

**The impact of quality assurance in construction in relation to ISO Standards:
A case study research in the construction industry in Malta.**

By

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A dissertation submitted to the Faculty for the Built Environment, University of Malta in part fulfilment of the requirements for the attainment of the degree of Master of Engineering (Engineering with Management).

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Abstract

Malta has recently experienced a significant boom in construction over the past few years. Although this is regarded as a growth factor of the local economy, the industry is often criticized for the use of poor workmanship, low productivity and failure to meet high quality standards. As projects are getting bigger and more complex, the need for a standardized certified quality system implemented across the board in Malta has become critical. This research study aims to examine the use and adoption of ISO standards globally as many construction companies worldwide set this system as a standard in their quality management system. The document ISO 9001:2015 outlines a set of requirements for a certified quality management system. Locally the integration of ISO Standards within contractors is still very limited. The research objective is aimed at identifying local gaps present in contractors implementing ISO standards within their companies locally. Using a qualitative approach towards research data collection, a series of semi-structured interviews conducted with key stakeholders through purposive sampling, within the construction industry, was used. A thematic approach to carry out data analysis was conducted using the NVIVO14 software data management tool and several critical factors hindering the implementation process were identified. As a result of this study, a set of strategies and suggestions to address the challenges in this sector are presented to guide industry leaders and policymakers to integrate the implementation of ISO Standards more effectively as part of a quality assurance management plan. In conclusion, the implementation of standards in Malta's construction sector offers a significant opportunity to improve the sector's efficacy and quality systems, thereby establishing a more robust foundation for the processing of Malta's building systems.

Keywords: ISO Standards, Quality management system, Malta, construction management, implementation process, quality assurance.

List of Acronyms

Abbreviation	Meaning
QA	Quality Assurance
QC	Quality Control
ISO	International Standards Organisation
QMS	Quality Management System
QM	Quality Management
PQM	Planning Quality Management

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CHAPTER 1

1 Introduction

1.1 Background

The construction sector is regarded as an economic growth factor that influences a country's economy. Malta has recently experienced a significant boom in construction over the past decade; however, it is often criticized for the use of poor workmanship, low productivity, and failure to meet high quality standards. As projects get larger and more complex, the volume of construction projects has increased. The need for a robust quality management system implemented across the board has become more critical in the local construction sector.

Many construction companies on a global scale adopt the ISO standards as an integrated system to improve quality and enhance performance. ISO Standards, specifically ISO 9001:2015 provide a list of requirements for certified quality systems. These standards are designed to structure the organization's management system. Also, it ensures that construction projects meet customer satisfaction criteria and are completed within time and budget. Locally, the integration of ISO standards within contractors is still very limited. Several factors hinder the implementation of ISO standards across the board. On the other hand, there is growing interest among developers and contractors.

1.2 Research aim

This research aims to study the feasibility and challenges of the implementation of ISO standards in Malta's construction industry. Specifically, the study aims at understanding the perspectives of key construction players, who carry a significant weight in the decision-making processes of the sector; developers and contractors. It aims to identify the critical barriers hindering a holistic approach to standardisation among local contractors to explore the different requirements of contractors in the field of construction management.

The study aims at developing a set of guidelines and recommendations, based on qualitative data, to guide industry leaders and policymakers in Malta with the nationwide implementation of ISO Standards, with a special focus on larger contractors.

1.3 Research Objectives

The primary objective of this study is to analyse the current quality management system in Malta's construction industry. The objective is further reinforced by examining the current systems used by local organizations, evaluating them from both the contractor's and the developer's perspectives

in relation to their contributions to various local projects. The second objective is to study the familiarity of ISO Standards. The primary document for reference is ISO 9001:2105, which outlines a list of requirements for an organization to follow.

Additionally, this study aims to identify the challenges and barriers that are present within the sector in relation to the implementation of the ISO Standards. Therefore, the final objective is to propose strategies or recommendations to overcome the main challenges listed by the key stakeholders involved in this study and facilitate the adoption of ISO standards within the local construction industry.

Summary of the objectives:

1. To analyse the current quality systems used by the different contractors in the area.
2. To understand the familiarisation of the contractors with the ISO Standards
3. To identify the challenges and barriers present locally within the sector that hinder the implementation of ISO Standards.
4. To propose strategies or recommendations that can guide industry leaders and policymakers to integrate the implementation of ISO standards more efficiently.

1.4 Research questions

1. Throughout the research, a questionnaire was presented to examine the integration of ISO standards in Malta's construction industry. The questions are listed below: Is the implementation of certified global standards, such as ISO standards, feasible at Malta's construction sites given the known benefits?
2. Given the present state of Malta's construction industry, what factors hinder the implementation of certified standards such as ISO standards?
3. Assuming that there is no implementation plan for integrating certified standards like ISO standards into the local construction industry, what gaps need to be addressed, and what steps should be taken moving forward?

1.5 Overview of research methods

An initial examination of the key aspects regarding the integration of ISO Standards in the construction industry on a global level is conducted in the form of a literature review, which includes information from research papers, books, articles, and journals. In addition, a case study research approach is taken to get in-depth feedback on the integration and implementation of ISO standards within the local construction industry in a real-life context. Moreover, using qualitative research as a methodological approach involving a naturalistic inquiry, intended to attain the

comprehension of social phenomena within the building sector. Given the lack of direct information on quality systems locally, first-hand qualitative data was crucial, with events, trends and patterns being extracted from areas of research in this topic. The research aims at collecting human experiences and theories based on day-to-day experiences. NVivo 14 software was used to analyse the data by conducting a thematic analysis highlighting key gaps hindering the implementation of ISO standards in the construction industry.

1.6 Structure of the dissertation

The structure of the dissertation is designed to provide a comprehensive analysis of the implementation of ISO standards in Malta's construction industry. The dissertation is subdivided into 5 chapters, each with its own purpose in exploring the research objectives.

Chapter one outlines the introduction and background of this study's research goal. The research objectives and related research questions are listed, and a description of the research method is highlighted.

The second chapter presents the literature review, pointing out several sources and setting a theoretical foundation for the understanding of quality management systems, specifically the ISO Standards. This chapter draws out the historical background of the standards, the principles and requirements of ISO 9001:2015 and their relevance to the construction sector both globally and locally.

In chapter three, the methodology details the research design employed in this study. The reasoning behind a case study approach, as well as the qualitative methods used to gather information from contractors and developers in the local sector. The use of NVivo 14 software for the thematic analysis of the semi-structured interview is explained.

The fourth chapter presents the results and discussion, analysing the data collected during the thematic analysis from the key stakeholders. The main themes identified are the perception of quality, the current quality systems used locally, familiarity with the standards, barriers hindering the implementation of ISO standards, and suggestions for the sector.

The fifth and final chapter outlines a comprehensive conclusion outlining the most key findings from the study and addressing the research questions formed at the beginning. This chapter describes the feasibility of the standards in the local construction sector, the most critical gaps to be addressed, and provides practical recommendations that can guide industry leaders and policymakers to integrate the implementation of ISO Standards more efficiently. Finally, based on its findings, the study suggests areas for future research.

CHAPTER 2

2. Literature Review

2.1 Quality Management

2.1.1 Introduction to Quality Management

The construction sector is often described as an industry that runs on inadequate standards, low levels of productivity, and does not meet high-quality outcomes (Aziz and Hafez, 2013). Given that competition in construction is increasing and projects are becoming more challenging, the sector is subject to potential methods and paths with different levels of risk (Ellingham and Fawcett, 2007). The construction sector is project-based, which means that multiple parties will be involved in one project, each with different important objectives and intentions to make sure that the outcome meets the aimed target. Therefore, the key ingredient of a successful construction project is consistent quality standards. Meaning that the management of quality is a fundamental task of successful project management (Barron and Burke, 2007).

Common challenges constantly encountered in construction projects that affect project completion deliverables consist of construction defects, reworks, time overruns, variations, and cost overruns (Neyestani and Juanzon, 2016). Moreover, such errors, when traced back, often lead to poor contract administration, a lack of supervision, and errors in design (Chini and Valdez, 2003). To surmount such challenges and decrease the impact on project outcomes, the commitment to quality management and high-quality standards by the top management is crucial (Arditi and Gunaydin, 1998).

In construction project management, an essential factor in reducing challenges is introducing some sort of structured framework involving a Quality Management System (QMS) (Landin, 2000). A QMS is considered throughout the whole lifecycle of the project, leading up to meeting the customer's expectations and completing the project on time and within budget with high-quality standards (Arditi and Gunaydin, 1998).

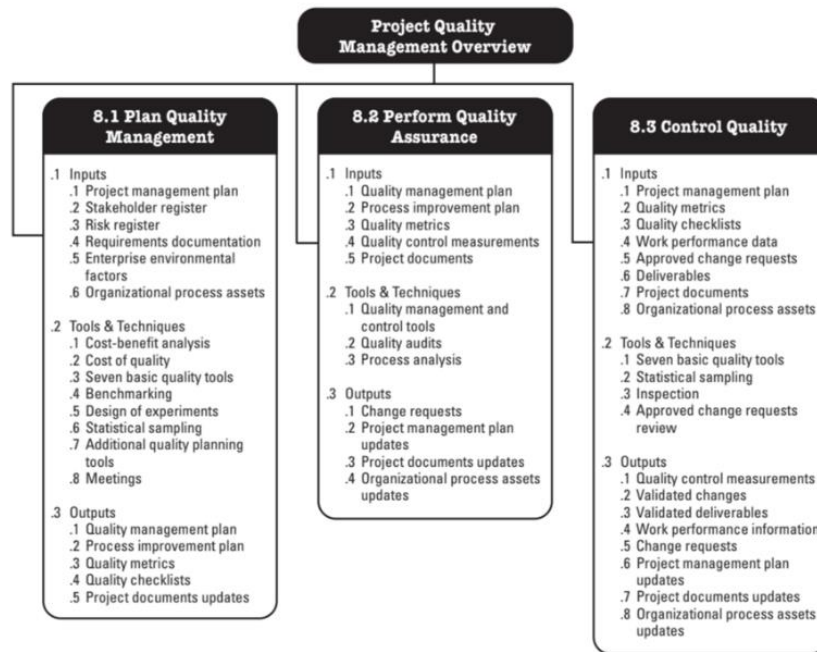


Figure 1: Project Quality Management Overview (PMI,2013)

2.1.2 Planning Quality Management - Plan, Perform, Control

Project Quality Management aims to establish policies and procedures within the framework of an organization's quality system and strives for continuous improvement. Moreover, it endeavors to ensure that the project requirements are realistic and achievable. PQM is categorized into three main segments, as depicted in Figure 1, which include quality management (QM) planning, quality assurance, and quality control of a project. The primary objective is to ensure that the overall quality management of the project aligns with the project requirements and is validated (Project Management Institute, 2013).

The framework of a system determines the quality standards and levels necessary for a project and its objectives, as recognized by all stakeholders. Additionally, the planning of a QMS necessitates the identification of a documentation method that conforms to the established quality standards. This planning should be initiated early in the project planning stage (Project Management Institute, 2013). The planning of a QMS generally adheres to a standard framework, as illustrated in Figure 2.



Figure 2: Plan Quality Management Process (PMI, 2013)

An auditing system is implemented for the quality requirements and monitoring of data results from quality control documentation, aiming to safeguard the applicable quality standards of the respective project. This process enhances the continuous improvement of processes within the organisation and facilitates the system to learn and improve for future projects (Project Management Institute, 2013). A generic approach to this system is depicted in Figure 3 below.



Figure 3: Quality Assurance Process (PMI, 2013)

The ‘control quality’ procedure entails overseeing and documenting the results of quality checks to evaluate performance and suggest any necessary modifications. This process benefits from analyzing the root causes of poor performance and confirming that the project outputs are as specified. Figure 4 illustrates a framework for quality control (Project Management Institute, 2013).

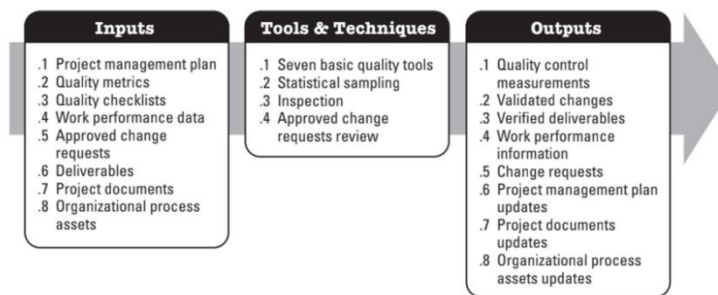


Figure 4: Quality Control Process (PMI, 2013)

2.1.3 Measuring Project Performance

The measure of project performance is the framework for analysing the performance corresponding to a defined goal. Furthermore, it aims to provide valuable feedback on where the project stands

and the current trajectory it is on. The benefit of measuring performance is guidance in steady growth toward the project goals and specifications while also identifying areas where performance is lacking (Rose, 1995).

Many have given their input on the fundamental aspects on which project performance is based and what should be measured throughout the project lifespan. Time, cost, and quality are deemed the 'iron triangle' of project performance that characterizes the flow and eventually the outcomes of a project (Atkinson, 1999). However, over time, the measurement of performance has evolved to encompass more criteria fundamental to a project. These include cost, time, quality, client satisfaction, health and safety, and functionality (Chan and Tam, 2000).

The measure of cost performance is the extent to which the conditions of a project lead to completion within the predicted cost and budget. Time performance is the achievement of completing a project within the stipulated time. Quality measurement refers to the ability of a project to conform to specified requirements. The measure of client satisfaction is a ratio of a client's perception of a result and its belief in that result. The measure of health and safety is the extent to which a project is completed without major injuries. Finally, functionality is measured by the level of conformity that the project adheres to regarding performance specifications.

2.1.4 Defining Project Success

In most cases, project success is assessed in various ways and aspects, depending on the types of stakeholders and their ideal definition of success (Chan and Chan, 2004). The project designers' expectations for success may differ from those of the client or the public. Hence, the success of a project in construction is subjective to perspective (Lim and Mohammed, 1999).

Project Management Institute categorizes the success of a project into four levels. Level one entails the project's capability to meet projected targets such as cost, time, quality, and schedule. Level Two measures the managers' efficiency in the project. Level 3 evaluates the adequacy of the user and the project's fulfilment of the functionality and requirements requested. Finally, Level 4 evaluates an organization's overall improvement and the long-term benefits learned from the project for future projects.

2.2 The ISO Standards

2.2.1 Introduction and History of the ISO Standards.

The International Organization for Standardization (ISO) is founded on the essential principle of establishing a system that ensures that organizational progress is structured to meet or surpass a set of requirements. Every organization implements actions related to quality, whether

standardized or not. Over the years, this has created global uncertainties about the boundaries of quality and what is deemed acceptable. (Aburas, 2020)

Post-World War II, concerns about quality escalated. Various industries, particularly in production, began incorporating internal quality systems and imposing regulations on their standards and suppliers. This evolution resulted in a global system with diverse quality levels and standards across industries, leading to decades of complexity and trade barriers. Consequently, it became evident that common standardization was necessary to simplify trade and prioritize customer needs. ISO successfully accomplished this objective. In 1947, the organization assumed the responsibility of establishing standardization for technical specifications to facilitate global exchange. Subsequently, in 1987, ISO formed a technical community comprising twenty primary nations and others as observers (Aburas, 2020). Consequently, ISO functions as an international organization with a global membership, tasked with developing and maintaining international standards. Notably, the founding of this group marked the introduction of the initial form of a Quality Management System (QMS). An essential characteristic of the ISO QMS is that the standard was designed from its inception to be compatible with other quality systems and methodologies, including Lean Management, Six Sigma, Total Quality Management, and British Standards (Project Management Institute, 2013). The objective was to formulate a standard that, through the documentation process, its systematic approach, direction, and review could be applicable to the management of any organization, encompassing the entire spectrum from initiation to the concluding stages.

2.2.2 Aim and Structure of the Standards

As mentioned earlier, the inaugural version of a quality management system was established in 1987, giving rise to the inaugural ISO 9000 family of standards. As articulated by Aburas (2020), these standards constitute a set applicable on a global scale, focusing on providing guidance through recommendations and requirements pertaining to design and assessment. It is important to note that this set of standards was not crafted to conform to a product standard, nor were they designed with specifications for production or services. In essence, the ISO 9000 standards are not intended for evaluating a product against a standard.

In 1987, ISO formulated five quality standards constituting the ISO 9000 family. This includes ISO 9000 and ISO 9004, both encompassing guidelines on quality systems developed by the established community. Additionally, ISO introduced ISO 9001, ISO 9002, and ISO 9003 as standards concerning conformity in terms of quality assurance, with a primary focus on the importance of the client to the supplier (Aburas, 2020). It is worth noting that aside from the ISO 9000 standards for quality systems, ISO has developed other series, such as those for

environmental management and health and safety. However, for the purpose of this study, only documents related to quality management systems will be considered.

2.2.3 Progress and Build-up

As the standards gained global acceptance and integration, feedback prompted improvements and additions. Initially, the ISO 9000 standards were characterized as aiming for customer satisfaction and meeting stakeholder requirements, with a need for greater emphasis on product and service specifications. This feedback culminated in the development of a new set of standards in 1994. The ISO 9000:1994, again comprising five documents, now places significant importance on quality assurance. The notable change was the inclusion of a list of preventive measures, going beyond the previous emphasis solely on final product standards.

A pivotal update in the ISO Standards, laying the foundation for the current standards, was ISO 9000:2000. This version amalgamated ISO 9001, 9002, and 9003 into a singular standard, with a shift in focus from 'quality assurance' to 'quality management' (Karunaratne, 2019). Moreover, the standards were organized around the process approach (with 8 clauses), emphasizing structure, customer focus, and satisfaction.

The ISO 9000 standards are now split into three categories (ISO, 2015):

- ISO 9000 – Quality Management System -- fundamentals and vocabulary
- ISO 9001 – Quality Management System -- requirements
- ISO 9004 – Quality Management System including guidelines for performance improvement.

In 2008, minor adjustments were introduced with the release of a revised version was released with minor adjustments. ISO 9001:2008 places increased emphasis on customer focus. Additionally, this version was designed to clearly define requirements and enhance consistency with other specifications.

The most recent ISO 9000 standard, published in 2015, represents the current 5th edition of the series, as can be seen in Figure 5. Significant changes in this edition include a shift in emphasis on the importance of risk and risk control, as well as a reinforced structure consisting of 10 clauses. (ISO, 2015) Furthermore, the aim of this edition was to ensure that the standard is easily integrated with other management standards.

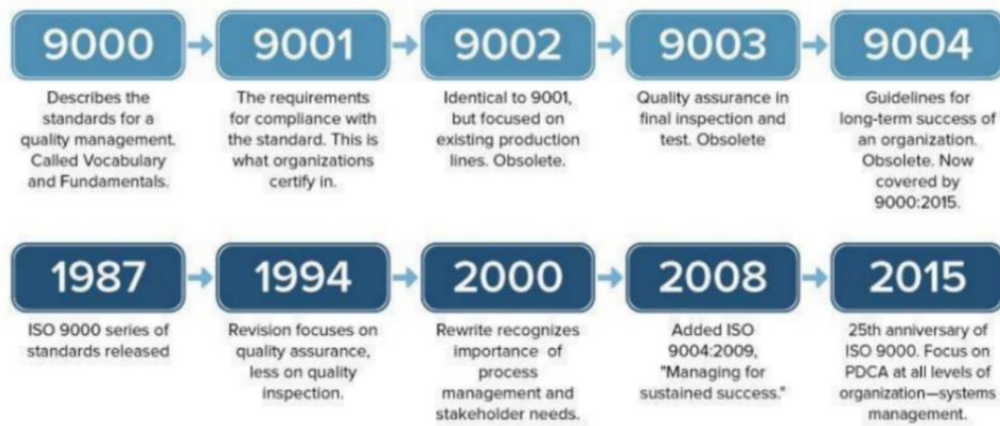


Figure 5: Defining the ISO 9000 series and evolution (Aburas, 2020)

2.3 ISO 9001:2015 – Quality Management System

2.3.1 Description and Structure of ISO QMS

In this study, ISO 9001 was selected as the foundation because this standard establishes robust principles for management systems with global applicability. While standards like ISO are not mandatory, there has been a growing interest in investing in them over the years. This surge in interest is partly attributed to the increasing demand for quality system requirements on a contractual basis and the preference for certified quality management systems (QMSs) among suppliers and products.

Globally, ISO 9001 has undergone rigorous testing across various sectors and industries. This widespread application is possible because the structure defined by ISO for the ISO 9001 QMS can be adapted to all industries and organizations, regardless of their diverse fields. As a result, ISO QMS is widely implemented, offering benefits for both internal and external purposes, as will be explained in detail below.

The foundation of the ISO QMS lies in the management-process approach, ensuring quality through a systematic approach. It doesn't cater to a particular product, nor does it provide specific definitions for product quality. Instead, it establishes a control process to facilitate ongoing improvement in project performance. The ISO QMS is designed to achieve client satisfaction through continuous improvement within the organization. Furthermore, the standard seeks to enhance leadership, improve overall performance, identify client requirements, and provide feedback on areas for improvement within the structure of the organisation (Aburas, 2020).

Throughout the entire ISO 9001 family series, the purpose of the standard remains consistent across different versions. All the ISO 9001 standards centre their focus on evaluating the organization's capacity to design, create, and deliver (both services and products), all the while enhancing

customer satisfaction concurrently. In summary, the structure of ISO 9001 is process-based and seeks to guide organizations in meeting client requirements, fostering internal improvement, and preventing nonconformity. Also, the standard aims at fine-tuning the organisations internally by proposing a quality system that gives importance to control, documentation, and procedures (Aburas, 2020).

2.3.2 QM Principles

Quality management principles are the foundations for quality, utilising beliefs, norms, rules, and values. Over the years, ISO built these principles from one standard to another. The recent version published, ISO 9001:2015 has these seven quality management principles (ISO, 2015):

1. Customer Focus
2. Leadership
3. Engagement of people
4. Process approach
5. Improvement
6. Evidence-based decision-making
7. Relationship management

These principles have been interpreted by various entities as follows:

When relating to the first principle ‘client focus’. An organisation is faced with two types of clients: internal and external. Internal clients are those individuals within the same organisation who, within the framework of their work, are reliant on one another to accomplish their duties (e.g. the management department is to provide the marketing department [client] with the latest deals for the market). External clients are those that obtain the final product, which the standard puts as its focus. The goal of ISO is to conform to the current external client's requirements and seek to surpass expectations to discern for future client’s needs and requirements (Aburas, 2020). The second principle ‘leadership’ sustains that the leader of any organization must establish a global vision and direction for the project before commencement. Moreover, leadership also signifies setting out exemplary behaviour for all the organizations to pursue, which eventually will elevate the reputation of the organisation (Aburas, 2020). In addition, the leaders of an organisation or project are responsible for identifying the most important demands of all the involved parties, such as the employees, clients, local communities, financial advisors, owners, suppliers, etc. In essence, leadership is the driving factor of the organization, and while sourcing the necessary supplies for its employees, it enhances accountability and is inspirational (ISO, 2015).

When relating to the third principle ‘engagement of people’, the organisation is responsible for being certain that all its workers, staff members, and operators have the necessary competency to

deliver their assigned jobs or roles. This then evolves into strengthening the employee's motivation in the organisation and increases the creative potential (Aburas, 2020). When the team within an organisation is well-trained, competent, and motivated, employees feel that their abilities are appreciated. Then the organisation can aim at delivering its goals and reaching its true potential, which eventually leads to customer satisfaction (Aburas, 2020).

The fourth principle 'process approach' suggests how tasks within a project or manufacturing processes can be considered more efficient and effective when they are assimilated and recognized as one connected process acting as a systematic and logical system. Hence, tasks are to be managed as processes, regardless of the organisation. With time, a cutback in tasks within the process deemed not adding value is to be removed, resulting in constant improvement of the process within the organisation (Wilson and Campbell, 2016). The dynamic of the process within a project will highly influence the result and, thus, the level of client satisfaction.

An organisation that strives to aim for continuous improvement must identify the essential requirements – this is defined as the fifth principle 'improvement'. To have constant improvement, the organisation's resources should be both well provided and managed. Documentation is crucial to be made accessible to allow for corrective action to be conducted (Chiarini, 2017). The organisation should set out (i) a board strategy for enhancement of processes on improvement, (ii) cater for training, (iii) set out targets for all members to boost self-improvement, and (iv) leadership provide guidance (ISO, 2015). Hence, in an ideal scenario, performance should be surveyed and improvement should be acclaimed (Aburas, 2020).

The sixth principle 'evidence-based decision making' suggests how reliability and preciseness are crucial in the quality management of a process within an organization, then analysed by proper methods. Decisions structured on the analysis of statistical data and collected information are more likely to lead to the best outcomes (Aburas, 2020). Information that is founded on evidence can be obtained by collecting measurements, documenting observations, conducting tests, etc. (Anttila, 2017). All in all, once data is constantly documented within the organisation, along with the use of proper instruments and with experience and professional instinct, the best decisions could be taken. The fact that a system of data documentation is in place instantly reduces risk throughout the process, given that it is evidence-based (ISO, 2015).

Through the seventh principle 'relationship management', top management can achieve long-term success within an organization by maintaining the relationship with the stakeholders. Stakeholders in an organisation or project are any group or member interested in the project's performance and success. These could be financial advisors, clients, workers, partners, suppliers, the general public, etc. (Aburas, 2020). The relationship with stakeholders requires the circulation of goals, knowledge, values, and understanding and is not seen as contentious entities outside the project.

2.3.3 Process Approach and PDCA Cycle

The ISO 9001:2015 standard then goes on and further emphasizes the process approach in subtopic 3 of the standard. The level of consideration and management related to the dynamic of processes in a system is devoted to the level of efficiency and strength of the organisation in accomplishing its planned goals and results.

By utilising this procedure, the organisation can keep oversight of the various relationships and dependencies occurring among the processes within the system, with the goal that, with time, performance continues to improve (Karunaratne, 2019).

The process approach is defined as a standardised definition and planning of a process while also considering the various interactions. The goal is to carry out the required tasks while adhering to the quality policies and the overall strategic direction of the organisation. ISO provides a framework for the management of processes and proposes a system achieved by the Plan–Do–Check–Act (PDCA) cycle. The global focus of this system is structured on risk-based logic directed at continuous improvement and providing for the customer (Karunaratne, 2019).

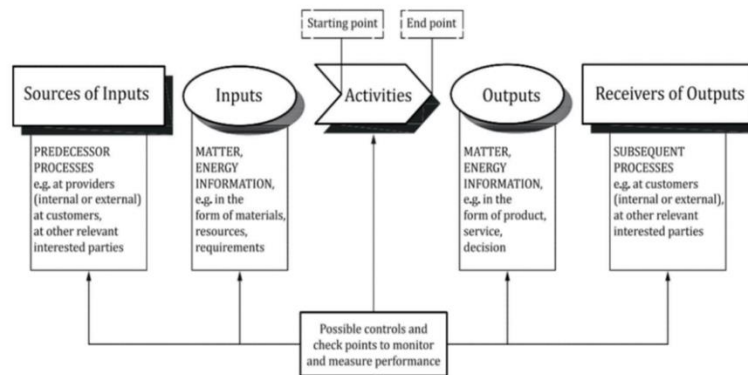
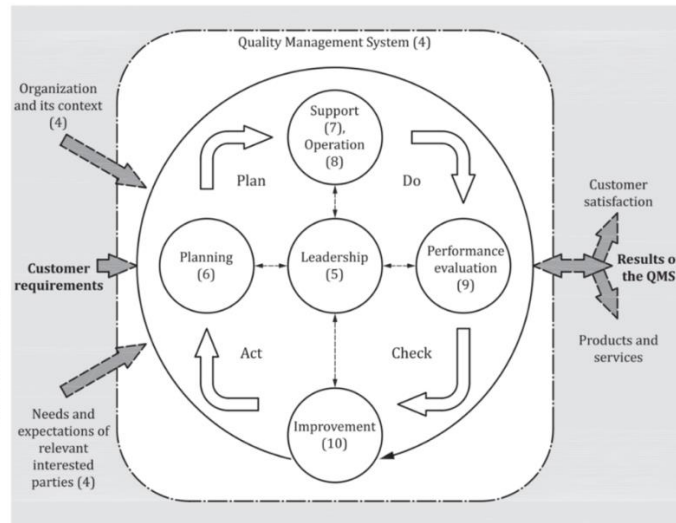


Figure 6: Schematic representation of a single process (ISO, 2015)

Figure 6 is a simplified diagram representing a process and highlights the link between elements. Moreover, the important checking points for monitoring and inspection necessary for control and assurance are not only marked but made specific for every part of the process.

