needs planning, organisation, and clear objectives and Key Performance Indicators. On the contrary, it may result only in overwhelming employees.

Table 4 Findings

5.4. Contribution

In relation to the contribution of this research, I strongly believe that it helps to fill a gap in the areas of IT technologies, Inventory Management and Restaurants, as there is little research connecting these topics. I can confirm this because it was difficult to find specific literature that dealt with these topics together, as well as from my primary research, where I could identify that managerial staff had different views and approaches to work in this subject.

5.5. Limitations and recommendations

There have been a few limitations during this study, which are explained in further detail with their relevant recommendations:

5.5.1. Sample size and variety

The size of the sample was small because I only applied my primary research in one restaurant with 3 venues. Although the majority of staff working in relation to inventory management participated in the study, the numbers may be short. Hence, maybe it would be better for future research to compare a wider variety of restaurants, hopefully utilising different IT systems. This would lead to a more varied and bigger sample.

5.5.2. Time constraints and stage of implementation

The primary research was applied to a restaurant that has already started implementing this IT software. Due to the limited time for this particular study, there will not be a follow-up after they have already finished implementing and perfected this process. Consequently, a recommendation is, if the time allows, to analyse and compare how the restaurant worked before, during and after the implementation of an IT system.

5.5.3. Mixed research, mostly opinion-based

This study was mostly based on the opinions of the interviewees, and although there are numbers concerning the questionnaire, their answers are also mainly based on their opinions and their relation with the implementation of the IT-based inventory control system. There could be a deeper objective-based study that analyses the numbers of the company, mainly to analyse the Return of Investment, Profit and others that indicate the real state of the finances of the company.

5.5.4. Availability of Literature

As it was explained before in this study, a limitation was the lack of previous research in this area that joins IT systems, Inventory management and Restaurants. Future research is necessary in the Hospitality sector, as it is one of the industries where the least research is available regarding Information Technologies.

References

Allnoch, A., 1997. Forecasting software ensures fast food customers' satisfaction. *IIE Solutions*, July. pp.50-51.

Dadić, L., Maškarin Ribarić, H. & Vlahov, B., 2020. Inventory management in bars and restaurants- employees' attitudes. *Tourism and hospitality industry 2020: Trends and challenges*, pp.79-91.

Dio, K.B.A. et al., 2022. Hotel and Restaurant Management System Core Transaction 1 (Order Management W/POS, Kitchen and Bar Module, Food and Beverage Costing, Inventory Management, Resto Analytics). *Ascendens Asia Singapore – Bestlink College of the Philippines Journal of Multidisciplinary Research*, 3(1B), p.167.

England, J., 2012. The hi-tech way to manage stock. *Caterer & Hotelkeeper*, 202(4743), pp.30-30.

Fabregas, K., 2024. *Forbes Advisor*. [Online] Available at: https://www.forbes.com/advisor/business/software/restaurant-inventory-management-software/ [Accessed 05 October 2024].

Fritz Wijaya, A. & Rakhmawati, M.I., 2019. Analysis and Design of Restaurant Information System using Unified Modeling Language. *SISFORMA: Journal of Information Systems*, 6(1), pp.23-27.

Garcia-Buitrago, M.A. et al., 2024. Perception of entrepreneurs in the processes of innovation and digitization of the supply chain: a study applied in small restaurants. *Cogent Social Sciences*, 10(1), Available at: https://doaj.org/article/60ea9568e87741708070a1f383aeb62f.

Greene, S., 2021. Combining ABC and XYZ analyses to manage inventory: Improve framework to develop and refine inventory policies, systems and procedures. *ISE: Industrial & Systems Engineering at Work*, 53(8), pp.32-35.

Mulay, O., Bhalerao, M., Bhamare, S. & Gaikwad, V., 2021. IoT-based food Inventory Tracking System for Domestic and Commercial Kitchens. *International Journal of Innovations in Engineering Research and Technology*, 7(4), pp.1-6.

Nguyen, T.T.H., 2023. Applications of Artificial Intelligence for Demand Forecasting. *Operations and Supply Chain Management: An International Journal*, 16(4), pp.424-34.

Olan, F. et al., 2022. The role of Artificial Intelligence networks in sustainable supply chain finance for food and drink industry. *International Journal of Production Research*, 60(14), pp. 4418–4433.

PR Newswire, 2024. Restaurant Management Software Market size is set to grow by USD 4.50 billion from 2023-2027, Growth of foodservice industry boost the market, Technavio. *PR Newswire US*, 10 July.

Rasulov, R., 2024. Optimization of direct supply chains in the restaurant industry: Addressing key challenges through technological innovation. *Economics of Development*, 23(3), pp.93-103.

Sabah Salih, H., Ghazi, M. & Aljanabi, M., 2023. Implementing an Automated Inventory Management System for Small and Medium-sized Enterprises. *Iraqi Journal for Computer Science and Mathematics*, 4(2), pp.238-44.

Sadykova, E.R., Prokhorova, E.A., Shaykhutdinova, F.N. & Safiullina, F.F., 2020. Digital Inventory Optimization in the Hotel and Restaurant Sector. *Atlantis Press*, pp.483-88.

Sarafi, I., Nafisah, L. & Muhsin, A., 2021. Inventory Policy Control Using a Continuous Review Model Based on Information Systems: A Case Study in a Restaurant Industry. *Jurnal Optimasi Sistem Industri* , 14(2), pp.154-63. Available at: http://jurnal.upnyk.ac.id/index.php/opsi [Accessed 04 October 2024].

Saunders, M., Lewis, P. & Thornhill, A., 2016. *Research methods for business students*. 7th ed. Harlow: Pearson Education.

Slack, N., Brandon-Jones, A. & Burgess, N., 2022. *Operations Management*. 10th ed. Harlow: Pearson Education Limited.

Swink, M., Hu, K. & Zhao, X., 2022. Analytics applications, limitations, and opportunities in restaurant supply chains. *Production and Operations Management*, 31(10), pp.3710-26.

Tonetti, B., 2019. The Impact of Integrated Business Planning on Safety Stock Calculation Methods. *Journal of Business Forecasting*, 38(3), pp.29-`33.

Wang, D. & Krasnonosova, O.M., 2023. Inventory Management as a Component of the Digitalization Process at Restaurant Business Enterprises. *Bìznes Inform*, 5(544), pp.121-26.