**Literature review**

Strict customer demands regarding quality standards have led organizations in Israel to appoint quality engineers even though they are not required to do so by law. In this study, I argue that the role of the quality engineer needs to be institutionalized, since currently, their successful performance in the role depends on the culture of the organizations employing them. Quality engineers must ensure that the demands of industry regulators and consumers are met, but at the same time they are also part of the management structure in their own organizations, which seek to implement processes quickly and save resources and time. It is common for an organization’s management to see quality control as a function that “burdens” production processes, and quality engineers find themselves in conflict with senior management and the consumer and/or regulator.

In Israel, quality control as a profession developed from the area, with a low level of institutional intervention. There has been no oversight from academic experts, and developments in the profession have been disconnected from those in other countries. Quality control is a profession that requires soft skills and there are no restrictions over who is appointed to the role in terms of education, training, or professionalism. This is also reflected in the fact that, often, quality engineers are granted minimal authority in their role. There are three main aspects that characterize the role of the quality engineer:

1. Relevant knowledge—a professional background pertinent to the employing organization.

2. The ability to work in a team, represent stakeholders, and communicate well with all stakeholders in the employing organization.

3. Extensive knowledge of the quality profession and the employing organization.

In recent years there have been various quality standards violations in Israel and other countries. In some cases these have harmed human health, and have also impacted on the profitability of companies. These events were exacerbated by the coronavirus pandemic. Eldina (2020) examined the impact of the pandemic on quality management procedures in food industries, and found that closures led to difficulties in transporting goods between countries, that there was an increase in demand for food products (foreclosures), and a decrease in the market for agricultural equipment. In light of this, organizations shifted employees between departments without appropriate training, which affected the safety and quality of products sold to the consumer. Barel (2022) identified an increase in incidents of quality standards violations, including in organizations with good quality control infrastructure and teams whose role is to monitor and control the quality of products in companies.

The events of the pandemic can also be viewed as an opportunity for organizations to improve quality control. The American Food and Drug Administration (which is very conservative) agreed to speed up the process of approval for a Covid-19 vaccine from 12 years to 18 months, based on the fact that the pharmaceutical companies involved in developing the vaccines (Moderna and Pfizer) had built quality control infrastructure into their core processes.

Anker (2022) argued that the difficulty of characterizing quality engineers as experts lies in the vague, even ambiguous nature of their role. They must recognize and use different communication styles, and their successful performance depends mainly on the culture of the organizations in which they are employed. This study was carried in the broader context of recognized professions (medicine, law).

Corporate culture is a crucial factor in distinguishing between two main types of organization. Organizations belonging to the first type strive for excellence and provide real value to customers and will therefore be successful over time, while those belonging to the second type do the minimum necessary, does not renew itself, and usually will not survive for long (for example, the Kodak company).

I argue that there are four main types of organizations in Israel in terms of their approaches to quality control:

1. Organizations that operate according to government regulations, e.g., the pharmaceutical and food industries. Quality assurance and regulation are critical elements in every factory, food, and drug company. The reason for this lies in the importance of maintaining strict hygiene in the production, packaging, and distribution of human grade food products. In Israel, strict laws governing food production, which are enforced by the Ministry of Health, have led to an increase in the requirements for quality assurance management in food manufacturing businesses, to ensure product safety and quality. Food quality control is performed by professionals, who ensure that companies comply with Israeli and international standards.

2. Organizations that are mandated by quality standards and industry regulators to hire quality engineers. The role has professional authority and can influence without direct authority.

3. Military organizations that work with the aviation or aerospace industries and the Ministry of Defense (e.g., the Israeli Air Force, Rafael Advanced Defense Systems, Air Industry, Beit Shemesh Engines). The demand for these organizations to hire quality engineers comes from their customers (e.g., Boeing, Airbus) or from within the existing organizational culture (e.g., the R&D culture in the Israeli Air Force, which is different from the rest of the Israeli military).

4. Hi-tech companies (except software quality engineering) that usually are not required to employ quality engineers, but that have a culture of quality control that is instilled in employees, given that poor quality work negatively impacts on profits.

Industry organizations and service providers constitute (in the opinion of the research author) about 75% of all organizations. There is no requirement for these organizations to hire quality engineers. Some of these organizations employ external consultants for standards certification (by the condition of the lesson), while those employed in this role are considered a “burden” and in most cases are pushed away due to business considerations

Anker (2022) argued that the authority of quality engineers who are hired to help their organizations comply with government regulation, e.g., in the pharmaceutical and food industries, is greater than that of those who work in industry and service. In this study, we expand on past work examining the authority and expertise of quality engineers in relation to other semi-professional roles in the organizations that employ them (including marketing, operations, production, planning and control, and human resources managers). The study will compare the authority of quality engineers in the following organizations: Trichome Pharma, KMG, Yomintech, the Israeli Air Force, the national laboratories in the United KPF, Beit Shemesh Engines, made in Ashkelon. This study examines the role of the quality engineer within the structure of the organizations that employ them and the interrelationships between them and other semi-professional roles, via interviews and observations with quality engineers and a questionnaire to cross-check the data obtained in the previous stages.

**The history of quality**

The concept of “quality” has existed since humans began creating products. In the Middle Ages, craftspeople and toolmakers based their professional pride and economic success on creating high quality goods that would ensure their customers were happy. To this end, craftspeople had to manage the quality of their work. From the end of the eighteenth century, after the Industrial Revolution ushered in an era of mass production, workers’ salaries became based on the quality of their output, and therefore the amount of proper production provided to users decreased. Factories now needed to employ “quality inspectors” within their production lines. The impact of this was felt in three industries in the United States: the arms industry, consumer goods, and agricultural equipment. The need for change became apparent when only a third of all ammunition that reached the battlefield was in good condition. The use of the term “quality control” began to describe a process of assuring product quality using statistical control methods and standards.

In recent years, companies have begun to understand that statistical methods and quality standards are not enough. Today, companies often use the term “organizational quality and excellence” (some companies also make reference to “innovation”) alongside other terms, such as management, “employee empowerment,” “learning organization,” “knowledge management,” and other terms indicating care for customer and employee needs. It also became clear that adherence to quality standards requires coordination between all areas of knowledge in an organization, to create a level of standardization that can reduce the number of production errors to a minimum.

Product quality is measured according to a set of requirements. These include the organization’s internal procedures, quality standards, regulatory requirements, and the customer’s requirements, from which the lofty production process is derived. Efforts to improve quality are concentrated on the product itself and the entire production process. The goal of commercial organizations is to maximize profits. Since revenue comes from the sales of products and services to customers, the amount of profit a company makes depends partly on customers deciding that they are satisfied with the quality of a company’s products and services (since quality is an objective characteristic). Moreover, the producer increases the company’s profitability from the behavioral aspect. According to Edwards (1950), defective products have a cost since “someone produces them and pays for the repairs, at least the cost required to produce them the first time.”

Most organizations employ a quality engineer, whose responsibility is to ensure compliance with the requirements of the regulator and the consumer, but whose degree of authority and expertise varies from one organization to another. The role of the quality engineer is very complex—they are required to make numerous decisions over a short period of time, based on the knowledge they have gained, even if a particular decision goes against those of other roles—e.g., those of the operations, purchasing, or research and development manager. Without the authority (organizational or regulatory) to perform the role there is a high chance of an increase in quality violations (Anker & Lurie 2022).