Furthermore, the PDCA cycle (Figure 7) approach is a convenient model to define, implement, and control corrective actions and improvements. This cycle was first introduced in ISO 9001:2008 where the focus of the standard was to phase out issues from the process by identifying the heart of the problem (Karunaratne, 2019).



NOTE Numbers in brackets refer to the clauses in this International Standard.

Figure 7: Representation of the structure of the PDCA cycle (ISO, 2015)

The PDCA Cycle is defined shortly as (ISO, 2015):

- **Plan:** define the goals throughout the process, list the resources required to achieve the outcomes in line with organisational guidelines and customer requirements, identify and mitigate any hazards, and manage potential risks.
- **Do:** Implement the planned tasks
- **Check:** monitor and (when relevant) measure processes of either respective products or services in comparison to policies, objectives, requirements, and planned activities, and report the outcome
- **Act:** proceed with the necessary actions to improve

2.3.4 Risk-Based Thinking

Adopting risk-based thinking is essential to setting up a productive quality management system. The concept of risk-based thinking has been implied in previous iterations of this International Standard implied the concept of risk-based thinking, which includes actions like anticipating possible nonconformities, examining instances of nonconformities, and putting appropriate countermeasures in place to keep them from happening again. (ISO, 2015)

To adhere to the requirements of this International Standard, an organisation needs to strategically plan and carry out risk and opportunity management efforts. Addressing these components lays the

groundwork for improving the quality management system's effectiveness, achieving better results, and preventing negative effects. (ISO, 2015)

Opportunities can emerge from advantageous circumstances that support the achievement of desired outcomes, such as those that allow the business to draw in clients, develop novel goods and services, cut costs, or boost output. Taking related risks into account is another aspect of addressing opportunities. Risk is a result of uncertainty and can have both positive and negative outcomes. It's important to remember that not all positive impacts of risk result in opportunities, but a positive deviation brought about by a risk may. (ISO, 2015)

2.3.5 Ten Requirements - QMS

ISO 9001:2015 specifies ten requirements for an organization's implementation of the ISO quality management system. In brief, these requirements include:

1. **Scope**
2. **Normative References**
3. **Terms and definition**

The first three points are more about explaining to the reader what the scope of the QMS is, the structure of the standards, and the definition of terms in the remaining requirements to avoid misinterpretation. In requirements 4 to 10, more direct and tangible specifications are mentioned.

4. **Context of the organization:** – Requirements presented by ISO for an organization to understand its identity and its situation. Internal and external issues that are compatible with the required goal. Grasping the needs and expectations of the relevant parties, both internal and external. Along with determining the scope of implementing a QMS while maintaining the process and steadily improving it, (Project Management Institute, 2013).
5. **Leadership** – QMS leadership comes with a level of commitment that is to be endorsed by informing all levels within the organization regarding the goal and significance of achieving the client requirements, conforming with legal exigencies, and building a quality policy. A quality policy consists of prominent documents with descriptions and statements about the overall goals of the organisation and its level of commitment to quality and client satisfaction. Commitment and leadership come with organizing the organization's responsibilities and hierarchy (Project Management Institute, 2013).
6. **Planning** – ISO establishes requirements for planning a QMS within an organization. The organization's context (requirement 4) is crucial in defining the needs and expectations of interested parties, which, in turn, results in identifying and addressing risks and opportunities. The requirements also focus on formulating quality objectives and

defining methods for achieving them. These objectives must be tangible, quantifiable, and measurable (Project Management Institute, 2013).

7. **Support** – This sub-section is subdivided by ISO, all having different requirements.
 - a. Resources – The organization must acquire and provision resources for establishing, implementing, maintaining, and continually improving the (QMS).
 - b. Competence: The company needs to determine the level of skill that each person needs to have and make sure they have the right kind of education, training, and experience.
 - c. Awareness: Competence by the standard is closely related to awareness. Workers must be made aware of the Quality Policy's provisions, as well as any upcoming changes that may influence their job duties.
 - d. Communication – The process of both internal and external communications must be set up.
 - e. Documented information – The requirement for the correct documentation is highly emphasised and recommended by ISO, both for internal and external processes (Project Management Institute, 2013).
8. **Operation:** For the operational component, which is the centre of the process, ISO has established several standards. Meeting the needs and expectations of consumers depends on operational planning and control. Setting design and development guidelines inside the company is crucial, but so is maintaining an eye on any services or goods that are supplied from outside the company. A mechanism for implementing remedial actions and one for managing non-conforming items are also required (Project Management Institute, 2013).
9. **Performance evaluation** – At the heart of ensuring optimal quality is the process of monitoring, measurement, analysis, and evaluation. ISO mandates an internal audit system aimed not at identifying nonconformities in products but at auditing the QMS process itself. Additionally, top management is required to conduct a management review concerning the QMS.
10. **Improvement** – continuous improvement is an important factor in ISO 9001:2015 and hence one of its requirements is based on a system for improvement, non-conformities, and corrective action (Project Management Institute, 2013).

2.4 ISO 9001:2015 and the construction industry on a Global Level

2.4.1 ISO Standards within the Construction Industry

The construction industry has consistently shown how closely it is linked to a nation's economic development. The consequences of poor performance over time, particularly in terms of quality,

have highlighted the need for a quality system. One of the most well-known quality systems, the ISO quality management system, has been gradually incorporated into the construction industry globally to improve client considerations from the inside out. (Aburas, 2020)

This global trend has been confirmed over time; in fact, project-based construction companies that follow the ISO QMS have benefited from advantages both internally and externally. According to a study, these construction companies have experienced rapid improvements in internal areas, which is good for the company and its employees. Improvements in working procedures, documentation, productivity, efficiency, and communication have all been noted (Aburas, 2020). Externally, the advantages centre on improving the company's reputation overall and increasing efficiency, which reduces cost overruns and delays and, in the end, increases profitability for the client and the contractor. Moreover, by meeting and even surpassing client expectations, construction companies that have implemented an ISO QMS have enhanced their overall relationships—not just with suppliers but also with customers (Aburas, 2020). As a result, the ISO QMS contributes to improving performance optimization both internally and externally, leading to an overall improvement in project quality.

The relationship between ISO certification and the construction industry, specifically in terms of performance, was examined in a study conducted by Din, Abd-Hamid, and Bryde (2011) in Malaysia, an area where construction companies were in the initial stages of QMS verification. The study incorporates principles of project management, financial management practices, and project success. Results indicate that ISO certification contributed to overall improvements in project management (PM) practices and financial management (FM) practices. Utilizing a certified QMS demonstrated its most significant influence in PM process leadership, overall policy and strategy, and activities throughout the project life cycle. Conversely, the study also reveals that operating with a certified QMS resulted in tangible improvements such as reduced cost overruns, adherence to schedules, and enhanced process quality with fewer reworks. This, in turn, contributed to an enhancement in the measure of project success and consequently increased client satisfaction.

To examine ISO quality standards in construction, Bubshait and Al-Atiq (1999) conducted a study in Saudi Arabia, evaluating the quality systems of 15 contractors against ISO standards. The study revealed that a significant proportion of contractors view ISO certification as a valuable tool for construction companies. The study emphasizes that certified process management leads to the delivery of high-quality services. It is noted that certain additional activities may incur costs, but they also add value, and clients prefer to have these activities performed and are willing to pay for them.

Karunaratne's (2019) study assesses how ISO 9001:2015 affects the project performance of Sri Lankan state-run construction companies. The study found that project performance is greatly improved when the 10 standards of ISO 9001:2015 are implemented effectively: scope, normative

references, terminology and definitions, organisational context, leadership, planning, support, operation, performance evaluation, and improvement. Important conclusions show that although active participation from top management is necessary for a successful QMS deployment, it is frequently insufficient. Sustaining QMS activities requires a strong infrastructure, well-defined competencies, and adequate training. Standard conformance in operations is guaranteed by appropriate documentation and quality controls. To find anomalies and promote continuous improvement, audits, and data analysis are required for ongoing performance evaluation. The research findings indicate that the successful implementation of the ISO 9001:2015 framework can have a good impact on customer satisfaction, operational efficiency, and overall project success. This can be achieved by removing significant obstacles and promoting improvements within the construction industry (Karunaratne, 2019).

A well-documented QMS boosts consumer confidence, which increases client retention and sales, claim Patel and Pitroda (2021). It ensures regulatory compliance in the most economical and resource-efficient way possible, supporting the organization's expansion and profitability. Moreover, the systematic documentation procedure lowers waste, minimises errors, and enhances overall operational effectiveness. A QMS also offers chances for learning and growth, which can aid in attracting and keeping qualified workers. The organization's internal coordination and communication are also enhanced by the formalised management procedures (Patel & Pitroda, 2021).

2.4.2 Limitations

Although ISO 9001 certification has many potential advantages, attaining this standard does not ensure that all of its benefits will materialise. While Magd (2008) emphasises the implementation challenges that occur when project teams lack a good understanding and execution of the QMS, George (2015) notes a lack of awareness and training on the benefits of the ISO 9001 QMS. The specific characteristics of the construction business frequently make it more difficult to implement QMSs successfully in this field, posing particular difficulties that are not present in the manufacturing industry, which uses more standardised procedures (Aburas, 2020). According to Boiral (2011), a lot of project managers prioritise certification over process efficiency because they see QMS mainly as a marketing tool rather than as a way to increase project value. Operational inefficiencies may arise from this misalignment as a result of inefficient QMS implementation. Inadequate senior management support is cited by Khattak and Arshad (2015) as a major barrier to the implementation of QMS in construction projects. Moreover, Rybski et al. (2017) raise concerns about the scant proof of the QMS's real influence on project performance, emphasising problems like inadequate training and awareness of the QMS as significant obstacles for project owners and managers. Furthermore, as noted by Neyestani and Juanzon (2017), some businesses believe that

implementing ISO 9001 is an expensive and time-consuming process that offers no meaningful benefits beyond satisfying client needs and preserving market competitiveness. (Aburas, 2020)

Another study points out a number of shortcomings with regard to the use of ISO 9001 in the construction industry. One major drawback is that ISO 9001 is seen as a "paper qualification," which casts doubt on its legitimacy and usefulness. The cutthroat market for ISO certification may jeopardise integrity and quality. Furthermore, issues including poor participation from upper management, inadequate training for staff, and ambiguous roles and responsibilities are brought to light. Effective quality management system implementation is further hampered by the bureaucratic structure of state sector organisations (Karunaratne, 2019).

2.4.3 Challenges

There are many obstacles in the way of the construction industry's adoption of ISO standards. The ever-changing nature of construction projects, along with unforeseen hazards and shifting scopes, makes it challenging to maintain consistent quality management procedures. Effective implementation is further hampered by the lack of support or apathy among stakeholders, especially from upper management. Unrealistic expectations set by project managers or clients can also cause dissatisfaction and a sense of failure. Standard procedures like ISO 9001 may not always work successfully because building work is bespoke and each project has distinct requirements. Other obstacles include the short-term nature of employment, inadequate worker training, and a lack of technical expertise. Effective implementation is further hampered by hostile contractual agreements and inadequate communication. Lastly, some project managers become resistant because they believe that ISO standards are unnecessary and bureaucratic (Aburas, 2020).

2.5 The construction industry on a Local Level (Malta)

2.5.1 Local Perspective

The building sector is commonly regarded as a growth engine that propels a country's economic development. Malta has experienced significant growth in development over the past decade. In 2018, the number of approved planning applications hit a peak of 10,305. Over the previous years, approvals had surged from 3,244 in 2013 to 9,112 in 2017. After reaching their peak in 2018, approvals numbered 9,821 in 2019, 7,460 in 2020, and 7,621 in 2021 as seen in Figure 8 (Times of Malta, 2023). There has been an average increase of 7,345 dwellings per year. This represents the largest intercensal growth in dwellings ever recorded in Malta, with the dwelling stock more than quadrupling over the century from 1921 to 2021. (National Statistics Office, 2023) - census.

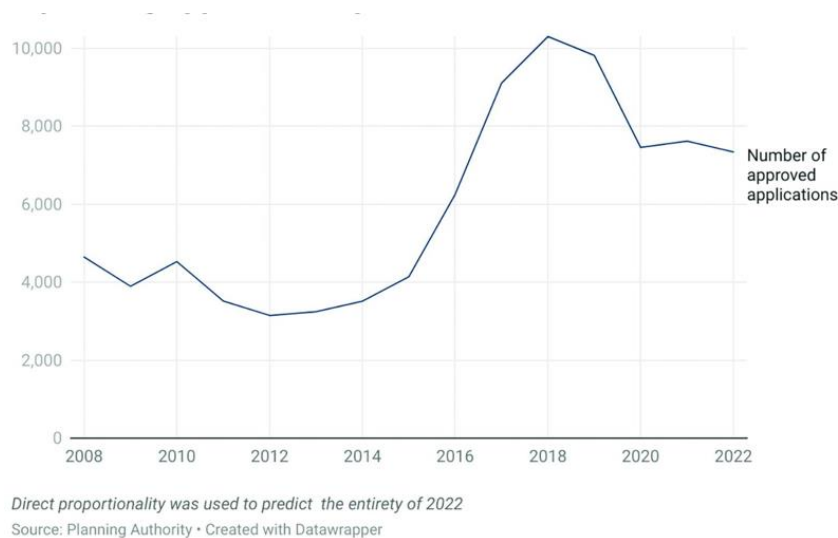


Figure 8: A graph showing statistics along the years (Times of Malta, 2022)

Moreover, this data is also translated into the contribution the sector provides to Malta’s total economy. NSO data from recent years suggests that the sector’s contribution fluctuates between 3.5 and 5% of Malta’s total economy and makes up almost 6% of Malta’s employment list (National Statistics Office, Malta, 2023). In spite of this, a number of reports have pointed out the deficiencies of the industry, namely with regard to quality, productivity, and quality management systems.

In his thorough analysis of the effects of Quality Management Systems (QMS) on Malta's construction industry, Zammit (2022) finds that differing degrees of adherence to quality standards cause notable differences in project success. His findings highlight how important it is to have strong quality assurance processes in place to improve project effectiveness and lower the number of cases of subpar workmanship that occur in projects without stringent quality controls. Zammit is an advocate for the industry-wide standardisation of quality assurance procedures through the use of international standards such as ISO 9000/9001. He shows through case studies and comparative analysis that good quality control not only minimises the need for rework, which lowers costs and mitigates risks, but it also greatly increases stakeholder confidence in construction results. His suggestions place a strong emphasis on the necessity of frequent inspections, competent worker training, and improved stakeholder communication to maintain high standards of quality and promote sustainability and economic gains in Malta's construction sector.

In his investigation of the quality issues raised by Malta's recent construction boom, Portelli (2022) points out serious shortcomings in regulatory enforcement and on-site monitoring that have resulted in a number of safety mishaps and structural breakdowns. The report emphasises the necessity of a strong licensing system for contractors, together with extensive training initiatives to raise industry standards for professionalism. In addition, Portelli supports the establishment of strict, regionally tailored quality and safety regulations to meet the particular needs of the Maltese

building industry. The results underscore the critical importance of strengthened accountability protocols for all parties involved, advocating for a transition to sustainable building methods that give precedence to the well-being of the community over short-term profits. Through these suggestions, the study adds to the conversation on building a robust and accountable construction industry in Malta.

2.5.2 Legal Notice – Contractor licensing

Since the moment Portelli suggested the licensing of contractors, a regulatory framework for the construction sector in Malta has been established by the Construction Sector Licencing Regulations, 2023, in accordance with the Building and Construction Authority Act (CAP. 623). According to the Building and Construction Authority Act of 2023, these regulations require all organisations and persons engaged in building, excavation, and demolition to get a valid license by fulfilling certain technical and safety requirements. The Construction Industry Licencing Committee is constituted to supervise the licensing procedure and guarantee adherence to prescribed guidelines. Additionally, the laws include provisional clearances, which allow applicants to temporarily carry on with their operations while the application procedure is underway. Fines and jail time are the consequences of non-compliance, underscoring how crucial it is to follow these rules. Those who are already working on construction projects can continue under temporary conditions while applying for official licenses, thanks to transitional arrangements. (Government of Malta, 2021)

2.6 Chapter Summary

The building industry frequently faces challenges with quality control, which can result in flaws, reworks, schedule delays, and cost overruns. To guarantee that projects fulfil customer expectations and are finished on schedule and within budget, effective quality management is essential and calls for Quality Management Systems (QMS).

Three key components comprise construction quality management: assurance, control, and planning. Early in the project, planning establishes documentation procedures and quality requirements. Quality control assesses performance and makes the required corrections, while quality assurance employs audits to monitor and uphold standards. With the introduction of ISO 9001:2015, which places a strong emphasis on risk management and continuous improvement, the ISO 9000 family of standards in 1987 laid the groundwork for an international framework for quality management. The ISO QMS improves external and internal interactions and may be applied to a variety of industries. This helps to make construction projects successful both locally and internationally.

CHAPTER 3

3. Methodology

3.1 Introduction

This chapter presents the framework used to analyse the impact of quality assurance in the Maltese construction sector using ISO standards. The chapter outlines the research design and the methods used to acquire the relevant data. Moreover, the methodology chapter highlights the selection of the different parties involved in this area of research and the nature of the choices made to validate the study. It explains the rationale behind the decisions made as well as the credibility of the research and any limitations of the study.

3.2 Research Design

As stated in Chapter 1, the study's goal is to analyse the impact of quality assurance within the Maltese construction sector, while also considering the integration of certified quality management systems such as those offered by ISO Standards. Given the lack of regularisation within the sector locally, the different scales of contractors, and the different levels of standards implemented, the topic brings complexities in understanding where things stand. Hence, before setting out the research design, one must understand what is being questioned in the corresponding research questions. Given the uncertainties within the sector, one would pose questions regarding the “how?” and the “why?”, rather than “how many?” and “how much?”. In this case, for such a type of inquiry as this, a qualitative approach is the most appropriate method for addressing the questions within the study (Crowe et al., 2011).

A qualitative study allows for the stakeholders to express their ideas and opinions regarding the topic being discussed. In addition, given the scarcity of direct information on quality systems within the local construction sector, first-hand qualitative information provided primary data beneficial for the study which was required to set a baseline of data for validity. The research examines multiple perspectives on quality in construction and the incorporation of quality management systems. With the collection of non-numerical data, it was possible to collate human experiences and theories along with organizational practices.

In addition, the research made use of a case study-format approach. This is particularly useful to get an in-depth understanding of the topic within the sector in a real-life context. Case study data is useful for explaining a topic or a number of events in everyday life. Hence, this approach bridges the data collected between the different stakeholders investigated to find the true gaps within the sector and why the implementation of one strategy may be preferred over another (Crowe et al., 2011).

3.3 Purposive sampling Technique

A critical component of the research is participant selection, which aims to gather important data from key interviewees in the Maltese construction industry. Purposive sampling was employed as part of the qualitative data collection technique with input from participants working in senior management in the local sector.. Criterion sampling is a purposive sample technique used in research to select people based on preset criteria or features. This selection strategy enables researchers to concentrate on study participants who have certain features or experiences that are relevant to the research aims (Saunders et al., 2019). There were eight participants altogether, split equally between developers and contractors. Selected participants had to meet two criteria: (i) participants interviewed from the contractor's side were involved in the top management of the contractor's company or had direct input within the quality management system of the contractor's company; (ii) developers were either project developers themselves or client representatives.

In keeping a standard baseline with the chosen sample, four projects currently in the implementation stage within the local sector were selected as part of the interview process. In addition, the projects were chosen depending on 4 major areas of construction: residential, industrial, commercial, and government projects. (Refer to diagram 9)

Moreover, given that the study aims to analyse the integration of quality management systems within contractor companies, a number of participants identified were either a contractor who has no association with ISO quality management systems, a contractor who has just started the process, a contractor who has just been certified, or a contractor who is experienced in the integration of ISO quality management systems.

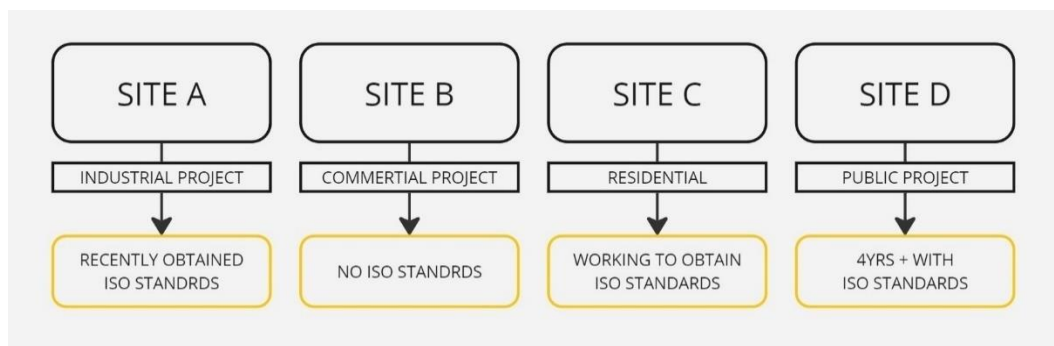


Figure 9: Description of site type and contractor ISO status (Author, 2024)

The recruitment process for potential participants to ensure suitable individuals were willing to participate consisted of initial contact via phone and email. A screening exercise was conducted to confirm that the participants fell within the required categories and were eventually provided with an information sheet highlighting the aim of the study and the rights of the participants to make clear all ethical conformities. Consensus was reached among all participants on a number of research areas, and when data saturation was achieved the sample was completed.

3.4 Qualitative Approach: Case Study method

Data collection is an important aspect of this study, which is designed to obtain the most valuable information from key stakeholders. As previously highlighted, a qualitative approach was chosen as the ideal method to investigate this case study research. Prior to initiating data collecting, it is essential to carefully design and establish a case study database, which should be consistently maintained during the whole process (Yin, 1994). A structured and classified collection of case data simplified the process of analysing the evidence from the case study and ensuring a consistent chain of evidence was made available to substantiate the development of conclusions based on the obtained data. The case study database included case-related information, videos or audio recordings of interviews, surveys, or other quantitative data (Saunders *et al.*, 2019). The primary method of data collection was via semi-structured interviews. Principally, this allowed a conversation between the interviewer and the participant that was flexible and open-ended. The goal was to give the participants the perfect platform to express their experiences and views. In addition, a semi-structured interview allowed the participant to delve into lateral topics that may not have been considered by the researcher but were relevant to the case being explored.

3.5 Designing a semi-structured interview guide for qualitative interviews

Data was obtained via qualitative interviews conducted with different actors who had expertise in the building sector, and this involved conducting individual interviews to observe the responses of the participants. Prior to the study, the interview questions were formed to focus on the main objectives and tackle the research questions. The questions were identical for both the contractors and the developers. This was primarily to establish a benchmark for all the interviews and to identify similarities and differences during the analysis. The structure of the interview consisted of nine questions, which are listed below.

The questions first look at the basic notions of quality, quality control, and assurance. Then the study shifted towards gathering direct information on how the organization that the participant is part of functions. This led to question the implementation of quality management systems within contractors in the Maltese construction sector and searches to find the main research gaps in doing so. Lastly, the participants were also asked about potential implementation plans within the sector and allowed to express their opinions.

In brief, the questions targeted the knowledge of each participant regarding the topic, the current focus and mechanisms of the organization regarding the topic, the integration of quality management systems, and the way forward. The questions included those listed below:

1) What is your idea of quality in construction projects? Additionally, what do you believe are the primary factors necessary to achieve this, from the planning stage to the project handover?

- To gain an understanding of the idea of quality in construction that the contractors and developers being questioned in this study have. Also, the participants are being asked to give information on what they think are the primary factors throughout the project.

2) Can you differentiate between quality control and quality assurance? How crucial do you perceive both of these aspects to be to your projects for the benefit of your clients?

- To have direct information on the idea of quality assurance and control for contractors and developers, as well as how it is perceived within their company. Also, the participants are asked whether this topic is beneficial for the client.

3) As a developer, when managing your projects, how do you prioritize between time, cost, and quality? Kindly elaborate on your reasons behind this prioritization.

- To compare the questions from the first two answers with the answers given in this question. Also, the study aims to compare these three factors from the contractor and developer perspectives.

4) Considering your prioritization of project elements, are there established mechanisms within your business to ensure quality under all circumstances?

- To understand how things stand within the local construction sector. How do the different contractors tackle quality, and what procedures do they have? Also, what do the developers think about the contractor's standards?

5) Implementing certified quality systems in construction projects ensures a certain level of quality assurance. What are your insights on this practice?

- This question aims at understanding how much the participants are familiar with the idea of certified qualified management systems within the sector.

6) ISO standards serve as globally recognized certified systems for construction project implementation, providing clients with a standardized level of quality assurance. Are you familiar with ISO standards and their operational mechanisms in construction projects?

- The question aims to understand if the participants are familiar with the ISO standards and their relevance within construction projects. This question also serves to

clarify the understanding of ISO standards for those who lack a definition for further questions.

7) ISO Standards, particularly ISO 9001:2015, emphasize a quality management system built on various requirements spanning leadership, planning, support, operation, performance, and improvement. Do you believe such a framework has relevance in Malta's construction sector at present? Considering the current scenario, do you perceive investment in quality as imperative? And do you anticipate that certified quality will entail additional costs?

- This question aims to understand what the participant thinks about the local sector's implementation of the ISO Standards. Its relevance and the pros and cons that such implementation may have.

8) Recently, in Malta, there has been a process of listing contractors in the sector. Do you believe the next logical step should involve ranking contractors based on certified processes and their capabilities, which could also influence the awarding of tenders and the allocation of project sizes?

- This question delves into understanding each participant's perspective on where things are at the moment. In addition, it allows participants to give their opinions about categorizing contractors similarly to what is being done in other European countries.

9) In conclusion, do you see this approach as the way forward for enhancing quality in the construction sector? Do you perceive it as beneficial overall? What gaps do you perceive need addressing, and what steps do you think should be taken moving forward to ensure continuous improvement?

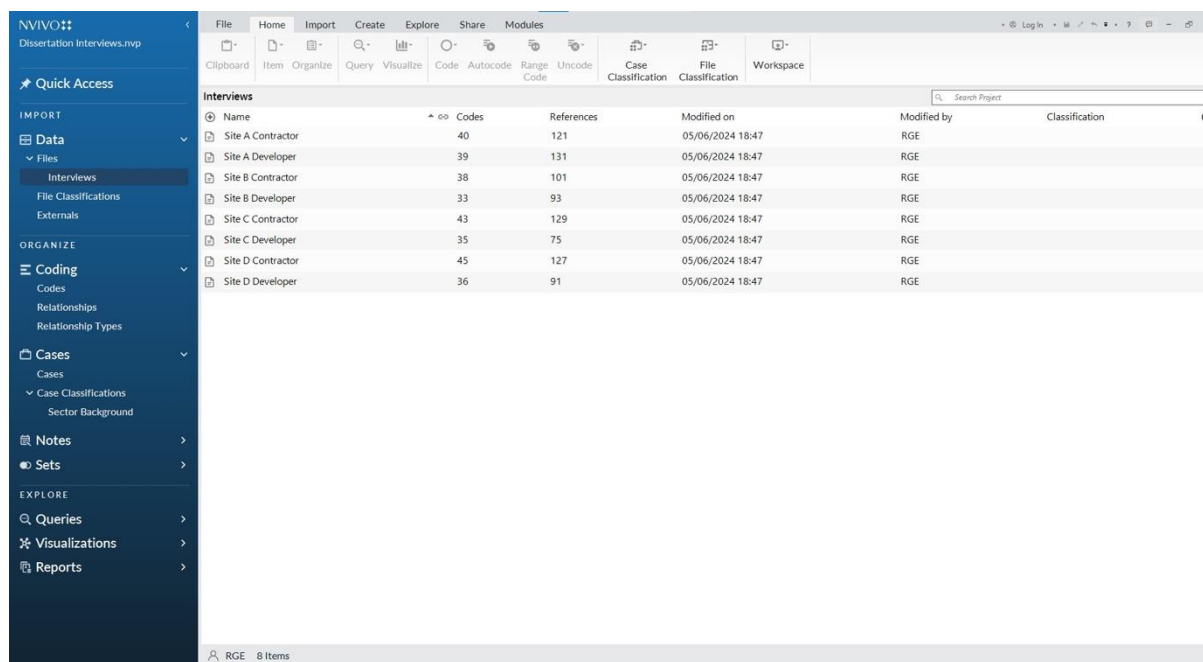
- To allow the participants to express their own opinions, what they believe are the true gaps to be addressed within the sector, and what the path forward should be.

Moreover, the data collection process consisted of interviews conducted in person, each lasting approximately 30-45 minutes to allow for discussion. With the documented consent of each participant, the interviews were all audio-recorded to provide accurate data collection.

3.5 Data Analysis – Software NVIVO14

The data analysis process is the foundation for obtaining valuable results from qualitative data given by key stakeholders. The transcription process for all eight interviews was the first step in the analysis. The audio-recorded interviews were accurately transcribed, including all the spoken words and some pauses or other emphasis to give as much as possible a realistic context of the interviews. The transcripts were typed, cross-checked with the recording, and reviewed to achieve the most accurate transcriptions of the interviews.

The next step involved inserting the data into NVIVO 14 Software. A project file was created within the program and structuring of the data inputs occurred as could be seen in Figure 10. Given that four interviews were conducted by contractors and the other four by developers, ‘Cases’ within NVIVO were created to help filter out results in the following steps.



The screenshot shows the NVivo 14 software interface. The main window displays a table titled 'Interviews' with the following data:

Name	Codes	References	Modified on	Modified by	Classification
Site A Contractor	40	121	05/06/2024 18:47	RGE	
Site A Developer	39	131	05/06/2024 18:47	RGE	
Site B Contractor	38	101	05/06/2024 18:47	RGE	
Site B Developer	33	93	05/06/2024 18:47	RGE	
Site C Contractor	43	129	05/06/2024 18:47	RGE	
Site C Developer	35	75	05/06/2024 18:47	RGE	
Site D Contractor	45	127	05/06/2024 18:47	RGE	
Site D Developer	36	91	05/06/2024 18:47	RGE	

Figure 10: Snapshot from NVivo 14 software showing the different interviews (Author, 2024)

The process of analysis started with a read-through of all the texts to further familiarize with the main ideas throughout the interviews. After that, the manual coding process was initiated. As can be seen in Figure 11, segments of the text were assigned manually to different nodes. These words or sentences provided crucial information following each interview question throughout the discussions. Throughout this process, different codes were being created. These codes represented different concepts and ideas relevant to the research questions. The different interviews brought up codes that were very popular and others that were unique to specific interviews. In the case that text references had the main idea already coded before, the same code would be used. The popularity of codes was analysed at a later stage.

As all the texts were analysed, the codes listed were revised and refined. This ensured that the highlighted codes thoroughly represented the data. Codes with similar ideas and topics were organized into themes in a hierarchical structure. Hence themes and sub-themes were developed from the codes which are represented with parent and child nodes in NVIVO 14 Software.

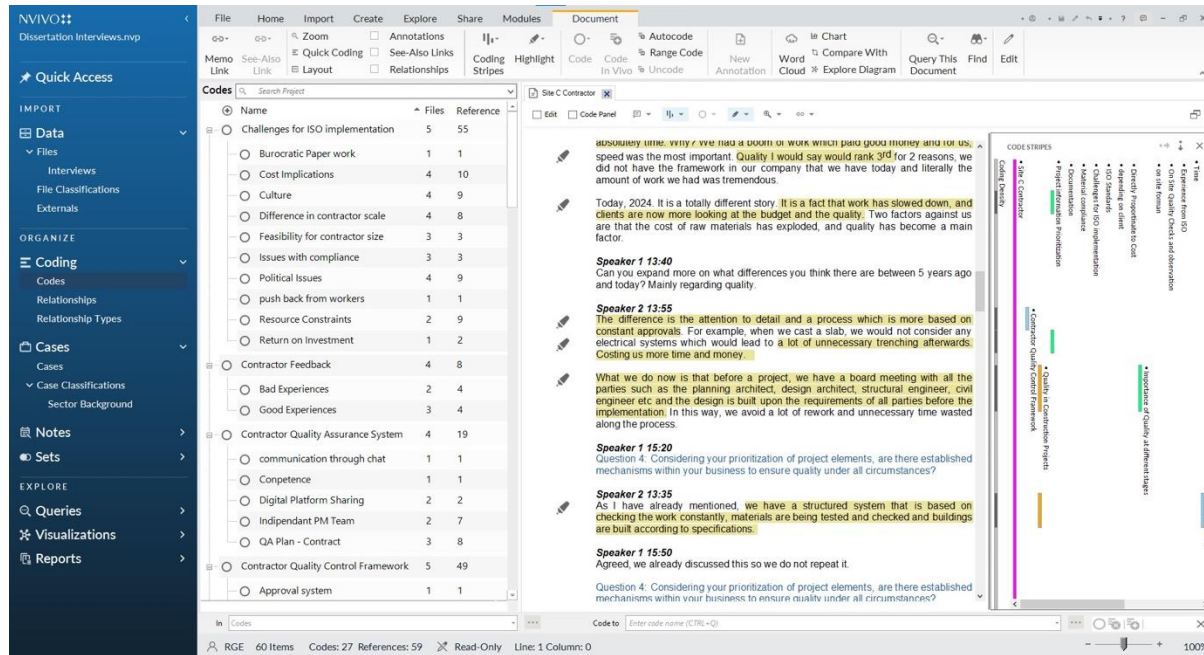


Figure 11: Snapshot from NVivo during the coding process (Author, 2024)

Figure 11 highlights the process of the analysis. Several of the different codes are shown on the left-hand side. Highlights of segments from the interviews are shown in the middle part of the screen. Every reference is cross-linked with a code. The diagram on the right shows how the different codes overlap throughout the text. This process was performed for all eight interviews.

As the process of analysis was finished, interpretation of results was conducted. The findings were integrated and the different data from codes was cross-referenced, linked, and reported. Relationships between the findings, the themes, and the research questions were drawn, and links were discovered. Utilizing NVIVO 14 visualization tools, data visualization was also made use of such as clouds, charts, and themes.

3.6 Ethical Considerations

This research has considered ethical considerations regarding issues of consent, confidentiality, and other sensitive information throughout the qualitative research. Before conducting the interviews, the interview questions were consulted and presented to the Faculty Research Ethics Committee (FREC) at the University of Malta for approval. This approval ensured compliance of the interview questions with all ethical standards.

Moreover, prior to the interview, the interviewees were presented with an information sheet regarding the aims of the study along with their privacy rights and anonymity. Participants were asked to sign a consent form outlining the rights and voluntary involvement. The consent form specifically stated that participants could withdraw from the interview at any time and that all the data collected would be handled with utmost confidentiality. Any information leading to identification shall be deleted.

Lastly, ethical considerations also include the safe storage of all data collected and the guarantee that all data shall be destroyed within four years from publication, as specified in the consent form.

3.7 Limitations

In this dissertation, a number of limitations must be acknowledged. Firstly, it is important to acknowledge that participants may have been reluctant to be completely candid and disclose the whole truth during the interviews, especially when addressing topics related to contractors or developers. This is mainly because the projects are still ongoing. This could have also led to partial bias in the given responses. Moreover, the conclusions drawn in this study are based on subjective data due to the qualitative nature of the study.. Therefore, this is derived from testimony and personal encounters rather than empirical evidence gathered from qualitative study. Qualitative data is derived from the subjective impressions and interpretations of individuals.

Lastly, the pool of data obtained from this study was limited to eight interviews mainly due to time constraints. While the data collected provided valuable insights, the collection of a larger pool of data would have offered a more global and comprehensive view of the construction industry in Malta. The limited number of interviews may have not captured the full picture and perspectives relevant to the research topic. Despite these limitations, this study can provide the primary important insights for future studies to be built upon.

CHAPTER 4

4. Results & Discussion

4.1 Introduction

This chapter presents the findings from the semi-structured interviews conducted. The aim herewith is to understand how quality management systems such as those proposed by ISO Standards are perceived by key stakeholders; along with the factors that hinder implementation, as well as the gaps and steps that should be taken to move forward. The results are formulated around the themes that have been discovered during the data analysis shown below in Figure 12. As can be seen in Figure 12, parent and child themes have been formed through the data analysis. As an indicator, the bigger the angle within the hierarchy pie chart, the more codes were referenced to that theme during the study.



Figure 12: A hierarchy pie chart illustrating the parent codes (Author, 2024)

The chapter starts by explaining the main themes discovered during this study, as shown in Figure 12. This includes the level of understanding of quality within the construction sector, as well as how important it is perceived locally. Furthermore, the current quality systems and processes implemented by the different contractors were analysed and discussed with the developers. In

addition, the level of awareness of ISO standards among participants was discussed. Insights regarding the challenges and benefits of such a standard implementation were analysed.

Moreover, a comparative analysis of the feedback given by contractors and developers was conducted, and the differences and similarities were highlighted. Finally, suggestions for the industry collected throughout the interviews were analysed and discussed.

To support the findings and discussions within this chapter, various visuals were generated using NVivo 14 software. Visuals are used to improve the understanding of the qualitative data collected and strengthen the various arguments. These include pie charts, bar graphs, word clouds, matrix coding, comparison diagrams, and others.

4.2 Quality in Local Construction Projects

4.2.1 Perceptions and Key Elements

During the analysis of the collected data, developers and contractors advanced several themes regarding their perceptions of quality in local construction projects. All the stakeholders have different priorities; however, some themes have become more popular. As shown in Figure 13, these themes include the prioritization of the quality of the process, the importance of quality at all stages, the experience within the process, and the relation to the cost.

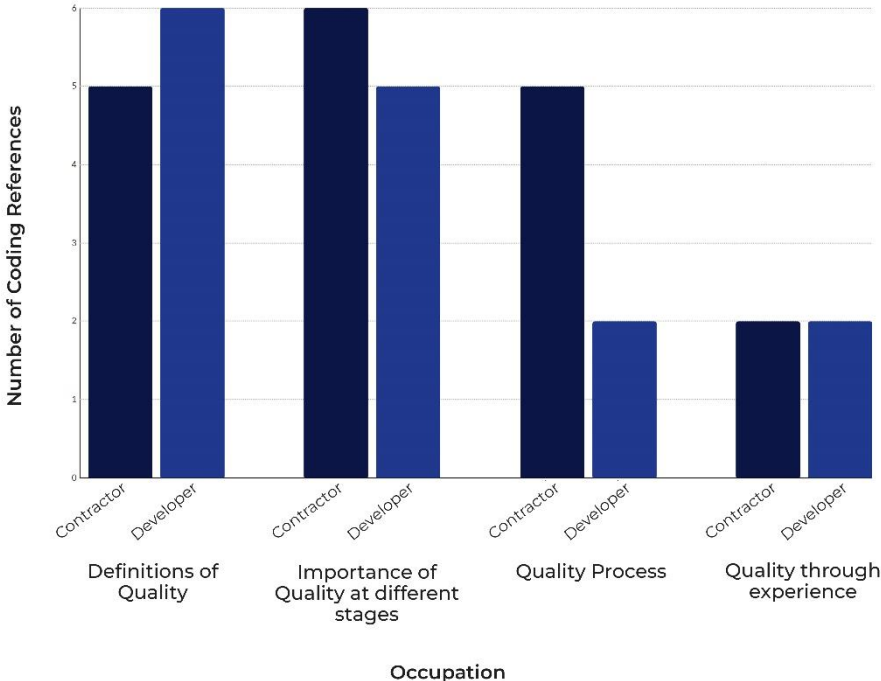


Figure 13: A graph showing the number of codes inputted regarding quality against occupation - Developers and Contractors (Author, 2024)

Both the developers and the contractors insisted that quality in construction is achieved through the final product itself and the processes involved. The contractor for site A stated, “I think there are two aspects to this, the quality of the product and the quality of the process”. This was also reinforced by a statement for the contractor of site C who stated that “different factors at the end lead to a good final product”. In addition, a popular response among the stakeholders was the importance of adhering to the specifications instructed by the design team. To achieve the desired quality in construction, adherence is deemed essential. The developer from site A stated, “The construction is built as per specifications from the architect”. Similar to this, the contractor from site B stated that “Quality in construction is targeting and adhering to project specifications”.

Other crucial aspects of achieving good quality highlighted by contractors and developers were the importance of testing and certifications throughout the process. The developer of Site B stated, “I think it is mostly based on the type of testing that goes into the materials that are on-site and certification”. In addition to this, experience and skilled workmanship were also among the crucial aspects declared by both the developers and contractors as integral parts of achieving high-quality standards. Contractor C mentioned, “Quality is an outcome directly related to the workers who can work with high standards.

This section highlights that both contractors and developers have a good idea of what vital aspects need to be considered to achieve good quality standards in construction projects.

4.2.2 Project information and its Prioritization

The thematic analysis proceeded with a study of how the developers and contractors prioritize time, cost, and quality in the different projects. The data shown in Figure 14 and 15 shows consistent prioritization between the two stakeholders.

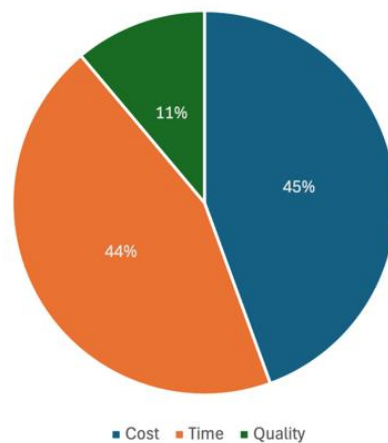


Figure 14: Project Prioritisation - Contractors (Author, 2024)

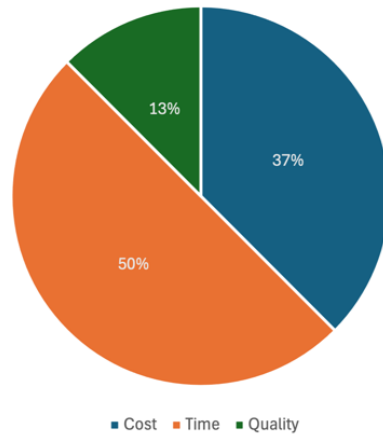


Figure 15: Project Prioritisation - Developers (Author, 2024)

All the contractors in this analysis prioritized time and quality as interlinked components that are their top priorities, with quality ranking third. The contractor from site A stated, “The priority is cost. Cost and time go hand in hand”. This was echoed by another contractor, who during the discussion answered, “In my opinion, the primary targets were cost and time”. Overall, contractors ranked time and cost equally, with 45% for both, as can be seen in Figure 14.

On the other hand, developers answered almost identically to the contractors. Slightly more emphasis was given to time; however, the gist of the trend is similar. The developer from site A stated, “I mean, I give them both (time and cost) the same priority to tell you the truth”. This was reinforced by the statement of another developer who said “Time and cost are the most important”.

Although quality was not ranked as a top priority by the stakeholders, it was not overlooked in the different projects. The importance of quality was also highlighted in specific contexts. The developer of site D stated, “We are quite amazed at the quality level we managed to achieve on this project”, in addition, a contractor from site C highlighted that different clients have different attention to detail, “for a high market project, attention to detail is crucial”.

These insights show that contractors and developers often prioritize cost and time in their projects, but quality still plays a major role.

4.2.3 Importance of quality at different project stages

The interviews with contractors and developers also highlighted the importance of quality at different project stages. The thematic analysis highlighted four main aspects popular with the different key stakeholders.

The first important aspect is quality considerations during the project's early stages and initial planning. A contractor from site A also insisted that when bidding for a tender, quality aspects

should be kept in mind and incorporated into the project estimates. He stated, “The quality of the product should be in mind from the beginning. Are you building cheap concrete walls or are they nice?”

The second key aspect was establishing quality control and assurance mechanisms prior to the project's implementation. It was stated that to avoid issues at a later stage, these systems should be agreed upon. The developer from site A stated, “Quality control and quality assurance are very important to be set up at the initial stages and agreed upon how it will work.”

The third key aspect highlighted is collaboration and coordination among all stakeholders involved in the project. The early collocation from the early planning stages is very effective in ensuring quality throughout. This was confirmed by the developer from Site A, who stated that “M&E contractors, were with us in the first stages of the design stage”. Such coordination will avoid rework and eliminate mistakes, avoiding extra costs for the client.

In summary, effective coordination and planning with a structured system from the early stages of the project to the actual implementation of the project lifecycle is crucial in construction projects, as highlighted by both the contractors and developers in this study.

4.3 Current quality management frameworks employed by contractors

Several important themes have emerged from the thematic analysis conducted on the interviews with contractors and developers. The stakeholders were asked about the current quality systems in the local construction sector, as well as what mechanisms and frameworks they use to ensure quality. The responses collected were divided into frameworks regarding quality control and quality assurance in NVIVO software. Till this point, no links with the ISO Standards were mentioned, and an analysis regarding the current frameworks was equal between all contractors.

4.3.1 Quality control framework.

The main aspects of ensuring quality control listed in the interviews are listed in Figure 16. As can be seen, some themes are regarded as more important than others. Also, the difference in responses given by contractors and developers is visualised. The contractors were more aware of the quality control systems and the hierarchy's importance. These themes include documentation and certification, on-site quality checks and personnel, material compliance, and third-party inspections.

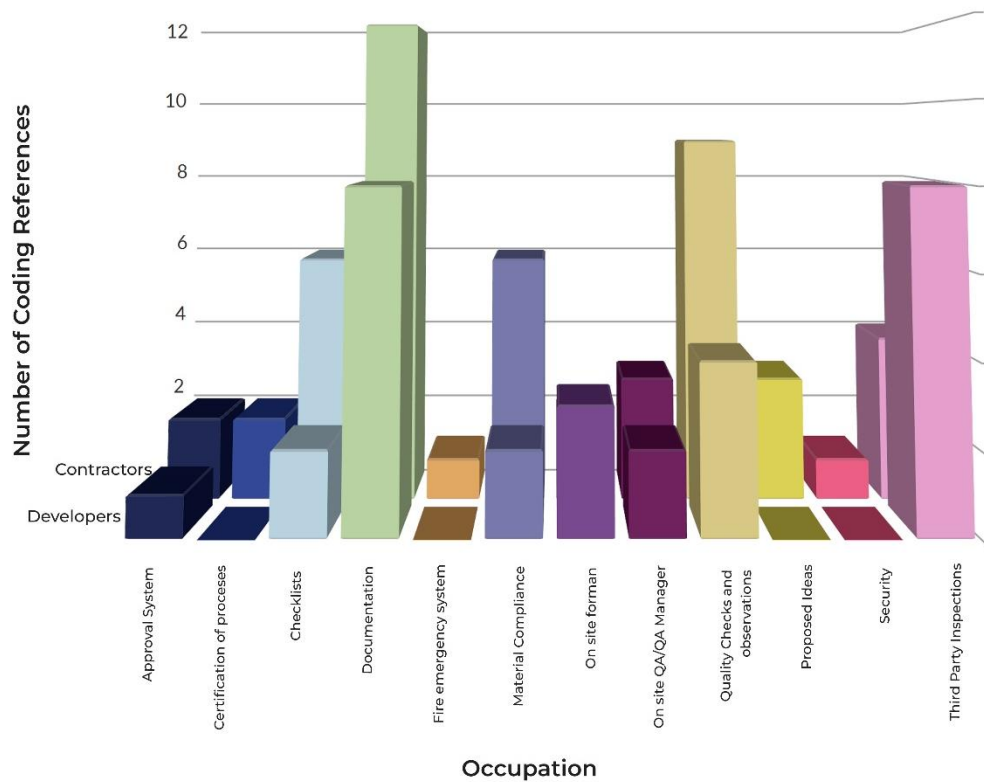


Figure 16: Number of coding references regarding QC against occupation- Developers and Contractors
(Author, 2024)

Documentation of the process was consistently highlighted by contractors and developers. The contractor from site D states, “Every step is reported and documented...certified and signed prior to any pouring of concrete”. There are multiple reasons why it is in the interest of the contractor to document thoroughly. The contractor from site C stated, “we can (1) monitor the work that is being done by the workers and (2) if needed one can look back specifically to every date”. As a result, the contractor uses documentation as a defence and a tool for variations.

The developer, on the other hand, sees documentation as an assurance system. The developer of site A mentioned, “There was a database and audit trail of everything.”

In addition, the checklist system for the works on site was also popular among contractors and equally viewed as a “ticking exercise” (Contractor Site A). However, with thick boxes, a high level of on-site observation is required. Almost all contractors mentioned that on-site, there is either a QAQC manager or a Forman responsible for quality control. Contractor Site A stated “we have a person whose specific role is to inspect and for two main reasons: (1) to give a quality product that we’ve built what they asked us to build. And (2) to catch mistakes before it is too late”. Hence, it

is common between contractors because, through their systems, quality is being checked and targets are being reached.

On the other hand, if we now look at the developers, one can see that the codes on NVIVO related to checklists, material compliance, quality checks, and observation are far less popular than the contractors. What is more popular is the involvement of a third-party inspector within the project. The developer from site A stated, “We onboarded quality contractors on the projects that reconcile practically with the quality results from the contractors”. This was echoed by the developer of Site B who stated, “We’re double checking the system” and also the developer from Site C who stated, “we usually test where we have large transfer slabs, major casts, beams, etc”.

In addition, there were also other frameworks mentioned by both the contractors and developers, such as approval systems, certification, on-site foreman, competence, etc. As seen in Figure 16, the contractors were more responsive in almost all aspects.

4.3.2 Quality Assurance framework.

The thematic analysis conducted on the interviews also produced interesting insights into the current quality assurance systems within local construction projects. In contrast with the response of quality control systems, for quality assurance systems, the developers were more insightful and informed. As shown in figure 17, the number of NVIVO codes from the developer side is higher.

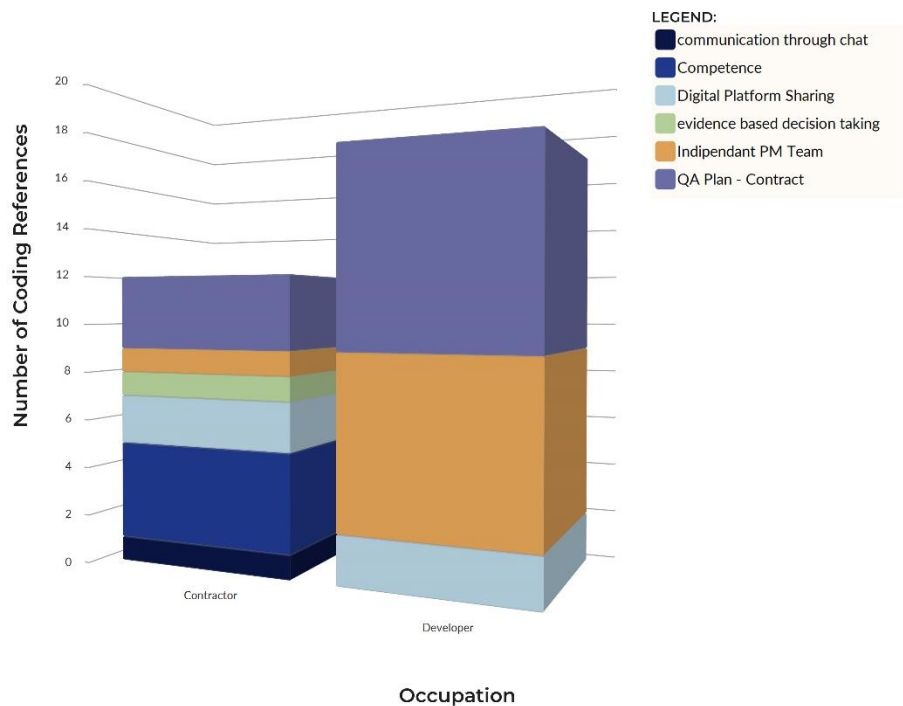


Figure 17: Number of codes references regarding QA against occupation - Contractors and Developers

(Author, 2024)

The two most dominant themes mentioned by the developers in regards to quality assurance, as seen in figure 17, are the option of having a quality assurance plan that is involved during the contract stage and the involvement of an independent project management team.

The inclusion of quality assurance measures during the contract stage is the foundation for ensuring good quality throughout the project. Contractors highlighted the importance of a quality assurance plan from the very beginning of the project and the approval system during the contract stage. The contractor from site B said, “At inception, we have done a Quality Assurance plan, which was in line with specifications and was submitted”.

On the other hand, developers also insisted that quality assurance plans should be set up early and agreed upon, highlighting the importance of efficient planning between the two sides. The developer from site A mentioned, “very important to be set up at the initial stages and agreed upon how it will work”. This was reconfirmed by the developer of site C who stated, “These are usually agreed upon prior to the implementation phase”.

Moreover, the involvement of a project management team was also highlighted by most developers in maintaining high-quality standards. The developer from site A that they onboarded “a project management team to make sure that things are in place”. The developer insisted that having a PM team on site is very effective supervision. He stated, “I have company X on site, which are the project managers and site supervisors, who do a brilliant job. They go every day, to check plans against installations.” The involvement of an independent PM team was also repeated from the developers of site B and D.

In addition, another point common between the two stakeholders was the digital platform sharing point. Basically, the contractor, the developer, and the other major stakeholders in the project would have access to all project information. Ranging from contract and tender forms to the daily documentation on site. Developer A mentioned, “There was a database and an audit trail of everything.”

Other remarks from the thematic analysis, mentioned only by the contractors as seen in Figure 17, included: competence checking of workers, communication platforms, and evidence-based decision-taking.

4.4 Implementation of ISO Standards in Malta

4.4.1 Overall assessment

The implementation of ISO Standards in Malta throughout the local construction industry presents a complex subject to tackle, as discovered during the thematic analysis of the interviews with

developers and contractors. The current construction scene has different wavelengths as it progresses locally. The sector includes contractors of various scales and different ambitions. Insights from the key stakeholders questioned in this study range from projects within residential, commercial, industrial, and public. Both the developers and contractors were asked what they thought about the implementation of certified quality systems locally, such as those presented by the ISO Standards.

Figure 18 shows the coding data collected on NVivo 14 software. The most frequent codes for developers and contractors related to ISO standards are listed. It is evident that throughout the discussions, the contractors had much more to say about the implementation of certified systems and ISO standards.

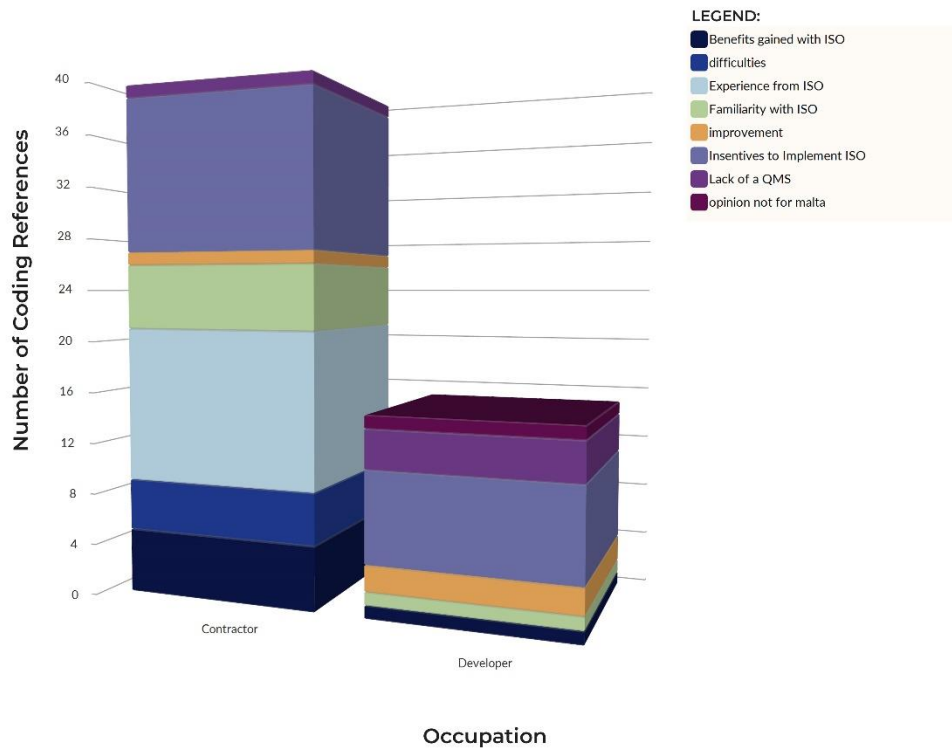


Figure 18: Number of coding references regarding ISO standards against occupation - developers and contractors (Author, 2024)

Various opinions and perspectives were presented in these interviews regarding the implementation of ISO standards. Both groups recognize the significance of such certification; however, opinions differ. The distinct viewpoints, complexities, and feasibility issues of adopting ISO standards shall be discussed below.

4.4.2 Developers' perspective on ISO Standards

The developers' perspectives on ISO implementation in Malta are mostly based on their experience of the lack of QMS in local projects and operational challenges. However, multiple developers mostly showed interest in ISO standards implementation locally and listed out several incentives for contractors to consider.

Developers in Malta particularly emphasized the need for a certified quality system to prevent local projects from having time delays and cost overruns, two factors that are very common within projects. Developer A stated, "The lack of a management system can lead to regret and extra costs, leading the project to overdue timelines". The same developer later added that the lack of a certified QMS has led to miscommunication between subcontractors. He then stated, "I think it is safe to say that certain areas the client had to pay for these items that the M&E consultant could have avoided in the first place" proving that inefficiencies are evident when the structure is absent.

In addition, developers with a renowned image of a company or a group would opt for a contractor who works based on a certified system. In fact, the developer of Site A which is an industrial site related to a fabrication company stated, "We didn't want anything to do with bad advertising and marketing when we came to the extension of the project". This was further reconfirmed by the developer of Site C who stated, "It would be beneficial for the client to be assured that for the tasks he needs, a qualified contractor with the required standards is appointed".

Therefore, developers during the interviews have shown an interest in ISO certification and its long-term benefits. The developer from site D stated, "One would need to ask, what benefit do I have engaging in contractor A, rather than contractor B...apart from cost, then comes quality". As a result, this is a clear indication that the QMS level would serve long-term in contractor selection.

Finally, evidence that ISO QMS aids in maintaining high-quality standards while constantly improving is a guarantee of a positive impact on the standards. In fact, developer D who was working on the project with an ISO 9001-certified contractor stated, "When we've worked with the same contractors on other projects in the past, with the same people and the same thing, the quality level wasn't the same."

4.4.3 Contractors' perspective on ISO Standards

The contractor's perspective on the implementation of ISO 9001 standards presents several different perspectives. Opinions are based on contractors who have both been operating with ISO standards for a couple of years and also those who do not have any certified systems yet. Hence, a thematic analysis of the interviews with contractors revealed critical insights.

The contractor from site A has just obtained ISO standards. The contractor from site B is not interested in obtaining an ISO. The contractor from site C is working to obtain ISO, and the contractor from site D is an experienced ISO contractor. This data is displayed in Figure 9.

Figure 19, shown below, presents the same coding data from NVIVO 14 as Figure 18; however, on the x-axis, the cases are plotted differently. The data is presented depending on the ISO status of the contractor.

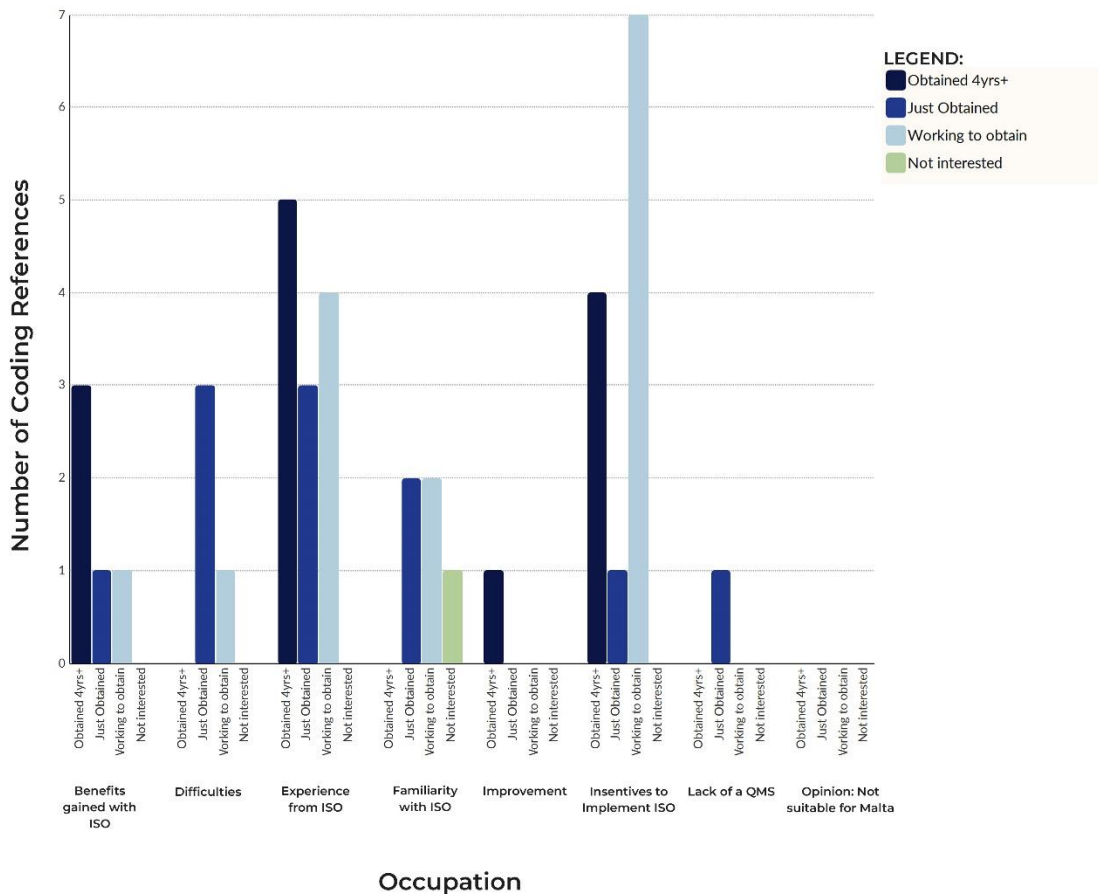


Figure 19: Number of coded data regarding ISO standards against ISO classification of contractors (Author, 2024)

As seen in Figure 19, the coded data from the interview on NVIVO from contractor B is very limited, which already shows a lack of interest in the topic. The majority of the data is from the three contractors who are more familiar with ISO standards. Throughout the discussions, the feasibility of the implementation of ISO standards was presented.

The first insights from the contractors’ experience with ISO were found to be the continuous demands for improvement and frequent audits. The contractor from site D, who has been using ISO standards for more than 4 years mentioned, “The requirements from one year to another keep

on increasing. When the auditor and the assessors come from abroad, they always keep imposing further requirements and improvements. This argument was identical with that of contractor B, who just obtained the ISO certification this year. The contractor highlighted the burden imposed on the company to meet the standards, he stated, “SO they’ll give you the 9001. Then on the back of that will be the improvements you need to make next time you renew it”. This shows that to maintain these standards, you need a team within the company continuously pushing the organization for audit preparations, which for smaller contractors may seem overwhelming and may not be feasible due to limited resources.

On the other hand, contractors also acknowledged the long-term benefits of ISO certification and its demanding process. Contractors who have obtained the ISO standards stated that the standards truly help in structuring the company and eventually improving the quality standards. The contractor from site D stated, “The benefits that are obtained by implementing a certified system are long term. ISO helps you structure your company and from the lessons learned along the way you keep on improving and raising the bar”. Hence, ISO QMS does not only tackle quality standards but also enhances the management structure and decision-making processes.

Contractor C, who stated that his company is in the process of obtaining ISO certification, emphasized that there are already visible improvements in their work due to ISO standards. He stated that they had already tried two years ago, but the company was still very behind, so they had subcontracted a specialised company to help them improve and achieve the standard. He stated, “Part of the work that has been done is already being visible in our company. I am confident that this new structure is showing in our work”. This confirms the long-term success of obtaining the ISO standards, making companies stand out more in a competitive market.

4.5 Challenges to the implementation of ISO Standards in Malta

The thematic analysis of contractors and developers using NVIVO has uncovered multiple challenges to the implementation of ISO standards in Malta’s construction industry. The main challenges coded are shown in Figure 20. Figure 20 is a hierarchy chart in which the size of the areas is proportionate to the number of codes collected from developers and contractors.

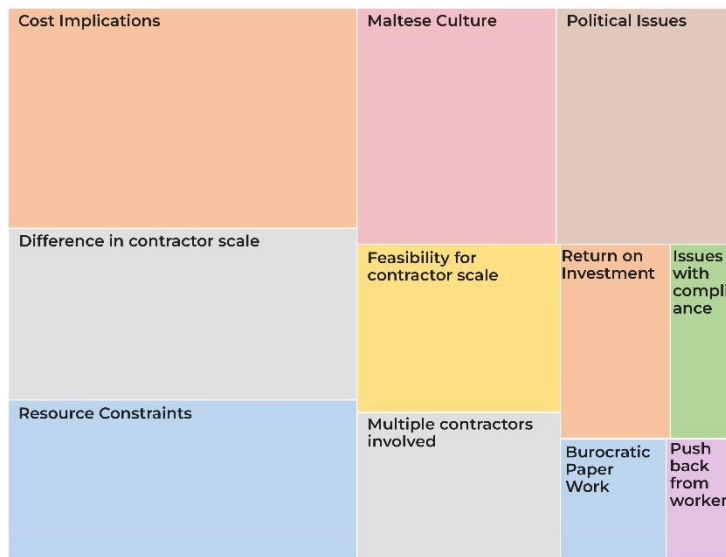


Figure 20: Hierarchy chart of challenges to the implementation of ISO Standards in Malta (Author, 2024)

Figure 21 then gives us information on the level of information the contractors and developers had to say about the same challenges related to the implementation of ISO standards locally shown in Figure 21. This section analyses these challenges and highlights the biggest gaps between incorporating global standards and the local Maltese construction industry.

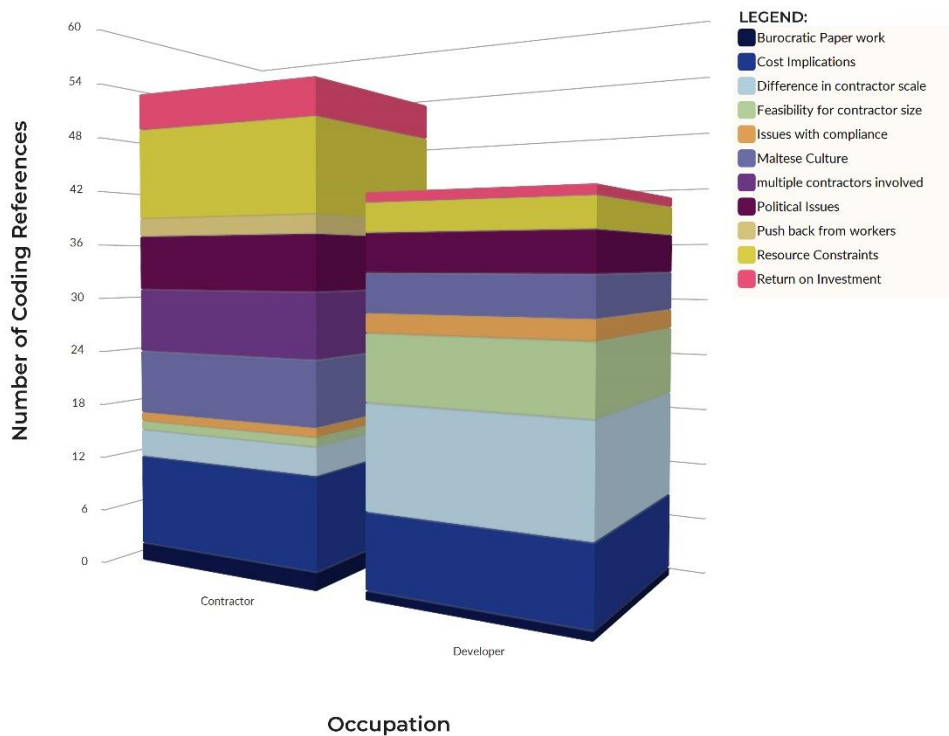


Figure 21: Number of coded data regarding the challenges of implement ISO Standards in Malta against occupation - developers and contractors (Author, 2024)

These challenges presented by the key stakeholders can be categorized into those who: (1) deal with the ISO Standards themselves; and (2) those related to the local construction sector.

4.5.1 Challenges related to the ISO Standards

The most coded challenge in the thematic research was found to be the **financial burden** related to the process of obtaining and maintaining the ISO standards within a company. Both the contractors and developers mentioned the substantial costs related to compliance to maintain the process. The contractor from site B stated, “To implement such a system, you need resources. This is one of the first barriers any contractor will find.” In addition, others may also find this challenging since the return on investment of such a step is not instinctive and tangible. The contractor from site D who is experience in ISO stated, “Let’s be honest, to achieve ISO standards one would have to invest in his company. One may not see the return instantly similarly to when conducting a project”. This is confirmed by contractor B who is not interested in investing in certified systems who explained, “if we have a bunch of contractors in Malta who are able to do without ISO, they will do without it. Why spend money on something, which is not paying anything back”.

Another challenge mentioned by stakeholders is the amount of **paperwork** involved in the process of maintaining the ISO standards, which is sometimes viewed as unnecessary. The contractor of Site B expressed, “I’m afraid it often becomes quite a paperwork exercise”. On this note, the developer of site C also expressed his thoughts on the impracticality of such paperwork when we shift to small-scale operations conducted by a simple mason. He stated, “So, it will be very difficult for a mason to keep up with all this paperwork. Are we going to eliminate the mason? I think although I agree with such standardisation, in Malta we have a majority of small-scale contractors that such a system will send them out of budget or force them to work for the larger contractors”. However, on the other hand, developer A took a twist and suggested that this should serve as motivation for the smaller contractors. “if I’m a small contractor, and I’m not working professionally, I try to improve”.

Compliance with the standards was also a popular challenge mentioned by the stakeholders. The reasoning was that it is not easy to control a construction site, similar to the controlled environment of a fabrication plant. The nature of a construction project itself is that the site is continuously changing day by day. The contractor from site A mentioned, “It is much easier to control in a manufacturing environment than in a construction site”. Adding to this, another challenge related to the **nature of construction** is the involvement of multiple contractors and subcontractors within a project. The contractors from site D, who are ISO certified, stated. “You cannot imagine how the site is completely changed as soon as other contractors come in since they have different standards

from us”. The lack of standardisation and uniformity in Malta often leads to compromised quality standards and safety measures.

4.5.2 Challenges related to the local sector and its implementation

Almost all stakeholders emphasised that the feasibility of implementing ISO standards is directly linked to the **scale of the contractor's company**. The difference between a small and a large contractor was found to be that smaller contractors have very limited resources, which may make it challenging to comply with the demanding standards. On the other hand, larger companies can absorb the cost more easily. The contractor from site B stated, “most of the times small businesses that consist of 25 people would rather use those 25 people on productive works. So, again, quality assurance ISO becomes secondary nature”. To the contrary, for larger contractors, there is more at stake by obtaining the standards. Developer from site C expressed, “I believe that a leading drive for such standards is to win tenders, so it applies more to the large contractors willing to take government tenders for example”.

Political influence within the industry was also found to be a major challenge faced locally by the interviewees. There are concerns about the local tendering processes and levels of favouritism within the construction sector. The contractor from site A expressed, “I think some of the political sponsoring has got a big influence on tenders. I don’t want to say it is corrupt, but you’re returning favours”. This was restated by a developer, who also felt that politics has a significant impact. The developer of Site A stated, “I don’t get a ‘star’ because I know someone, I get a ‘star’ because I have these standards like ISO standards, and everything is in place.”

Another challenge unfolded through the thematic analysis in NVIVO is the local **culture** within the sector and the ‘island mentality’. The mindset embedded within the individuals involved in the sector was found to be a major hurdle that results in resistance to change and a preference for traditional practices. The contractor from site A mentioned, “There’s a huge culture difference. And there’s an island mentality that goes with the industry”. This was also echoed by another developer who stated, “In my opinion we are years behind. I think its more the culture of the sector”.

The resource pool in Malta was another problem discovered. Contractors and developers expressed their thoughts about the shortage of skilled workers and described this challenge as a critical issue. Both the stakeholders acknowledged the difficulty in employing skilled masons and workers who truly master the skill, both locals and foreigners. The repercussion of this is reflected on site, in fact the contractor on site mentioned, “so you can have all the checklists. If you don’t have the right people, it’s useless”. Adding to this, the integration of certified standards may cause stress and impact local workers. Developer of site C expressed, “remember that we are already losing

skilled masons, and they are very difficult to find. You do not want to create an environment in the industry that would continue to eliminate good masons”.

The implementation of ISO standards throughout the Maltese construction industry evidently brings with it a number of issues and challenges, both related to the standards themselves and specifically related to the local sector. These challenges highlight the need for tailored strategies to tackle the gaps mentioned.

4.6 Suggestions to the industry

The contractors and developers interviewed within the Maltese construction sector have produced an extensive list of suggestions aimed at improving the sector and increasing overall standards. Through the thematic analysis conducted on NVIVO 14, these suggestions have been transformed into a list of key ideas from the key stakeholders. Figures 22 and 23 show two diagrams illustrating the different interlinks between contractors and developers and the various codes. On the whole, both the developers and contractors gave a considerable amount of feedback. This section analyses these findings and presents a comprehensive overview of the improvements and suggestions mentioned.

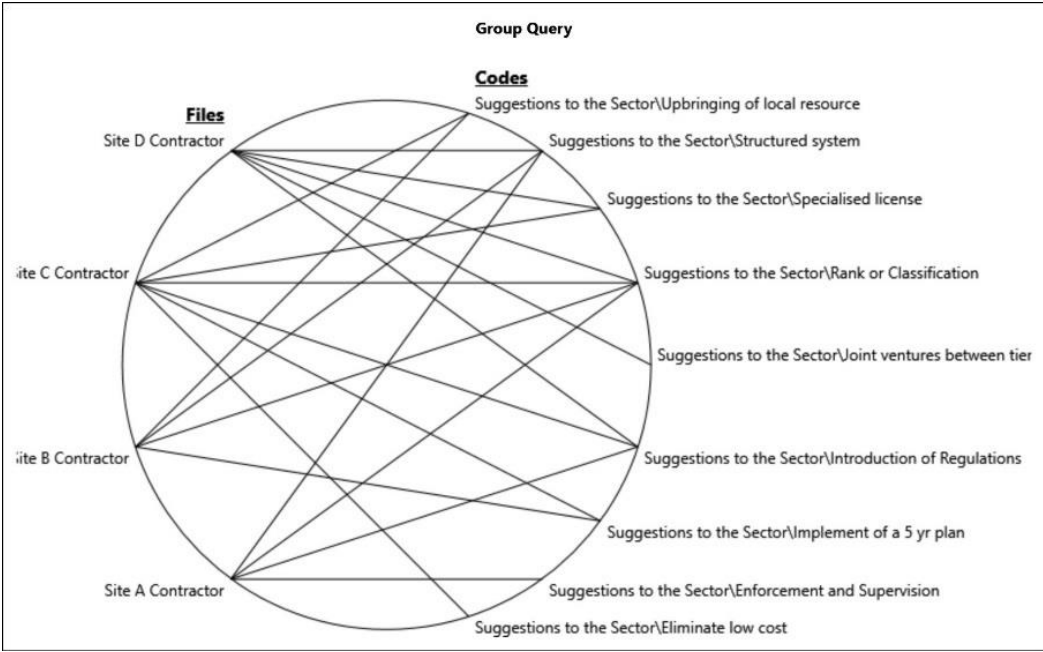


Figure 22: Group Query relationship diagram for contractors regarding suggestions to the sector (Author, 2024)

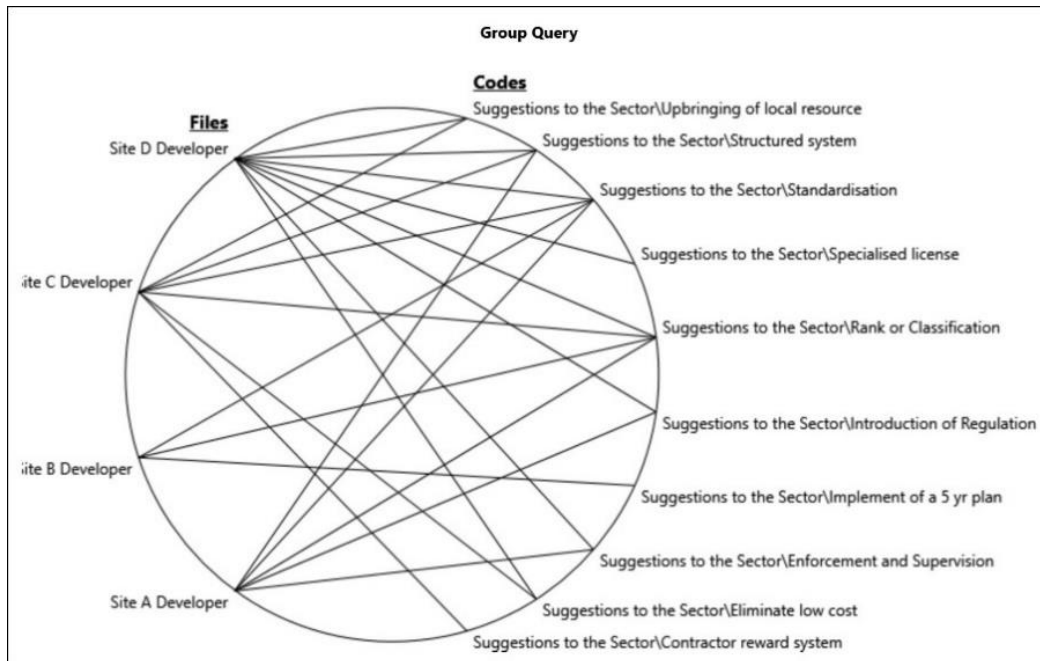


Figure 23: Group Query relationship diagram for developers regarding suggestions to the sector (Author, 2024)

A crucial theme that emerged from the interviewees was **standardisation** and the need for a more holistic approach to quality and safety standards throughout the sector. In fact, the contractor from site A mentioned, “There needs to be standards introduced”. Developers also expressed their willingness and importance for standardisation at a local level. The developer of site D stated, “if there is a system that everyone is aware of, everybody’s contributing towards the same achievement, the same goal in terms of quality”. The goal of establishing clear standards would help guide all contractors to meet at least the minimum requirements regarding quality and safety.

The next key suggestion that goes hand in hand with the standardization suggested by the key stakeholders was the introduction of **stricter regulations** and guidelines. The interviewees believe that by introducing well-defined regulations, one maintains a high-quality standard and a safer construction industry. The contractor from Site c expressed, “there should be guidelines that if you are willing to be a contractor, you must also be willing to respect the guidelines”. Developers who shared this sentiment reinforced this idea. The developer from site D explained, “if it’s going to be self-imposed, unfortunately, it doesn’t work. So, it needs to be regulated in a way that it is imposed on other”. By means of a regulatory framework, one would ensure that all contractors adhere to the same set of standards.

The stakeholders also expressed the need for an enhanced enforcement system with proper supervision as a critical criterion for the sector's improvement with stricter regulations. Both contractors and developers believe that improvement is driven by stricter penalties for non-

compliance and non-conformities related to contractors working within the sector. The contractor from Site A explained, "How health and safety improved in the UK, it was by fines. Once, the owners of the business are going to say, 'Oh, hang on here, we can't afford another one'. This was similarly expressed by the developer of site A who stated that, "The whole country needs more enforcement. This sector especially and unfortunately, now, we are seeing a lot of fatalities". Therefore, stronger enforcement by the authorities would enhance the professionalism within the industry by ensuring that the contractors adhere to the established standards.

Adding to this, a critical point that was pointed out by the contractors and developers during the analysis was the need to **eliminate low-cost, unlicensed contractors**, who most of the time compromise both quality and safety. These contractors are portrayed as a risk to the industry because of their poor workmanship, old machinery, and barely any management system, contributing to accidents. The contractor from site C stated, "The problems that have happened in Malta, the accidents that happened lately, all circulate with low-cost contractors with no experience at all and barely any licensing. Is this justifiable?". In addition, the developer of site D pointed out the unjust and unfair playing field created by such contractors, stating the need for, "A level playing field, because then you get the contractors which do their best to actually get quality standards in place".

The next key suggestion that was identified throughout the discussions was the need for a more **structured system**. Although Malta has recently licensed contractors, the interviewees believe that the sector is still disorganized and places everyone in the same category. Therefore, it was proposed that a structure system be formed so that only certified contractors are allowed to perform what they are qualified for, improving the overall quality and safety. Developer of site D stated, "The ideal would be a structured system for contractors that would structure the sector and remove the confusion that there currently is".

The solution that was mostly common between both contractors and developers was the introduction of a **tier system**. A system that would classify contractors based on both experience and quality management systems such as ISO and skills, as well as the turnover and scale of the company,. Contractor of Site C who is working to obtain ISO stated, "I believe that it would serve as a driving force for contractors to keep on improving and building your company". He also added that a tier system will create a level playing field, "I believe that it would serve as a driving force for contractors to keep on improving and building your company". This was also echoed by developers, with one from site D who said, "There needs to be a classification. To classify each contractor. You classify not just with quality, but with skill and knowledge which goes together".

In addition to this, the tier system should be supported by **specialised licensing**. Another key suggestion discovered from the thematic analysis was to implement licensing along with good training for the different construction operations done locally. In this way, contractors are only

authorised to perform tasks for which they have been trained and licensed. The contractor of site C explained, “There should be specific courses for demolition, excavation and construction, and if you pass these courses, you will have the license to work so”. Therefore, a contractor, for example, who specializes in steel manufacture, is not automatically capable of doing excavation work, and vice versa.

Therefore, the scale of contractors, their certification and quality systems, and their experience will dictate the classification within the proposed tier system. This may seem like a big operation to implement instantly on a local level. Hence, both the contractors and developers advocated for an **implementation plan** to introduce and enforce this new system along with the regulations gradually. In this way, one prevents chaos and disruptions in the ongoing projects, and the sector progresses gradually. The contractor from site C stated, “We need to sit together, both the authorities and contractors and develop a road map and strategy which then would be implemented in phases”.

Moving forward, another suggestion was to establish a government reward system as an incentive to invest in a company's QMS. In addition to this, contractors also added incentives to reward contractors who incentivize youth training and create a skilled workforce based on local talent that can uphold higher quality standards, leading to a more competent and skilled workforce. The developer from site C stated, “A good idea would be for the government to reward contractors who would invest time and money in youth”.

Adding to this, another key recommendation discovered through the analysis was the critical need for a **proper local trade school**. A school aimed at producing local skilled workers ready to raise the quality level of contractors. In fact, the contractor of site B stated, "I would prefer to have like for example skilled workers being brought up from trade schools rather than having competence certificates". This was also recited by the developer of site C who stated, “I believe that there is no good facility that is producing good masons". The contractors were convinced that without skilled workers, the introduction of standardised quality systems is not fully effective; hence, the supply of competent workers to tackle the lack of resources is critical to meeting high standards.

CHAPTER 5

5. Conclusion

5.1 Introduction

This chapter provides a concise overview of the most significant results derived from the semi-structured interviews conducted with contractors and developers in Malta's building industry. The objective of this research was to evaluate the feasibility and implications of incorporating ISO standards within the local construction sector. The following subtopics will provide a concise overview of the findings by addressing the three fundamental study inquiries.

5.2 Research Objectives

Is the implementation of certified global standards, such as ISO standards, feasible in Malta's construction sites given the known benefits?

The feasibility of the implementation of certified quality systems such as ISO Standards in Malta's construction industry is multidimensional. From the data collected, the appreciation of the benefits of ISO implementation is evident. Improved quality, enhanced project management, more structured organization, and more credible processes are recognized both locally and internationally.

The developers showed interest in ISO standards and highlighted the long-term benefits of having a contractor with a certified management system. They recognized that the improvements to such systems eventually resulted in the prevention of common issues faced locally, like time delays and cost overruns. Furthermore, developers stated that a contractor with a certified system would have the upper hand and an advantage over other contractors in tendering processes, as well as during selective tendering processes.

On the other hand, contractors interviewed had different exposure to ISO standards; hence, ranging data and different perspectives were collected. Contractors who have experience with how the standards work within their company have praised the standards. They especially praised the structural and quality improvements that ISO 9001 has brought to their company. The continuous, demanding processes for improvements and the frequent audits are seen as the driving mechanisms to keep pushing the organisation for better management practices and higher quality standards. In comparison, the contractor who is not interested in ISO certification sees the process as burdensome with heavy cost implications.

The study thus concluded that the key stakeholders closely related the feasibility of the implementation of ISO standards to the size of the company, especially in terms of resources

available and revenue. Smaller contractors may have different challenges in maintaining the demands of the ISO standards, while larger contractors can easily absorb these within the system.

Given the present state of Malta's construction industry, what factors hinder the implementation of certified standards such as ISO standards?

Several factors hinder the implementation of certified standards across the board in Malta's construction industry. The stakeholders have identified several challenges, including those that deal with the standards themselves and those related to the local sector.

The most significant challenge identified related to the standards themselves is the **cost implications** related to the process of obtaining the standards and their maintenance. Both the contractors and developers appreciate the substantial cost that the company would need to invest without an immediate return on investment. Hence, when one considers smaller contractors, this is a decisive challenge since one often prioritizes investment related to operational productivity rather than standardised systems.

Another major challenge that hinders implementation is the amount of **paperwork** involved in the process of maintaining the ISO standards. Some contractors viewed this as unnecessary and expressed concerns about the workload required for maintaining the documentation. This is of concern, especially for smaller contractors. In addition, the **nature of construction sites** and their dynamics within the implementation process, with the constant changes and involvement of other subcontractors, can make the implementation of standardized processes much more complicated.

In addition, challenges related to the sector locally include the construction culture and '**island mentality**' as another barrier. Almost all the stakeholders mentioned the presence of individuals within the sector who resist change and have a preference for traditional practices. Moreover, some speculated that **political influence** and favouritism during tendering processes also hindered the drive towards investing in such certified quality systems. Finally, the local sector's limited resource pool is a critical factor. Contractors have expressed their concerns about the shortage of **skilled workers** available and capable of maintaining high quality standards during the project implementation.

Assuming that there is no implementation plan for integrating certified standards like ISO standards into the local construction industry, what gaps need to be addressed, and what steps should be taken moving forward?

Assuming that in the local sector there is no implementation plan for integrating ISO standards, the key stakeholders listed out some gaps that need to be addressed to facilitate the transition. The

interviewees emphasized the need for **standardisation** in the local construction sector. A unified system that everyone aims to contribute to. The aim is that a standardised approach would help guide contractors to at least meet quality requirements.

A key suggestion that compliments standardisation across the local industry is the introduction of **stricter regulations** and **guidelines**. The key stakeholders believe that well-defined regulations are critical in order to raise the bar in local quality standards. Some argue that self-imposed guidelines do not work given the culture within the local sector and therefore must be regulated. In addition, an enhanced enforcement system was also highlighted. Both the contractors and developers believe that stricter fines should be imposed on non-conformities to help drive improvement. Moreover, the interviewees also stressed the need **to eliminate low-cost, unlicensed contractors** who compromise quality and safety. It was pointed out that these contractors often contribute the most to accidents on a local level because of their poor workmanship, use of old machinery, and lack of quality systems.

A **structured system** within Malta's construction sector was also listed as one of the biggest gaps that need to be addressed by the key stakeholders to improve quality across the board. Despite the recent legal notice imposed locally, as mentioned in Chapter 2 of the licensing of contractors, the key stakeholders feel that the sector remains disorganized. A structured system would ensure that contractors perform the tasks they are competent in while creating a level playing field where contractors investing in quality are not disadvantaged.

Building on the need for a structured system, the key stakeholders agree with the introduction of a **tier system** for the operating contractors within the local construction sector. This system would classify contractors based on both the use of a certified system such as the ISO Standards and their experience, turnover, and company scale. Moreover, further **categorization** would be based on work expertise and the fields the contractor is trained and competent in. Accordingly, the awarding of tenders locally would be based on this tier system. On the other hand, developers would have a clear classification of contractors. **Specialized licensing** of contractors related to the different areas involved in the construction process was also recommended, supported by good training. Both contractors and subcontractors advocated for a phased implementation plan for such a proposed system to avoid a chaotic environment within the industry with the possibility of influencing project timelines.

The key stakeholders proposed a **reward system** as a final step that would incentivize investment in a QMS system locally among contractors. Contractors recommended that rewarding contractors who invest in ISO standards would be very effective, while also rewarding those who promote youth training. Finally, the need for a **proper trade school** was pointed out as a critical requirement to produce skilled workforce training based on local workers, which would uphold higher quality

standards. Contractors believe that without skilled workers, the introduction of a certified quality system would be ineffective.

5.3 Final inference

In conclusion, the introduction of the ISO standards across the board in Malta's construction sector truly offers a significant opportunity for the sector to improve in quality systems and efficiency. As pointed out in the literature, ISO QMS surely offers great benefits to contractors as stated by Aburus (2020), Din, Abd-Hamid, and Bryde (2011) and Karunaratne (2019) highlighting the improvements in internal structure and processes, the external processes and reputation, and the overall project success rate. These highlights align with the findings of this result, where the key stakeholders interviewed familiar with the standards pointed out the improvements in documentation, communication, internal structure and client satisfaction.

On the other hand, challenges remain. As highlighted in the literature by the works of Magd (2008), George (2015), and Boiral (2011), challenges related to the implementation of ISO standards are evident. Such as the paperwork involved, inadequate training, the cost implication and the perception of the standards regarded as a marketing tool. The study confirmed these issues have similarities with those found by Maltese contractors and developers both related to the standards themselves and related to the local sector. Specifying the financial burden of implementing and maintaining the standards, the excessive paperwork involved, compliance issue for small contractors, and the over all culture.

The study finds that with the implementation of ISO standards, Malta's construction sector can truly beneficial greatly, however this cannot be achieved in isolation. All the suggestions and recommendations collected from the key stakeholders are all very well thought and effective. These should be incorporated into an implementation plan based on a number of years, to significantly elevate the sector's standards locally. The suggestion for incorporating a tier system is truly valuable and I urge policy makers to consider. This system should set a structure that accounts for both large and small contractors, by addressing their specifying needs and reducing the gaps that resulted in this study.

5.4 Contributions to knowledge

This study contributes to the body of knowledge by highlighting the tangible benefits of implementing ISO standards within the construction sector, specifically in Malta. Additionally, the

study identifies several challenges faced locally both related to the standards themselves and the construction sector. Furthermore, the study provides a set of suggestions and practical solutions, including the proposed tier system for contractors in Malta.

5.5 Suggestions for Future Research Work

Future research building on the findings of this study should focus on the detailed design and implementation of a tier system tailored for Malta's construction sector. This includes identifying and defining the different tiers within the overall structure, along with the different criteria for each classification. These can include the requirements for certified systems such as ISO standards, company size, financial turnover, and areas of expertise. Additionally, further research should explore effective incentive mechanisms to encourage contractors to enhance their quality systems. This includes addressing the specific needs of the smaller contractors and creating an effective pathway to gradually enhance their quality system, leading to a more structured and quality-driven construction sector in Malta.

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Appendices

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 Appendix A.1 Interview questions58

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Appendix A

Appendix A.1 Interview questions

COVER LETTER – QUESTIONNAIRE CONSENT

Title of the Study: The impact of Quality assurance on site in relation to ISO Standards: A case study research on the construction industry in Malta.

My name is Riccardo Gatt Ellis, and I am a second-year master's in engineering student (Structural Engineering with Management) at the University of Malta.

The focus of my study is to investigate the Quality Management Systems in Malta's construction sector in relation to the ISO standards. The objective is to analyse the current quality management systems employed by these organizations and evaluate their efficiency. The primary document for reference will be ISO 9001:2015, which outlines the requirements for a quality management system (QMS).

This survey ensures complete anonymity, with no collection or use of personal data in the ongoing research. The gathered data will exclusively serve the study's purpose, offering no direct benefits or anticipated risks to participants. Participation in the questionnaire is entirely voluntary, allowing you the freedom to choose whether to partake or decline.

Throughout the survey, there will be no inquiries soliciting personal data or information leading to individual identification. You also have the option to skip specific questions if you prefer not to answer. If you have any questions or concerns regarding this research, feel free to contact me or my supervisor using the provided details.

Riccardo Gatt Ellis

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Prof. Rebecca Dalli Gonzi

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Research supervisor

ECLARATION BY RESPONDENT: I hereby confirm that I am 18 years of age or older. I am aware that completing and submitting this anonymous questionnaire implies that I am participating voluntarily and with full informed consent on the conditions listed above.

INTERVIEW QUESTIONS

Exercise to investigate the quality management systems in Malta's construction sector in relation to the ISO standards.

- 1) What is your idea of Quality in construction projects? Additionally, what do you believe are the primary factors necessary to achieve this from the planning stage to the project handover?
- 2) Can you differentiate between quality control and quality assurance? How crucial do you perceive both of these aspects to be in your projects for the benefit of your clients?
- 3) As a developer, when managing your projects, how do you prioritize between time, cost, and quality? Kindly elaborate on your reasons behind this prioritization.
- 4) Considering your prioritization of project elements, are there established mechanisms within your business to ensure quality under all circumstances?
- 5) Implementing Certified Quality Systems in construction projects ensures a certain level of quality assurance. What are your insights on this practice?
- 6) ISO standards serve as globally recognized certified systems in construction project implementation, providing a standardized level of quality assurance to clients. Are you familiar with ISO standards and their operational mechanisms in construction projects?
- 7) ISO Standards, particularly ISO9001:2015, emphasize a quality management system built on various requirements spanning Leadership, Planning, Support, Operation, Performance, and Improvement. Do you believe such a framework has relevance in Malta's construction sector at present? Considering the current scenario, do you perceive investment in quality as imperative? And do you anticipate certified quality to entail additional costs?
- 8) Recently in Malta, there has been a process of listing contractors in the sector. Do you believe the next logical step should involve ranking contractors based on certified processes and their capabilities, which could also influence the awarding of tenders and the allocation of project sizes?
- 9) In conclusion, do you see this approach as the way forward for enhancing quality in the construction sector? Do you perceive it as beneficial overall? What gaps do you perceive need addressing, and what steps do you think should be taken moving forward to ensure continuous improvement?

Appendix B

B.1 INTERVIEW NO. 1 – TRANSCRIPT

Site A – Developer

Speaker 2 0:01

What is your idea of quality in construction projects?

my idea of quality from this project time I'm heading from, the Company Y point of view is that the construction is built as per specifications from the architect. To achieve this, what we did is we onboarded quality measures and quality contractors on the projects that reconcile practically with the quality results from the contractor. So, in this way, there were instances that, for example, the contractor had a reading of concrete, for example. And when it was checked against our quality contractor, whoever did the checks it resulted otherwise. It was good that we had a second check because the first check from the contractor wasn't right. The architect could make a decision practically on the second check. So, there is a double-check system. Which is to be paid for eventually.

It needs to be paid for obviously, this depends between contractor and contractor in Malta, I think the contractor we had, I think he's very, very up to date from the quality point of view, but still, I mean, to be super 100% from a client's point of view, we did some checks of every cast mainly. And obviously, that had an extra cost.

Speaker 1 1:56

Okay, and to add something to this basically, as we will discuss later ISO also discusses the management of the contractor, what do you think about this? What is your opinion of the management system of the contractor?

Speaker 2 2:19

I think from experience yes, they (the contractor) had a person on site. For this reason, and for this job. And every update meeting weekly on Thursdays that we had, this person used to update the different parties, how the contractors and the team with any discrepancies, and if the architect wanted to check something, they were very, very responsive. There was a database and audit trail of everything. And this was uploaded into the portal that we are using for the project. So finally, I as a client can have the whole package and the whole test. You can go back and check for example, that roof, that test, that concrete truck, and exactly the date and time you can go down that way.

Speaker 1 3:18

Question 2: Okay, so we can move on to the next question. Do you have an idea between what is the difference between quality control and quality assurance in a project? And what do you think are the most crucial aspects of these two?

Speaker 2 3:38

Quality control mainly is how you're going to manage the quality of the project. And quality assurance is your check, to check the quality levels of different parts of the project mainly. To assure yourself that you're on sort of the right track practically. You're on the right track and how the standard and the architects are trying to achieve this quality. Practically, to tell you the truth. The architects, I think no architect is on-site 24 by seven. So quality control and quality assurance is very important to be set up at the initial stages and agreed upon how it will work. So, there must be a third party. Exactly. A third party or a project management. To make sure that things are in place. Exactly.

Speaker 1 4:49

Question 3: So, in this project between time cost and quality, what do you think was the priority and why?

Speaker 2 5:00

I mean, I give them both (time and cost) the same, the same priority to tell you the truth. But in the beginning, during a project, this can shift. So, at the beginning I just can say something about this project. At the beginning, we had a timeline, a baseline to where we wanted to really focus on. Obviously, the costs and budgets were there. and they were very stringent, from a budget point of view, because obviously, we had agreements with our group and agreements with the Malta enterprise. So, it was very important to stay within budget. We're not We're not a company that, because you hear a lot of construction projects, for example, they budget 10 million, and they finish at 25 million. We can't go that way. Because it's an approval process. Otherwise, even with our group, we have very stringent agreements.

So, the budget, and the cost were very important. That was critical. Even from an architect's point of view, because I mean, the project is big, and to fit at least the construction, let's say on

construction for now, because that's, that's the clearest path that we have at the moment, we're striving to keep on budget from an M&E point of view. Even from an internal finish and from an exterior point of view but those are still far away.

Speaker 1 6:28

Sometimes it may be the case that because of budget constraints and time delays, the project is then rushed, and the quality standards may be forgotten.

Speaker 2 6:41

So that's a very important point. Because now with finishes, very important, since it's the final thing, they don't see the column, the concrete, or the steel, they see the tile, they see the furniture, they may see the cable passing, you know, so it's very important when finishes come in.

Speaker 1 7:05

Okay, so the cost and the budget were the leaders of this project.

Speaker 2 7:11

Yes, but now the timeline is taking priority. Because we have business coming in. Before the original scope, we didn't have any business. It was just a flexible project, a flexible manufacturing area to place any business that came in. In the meantime, business came in, certain dates were obviously good for the first phase, but now they are becoming critical.

Speaker 1 7:43

Question 4: We already mentioned it in question one, but basically, are there any established systems within this project to ensure quality?

Speaker 2 8:01

Practically, if there is a third party and I have IAS on site, which are the project managers and site supervisors, who do a brilliant job. Because they go every day, to check plans against installations, it's not their total job, because it's the consultant's job. But having someone on site from a project

management point of view, and from a site supervision point of view, it's very, very important, important.

Speaker 1 8:34

Question 5: So, what do you think when implementing certified quality systems in construction projects and ensuring a certain level of quality assurance?

Speaker 2 10:06

Practically it's important, I think, for every building project to have quality, through a quality management system in place and agreed upon. As regards to how many times, what checks will be done, and so on. So that's number one.

But we don't want to just do a quality management system on civil works only. I am seeing and experiencing that a quality management system needs to be implemented also and agreed upon before. Now, that we're one and a half years after the project we are waiting for services to come in. When the second contractor comes in, the third contractor comes in, and the fourth contractor comes in, they will all work together on the project, and you need an overall management system because it can be a catastrophe practically. And even, added expenses for the client, and rework because a window is a window, but you have services passing through three stories, and you must remove everything because it's not aligned it's extra cost and time. So, with everything, it's of high importance. The lack of a management system can lead to regret and extra costs, leading the project to extra time and overdue timelines. As you touch these things down timeline and cost just soar up.

Speaker 1 11:49

It could be that the third and fourth contractors were not included in from the planning stage of the design of the project.

Speaker 2 12:15

A point on that. I think in Malta, maybe if we take it as a whole, from what I'm understanding the M&E contractors, were with us in the first stages of the design stage. What I can't understand is that they don't give architects their intentions or at least basic ideas or blackouts. Unfortunately, it could be too late for certain items because the building is constantly progressing, it was built. I mean the M&E came in, in the initial stages and they didn't want to sort of coordinate. We also tell them to give us at least for example a 50 by 50 opening so that we can progress. But they don't give

feedback because they tell you that practically each contractor uses different equipment and different methods and different ducting etc. But in our case, I think it is safe to say that in certain areas the client had to pay for these items' that the M&E consultant could have avoided in the first place.

Speaker 1 13:54

Question 6: Now we are going to shift to ISO. ISO standard serves as a globally recognised certified system, also in construction projects. By providing a standardised level of quality assurance ISO is implemented abroad. Are you familiar with ISO standards and how they operate?

Speaker 2 14:27

Yes, yes. Company Y has a number of ISO standards that we are audited on every year. So yes, from a production and manufacturing point of view, we have to adhere to these because obviously, we can't sell to certain clients. So basically, ISO is not a certificate that to be acquired once it is, but a continuous audited process.

Speaker 1 15:00

Question 7: The part of ISO that applies to the current structure is ISO 9001 2015, which has several other stuff of requirements such as leadership planning, support, Operation performance and improvement. That applies to the contractor mainly because he is the one with the main operation of the project. And do you believe that such a framework has relevance in Malta's construction sector? Are we far behind?

Speaker 2 15:41

In my opening, we are years behind. I think it's more the culture of the sector. I mean, before this project, I wasn't involved in the construction. But when you see from a construction point of view, from a services point of view, I'm seeing the whole project as well. From the recent stories, we're hearing more of them. In the construction sector, I think contractors need to be regulated in some way. And then there needs to be standards introduced. And the most important is that whoever is in government needs to have management and supervision on this. I mean, we'll have sentences from courts where this is expanded in detail. And it was it was clear the highlight the sector needs some sort of regulation.

Speaker 2 17:14

But what do you think is the most is the biggest gap? As previously I mentioned, do you think that are any additional costs?

Speaker 1 17:41

There is a big cost when your take on this, but it depends. I mean, we as a client, Company Y, needed a professional approach to this project. We are measured in the factory for health and safety issues and everything. And for sure, we didn't want anything and bad advertising and marketing when we came to the extension of the factory. For small projects, I can't see why, for example, need to employ additional subcontractors to cost more money. But I think the contractor himself, needs to be regulated to have some sort of standard. A basic be at least some steps that they need to follow.

Speaker 2 18:37

So, more enforcement.

Speaker 1 18:35

That's the ultimate. I mean, it's the whole country that needs more enforcement. This sector especially and unfortunately, now, we are seeing a lot of fatalities. In this country, we lack enforcement. But enforcement, unfortunately, is either non-existent or to a lower minimum, which in the sector is dangerous not to have such standards.

Speaker 2 19:07

Question 8: In Malta we have just started from the very beginning, basically last year, 2023 there was a legal notice that obligated the listing of all the contractors in Malta....

Speaker 2 20:24

It will be very, very helpful and valid, I think. First, to try to avoid any catastrophes that we had. And I think whoever is a contractor and wants to grow the business, he needs to make an effort, at least to get the system so that he is awarded the next chunk of projects. A positive thing for a contractor who wants to expand his business. But I think if I'm a small contractor, and I'm in the last place either I close the business or try to improve something.

So, I think it will lead to a healthy competition between contractors. But enforcement is very important. And I don't get a star because I know someone, I get a star because I have these policies, these standards, like ISO standards and everything in place. I mean, that would be the ideal, I think.

Speaker 1 22:07

Question 9: the last question is in general. do you see this approach as the way forward as already discussed? And do we perceive it as beneficial overall, what gaps do you perceive that need to be addressed? And what steps do you think should be taken forward?

Speaker 2 22:38

Yes, in summary, this approach would help a lot, even when a client comes to select the contractor. Nowadays, we do it through the experience of the architects and word of mouth. You ask the architect, you ask the professionals in the business like the project managers, the architect could have worked with someone, and it was okay. Then the other consultant, like, for example, who was in another project would say it was a flop. So then you take the cost, you take the quality, you take the history of the projects, you go and see the projects, you ask other clients, how, and that's, that's how it was rated, and how it is rated at the moment. So having this list, but, in the background, having a serious adjudication. The most important aspect is that the ranking is done independently. There is a body that nationwide is approved by everyone.

There are a lot of gaps at this point. So, it's building step by step. I think the first step of getting to know who a contractor is is the first step.

Secondly would be for example, the machinery that the contractors use. Because I see machinery, we use machinery, which is for 4 and 5th hand from other countries. Why? Because we're a small island and everything passes by. You have oil beneath cranes, you have hydraulic oil coming out. Why? How is this approved? Its like the VRT of a car, if the VRT doesn't pass they can't use it enforcement, enforcement, and enforcement. I think the biggest hurdle would be the enforcement of it and trying to change the culture. That's the main hurdle.

Speaker 1 25:14

Even the competence of the workers. For example, if you have a crane operator, at the moment, you can be an operator of five sites, but why shouldn't we have some sort of training?

Speaker 2 25:30

If I see our business in manufacturing if you are to be placed operating a machine, we'll give you training on that machine and you sign that you were trained you know. These are simple, simple standards, which I think are not used at all the construction industry.

ISO has one of its requirements on Improvement and operation and it requests the training of people. This would improve this and also clarify the competence and so on.

B.2 INTERVIEW NO. 2 – TRANSCRIPT

Site A – Contractor

Speaker 1 0:00

Question 1: What is your idea of Quality in construction projects? Additionally, what do you believe are the primary factors necessary to achieve this from the planning stage to the project handover?

So, I think there are two aspects to this, the quality of the product and the quality of the process. So, the quality of a process is almost non-existent within Company X. Very limited in quality procedures. But then the quality of the product is reasonable. I wouldn't say that what we've built here is exceptional quality. Some bits are good, some bad bits and most of that is *achieved by experience rather than process*.

So how to achieve this from a planning stage, the project handover. So even when you're estimating a project, the quality of the product should be in your mind, are you building cheap concrete walls? Or are they nice, you know, so that the specification should drive you to an estimated stage? Not necessarily sure that that is the case. I am not sure that particular reference is made to the quality estimating stage, it's more about how do I get the cheapest price. How do I how do I win the project and worry about that later? Somebody else will worry about that later on. I think that's the general approach. And I think that's as common across Europe that estimate doesn't necessarily focus on the quality of the product, specifications dictate. But the quality of delivery isn't something that's particularly well considered.

Question 2: Can you differentiate between quality control and quality assurance? How crucial do you perceive both aspects to be in your projects for the benefit of your clients?

So, differentiate between quality control and quality assurance. Yes, well, one is guaranteeing that you're you've got a quality project and one of them is controlling. It's interesting, we had a lecture two or three weeks ago with the concrete society with the guys in the batching plant at Company X and the level of quality control for quality assurance that they go to I was quite pleased, I guess.

Speaker 2 2:30

But because maybe it is within a manufacturing environment.

Speaker 1 2:38

It is much easier, much easier to control in a manufacturing environment that is from exactly a hole in the ground (construction site). Quality control here is normally by inspection, reference to drawings. So more of a viewing and ticking exercise. Quality assurance isn't anything that we would have you cannot guarantee.

How crucial do you perceive both aspects in your projects and the benefits?

Quality assurance from a concrete perspective, you know what you're going to get. You have pretty good control over the quality of the material being used. Reinforcement and concrete are quite easy to do. The quality control on-site, we have a person whose specific role is to inspect and for two main reasons: (1) to give a quality product that we've built what they've asked us to build. And (2) then to catch mistakes before it is too late. So, it depends on which hat you want to wear. I would say, the dominant would be to eliminate mistakes, cost, rework, etc.

Speaker 2 4:01

Then time delay time and all of that. So, you had to employ one person, specifically for this role.

Speaker 1 4:09

Yeah, so we've got a QA manager, our QC manager here. But I am not a believer in it. What do I mean? Because if you make a single person responsible, then the people who aren't responsible for it, are even less responsible. They move even further away. So, it should be that your quality inspections are done by the whole team, not just 1% because it lets everybody else off the hook. And then you end up in debates about who should have seen it.

Speaker 2 4:50

So, at the moment is just being done for the sake of having a sort of history and data collection.

Speaker 1 4:55

Yes. We've got boxes and boxes and boxes of paper with tick sheets. It frustrates me, I've come from a digital world, you know, I paper all over my desk, and everything I would do previously, everything, digitised everything, we have two or three bits of software that we would use, but never have bits of paper with coloured on dots and everything. So, this is a bit of a bit of a process to go through, I think, to improve the quality of delivery. I think we've got a good quality product here; it could be better.

Speaker 2 5:37

But what do you think can be better? Because the concrete is correct. As you just said

Speaker 1 5:43

The concrete is correct. The reinforcement is correct. The quality of the finish? It is not good.

Speaker 2 6:19

Question 3: As a developer, when managing your projects, how do you prioritize between time, cost, and quality? Kindly elaborate on your reasons behind this prioritization.

Speaker 1 6:19

So, I would say, honestly, quality is third place. So, the priority is cost. Cost and time go hand in hand. But the quality, at the moment, plays a third part in this. What I notice here is the amount of time that we've spent snagging, reworking, and recovering from errors. When we've got something wrong, it kind of goes unrecorded. People in our cost control wouldn't necessarily record snagging or reworking. It's named just minor. But some of the stuff we've done, there's been, you know, take it apart, put it back together. And that's not really minor, so the cost of that is not really captured. Something that I want to develop in the future is how we understand what the cost of rework is, against the cost of doing it right. Generally, build it right once you have, you'll make money. Not far off.

Question 4: Considering your prioritization of project elements, are there established mechanisms within your business to ensure quality under all circumstances?

No, it is done by tick sheet inspections. So, the depth of the inspection plans I don't think is particularly good. So, it's a visual inspection. Inspecting concrete and reinforcements is pretty straightforward. If we got the right cover, we got all of those bits and is it the right grade for concrete? You can't go too far wrong, you know, has it been compacted properly, as have been cured properly on all of those bits? You know, that's really easy. But a good example was the waterproofing here that even the manufacturer can't tell me how he's going to demonstrate that the waterproof barrier, it's actually waterproof. It's your product! So there's more work to do, I think

in getting proper test and inspection plans to start before the people arrive on site. So, you know, what does completion look like? What are the bits you need to say this is finished? On concrete and steel is easy, but you need to understand how you're going to finish before you put an inspection plan together, so you don't miss those steps along the path to getting there.

The guy who does it for us here, Irshad, he is pretty good. It's pretty good. But I've seen a lot worse. Much worse. The structural steel and cladding here have been a disaster and are too strong. But you know, the columns have been too short. Installed out of the vertical plane. Some of the panels have been damaged as they've been installed. The quality of the design has been a problem. They didn't design it properly from the start, you know, so *if you had a good process in place, then the issues would have been picked up* as the designer developed and was approved and all the rest.

Speaker 2 9:35

Question 6: ISO standards serve as globally recognized certified systems in construction project implementation, providing a standardized level of quality assurance to clients. Are you familiar with ISO standards and their operational mechanisms in construction projects?

Speaker 1 10:20

ISO standards? Yeah. I've been through all of them.

9001. So I've got that opinion on 9001, I think it is a piece of bullshit dressed as a piece of paper. So Company X, do you want to delete this afterwards?

Speaker 2 10:32

Yes. I will delete it later on.

Speaker 1 10:31

Company X got the 9001 certifications. I think it was January or February.

Speaker 2 10:35

But for the construction project process or the manufacturing process?

Speaker 1 10:42

As a contracting company. I'm not sure how they achieved it with so little process in place. So, what tends to happen is, ISO inspection comes around and looks at what you do and how you do it. A bit of health and safety, a bit of quality, a bit commercial, and then we'll make some recommendations as to how you should improve.

So, they'll give you a 9001. And then on the back of that will be the improvements you need to make next time you renew it a year or two years,

Speaker 2 11:21

Agreed, because ISO works on improvement, audits and so on.

Speaker 1 11:26

Yeah. And when you look at the improvements, how am I going to do this? So, it'd be interested in the next time they (ISO) come around, and what will they say.

Speaker 2 11:43

Question 7: ISO Standards, particularly ISO9001:2015, emphasize a quality management system built on various requirements spanning Leadership, Planning, Support, Operation, Performance, and Improvement. Do you believe such a framework has relevance in Malta's construction sector at present? Considering the current scenario, do you perceive investment in quality as imperative? And do you anticipate certified quality to entail additional costs?

Speaker 1 11:46

yeah. So, leadership is like a bit hash. So quality leadership...

None of our procedures were there. Very few actually centre on any of these as a process to step through. And that's why I'm concerned that when they come to renew, the auditor is going to say, not done anything, you've not done any improvement.

Speaker 2 12:27

So how they were awarded in the first place?

Speaker 1 12:29

Yeah, so they came in, did an inspection, they reviewed some health and safety stuff, they reviewed some office stuff and they came to chat with me about what I do and then wrote a report on the back of it and gave the 9001. They were really pleased for themselves for getting it.

Do you believe such a framework is relevant? Yeah, absolutely. I think it has. I think then you get to the position where you're actually buying a view. You're paying inspector to come and the auditor to come and see you. But at least it gives you a starting point. And I think Person X, particularly is progressive in what he wants to do with a visitor. He wants to improve the business. But there's an awful lot of people to drag behind him in doing it and not actually want to be included, you know. So long as they keep trying to improve against that, then it will get better.

Question 8: Recently in Malta, there has been a process of listing contractors in the sector. Do you believe the next logical step should involve ranking contractors based on certified processes and their capabilities, which could also influence the awarding of tenders and the allocation of project sizes?

Malta's construction sector at present. I've been writing a paper for the Malta Chamber of Construction Management, about my view of the I've been here a year.

There's a huge cultural difference. And there's an island mentality that goes with you, and I'm not being rude or patronising or anything like that. My immediate thoughts are that nobody wants to take responsibility.

If you can find someone to blame, then that's the first position when something goes wrong. Who's to blame? Rather than how do we fix this? How do we make this right? How do we make it better? How do we not make the same mistake again? That all happens afterwards.

When the energy is gone out of the problem? People don't remember how to make it right and how not to do it again. People have been so focused on blaming someone.

Speaker 2 14:56

We have just seen this happen in the Jean Paul Sofia accident case.

Speaker 1 15:01

Okay, so for example, yeah, I read the Jean Paul Sofia report and there was another one. Then there was another accident. A month or so ago, two guys were breaking out screed and the rock broke beneath them. And everyone is saying there's not enough training, who was supervising etc. But you can't blame the person who stood there with the breaker in his hand, on a method of construction that he's unfamiliar with. There's no amount of training that would have saved him from that, you know, *the person who put into work is the one to blame*. The poor guys who were in the factory that collapsed, there's no amount of training that would have saved their lives, you can't train those people to know that the blockwork is just built so badly. That, you know, no engineering in it whatsoever. You can't train workers to do that. *People/ company owners need to take responsibility, I think of health and safety and quality*. Because the two kinds of go hand in hand. If you've got a good quality product, most probably because you're well organised. And by default, you've got a good quality product to go with it. But then I find people so quick to state that it's the BCA's fault. It's the government's fault. It's the Perit's fault.

Speaker 2 16:31

Some people expected the architect to stay on site all the time. Why?

Speaker 1 16:37

This was one of the points in my paper. Why is the architect responsible for writing a method statement, when he's not the person who's going to build it? He can write, he can do a risk assessment. He could write a risk assessment, you know. You can review his design and say, Well, look, we're digging big holes in the ground, you know. Watch out for this, or there are some cables in the road watch out for the cables. Or if you're refurbishing a house, you know, the floors or the rock planks, you know, watch out for it. But he can't be *there to manage those risks in real time*. *That's for the site manager, the project manager, and the company director*.

Speaker 2 17:24

Yes, but the problem and maybe it will lead to the next question.

In this case, this project is quite a large-scale project, one expects to have a lot of different parties. The project managers, the various contractors and so on are all on-site. But when you look at smaller-scale projects, where accidents happen, the feasibility of the project does not make sense. What do you think?

Speaker 1 17:57

I think that's the second part of it. People are letting money dictate their decisions. How can you value someone's life in a small block of flats, maybe two or three floors of flats, and you need to implement the same health and safety regime on that as you would on a project like this? Why wouldn't you? What's the difference?

Speaker 2 18:26

Yes. I agree, but if I'm a developer or a small contract I would lose half of the profit, for example.

Speaker 1 18:38

Yeah. So, I live in Rabat and so I walk around in the nice evenings, and I was watching these guys. They were putting some reinforcement down on the first floor, and second floor of this block. And the steel fixer was wearing flip-flops. And in parallel with that, there's an attitude of, you don't tell me what to do. I have been a steel fixer my whole life. I'll wear flip-flops if I want to. And I think that there's a really deep ingrained Maltese character of resistance.

Speaker 2 19:19

It must be a cultural shift.

Speaker 1 19:22

And I think that that is needed all the way through the construction industry. It needs to happen. Some of the things I see people do here, in the UK I would be sacked! I wouldn't last 10 minutes.

Speaker 2 19:38

Do you know if in the UK there is no ranking system for contractors?

Speaker 1 19:45

So, you do not necessarily have a ranking system.

People call themselves tier one, tier two, tier three. But I don't think there's much difference in reality between definitely between tier one and tier two. Tier one tends to be the major national

contractors, big organisations, billion turnover kind of businesses. Tier two generally would be a regional contractor. I don't know, maybe 100 million turnover or something and then in tier three would probably end up being the subcontractors, and people like that. But the sort of the health and safety standards in some of the tier three contractors would be as good or as if not better than some of the tier one. And it's taken all the way through the levels.

Speaker 2 20:40

So, the quality procedure is the same between tiers, the turnover is the distinction.

Speaker 1 20:50

In most companies, you have two forms. Then one person left a company got another company and took their procedures with them. I know all the forms end up looking like this.

Speaker 2 21:03

Some may suggest that in Malta, for example, we should start to rank contractors now.

Speaker 1 21:40

There's more than that to it as well.

Speaker 1 21:49

I think some of the political sponsoring, has got a big influence on tenders.

Speaker 1 21:58

E&L across the road here are going to do the Marsa roadworks. The steel bridges, and the work that I've seen them do here. They can't get the length of a column right. And are the major steel suppliers in Malta.

Speaker 1 22:23

I think the reason is that they heavily sponsor political parties.

Speaker 1 22:34

So even if you did rank the contractors. The selection process is a bit more, I don't want to say it's corrupt, but you're returning favours.

Speaker 2 22:49

It is. I think the current state of the construction industry in Malta is the result of a history of government individuals accommodating contractors over the years. Including awarding tenders.

Speaker 1 23:01

I wrote that actually and said in the early 70s in the UK, in the construction industry people were falling off buildings, being run over etc. A dreadful state. And so, *they introduced legislation*. And in the mid-70s, they changed the responsibility from the person to the corporation. So, the health and safety committee made it *the employer's responsibility* for the health and safety of their employees. And it probably took another 15 years for that to start to work.

You know, once contractors were getting heavily fined for accidents, so enforcement, sort of punishment. So now it gets to the point where the fine, if you seriously injure someone or kill someone, the fine that you would receive would probably be enough to put you out of business. So, if you're a small company, and you received a 100,000 euro fine, is a big chunk.

So it's kind of it started off with people moaning about it. It's too much! it's too heavy! And now it's under reverse effect. So, now the contractors in the UK are pretty much self-policing. Very little input from the Health and Safety Executive. OSHA equivalent in 30 years of working in the UK, I probably met a health and safety inspector, and a government health and safety inspector twice. And one of those was by invitation. So if there was a major accident, touch wood I've never had many because of a major accident. Then the inspectors would come in shut everything down and a full investigation and eventually, if you were found a fault, you'd been caught, and you'd get a whopping fine, massive, massive, fine, big enough to disrupt your business.

Speaker 2 25:10

What do you think should be done? What are the gaps?

Speaker 1 25:20

When I was thinking about how, how health and safety improved in the UK, it was by fines. Once, the owners of the business are going to say, 'Oh, hang on here, we can't afford another one'. *So you'll start investing in systems, people, procedures to make sure that you don't get a fine again, you know, as best you can.* So to avoid having an incident in the first place that will receive a heavy fine, invest in the right people invest in the right person procedures and practices, and train people in those is going to help prevent anything recurrent. So, it kind of feeds itself. So, legislation changed again, in the mid-90s. There were a couple of pieces of legislation that came out that made it even more onerous.

Speaker 2 26:16

But in Malta, there are their legal notices. The problem is that it is not enforced. Right?

Speaker 1 26:32

And there's no punishment. There's no consequence.

There was somebody, I think it was in, in Marsascala. Somebody fell off the building and the three company directors were fined like 200 euros each. You spent 200 euros in a restaurant, honestly. That's no punishment.

So, there's no motivation for those people to think, "A shit, you know, we've got to sort things out here. You know, the flip of that, though, is if you said, right, we've had enough. We're going to have unlimited fines, for incidents of accidents, and the fine will be dictated by the level of complacency in the accident. So, the guys at court, are complacent and their responsibilities to their employees. Absolutely! Should have been *the maximum find that they could possibly have, which would be the turnover of the company for a year.* Things would be changed quickly enough, would they?

So, can you imagine if that was even suggested in Malta? As a consequence, the government would collapse. All the support of the government would be withdrawn. And then whoever says, oh, no, no, we're not going to do that, they would get all the political support, and it would carry on.

That's the fundamental rule.

Speaker 2 27:50

I agree with you. The one thing that may cause change is the fact that people are now getting fed up with construction.

Speaker 1 28:01

Yeah. I went to Mercury Towers when it was being constructed, the debris and dust is disgraceful. If I were involved in a project like that, I would have a team of people just cleaning. People outside shop windows are thick with dust from the construction. No wonder people are pissed off. No, no regard for anybody else. And it's a pretty poor way to be that you just don't care about the people around you, you just turn up, build a building, make a load of money, and go away again, you know. There's no wonder people are getting fed up with it.

So, we have a school, the considerate constructor's scheme that you paid to be part of, and that they measure I think there are five different measurements that they got. How you interact with the community, how you interact with your employees, you know, what are the wider benefits of the project? Real soft skills, not skills, real soft touches. And so you are measured against that, and it's completely voluntary. But the contractors take huge pride, you know. If you score 45 out of 45 on your wall all over LinkedIn, congratulations. But if you get a low score, you know, dragged in front of the director, why did we get such a low score? Etc.

So, I'm hoping that in Malta, construction grows, it kind of feels like the UK was in the 80s construction-wise. You know, a bit of a Wild West Show, nobody really cares, almost a cowboy but a bit wild. Fuck everyone. We'll do what we want. And I hope I hope it changes. I think it will. *But I would increase the fines to make people really suffer to the point where they have to change,* but I can't see that ever happening.

B.3 INTERVIEW NO. 3 – TRANSCRIPT

Site B – Developer

Speaker 1 0:00

Question 1: What is your idea of Quality in construction projects? Additionally, what do you believe are the primary factors necessary to achieve this from the planning stage to the project handover?

Speaker 2 0:01

Quality and construction projects, I think it's mostly based on the type of testing that goes into the materials that are on-site and certifications etc, apart from the workmanship.

“What do you believe the primary factors are from the planning stage to project handover?”

So, basically throughout the design stage, the quality of the design will already dictate how the flow of the project will be. Can you explain more?

Speaker 1 1:00

The idea of quality from the design stage and then also to the implementation of the Project. In the sense of not only the quality of materials but there are also two types of quality. Quality throughout the implementation process and quality built into the management system. So, it is more about the quality system of the management and how the different parties and the different contractors throughout the design stage collaborate. For example, how the engineering firms collaborate with the structure engineers. How the different parties are communicating if there is some kind of communication portal to discuss and so on. These together are already dictating the quality of a project long before the project begins.

So not only the materials, the steel, and the process on-site dictated the quality of a construction project.

Speaker 2 1:49

So, more coordination between the parties. Ah yes agreed. I think it's important that from the client side on the contractor side, there is good planning of the types of testing that when going to the project one is to make sure the quality is of the best type.

Speaker 2 2:21

And I think even maybe during the execution stage for example regarding deliveries. One needs good organisation of deliveries or for example of concrete so that it doesn't take a long time on sites when they're casting.

Speaker 1 2:45

So do you think this should be agreed upon before the construction process. Perhaps even at the contracts stage and so on.

Speaker 2 2:51

I think it will be beneficial to have, not requirements, but specifications ahead at the contract stage. But then it's important as well at the execution stage that for example, the contractor's planned casts, they make sure that everyone is on the same page. How they go on the sequence of works and design of testing that they're going to do.

Speaker 2 3:25

Question 2: Differentiate between quality control and quality assurance.

Speaker 1 3:46

The quality control is more on how it is done on-site. And then quality assurance is a system that makes sure that the quality control is up to standard. Quality assurance is more that there is a system that assures the client, you in this case that the construction is done up to standard and that's specified by the architects and the engineers.

Do you think that these are crucial in your projects? Know that quality assurance is considered and guaranteed?

Speaker 2 4:33

Definitely. Especially for this development. For example, since it's a commercial development, there are certain requirements of loading (*weight class*) of each floor etc. So, it's very important that the client is assured that the structure is according to what he plans to use it for.

Speaker 1 5:04

You as the client, did you from your will sort of appoint someone to take care of these aspects? The quality assurance and quality control aspects. Or did you just trust the contractor that he would do everything?

Speaker 2 5:27

No. So over here, what we do is not for every cast, but for certain casts, which we know are crucial for the project or are crucial casts. To make sure that the qualities are met, we get an independent company to test apart from the testing of the contractor.

So, we're double-checking the system. So, like that, we can compare and make sure that we are in line with the testing that the contractor has. It won't happen for all the casts.

Speaker 1 5:51

But are the casts tested all through the contractor?

Speaker 2 6:05

No, every cast is tested.

This is just a double-checking system on the major costs, yes, from the client side and usually this is suggested by buying the architects okay.

Speaker 1 6:31

So, this is sort of extra cost to the client, but it is to reassure ensuring that the quality is met as requested.

Speaker 1 6:31

Question 3: In your projects between time cost and quality, how do you manage these three?

Speaker 2 6:52

I think for this project in particular, time and cost are the most important. Cost is important, but when it comes to priority time at the moment is the crucial target.

For example, over here, currently, we have one of the floors which is going to be used as a supermarket temporarily before we start the next phase. For us (*the client*) time is the most important. Still cost, but some decisions that we're taking...

Speaker 1 7:33

More related to time than cost may be because of a revenue stream for the project.

Speaker 2 7:20

Exactly, because a delay in the duration of the project will also impact his business or his ongoing business. So, in that case, time is more important, but overall, I think for the budget, the cost is the most important.

Speaker 1 7:58

So usually, as you are saying when time is kept the most important aspect and the project sort of is being rushed. The quality may be left behind, sort of left in third place. Since this is not the highest priority, the tolerance for low quality will increase.

Is there a system throughout also the project that sort of reassures that the quality and the organisation as a whole is still up to standard?

Speaker 2 8:50

From our side, the management side we focus a lot on this. Usually, when we notice that there is either a delay or example a long cast which might degrade the quality of the concrete, we advise them on what is best. For example, when scheduled to cast and it's raining and you have an open roof, the concrete ends up having different properties. So, in that case, if the contractor still decides

to go ahead with his plan, we suggest to the client and say that we don't think that this is up to standard.

We had a case over here where the contractor needed to do remedial measures to strengthen the cast. So basically,

Speaker 1 10:14

So basically, the project management team acts as the eyes of the client throughout the project.

Speaker 2 10:37

Ideally, we try and anticipate these before. So that, for example, when we know that it's going to rain, we try and anticipate it and say, Listen, we suggest that you don't cast today, even one day of delay on that cast isn't going to impact the project that much rather than if you cast it's a disaster and you have to do it and you'll take another week or two.

Speaker 1 11:01

So basically, with this system, you try to avoid rework and extra cost to the client as much as possible.

Speaker 2 11:11

And so, this is basically the system is only

Speaker 1 11:18

Question 4: Considering your prioritization of project elements, are there established mechanisms within your business to ensure quality under all circumstances?

Speaker 2 12:50

It will definitely help especially for projects where there isn't a party, like a project manager who would consider this and indicate to the client that there isn't any risk. It's more reassuring for him that he has a contractor who is using the certified system.

At the same time, I've always experienced that some certifications which let's say even though something is certified, when you look at it, you kind of second guess the certificate. This means that certification itself will not solve everything.

Speaker 1 13:46

ISO is quite a serious group of certifications, and you can't just buy a certificate and that it. It's more an audited continuous system.

Question 5: Are you familiar with the ISO standards and the operational mechanism in the construction project?

Speaker 2 14:10

No

Speaker 1 14:25

Okay, so, briefly, the ISO standard provides a quality management system, for the contractor in this case. And mainly it had several requirements to meet such as leadership, operation, client focus etc.

Do you consider this relevant to the Maltese construction sector? And if not, why?

Speaker 2 15:10

Do I see it happening? No, not really, especially on these smaller sites and smaller contractors.

Speaker 1 15:30

For now, let's discuss this project, for example, that is a multi-million project. So do you see it happening in projects like this in Malta, to try to elevate the bar?

Speaker 2 15:42

Yes, in this project, we try and make sure that every material that is used over here, we to get the specifications, including all the information to make sure everything is up to standard, as requested by the architect.

Speaker 1 16:05

So, in Malta, do you see it happening throughout the contractors?

Speaker 2 16:18

No, no, no, definitely No.

Because of the mentality, because of politics. So I think, I think the old mentality definitely factors into this issue. And, unfortunately, sometimes the smaller the site is the harder it gets. Contractors don't see it as important as other larger sites. And so for them, they say, 'uija go ahead' there's no need to do the steps or no need to get certification for this. Let's just finish this project and move on.

Speaker 1 17:05

And as a client, what do you invest to work with a contractor that works with a quality system?

Speaker 2 17:27

I'm thinking of the different contractors we have here at the moment. I would say, yes. But unfortunately, for us and the main client, for finishes, especially I don't think that quality is of that much importance.

Speaker 1 18:14

In reality, in the project, once opened one will not see the grade of the concrete and the reinforcement.

Speaker 2 18:23

To be honest, that's why I'm saying it could be because it's a temporary finish. Not depending on the likes of the client. So, for him to spend his money on something, which is for two or three years, and then he has to do it again, it is not of great importance.

Speaker 1 18:45

Question 7: ISO Standards, particularly ISO9001:2015, emphasize a quality management system built on various requirements spanning Leadership, Planning, Support, Operation, Performance, and Improvement. Do you believe such a framework has relevance in Malta's construction sector at present? Considering the current scenario, do you perceive investment in quality as imperative? And do you anticipate certified quality to entail additional costs?

Speaker 2 19:08

I think yes, I think they do factor in an additional cost to the project because usually, they have specific people whose job is only that. So here, for example, there is a person who takes care only of QA/QC. They (the contractor) have an online system which is not paper-based. They still have the papers for example for certificates of competence and specifications.

But mainly it's about concrete grades and reinforcement for concrete structures. And then for the steel, the quality assurance is mostly based on the certification of the seal from the factory itself, but even for uses of paint for example. Everything that is involved in the structure needs to be certified in that way.

And then, for example, when we're bolting a column and you need to grout the base and the bolts, you need to make sure that that that grouting that is being used is up to standards.

Speaker 1 21:02

And from your experience in this project, what is the percentage amount of rework that had to be done? Is there at a database that tracks, for example, the amount of rework that had to be done.

Speaker 2 21:23

We don't have it specifically. I mean, we have in our in our logs. We do mention if there's something which wasn't done to specification. In this phase of this project, so far, I think two main issues, were the fault of the contractor.

It was in the beginning of the project, basically, in the ground slab of the project. We had an issue with a cast, which was cast during heavy rain. And then there are smaller scale occurrences regarding smaller batches of concrete.

Speaker 1 22:12

So, the level of rework is still limited.

Question 8: Recently in Malta, there has been a process of listing contractors in the sector. Do you believe the next logical step should involve ranking contractors based on certified processes and their capabilities, which could also influence the awarding of tenders and the allocation of project sizes?

Speaker 2 23:01

I think it will definitely help. It will help the client know what he's getting, and it will justify even the cost of what he's paying for. If he chooses to work with a contractor or has lower level, he knows the reason why.

Speaker 1 23:38

Okay.

Question 9 -

Speaker 2 24:02

Definitely. The way forward and I think. Beneficiary as well, because I think it will improve the construction industry in general. And the types of buildings that that have surrounding us and that we're living in.

Speaker 1 24:30

Where do you think that it is most likely to happen? In small projects, do you see it happening or only in big projects where the client basically can afford to pay extra for either a management team and a certified contractor?

Speaker 2 25:00

I would like to think that they are that they are implemented in all projects.

One example I can maybe think of is a project, which is very small and a small budget like simple alterations, and it's like a small client, I don't think that they will look into the quality and this detail.

But for even medium, if you have a block of apartments. No, that definitely, I think it has to be.

Speaker 1 25:37

One last thing, what do you think, may be the primary factors stopping this implementation in Malta?

Speaker 2 26:28

No, this would definitely cause chaos. I think it will stop most, if not all the sites that are ongoing at the moment. So, then that's an issue for sure. But at the same time, if..

Speaker 1 27:03

But at the same time, everyone knows that something has to happen.

Speaker 2 27:09

Exactly, not only on the quality of the materials but beyond.

In a block of apartments, maybe they do three tests per week if they do them. So, not only the quality of materials but also the quality of the whole process and the whole architecture of the building itself. Everyone knows that something must happen, but no one is willing to suggest a change.

I think rather than then implementing this all at once. To avoid what happened with the licensing of the contractors I think there should be a holistic plan. This procedure is started and done slowly to the different contractors and not stop the construction process after this process, has been done to all the contractors.

Then that is where I would proceed with the rest of what we discussed, like, for example of the Tiers, of having new project scales, - so it should be implemented stage by stage.

So in this way, I think it's, it's a good option of how to still get to where we want to get but in a more strategical way.

B.4 INTERVIEW NO. 4 – TRANSCRIPT

Site B – Contractor

Speaker 1 0:00

Question 1: What is your idea of Quality in construction projects? Additionally, what do you believe are the primary factors necessary to achieve this from the planning stage to the project handover?

Speaker 2 0:37

So, Quality in construction is targeting, and adhering to project specifications, whether they are whether they are contract-based or whether they are construction-based. Obviously, there are various aspects to deal with this project and its construction.

So, our targets here are related to reinforcing concrete, and steel and there are specifications from the architect and from the engineer that you have to abide to. So, in this case, the objective of this quality is to meet those specification goals.

Speaker 1 1:10

Question 2: Can you differentiate between quality control and quality assurance? How crucial do you perceive both aspects to be in your projects for the benefit of your clients?

Speaker 2 1:35

This is also confusing even in my head, what is quality control? The way I try to distinguish is one is planning what you want to achieve. And the other is, is monitoring. I don't know if it is correct but that's the way I always think. Quality control is more of the implementation. And then assurance is a system that the quality procedures into place in this project as a contractor.

Speaker 1 2:12

Question 3: As a contractor, when managing your projects, how do you prioritize between time, cost, and quality? Kindly elaborate on your reasons behind this prioritization.

Speaker 2 2:21

This is a difficult question because this is a design and contract. So, in my opinion, the primary targets were cost and time. So, when you go for design and build project, you're giving priority to cost and time.

So basically, quality would rank at the third place. That doesn't mean that quality is a failure, but the other two are a priority.

Speaker 1 3:03

Okay, I asked this question, in other projects and even smaller-scale projects, the tendency would be that a developer would be interested mainly in the cost and the time and then the quality would be left behind. Can you explain to me what quality measures you have in this project leading to the next question?

Speaker 2 3:36

In this case, we have *Company Z* on board as the QA QC expert team in this project.

At inception, we have done a Quality Assurance Plan, which was in line with specifications and was submitted.

Speaker 1 3:50

During the contract stage?

Speaker 2 3:55

No, post-contract stage. During the contract stage, there was a requirement for quality assurance and quality control and as soon as we signed off the contract we worked on technical documents to be submitted.

Obviously, the quality assurance plan included also how to check that we are achieving these in the form of checklists. So, again, that was the plan, it was approved and as soon as we started with the work we started implementing. Obviously always detailed with the construction taking place, for foundation layouts, concrete, steel, etc. We have checklists for every aspect of our way.

Question 4: Considering your prioritization of project elements, are there established mechanisms within your business to ensure quality under all circumstances?

What we did here is we've translated these forms on digital platforms, we process it towards a system, a centralised system and all the information is accessible instantly all the time to all parties.

Speaker 1 5:14

Who conducts the checks?

Speaker 2 5:16

the checks are basically threefold. So, there's the person who creates them from the project management aspects and addresses them to the person's concern, which is the person from *Company Z* and from the design office. In our case Forward Structures, and when these are filled in, signed off, and there are no observations or fails, these are close as that particular aspect being complete. So, the reinforcement is checked, concrete is checked etc.

Speaker 1 6:00

So, you have quite a good system of checking quality, do you think that more can be done? Or do you know, when your grey areas are for example?

Speaker 2 6:22

In my opinion, what is being done it's enough, it's quite holistic, and for usually in these kind of projects with the setup there is things tend to be in place. Okay, so the smaller projects are more problematic.

But if I were to say, what can be done more? Sometimes it's useless to have a million checklists, ultimately, it's what you put in. If you're just filling in forms for the sake of having forms, it's totally useless. That sometimes is a problem. Sometimes we're doing things simply for the sake of doing it. Sometimes there are forms that we are asked to create that for us just are an overburden, they are not practical.

So we believe that rather than having checklists, the observation during implementation for example of the process done by the workers is more effective and important.

Speaker 2 0:05

So you can have all the checklists. If you don't have the right people, it's useless. Ultimately if the people don't know what they are doing and they are not being supervised you can have all the checklists because you will not get it right.

Speake 1 0:20

The workers that are working on site are they trained, do they have some sort of skill cards? Do you give them some training and so on, because ultimately this is the most important?

Speaker 2 0:41

Any employee here has a competence certificate for the different trades. Again, it's a document. When you're on-site, you have the same document for the same people, but you can say that person is better than that person. You can say that person just came from abroad and does not even understand your language. So, again, there is a difference between forms and what is being done on-site.

Speaker 1 1:29

I agree, since it is a paper-based system, there are still flaws that can keep on happening and so on. But at least on one hand, there are competent certificates for every worker on site which shows a level of work standards from the contractor.

Speaker 2 1:41

Definitely. Building up on this issue, I would prefer to have like for example skilled workers being brought up from trade schools rather than having competence certificates. Why is it that employees in the hospitality industry, are being checked and trained for good skills and then for construction, everything goes? We want to have workers coming out of masonry construction school, and all the other trades. At that point, paperwork would not make sense anymore and it would not be important.

Speaker 1 1:58

Question 6: ISO standards serve as globally recognized certified systems in construction project implementation, providing a standardized level of quality assurance to clients. Are you familiar with ISO standards and their operational mechanisms in construction projects?

Speaker 2 2:10

I have heard of ISO standards, but definitely I don't have too much experience and exposure. I've been with a company in the past, where I've been through the process to certify its processes in Malta.

Speaker 1 2:28

Processes of manufacture, for example, like producing bricks?

Speaker 2 3:15

In this case, it was an infrastructure contractor, so road works. And, we were working on certifying the company, its processes, etc. Their specific tasks, workflows and not specifically QA.

Speaker 1 3:28

Exactly, because ISO specifically the 9001 2015 documents sets a quality management system, where the foundations are based on continuous improvement, and as you may know, ISO conducts constant audits. So it is a continuous process, you don't simply achieve that certificate once and that's it. Really and truly once you are ISO certified that's just the beginning.

Question 7: ISO Standards, particularly ISO9001:2015, emphasize a quality management system built on various requirements spanning Leadership, Planning, Support, Operation, Performance, and Improvement. Do you believe such a framework has relevance in Malta's construction sector at present? Considering the current scenario, do you perceive investment in quality as imperative? And do you anticipate certified quality to entail additional costs?

Speaker 2 4:36

the biggest gaps, I think from our last question are resourcing which really and truly is money. So, to implement such a system, you need resources. Okay. So that is one of the first barriers any contractor will find. Most of the times small businesses that consist of 25 people they'd rather use those 25 people on productive works. So, again, quality assurance ISO becomes secondary nature. Exactly. So that is the first barrier (extra cost).

But again, besides investing in the system itself, it's investing in time for people to maintain it, okay, so what you're putting in and what you're taking out of it, it's a very, very different balance, and this happens for contractors as well. So we need the right people.

Speaker 1 5:59

So we need the right people. Right?

Speaker 2 6:01

You need the right people and ultimately, it needs to pay up.

In a sense that If we have a bunch of contractors in Malta that are able to do without ISO, they will do without it. Why spend the money on something, which is not paying anything back, or seemingly paying something back? Because ultimately, quality should be pushed up. I'm afraid it often becomes quite often a paperwork exercise. I've been to through the process of working for a company during the audit. Everything gets perfect in between everything and in between its business as usual.

Speaker 1 6:55

Question 8: Recently in Malta, there has been a process of listing contractors in the sector. Do you believe the next logical step should involve ranking contractors based on certified processes and their capabilities, which could also influence the awarding of tenders and the allocation of project sizes?

Speaker 2 7:17

I fully agree, Italy has a similar system where each contractor is licenced to do specific work, whether it's in volume, whether it's in trade, you cannot have a finishing contractor certified to do restoration, and you cannot have an excavation contractor to do steel works etc.

I think it's a recognised system and it is a good system itself. To come to out of the blue to that situation there are a lot of processes involved. One needs to understand how to rank contractors, one needs to understand who's going to rank and on which basis we're going rank. So there are a lot of criteria that go in.

If were going to rank contractors but not provide trade schools to supply a good level of skilled workers, I think it is almost useless to rank. Because ultimately, you all have the same type of workers that are working for you. So there's a lot of things to be done and moved up, pushed forward together. You cannot go for ranking contractors to kind of go, without the contractors having the availability to employ enough skilled and competent workers.

Speaker 1 9:55

But what do you think are the barriers?

Speaker 2 10:00

The largest barrier in Malta is the fact we are a small country which unfortunately I believe has an island mentality, politics and the resource pool. That is a very limited resource pool, you can't filter people based on their skills and so on. Employment is a Russian Roulette, if you're available you want to work – come.

Low-skill workers, which sometimes leads to accidents, problems of quality safety, the. Health and safety etc.

So, whoever says that the local industry's main problem is contractors. I think contractors is the last bit of the whole pyramid. One should overlook a big approach.

Speaker 1 10:55

So, by certification, you think that it will not resolve the whole construction situation.

Speaker 2 11:25

Definitely not. By itself, it's a burden to the industry adding costs to the end customer.

This is the same as you architects come out of university. You train and come out as good thinkers and prepared for real-life problems. Then they start to experience the real world but effectively you always have architects available with responsibility and qualified. To be employed. The same thing must happen in the case of skilled workers being ready to be employed by contractors.

I believe one of the main issues that Malta must target in my opinion is the issue of resources. There are a lot of projects happening and the resources are limited.

B.5 INTERVIEW NO. 5 – TRANSCRIPT

Site C – Developer

Speaker 1 0:00

Question 1: What is your idea of Quality in construction projects? Additionally, what do you believe are the primary factors necessary to achieve this from the planning stage to the project handover?

Speaker 2 0:30

Generally, when we first think about quality in construction some say the building process quality, specification of materials, employees and skill. Different factors that at the end lead to a good final product.

Speaker 1 0:53

Question 2: Can you differentiate between quality control and quality assurance? How crucial do you perceive both aspects to be in your projects for the benefit of your clients?

Speaker 2 1:10

Quality control means the quality standards during the work and quality assurance means the guarantee of good quality during the work. Quality control is more about the implementation on site, quality assurance is more about assuring to all the different parties that the work to be implemented is done up to the agreed standards. These are usually agreed upon prior to the implementation phase.

Speaker 1 1:29

Do you usually work as a traditional procurement route or design and build?

Speaker 2 1:34

We usually work everything in-house (*referring to a design and build route*), at this stage we have a very large team. And when some tasks may be too complicated, we then subcontract a design firm to take the design role of that specific project. Usually in design & build, we try as much as

possible to be innovative with different building materials and methods to always stay competitive and still have a good margin of profit.

Speaker 1 2:16

Question 3: As a contractor, when managing your projects, how do you prioritize between time, cost, and quality? Kindly elaborate on your reasons behind this prioritization.

Speaker 2 2:29

To be fair I have an employee which is all the time keeps track and balances between time and cost. We usually give importance to the timeframes and budget at an early stage prior to the implementation of the project, we also discuss with the masons what they think about the allocated timeframes and we proceed on that. Quality usually comes at a very later stage.

We have developed a simple database yet effective that gives us information that then we can see where to focus most.

Speaker 1 3:01

But when the project starts, what is your main priority? For example, do you go for fast construction? Low cost? High quality? Etc.

Speaker 2 3:14

You consider everything! You look at the time, you consider the cost, you then see how many workers you are going to allocate workers and then you also consider the contingency that you afford. The aim is that you always reach your goals.

Speaker 1 3:38

Question 4: Considering your prioritization of project elements, are there established mechanisms within your business to ensure quality under all circumstances?

Speaker 2 3:44

I usually work by having a very good foreman leading every site including this one. Then I have an overall Forman which is above all the projects, I have more than one. Usually, these are always taking care of the quality on the different sites and pushing all the teams to work as instructed. We have an online platform between the top management including the overall Formans that usually these are constantly reporting and giving updates.

Speaker 1 3:54

Yes, but onsite who takes care of for example the steel distances, good cover distances etc?

Speaker 2 4:01

Yes of course. The foreman of every site. And then before every cast, the ‘perit’ or one of his employees comes and does the checks also themselves.

Speaker 1 4:10

Ok, I believe that this is only feasible in small residential projects like this one. For slightly larger projects this may become to problematic.

Speaker 2 4:17

Yes, for larger projects you can then afford to have a QAQC manager and a project supervisor always on site.

Speaker 1 4:23

You can also have a project management team for example.

And do you check the concrete? and at what instances?

Speaker 2 5:07

Yes, we do check concrete strength. We send samples to a sub-contractor – *Company Z*. We usually test where we have for example large transfer slabs, major casts, beams etc.

For a simple slab spanning a bedroom of 3m we repeated in every floor, we usually do not test every floor.

Speaker 1 6:10

So we can safely say that you test where there are the major structural elements.

Speaker 2 6:18

Exactly. I understand that in larger projects one has to test more frequently but for smaller projects with very small slabs we test in intervals. You must also consider that the foreman on site if he sees that the concrete mix does not look good, he will instantly notify the head Forman and a decision is taken. In addition, we can also test afterwards by cores by compression test in the case of any doubts.

Speaker 1 6:35

Question 6: ISO standards serve as globally recognized certified systems in construction project implementation, providing a standardized level of quality assurance to clients. Are you familiar with ISO standards and their operational mechanisms in construction projects?

Speaker 2 6:50

No not exactly, can you please explain?

AN EXPLANATION WAS GIVEN

Speaker 2 8:00

One needs to study the feasibility in Malta. I believe for larger companies having such a certified system in an added value however I believe that it will influence the whole process including the cost to the final client. Again, the feasibility on a local level one needs to see.

Speaker 1 8:14

Why do you think that it won't be feasible?

Speaker 2 8:20

Let me tell you. In larger projects, the budgets are usually more flexible. In the case of for example Gozo let's be honest, large projects there are none in contrast to Malta. I believe that a leading drive for such standards is to win tenders, so it applies more to the large contractors willing to take large government tenders for example.

Speaker 1 8:50

Question 7: ISO Standards, particularly ISO9001:2015, emphasize a quality management system built on various requirements spanning Leadership, Planning, Support, Operation, Performance, and Improvement. Do you believe such a framework has relevance in Malta's construction sector at present? Considering the current scenario, do you perceive investment in quality as imperative? And do you anticipate certified quality to entail additional costs?

Speaker 1 9:13

One must understand that for a contractor to implement such a system you must invest, and then you must see the return that such an investment will bring to your business. I agree with such a step, but one must then see what return moneywise or not one will obtain.

Speaker 1 9:25

So you think that it will effectively send a project over budget with such a step?

Speaker 2 9:50

I would say yes. You have to expand the team, which I believe would need to consist of experts. These eventually are added costs so one must increase the costs in order not to lose from his profits.

Speaker 1 10:04

Understood. Or either it is a step that shall be taken by everyone that will then increase the costs globally or on the other hand it is done by larger contractors.

Question 8: Recently in Malta, there has been a process of listing contractors in the sector. Do you believe the next logical step should involve ranking contractors based on certified processes and their capabilities, which could also influence the awarding of tenders and the allocation of project sizes?

Speaker 2 10:27

I think the in essence this is a good approach. However what is the difference between the tiers?

Speaker 1 10:33

There are many factors. If for example one looks at the UK or Italy, there are different tiers. First of all, tiers depend on the scale of the projects taken by the different contractors and secondly, tiers depend on the structured frameworks that the different contractors have both certified and not. This does not mean that Tier 3 contractors can neglect standards and Tier 1 cannot, the standards shall be uniform between all levels however the scale and ability of the contractor varies. This is then also included in the tender applicants for different projects.

What do you think?

Speaker 2 11:15

Listen, in larger countries, this shall work for sure. In Malta and Gozo, I think it is a very good idea however I am not sure it works. First of all, there is a mix of masons working on small residential projects and larger contractors. So, it will be very difficult for a mason to keep up with all this paperwork. Are we going to eliminate the mason? I think although I agree with such standardisation, in Malta we have a majority of small-scale contractors that such a system will send them out of budget or force them to work for the larger contractors.

Remember that we are already losing skilled masons, and they are very difficult to find. You do not want to create an environment in the industry that would continue to eliminate good masons. As much as I believe in having certified systems as you have mentioned, I think it is useless if you do not have skilled workers who truly know the trade.

Speaker 1 11:49

I agree. From your experience is skilled workers a current problem?

Speaker 2 11:56

For sure. Experienced masons who are retiring are not being replaced by young masons. With no offence, the younger generation does not want to work in such an industry, probably because it consists of hard work. So at this point, the remaining masons are appointed to the works that truly require skill such as 'lavor'. The rest is being done by foreigners. So at the point that these fase out, this will be a huge problem.

Speaker 1 12:07

What do you think must be done?

Speaker 2 12:12

A good idea would be for the government to reward contractors who would invest time and money in youth. I believe that there is no good facility that is producing good masons. It is useless to say that we want to build with 'Franka'. Who is going to build it? We must truly think for the coming future because it will be a problem.

Speaker 1 12:40.

Question 9: the last question is in general. do you see this approach as the way forward as already discussed? And do we perceive it as beneficial overall, what gaps do you perceive that need to be addressed? And what steps do you think should be taken forward?

Speaker 2 13:17

Overall, I do believe that the local construction industry at this point should look at improving the overall standard. Both as the level of contractors and also building materials such as bricks.

Speaker 1 13:24

I believe that in the case of bricks, only one supplier provides bricks with CE Markings in Malta. In the case of the others, it is true. Either you build with assumptions in the compression capability of bricks or you request a certificate of the supplies.

Speaker 2 13:33

Exactly, however, I doubt it if the certificate would be of your given batches. Really and truly the aggregate used in the mixes is constantly being changed and recycled. The same applies to Franka blocks.

Speaker 1 13:51

Let's get back to the topic. What do you think are the gaps?

Speaker 2 13:59

Listen, I agree that such a topic is very important. It is also evident that lately in Malta there have been accidents that make you question the level of workmanship in the local scenario.

I believe that we should try to implement tiers to contractors, but it has to be done with the right intention and with all respect from people who have experience from working in the industry. I believe that some small-scale projects which involve excavation exactly to third parties and involve underpinning for example, have more risk than larger-scale projects. So along with having tiers, a quality system also makes sense.

Unfortunately, at the moment, you have people who are not qualified or not experienced in complex operations who are attempting to operate such works. This is very risky, and it would be beneficial for the client to be assured that for the tasks he needs, a qualified contractor with the required standards is appointed.

Speaker 1 14:47

Although I agree perfectly with you, I would also add that not only the main operator would need to be qualified. If one employs for example foreigners, they need to be trained. One must understand that if these have never worked in a construction site it is very risky both for their safety and also the safety of others. Let alone if they are appointed early on to operate machinery.

Speaker 2 15:08

In our case, we only employ people who have experience in construction, both local and foreign. I am sure that others employ foreigners who have completely no experience in the sector. You cannot work like this.

I would believe that they do so since there would be a difference in wages. Such employees would be paid less than workers with experience in the sector. But you would need to see how productive they are and what quality of work they produce. Effectively, the employer/ contractor is responsible for them.

B.6 INTERVIEW NO. 6 – TRANSCRIPT

Site C – Contractor

Speaker 1 0:00

Question 1: What is your idea of Quality in construction projects? Additionally, what do you believe are the primary factors necessary to achieve this from the planning stage to the project handover?

Speaker 2 0:12

For us as a contracting company, the word quality is a word that may seem difficult to explain. Quality is an outcome directly related to the workers who are able to work with high standards.

You may tell me, so you don't have good quality in your work? We have yes, but the workers who truly know the trade, but they are very limited. There are workers that give good quality but there are also others that do not reach the standard that we would like.

What would happen if we do not build with good quality? When the project is finished such as a residential unit, for example, there will be problems with the client and complaints. How can we avoid this? We try as much as possible but sometimes it is very difficult. Why? Usually, target dates are very tight, so you need to keep on moving very fast. To keep good quality with high speed during construction, it is not very easy.

This also depends on the client. For example, a developer building a residential unit that will be used for renting to foreigners will not give so much attention to detail. Don't get me wrong, this does not mean that structural materials are replaced with low-quality materials, but overall, the attention to detail is much less.

On the other hand, we have other projects on a high market. The clients are able to afford luxurious buildings and generally, these are well of. In this case, attention to detail is crucial.

Speaker 1 2:40

Can you expand more on your company organisation? How do you function and how the system is structured?

Speaker 2 2:48

At this point as a contractor company regarding quality, first, we have built a network of systems that we have full control on. For example, we have a concrete batching plant that we produce to supply our projects. So, in this way, we know that the concrete is all the time being tested and is up to the required quality standard in all instances. In addition, we invested in a laboratory operated by engineers where concrete is constantly being tested as per specifications.

Usually, we work with two systems. The general testing of each cast and testing of concrete at random to ensure that the quality is spot on.

Speaker 1 4:22

And for example, regarding spacing of reinforcement, cover distances etc. Are these checked on-site?

Speaker 2 4:28

We as a company first employ people who have experience in the industry. In every site, the Forman is with high level of experience and usually with a background in the sector. We also have some that have been qualified in construction building engineering.

These are all given a site and oversee managing the site. The role is to first constantly check the work that is being done on-site and instruct the other workers. In addition, he would oversee constantly informing the 'Perit' of the works and in case of any questions ask. Moreover, steel orders and concrete cast orders are also done by the foreman.

In addition to this, we have a person dedicated to documenting the sites. This person is daily going to all the sites and taking daily update photos. These are then uploaded on our system. This for us is a database that we can (1) monitor the production that is being done by the workers and (2) if needed one can look back specifically to every date and see what operations were done and how.

Also, we have a Head Forman, who are all local and are experienced masons whose job is constantly hopping between our sites and overseeing the works. So for us, this is a sort of

reassurance. The head Forman is in a platform that he can constantly inform the board of directors regarding the work.

Speaker 1 9:02

Regarding construction materials, do you usually ask for certified materials?

Speaker 2 9:06

When for example we consider bricks, at this point we are asking for a certificate from the supplier. Keeping in mind all the things that are happening in Malta at the moment we have decided that certification is necessary. Also, periti started asking us to insist on this.

Speaker 1 9:43

Ok so one can say that you have a very structured system.

Speaker 2 9:52

To be completely honest. At the moment, for the past two years, we have employed a company to help us achieve ISO certification. Part of the work that has been done is always being visible in our company. I am confident that this new structure is showing in our work. We have all the framework; we have the paperwork starting to be in place so we continue to work to achieve the Certification.

Speaker 1 10:05

Ok, we can discuss ISO further later on. Let's continue with question 2 for now.

Question 2: Can you differentiate between quality control and quality assurance? How crucial do you perceive both aspects to be in your projects for the benefit of your clients?

Speaker 2 10:12

Regarding quality control, our biggest headache is the continuous testing. Since these are measures that are being newly implemented, it is not easy to control our workers but slowly we are getting there. But for us the most important factor is observation. You can have the best materials but if the workmanship is poor, you do not have a good result. In addition, observation for us is important

and documented for the fact that in the case of any doubts or problems with time, we can always refer back to the documentation.

Speaker 1 10:57

Question 3: As a contractor, when managing your projects, how do you prioritize between time, cost, and quality? Kindly elaborate on your reasons behind this prioritization.

Speaker 2 11:13

The truth is, if we had done this interview 5 years ago, I would have told you absolutely time. Why? We had a boom of work which paid good money and for us, speed was the most important. Quality I would say would rank 3rd for 2 reasons, we did not have the framework in our company that we have today and literally the amount of work we had was tremendous.

Today, 2024. It is a totally different story. It is a fact that work has slowed down, and clients are now more looking at the budget and the quality. Two factors against us are that the cost of raw materials has exploded, and quality has become a main factor.

Speaker 1 13:40

Can you expand more on what differences you think there are between 5 years ago and today? Mainly regarding quality.

Speaker 2 13:55

The difference is the attention to detail and a process which is more based on constant approvals. For example, when we cast a slab, we would not consider any electrical systems which would lead to a lot of unnecessary trenching afterwards. Costing us more time and money.

What we do now is that before a project, we have a board meeting with all the parties such as the planning architect, design architect, structural engineer, civil engineer etc and the design is built upon the requirements of all parties before the implementation. In this way, we avoid a lot of rework and unnecessary time wasted along the process.

Speaker 1 15:20

Question 4: Considering your prioritization of project elements, are there established mechanisms within your business to ensure quality under all circumstances?

Speaker 2 13:35

As I have already mentioned, we have a structured system that is based on checking the work constantly, materials are being tested and checked and buildings are built according to specifications.

Speaker 1 15:50

Agreed, we already discussed this so we do not repeat it.

Question 4: Considering your prioritization of project elements, are there established mechanisms within your business to ensure quality under all circumstances?

Speaker 2 16:01

I see this as when you are sick you go to a qualified doctor for advice, you would not trust anyone who is not qualified to give you advice. I believe that at this point, the same applies to construction. If you have a good reputation and you develop a good quality system, clients will automatically be driven to work with you. One still has to understand that as much as you work on your company, mishaps will always happen. Unfortunately, you will be judged on that.

Speaker 1 16:57

Question 6: ISO standards serve as globally recognized certified systems in construction project implementation, providing a standardized level of quality assurance to clients. Are you familiar with ISO standards and their operational mechanisms in construction projects?

Speaker 2 17:15

Basically, I know briefly that ISO is one of the top. As a company, it has caught our interest from 2 years ago, but we were very much behind in obtaining this. We were behind because it was still the stage where there was a boom and a lot of work, and we did not have the time and energy to

work on this. Now that we have time and less work, we shifted our focus on obtaining high-quality standards and getting an advantage over other companies.

At this point, we have also noticed that for public tenders, the fact that a company is certified with for example ISO will play a major role. A company with a certified quality management system and one which does not have will make a difference.

Speaker 1 18:05

When you say public tenders. Do you mean construction projects or road infrastructure?

Speaker 2 18:22

Both and we as a company have invested in both sectors. Lately, we have been awarded quite a good number of tenders related to road works. Regarding construction we take tenders related to housing for example, we also took the building of education schools.

Speaker 1 19:37

So, you are saying that the awarding of tenders is already at the moment being influenced by such systems.

Speaker 2 19:51

Yes agreed. If I am not mistaken it is not obligatory, but it would make one party at an advantage to another. You would be preferred. And it may be the case that the difference would be a small difference in the budget, so everything counts.

But on the whole, even for us, we are always aspiring to get more professional and be with the leading contractors.

I also see this differently, although others see this as farfetched. Why in the case of a tender for roadworks in for example Italy, we are not capable of submitting? Why foreign contractors can come to Malta, and we cannot do vice versa? So, with a quality system such as ISO, we can get global recognition of our capabilities.

Speaker 1 22:31

Question 7: ISO Standards, particularly ISO9001:2015, emphasize a quality management system built on various requirements spanning Leadership, Planning, Support, Operation, Performance, and Improvement. Do you believe such a framework has relevance in Malta's construction sector at present? Considering the current scenario, do you perceive investment in quality as imperative? And do you anticipate certified quality to entail additional costs?

Speaker 2 23:11

A lot that you have mentioned, we have worked on and we already have in place. For example, we have made drastic changes regarding Health & Safety in our projects. We still have fines coming in all the time, but compared to previous years we have improved a lot at the moment. I would say that we are not getting fined during the construction phase, but at the M&E works and finishing phase.

Speaker 1 23:27

How?

Speaker 2 23:29

Unfortunately, in Malta, people who work in finishes, electrical, plasterers etc, are still very behind in quality standards compared to us. The monitoring is far less than ours, if any. No Health and Safety measures whatsoever. For example, part of our H&S procedure is that once we finish a floor, hence a slab is cast, we take photos, our engineer gives the go-ahead that everything is safe and in place, we inform OHSA of our progress and we close off everything. This means hoarding and railing at all openings, and the floors are cleaned from waste. Then a sub-contractor related to finishes or M&E comes in with time, and he would destroy all the safety features you had done. The worst part is that if anything happens, we will still be in trouble with BCA and OHSA. A fine.

Speaker 1 24:36

I agree. This is one of the main issues regarding a construction project. A project consists of multiple contractors and sub-contractors. So one would affect the other.

Speaker 2 24:40

Exactly. For example, you have a building which is ready from the civil works with all the quality checks, the plumber comes in and chases a horizontal cut around the whole room. Which is very bad. You can't always control this because if the apartment is sold shell form, the clients will appoint their sub-contractors and we would not even be notified who these are and when they are going to work.

For slightly larger projects that would be less problematic since you have proper contracts between parties, and one could easily include specifications in contracts even for M&E works and finishes. Along with a list of specifications.

Speaker 1 26:10

Do you think that ISO standards will bring with it more cost?

Speaker 2 26:24

For sure. First, one would need quite an investment for this. You would need to pay for a company to provide the necessary guidelines to reach the standards of ISO. In addition, you must employ people to manage the ISO requirements within the company and these cannot be people for the sake of having the. These must be already well-known about ISO and in a position to keep everything in place for when the auditors come in.

SO effectively, the cost would need to be paid off from somewhere.

Speaker 1 26:56

Do you think that it will pay off? Do you think that it will persuade a developer to work with contractor A and not B because of ISO certification?

Speaker 2 27:05

I would believe yes. How things stand today people are always opting for getting the best service. Also, people with the help of the internet are very well informed about the topic and can get feedback about their questions. You can't fool people easily anymore. In addition, I believe that people are more concerned about their social status and do not want to get their names jeopardised

because of accidents for example. So people would be willing to pay more and have a contractor who is of high standards and ISO certified.

Speaker 1 28:22

Question 8: Recently in Malta, there has been a process of listing contractors in the sector. Do you believe the next logical step should involve ranking contractors based on certified processes and their capabilities, which could also influence the awarding of tenders and the allocation of project sizes?

Speaker 1 28:57

First of all we as a company were one of the very first that publicly agreed that there should be licensing of contractors and I will tell you why. We invest a lot in machinery, we have a lot of hidden expenses such as insurances etc but we believe that these are crucial so we invest in it. So we believe that there should be guidelines that if you are willing to be a contractor, you must also be willing to respect the guidelines and follow through. There should not be an option for some contractors who do not follow guidelines but then have the right to compete with us for tenders. Profit is important, but so is the need to follow guidelines. So licencing was truly the first first step.

The problems that have happened in Malta, the accidents that happened lately, all circulate with low-cost contractors with no experience at all and barely any licensing. Is this justifiable? If I have a crane and a truck, am I instantly a contractor?

I believe there should be specific courses for demolition, excavation and construction, and if you pass these courses, you will have the license to work so. Now it would be useless to go through all this hassle if the courses and licensing are a joke. It would be a total waste of time. These initiatives should be to improve the sector.

In this way, you would start to tackle these few contractors who are not working seriously and who are not following guidelines. This would benefit the whole sector since when an accident happens the whole sector is put into the same category and classified as a cowboy. This is not justifiable.

Speaker 1 31:24

I agree. We should work on an idea that would try to climate as much as possible such instances.

Speaker 2 31:41

Of course. For example, lately, there was that accident where a roof had collapsed because of an excessive weight being loaded on a traditional stone roof. For us it would be more than common sense to know that it would be risky to do such a task.

So, if these workers and their employer would have some basic knowledge of judging a building and how a heavy load would affect it. The accident and the fatality that occurred with it would have been avoided.

Speaker 1 31:56

Do you give courses to your workers?

Speaker 2 32:01

Yes of course. When they are employed, they usually have a basic meeting on health and safety and usually with every initiation of a project a tool kit meeting would take place. In addition, at least once yearly the workers would have a two-day workshop to refresh on the basics of their works. These are done internally, but I believe this should be obligatory for everyone.

Also, something that we are noticing as a company is that as the process of being a contractor is getting more complicated, simple masons that as in charge of a site and who strictly speaking are now contractors. They are coming to us and willing to be sub-contracted to avoid this process which may also involve paperwork.

Speaker 1 33:53

Do you think this is this is beneficial to you? Is it easy to find good, experienced masons?

Speaker 2 34:01

Yes of course. Skilled local workers are getting scarcer year by year. I believe that there are not many young men who are training to work in this industry. So it is a pity.

Speaker 1 34:31

But there are masons who are constantly getting licensed.

Speaker 2 34:42

Yes, I agree. But let me tell you something. I value experience more than a licensee in the case of masons. You get people with a licensee who can't even get a door opening correct, and a mason who has been working for 30 years and who is not capable of passing a written test can build arches and is truly a master. So I have my doubts regarding the Mason test, but let's not get into that topic.

Speaker 1 35:12

Do you think that there should be more enforcement in the sector?

Speaker 2 35:19

Yes and no. I think that there is no middle ground. Either white or black. For example, if you tell me having workers without a harness exactly at the edge of a floor it is one thing. If you tell me a mason in 40-degree sun who needs to wear a helmet all day it is another. It is not comfortable to wear a helmet when you are building a wall. People who write the laws and enforce them should be people who have experience in the sector. If a tower crane is working all workers should wear a helmet, but my point is that not because we need enforcement then we have to be extreme.

Speaker 1 36:47

Ok, Agreed, so to close off you do agree with the tier system?

Speaker 2 36:58

Yes, fully and I believe that it would serve as a driving force for contractors to keep on improving and building your company.

Speaker 1 37:23

Question 9: the last question is in general. do you see this approach as the way forward as already discussed? And do we perceive it as beneficial overall, what gaps do you perceive that need to be addressed? And what steps do you think should be taken forward?

Speaker 2 37:42

I would believe that contractors may see this as a waste of time and unnecessary paperwork from the authority's side. I believe that the authorities still do not yet know how to regularize contractors and the industry itself in Malta. We are also experiencing a lot of entities related to construction that have created this bureaucratic feel and always contradict each other.

We need to sit together, both the authorities and contractors and develop a road map and strategy which then would be implemented in phases. For example, we developed an implementation plan agreed upon between all the parties that would be implemented in for example 3 years. Contractors who fail to keep up with this plan will have their licenses taken.

The vision of having tiers is also a good step forward.

In addition, I would advise the authorities to truly develop a system that would produce young masons and builders that would feed us the contractors and continue to raise our standards. Unfortunately, resources are very limited in Malta, including the pool of workers. We would wish to employ more local employees, but the truth is that the younger generation is not an option to choose this industry.

B.7 INTERVIEW NO. 7 – TRANSCRIPT

Site D – Developer

Speaker 1 0:00

Question 1: What is your idea of Quality in construction projects? Additionally, what do you believe are the primary factors necessary to achieve this from the planning stage to the project handover?

Speaker 2 0:21

For me, quality is achieving quality based on the specifications based in the architects and the engineers, with the consideration of the client. Also, it should also make way for good end results including also the materials and elements being installed. So, a balance between getting things right, meeting specifications and having a satisfied customer.

Speaker 1 1:06

What do you think are the primary factors necessary to achieve good quality in a project?

Speaker 2 1:21

You definitely need a good set of specifications, a reliable contractor with a good eye on quality in terms of achieving the spec required in the documents. And, if there is an issue with achieving that specification, at least it's not just a matter of getting something similar and just dumping it there, but actually explaining what are the alternatives to meet the same specifications and getting approval to do so.

Speaker 1 2:08

What do you think about the contractor? This morning, I discussed from the contractor's side and how he explained it seemed like everything was perfect. He showed me all the quality assurance and so on. Do you think that the contractor could have done things better or overall, the contractor did a good job, but you had to keep on pushing him and so on?

Speaker 2 2:30

With regards to the contractor if we were going to go specific. Yes, we can now we can say that overall, the quality was delivered. If you're asking if there is room for improvement, then there definitely is there is always room for improvement. But we are quite amazed with the quality level we managed to achieve on this project.

And yes, overall it was not quite simple at the outset of the project, but we managed them to get the level that we needed and set it straight from their own.

Speaker 1 3:19

Okay, so the contractor did quite a good job.

Speaker 2 3:23

Yes, yes. Yes. In terms of in terms of quality, whatever, if it's, quality testing of concrete, mainly, and the surface finish, sealers of it's waterproofing etc. So even the process, we've got the submittal form procedure. So it's not just the contractor deciding what exactly to use, but he needs to submit the technical literature, it gets reviewed by the project architect approved and then utilised on site and then there are quality checks to ensure that the material he is using is also the material approved through the project architect. So, there's an entire thing going on, there is a whole process. You know, there's a checklist eventually from the contractor to make sure that all is good.

One of the checklists would be is the material being used according to the approved submittal, so that's already a tick box that you can fill in knowing that you've got the right material.

Speaker 1 4:38

When I spoke with him has stated that they have been using the ISO standards, the 9001 for more than four years. Do you think that this reflects their work?

Speaker 2 4:57

I think yes and no, I think It plays a part in the improvement we see in this particular contractor. And because when we've worked with the same contracts on other projects in the past, and we're the same people and the same thing, the quality level wasn't the same.

So yes, looking back, there is an improvement in terms of quality, at least on this project, for sure.

Speaker 1 5:30

We can move on.

Question 2: Can you differentiate between quality control and quality assurance? How crucial do you perceive both aspects to be in your projects for the benefit of your clients?

Speaker 2 5:42

Quality Assurance are the measures you want to implement to make sure that you achieved the control. So, you need the overall plan at the outset of the project to make sure that that is implemented at the early stages to make sure that quality control is then delivered across the lifespan of the project.

Speaker 1 6:13

Was this agreed upon in the contract stage or it was agreed upon after?

Speaker 2 6:20

No, we always implement it at contract stage.

Speaker 1 6:25

Ok. So, the contractor had to submit sort of his plans regarding quality within this project.

Speaker 2 6:28

Yes. All the quality plan, the QA QC plan, gets triggered from the early stages purely to make sure that quality is being delivered.

Speaker 1 6:42

Question 3: As a contractor, when managing your projects, how do you prioritize between time, cost, and quality? Kindly elaborate on your reasons behind this prioritization.

Speaker 2 6:58

If you had to look back at the original timeline, the project's civil works were scheduled to be completed in June last year. So without taking into consideration any extension of time, which was due to the contractor, and any other aspects that contributed to such delay but one of the major contributions to such delay was the initial archaeological monitoring that was implemented as a PA requirement planning application. At the planning application stage, when it was an imposed condition that we had to avoid doing. So instead, from day one, when we hit the ground, we couldn't hit the ground fast, but we had to avoid two terms and Terms of Reference issued by SCH to carry out excavation. So instead of going down with hitting the ground with heavy machinery, we had to make use of small machinery, toothless buckets, open trenches, getting labourers in the trenches and literally cleaning the rock face, for the archaeological monitor, to inspect and give the clearance to proceed for excavation. So that so that influenced the project timeline, because I believe the first official clearance came some three months later, so the general excavation, as we know it, when it started, it was already three months in delay. So, it's a delayed start, technically, so it's a major contribution to where we stand today.

But of course, you cannot go beyond processes which are already imposed on the site. So, unfortunately, recovery of such an important portion of time, couldn't be absorbed within the overall period.

Speaker 1 9:33

And, what about the budget?

Speaker 2 9:39

If I recall correctly, we are still within budget. It relates to whether you're asking for the budget, the original budget from the contract the accepted contract price because there was had a slight increase. So technically the accepted contract price was slightly over the approved budget. Right.

But it was minimal, and it was accepted. So, if we had to baseline our accepted contract amount, as we spend today, we're still within the contract amount. Even though we've had quite several variations. When we mean variations from the client, number of variations from the client, yes,

with changing design changing specs, changing or increasing the spec, you know, so, yes, we had some variations,

We directed the contractor to list them as variations rather than mixing them up with measured works.

Speaker 1 11:08

Okay. And do you think that the quality was kept constant throughout the process? Or since the project was behind? You had to sort of close one eye?

Speaker 2 11:17

In this case no. No, it's because we were adamant that quality needs a good effort, and it needs its own time and input from the contractor to have it monitored continuously. So, we never turned a blind eye to quality in the sense and natural effects when there were quality mitigations that we wanted the contractor to implement to make sure that they were addressed.

Speaker 1 12:09

On this point, I believe is directly linked to the workers who are doing the work on site. What do you think from your site?

Speaker 2 12:27

It all goes about the team on site. So, in this case, the foreman employed responsible on-site is very knowledgeable on many aspects of construction, especially cast in-situ elements, and the concrete in this project was an integral part of the structure since its frame structure. So many concrete walls and concrete elements, so it helped to make sure that the quality desired is also being translated into good workmanship by his team.

And even when assigning personnel on site, given that he knows the specific quality desired, then he can assign the workers accordingly to make sure that the quality is being delivered. So, if there is a team, which is less knowledgeable, it possibly might schedule that team on a different task on that day.

In terms of brickwork and the traditional brickwork method, then some instances will have some issues in terms of quality cause rather than the quality of the material itself being used, meaning the brick itself, it was the workmanship that was an issue at certain points, meaning that you'll get door jams not vertically aligned. The lentil does not align horizontally. So, you tend to get this poor workmanship that if not tackled immediately, you might end up with issues.

Not rectifying quality issues straightaway might then lead to other quality issues later on, maybe also adding extra cost to the client.

Speaker 1 15:38

Was there a lot of reworks in this project?

Speaker 2 15:46

In terms in terms of quality no. It was more of an issue of instructions being issued late. Meaning that the works on site were already carried out. So, we had to rectify in that sense because the client opted for a different setup of a room for example. So, we had to close that door on one side and open another one on the other.

But in reality, any errors that the contractor made due to quality, were very minor. One case in point I remember was that they've costed a concrete wall. During the first pour literally, when they dismantled the formwork, it resulted there was an area which was full of honeycombing. So if you had to chase that out, and then cast it again. So quantity wise that was it was not correct.

Speaker 1 17:08

Okay, so now let's go more on a generalised idea. In this case, the contractor is already using quality quality-certified system in terms of management. What do you think of this idea of certified quality systems in for contractors in Malta in generic?

Question 5: Certified systems in contractors....

Speaker 2 17:26

It's the ideal. In a sense that if there is a system that everybody is aware of, and everybody's contributing, so each contractor is contributing towards the same achievement, to the same goal in terms of quality, it automatically means that you're setting the standards throughout. And setting a standard, again, would mean that the general public, developers etc, they know they know what to expect when engaging a contractor, which is avoiding to a standard.

So yes, the overall strategy will definitely help and having an overall strategy of quality standards throughout and certified accordingly, to make sure that the baseline standard has been achieved.

Speaker 1 18:22

But do you think that there may be some factors that will not even stop this from happening?

Speaker 2 18:32

Well, if there's, if it's going to be self-imposed, unfortunately, it doesn't work. So it needs to be regulated in a way that is imposed on others. Or else there is a benefit for a contractor to do it.

Speaker 1 19:10

One would need quite an investment to implement ISO. I discussed with a contractor who employed a company to help him and lead him to achieve ISO within his company. He mentioned that it's a very costly exercise, but he said that to be awarded specific tenders, you need such certification.

So maybe in that case, it would be beneficial, but for smaller contractors or simple masons that are building residential units, I don't know that area how it should be tackled.

Speaker 2 19:33

Eventually, it still goes about quality. One would need to ask, What benefit do I have engaged in Contractor A, rather than Contractor B apart from cost because cost can be easily a factor to decide upon, but apart from cost, then comes quality.

So, when comparing the fact that contractor B is slightly higher in terms of cost than a deal to quality aspects meaning that his he keeps an eye on quality, then is a contributing factor to these guys, but the smaller contractors need to first get also education and training on this aspect. And a level playing field, because then you get the contractors which do their best to actually get quality standards in place. And unfortunately, when faced with unfair competition, because somebody else is not even licenced for example, to carry out the works, of course, it's unfair competition and would end up in the initial contractor to not that not getting work basically.

So, that would ruin his business at the end of the day. So, the thing with unfair competition needs to be tackled in tandem.

Speaker 1 21:26

Question 6: ISO standards serve as globally recognized certified systems in construction project implementation, providing a standardized level of quality assurance to clients. Are you familiar with ISO standards and their operational mechanisms in construction projects?

Speaker 2 21:51

It's better because I didn't go into the details of the ISO certification, I know they exist. And it's a standard and so on.

Speaker 1 22:06

EXPLANATION GIVEN

Speaker 1 24:05

Knowing so do you see it happening in the current local construction section?

Speaker 2 24:23

The standard itself will definitely be a benefit to the industry, mostly large contractors because there's an entire setup because as you clearly mentioned, it's not just a matter of one aspect, it's

across the board. So you need you need the whole structure and that comes within a large contractor rather than a smaller contractor.

It will definitely be an improvement and somehow, it will also benefit if it is reflected onto the smaller contractors. Sort of a reduced version of this. For example a reduced version on to the smaller contractors to, to achieve the bare minimum requirements of standards.

Speaker 1 25:05

Question 8: Recently in Malta, there has been a process of listing contractors in the sector. Do you believe the next logical step should involve ranking contractors based on certified processes and their capabilities, which could also influence the awarding of tenders and the allocation of project sizes?

Speaker 1 25:50

And even more, for example, when one looks at Italy, or at the UK or France, basically contractors are ranked with tiers. So, maybe a solution for Malta would be to implement tiers to the contract, there's first of all, it would try to motivate the contractors to always improve. And additionally, by having the tiers, for example, the larger contractors would be in tier one with all the certifications and then for specific tenders and projects, for example, only they can work. So what do you think on this?

Speaker 2 26:38

The issue with the licensing of contractors. Eventually. Yes, so all that you said needs to somehow be reflected under the contractor's licensing that we've experienced recently, but it's not just a matter of quality it goes, it goes beyond. Currently the licensing of contractors, groups together all types of contractors, small, medium, and big. So, individuals who are self-employed small and medium businesses and large contractors, are grouped together and called contractors.

So, the very first thing in my opinion would be that there needs to be a classification. To classify each contractor. You classify not just with quality, but with skill and knowledge which goes together. And then you can progress to a tier system.

For the tier system, we might look into what's happening abroad, but it could not directly apply to what's happening locally. But for sure, there needs to be classification of contractors in terms of size, in terms of turnover, and in terms of knowledgeable people within the structure.

Because again, large contractors can get broad knowledge based on a group of people while smaller contractors need less knowledge for the job, they can carry out but have less paperwork. So, this means that possibly the guy and this level, at the smaller contractor level is more knowledgeable as a guy hands-on guy rather than the team of the larger contractor.

Then comes into play the categorization by turnover, because of course the smaller contractor the turnover each year would be less than the larger contractor's. So, by default, if the smaller contractor carries a turnover of 1 million a year, by default, it means that he cannot then apply for contracts that are greater than 1 million in terms of turnover

for that project. So he cannot qualify for that.

So it's not just quality. Quality yes. It is part of the whole quality; it should be part of the whole strategy of categorization.

So even the guys who have a smaller company. Some tend to make sure quality is always there and the bigger guy who because of the team being implemented, he might turn a blind eye every so often to quality. So, you can view quality as the benchmark to reach or to constantly keep the bar at the same level in terms of education and upskilling.

Speaker 1 30:04

And in the case of residential units or blocks of apartments and so on. How can we tackle the smaller contractors? How do you think we can classify them?

Speaker 2 30:19

First of all one has to understand what is happening and has been happening in Malta. There is a misconception. The licensed mason in Malta is not just there on site to build a wall in bricks and stone but he has the broader knowledge to manage the site and take responsibility for the civil works for mainly smaller projects. With all the site management involved, sanitary laws, geometry, and knowledge of concrete and shuttering etc, so it's the broader aspect. Similar to when we refer

to 'Perit', it is not just an architect, but an architect, urban planner, conservation, civil and structure engineer, etc. So similarly, I believe that 'licensed mason' in Malta is the umbrella term.

So when it comes to quality within these smaller contractors, there should be sort of a system that caters for the smaller contractors and pushes them to continuously upskill their skill and quality within their work. This is the method I see for the smaller guys to improve quality. It is not simply about paperwork its more about guidance. And in addition of this, the system should cater and sort of be an incentive for young men to learn the skills and trade etc.

Speaker 1 35:58

Question 9: the last question is in general. do you see this approach as the way forward as already discussed? And do we perceive it as beneficial overall, what gaps do you perceive that need to be addressed? And what steps do you think should be taken forward?

Speaker 2 36:10

Yes yes. It is already a challenge to identify the gaps that there are. From my experience, for smaller contractors it is not about not being willing to improve, because they want to improve but the problem would be finding the help they need. So there needs to be an entity to help them achieve the ultimate goal etc. Then when it comes to larger contractors there should be more strict management systems. The ideal would be a structured system for contractors that would structure the sector and remove the confusion that there currently is.

B.8 INTERVIEW NO. 8 – TRANSCRIPT

Site D – Contractor

Speaker 1 0:00

Question 1: What is your idea of Quality in construction projects? Additionally, what do you believe are the primary factors necessary to achieve this from the planning stage to the project handover?

Speaker 2 0:21

Quality is very important, both for the structural integrity of the building itself to withstand all elements in the future years and also to assure the client that the project that is being built is of good quality and as requested.

Regarding controls in our projects, we try as much as possible to be very strict. When it comes to structural materials for example, regarding materials such as steel it would arrive on-site certified by the manufacturing plant. Moreover, when we start to assemble the reinforcement on-site, every step is reported and documented. Distances and covers are checked, and reinforcement is checked also by our engineers, certified and signed prior to any pouring of concrete.

In addition, we also certify the shutter systems for casting in situ concrete. Formwork is checked mainly for integrity so that when concrete is poured the frame will withstand the poured concrete. In this project, we only had one accident, and it was not even our fault. The studs used were defective and when loaded they cracked.

Also, we fully document the process on sites two to three times a day. Here we have a QAQC officer who well documents the process fully. Photos are taken of all the works that are happening on site and are stored on our digital platform. These are shared also with our engineers and the engineers of our client. This process is important for multiple factors. First of all, one can go back and refer to photos. Quality control is very constant and overlooked by multiple individuals given that it is shared. And in case of variations or claims we have full documents to back us.

Speaker 1 2:27

And are these processes specific to this site? Or are they a standard process for your company as a whole?

Speaker 2 2:34

No, it is standard for all projects taken by our company. However, in the case of such a project, this was also a requirement at the tender stage. We had submitted our procedures and it was approved later on at contract stage between all parties.

Now regarding concrete, we also have our processes and checks. We usually study what cast will be taken before the day, for example here the majority of concrete is C37. Then we analyse the specifications from the architect, for example addition of admixtures of waterproofers etc. Every time that concrete arrives on site, it is tested regardless the type or size of the cast. In addition, we have in-house frameworks for the number of tests for each operation. For example, when the cast is larger than 30 cu.m, a second test is taken and so on and so forth. In the case of major casts or large spans, we even had 3, 4 or 5 tests for each one. But in this way, you can fully assure that the quality is there and is consistent.

Speaker 1 4:10

Do you as a major contractor have the required labs to test the concrete or do you sub-contract testing companies?

Speaker 2 4:19

Yes, we have our own testing facilities within our company that we can constantly keep on testing in. In this project, to further highlight transparency we had agreed upon a system that double-checks the system. This means that we do our testing with our schedules, and then from the client side randomised testing is conducted in order to ensure the tests are obtained from our side. So, in this way, one can fully assure that the works that are being done are complete as per specifications and quality standards.

Speaker 1 4:52

So from my understanding, you have a very well-structured quality system within your company and of course reflected also in this project.

Speaker 2 5:03

Of course. The number of documented reports that we do is very demanding and time-consuming. There are daily reports done every day with 2 to 3 updates throughout the day. We also register data such as the daily people on site and workers. We have a security on site that all the time has the exact number of persons on site with their roles and names etc. Along with all the machinery that enters and exits the site. This is all stored in our documented system.

Then for operations that involve the casting of concrete, we have its reporting quality system.

Speaker 1 5:30

What do the concrete lists have different than others?

Speaker 2 5:39

Specific data such as the arrival of the concrete on site, the time that it was left waiting on site, the temperature of the concrete. Specifically, during the hot summer season, it is very important. We had instances years ago when during summer times concrete would be seen boiling. So knowing the disadvantages of such casts, we document all the data. This then leads us to take decisions to the time casts are undertaken. In summertime, it is a normality for us to do major casts during the night to avoid high temperatures. So with the data that we have, we can make evidence-based decisions.

Speaker 1 5:58

You mentioned the workers earlier on, do your workers have training or are they certified for a specific skill for example?

Speaker 2 6:05

The reality is the workers are continuously coming and leaving our company. So what we usually do amount the year we have specific annual workshops that would give a brief overview to the workers. One would know the level of experience on the type of worker, so the jobs assigned to the workers are a reflection to their experience.

However, with the initiation of any project, we assign a toolbox talk where the workers are reminded of the Health and Safety procedures, dos and don'ts on site, etc. In addition, our workers have the skill cards that were recently introduced by the authorities.

Something that I also forgot to mention and is a policy within our company is that in every site that we operate in, we have a fire escape plan and several fire extinguishers and so on as requested by the fire engineers.

Speaker 1 8:05

Now on-site, what is the structure of the team assembled?

Speaker 2 8:13

Here the team consists of a Forman and then the workers. We usually have teams such as the masons, formwork team, steel fixers etc. For the masons, we have one that is present on-site always when the masonry work is taking place. This building specifically is not a masonry building, it is a frame structure so the masonry here is more as partitions rather than structural.

Speaker 1 8:41

Question 2: Can you differentiate between quality control and quality assurance? How crucial do you perceive both aspects to be in your projects for the benefit of your clients?

Speaker 2 8:52

I just explained all this but basically the control is our framework that is in place as the work is implemented, assurance is our guarantee to the client that with our quality control system, the quality standards for the project will be achieved. I always insist with the workers and also those at the plant that we should always have consistent good work. Which is not always easy. For example, the aggregate for concrete is constantly being changed. The results would be reflected in the lab tests.

Speaker 2 9:15

Do you have a lot of reworks in site in your projects?

Speaker 2 9:29

We try to avoid it as much as possible since it is very disadvantageous both for us as the contractor and also for the client. Both in terms of time and also in terms of budget. We rarely have problems that we would need complete rework. So this shows that our procedures are being reflected in our results and productivity.

In addition to quality control, we also have a resident civil engineer on-site and a QAQC officer. They are the majority of the time always on site. So these are always going around the site and monitoring. In addition, you have an independent project management team that is also always monitoring the site regularly and has their own documented database. So the level of constant checking in this project is spot on.

Speaker 1 10:30

Question 3: As a contractor, when managing your projects, how do you prioritize between time, cost, and quality? Kindly elaborate on your reasons behind this prioritization.

Speaker 2 10:41

To be honest, first of all, time was not kept as originally planned. Why? A mix of a lot of things. First of all, the very beginning of archaeological remains was discovered that completely had jeopardised our schedule. We calculated that this affected us for approximately a delay of 3 months when compared to the original completion date.

In addition, we had a lot of scope creep. The client had made various decisions along the way that when calculated would be of high significance when calculated. Now in reality this would benefit us, since in such instances we would apply for claims and variances for every operation.

In terms of budget, we are consistent and if I am not mistaken we are still within the starting budget. In terms of quality, I believe that it was consistently good throughout the project. With our procedures, it is difficult to close an eye on quality, even because we are audited from abroad. But at the end, the client should judge on what he thinks of the quality of the project.

Speaker 1 12:23

Question 4: Considering your prioritization of project elements, are there established mechanisms within your business to ensure quality under all circumstances?

Speaker 2 12:31

I think we all already discussed this in question 1 but on the whole, we have as much as possible track of everything. Full documentation of our procedures related to the project.

What I forgot to mention is the disposal of material. Apart from the fact that we separate the construction waste so that it can be recycled, we also keep track of it. Generally, bricks and rubble are taken back to the plant to be crushed, and steel reinforcement is collected and shipped to be recycled.

Speaker 1 12:56

Question 5: Certified systems in contractors....

Speaker 2 13:12

I believe yes. I would say that the main advantage would be that you have a structured system. I would say that one cannot look at this topic and search for the results instantly. Let's be honest to achieve ISO standards one would have to invest in his company. One may not see the return instantly similar to when conducting a project. The benefits that one obtains by obtaining a certified system are long-term. ISO helps you structure your company and from the lessons learned along the way you keep on improving and raising the bar. As I said earlier, with the database ISO sets out within your company one can make evidence-based decisions without any delays. Something that in Malta I doubt how much certain decisions in the sector are taken based on data. This is from an internal perspective.

From an external perspective, a contractor with certification will attract more a client. I believe you are an advantage over others, also due to the fact that the management system ISO imposes on your company will highly improve the image of the company.

One cannot simply list the benefits, because ISO simply touches all the different aspects within your organisation. Starting from the management style, the team and its structure, the operations of a company and its strategies, its plants and how they operate etc.

Speaker 1 15:19

So effectively you are saying that ISO will set out to a company the framework and structure of how it should operate, whilst pushing it to keep on improving.

Speaker 2 15:27

Exactly. One won't directly see the influence of the ISO Standards in a tangible way on-site. Instead, the structure and management style of the organization will influence and dictate the level of workmanship and quality standards on-site reflected in the result.

In addition, the requirements from one year to another keep on increasing. When the auditor along with the assessors comes from abroad, they always keep on imposing further requirements and improvements.

Speaker 1 15:44

Question 6: ISO standards serve as globally recognized certified systems in construction project implementation, providing a standardized level of quality assurance to clients. Are you familiar with ISO standards and their operational mechanisms in construction projects

So the company is ISO certified right? How often do these audits happen?

Speaker 2 15:52

Yes, the company has been ISO 9001 certified for at least four years for sure. We were one and still are of the very few who have a certified quality management system in Malta as a contracting company.

Yes, Auditors come in frequently it depends on how much you are established within the ISO community. Audits generally range from every 3 months to every 6 months.

Speaker 1 16:18

And do they only visit the offices or even the construction sites?

Speaker 2 16:21

Both. I can tell you more about the audits that are conducted on-site since it is more my area. Yes, the ISO auditors come on-site and do their checks. We usually show them our documentation and so on.

However apart from the actual ISO auditors, we also have our own officials who oversee ISO implementation within the company who also constantly monitor and do their checks.

Speaker 1 16:50

So you have specific people who are employed for the implementation of ISO within the company and to keep track of the company?

Speaker 2 17:01

Yes of course. They are very technical, and they range also to occupations such as pharmacists etc. Funnily enough.

Speaker 1 17:12

Why?

Speaker 2 17:13

The company at this point has expanded a lot. Apart from the obvious construction projects, we also have structural elements manufacturing plants such as bricks and precast elements. We have expanded our machinery also to operate in marine and harsh environments. The company has also started providing and producing oxygen and other gas tanks along with a whole branch for fire extinguishers. So, since the company has expanded this much, a lot of experts are required on board.

Speaker 1 17:24

Question 7: ISO Standards, particularly ISO9001:2015, emphasize a quality management system built on various requirements spanning Leadership, Planning, Support, Operation, Performance, and Improvement. Do you believe such a framework has relevance in Malta's construction sector at present? Considering the current scenario, do you perceive investment in quality as imperative? And do you anticipate certified quality to entail additional costs?

Speaker 1 17:45

I believe that for the costs that there are involved, the benefits for the company are more worth it. One has to understand how he looks at his company, and where he wants it to be. Without a framework, you have a higher chance of being less organised or lowering your standards. In a company, there can be times when interest and energy from the management can fluctuate, and this will be reflected in the work.

In addition yes I think at this point it is relevant with the Maltese construction sector. I mean it is not easy, within this project for example now we are at a point that the civil workers are nearing completion so now the M&E contractors and finishes are comping in. You cannot imagine how the site is completely changed as soon as other contractors come in. Since they have different standards from us. In the case of M&E works we had prepared a lot of the building works such as openings for vents and services etc. But it is very difficult to control them. So it is irrelevant to have the civil works done with all the quality checks and so on, if then other contractors will start chasing all over the place. What I mean is that standards should be implemented throughout, at least for contractors who work in large projects.

Speaker 1 19:10

Question 8: Recently in Malta, there has been a process of listing contractors in the sector. Do you believe the next logical step should involve ranking contractors based on certified processes and their capabilities, which could also influence the awarding of tenders and the allocation of project sizes?

Speaker 2 19:34

Is it possible? Obviously, you will find resistance. But looking at the future, and knowing also the result of low-quality construction evident in Malta, it is the only way forward. It is no longer the time of non-professional contractors to be left to work. Accidents are also evident and happening frequently, so it is not that nice.

The Maltese are stubborn. For example, for simple things such as getting your workers to abide by the H&S measures, it is not easy. In our sites, I would still say that there are a lot of room for improvement, but at least the basics are there and consistent. I am not convinced that this is consistent throughout the sector. But we still have resistance of instances such as wearing a helmet. I understand that it is not comfortable to wear a helmet, and sometimes if it is hot and there are no crane works, we allow them not to wear it, but otherwise not.

Speaker 1 20:43

And what do you think regarding the tier system? What is your view on this?

Speaker 2 20:53

But can for example a tier 1 contractor do a contractor 3 job? To understand well your idea?

Speaker 1 21:03

Yes, of course. Mainly the revenue, their focus of work and the certified systems will determine the tiers.

Speaker 2 21:19

Ok understood, one would need to analyse whether it would be a fair playground for everyone. But then again at the moment, one can do whatever he likes. In addition to this I would suggest that a tier 3 contractor for example can do a project with a tier 2 or 1 contractor in a joint venture in order to gain experience and understand how a higher tier contractor functions. That would make sense if we truly want to discuss how we can improve the construction sector locally. I believe also in this idea when it comes to the awarding of tenders. Contractors that have truly invested in their company and have made the efforts to truly be at the top, will have the right to bid for certain tenders.

I think that a second step would be to categorise contractors on what they are certified and licensed to do. If you are qualified on multiple areas, you can work in multiple roles as a contractor. But on the other hand if you mainly are a building for example, you may not be the right guy to do an excavation job.

Speaker 1 23:21

Question 9: the last question is in general. do you see this approach as the way forward as already discussed? And do we perceive it as beneficial overall, what gaps do you perceive that need to be addressed? And what steps do you think should be taken forward?

Speaker 2 23:57

The reality is that recently in Malta there was a boom in construction. A boom that factored a lot in Malta's economy. With this boom, the construction sector saw an influx of people who because of the wealth that the sector was subject to, these people invested in construction. Ranging from real estate agents, developers, contractors and so on.

In the process, in this case, some of these contractors may have built up their companies on weak foundations. Working with old machinery, non-competent foreign workers, low-quality standards and so on. I believe the motive would be to have high profits in a short period of time. So now is the time that we should approach construction and truly make a plan to move forward and improve the standard overall.

So, I truly agree with the idea of having certified systems across the board such as we had implemented in our company.
