The Role of Quality Function Deployment (QFD) in Optimizing Self-Management Skills in an Iraqi Industrial Environment: An Applied Study at the General Company for Electrical and Electronic Industries, Baghdad

P-ISSN: 1680-9300
E-ISSN: 2790-2129
Vol. (26), No. (4)
pp. 112-129

Safa K. ALwitry
Middle Technical University/ Administrative Technical College – Baghdad, Iraq.

Abstract:

This study aims to examine the correlation and explanatory effect of the Quality Function Deployment (QFD) tool as an independent variable on the enhancement and development of "self-management skills" as a dependent variable with its dimensions (self-control, trustworthiness, adaptability, and initiative), to demonstrate the extent to which the General Company for Electrical and Electronic Industries -Baghdad, in transforming customer needs into applicable design criteria to bring about a qualitative shift in the behavior of its technical and engineering staff and move them toward a state of empowerment and self-regulation. The study employed a questionnaire as a data collection tool, and the data were analyzed using (SPSS) statistical software, The study targeted a population of (106) technical and engineering staff involved in technical services and quality control at the General Company for Electrical and Electronic Industries-Baghdad, eleven individuals were excluded due to unavailability, leaving (95) valid responses for analysis, with a response rate of (89.62%), to ensure the highest degree of statistical accuracy, The most significant finding of the study was the presence of a statistically significant positive effect of the QFD methodology on enhancing the multidimensional self-management skills of technical and engineering staff. This confirms that the adoption of technical and technological quality mechanisms is the fundamental means of transitioning employees from a traditional role to one of empowerment and self-monitoring, thereby achieving the company's objectives.

Keywords: Quality Function Deployment (QFD), Self-Management Skills, Technical and Technological Quality Mechanisms.

1. Introduction

The Quality Function Deployment (QFD) tool is one of the fundamental management methodologies that translates the voice of the customer into specific technical and operational requirements, thereby supporting process improvement, the establishment of quality standards, and related decision-making (Chan & Wu, 2002; Huang et al., 2022). In contrast, the self-management literature focuses on employees' ability to manage their self-efficacy, exercise self-control, adapt to work demands, and take the initiative in problem-solving (Stewart et al., 2019). Although there is a wealth of scientific literature on both variables separately, empirical evidence examining the direct relationship between the application of QFD and self-management skills—particularly in Iraqi industrial settings remains limited. The

Journal of Prospective Researches
Vol. (26), No. (4)
The paper was received on August 19, 2026; accepted on October 17, 2026; and published on November 22, 2026.
Corresponding author's e-mail: safaalwitry@mtu.edu.iq

10.61704/pr.777

research gap centers on the need for empirical evidence demonstrating the extent to which the translation of quality requirements into operational guidelines is associated with employees' level of self-management skills.

Theoretically, this relationship is explained by (QFD)'s role in clarifying requirements, organizing information, defining performance standards, and supporting monitoring and review mechanisms (Chan & Wu, 2002; Zhou et al., 2024). This clarity enhances employees' ability to monitor their performance, adapt, and take initiative, consistent with the behavioral perspective on self-regulation (Stewart et al., 2019). Accordingly, the present study seeks to test the statistical relationship between (QFD) and self-management skills across their various dimensions in an Iraqi industrial setting, without assuming a prior causal relationship. Currently, Iraqi industries face operational challenges characterized by low efficiency, limited reliance on modern management tools, and fluctuating competitiveness, creating an urgent need to adopt integrated management models that combine strategic tools with the behavioral dimensions of individuals. (QFD) provides a systematic mechanism for reducing the gap between customer expectations and actual outcomes (Chan & Wu, 2002), while self-management skills constitute a behavioral foundation that determines individuals' discipline, adaptability, and initiative (Stewart et al., 2019). However, systematic reviews highlight the scarcity of studies addressing the construction of a unified conceptual model that directly links these two variables (Huang et al., 2022) a gap that is widening in developing environments such as the Iraqi context.

Based on this, the research problem is defined as answering the following main question:

How can a conceptual framework be formulated that integrates the Quality Function Deployment (QFD) tool with self-management skills to enhance operational efficiency in the Iraqi industrial environment?

Accordingly, this study aims to construct a theoretical framework and develop a conceptual model that clarifies the relationship between (QFD) and self-management skills including their various dimensions and their complementary roles in achieving operational efficiency, thereby making an original intellectual contribution to the Arabic literature that serves as a foundation for future applied research in industrial settings.

2. Research Methodology

This section reviews the research problem, importance, and objectives, as well as the methodology employed, data and information collection tools, statistical analyses, and research limitations, as follows:

2.1 Research Problem

Based on the fundamental challenges related to achieving operational efficiency and response time to competitive market requirements facing Iraqi industries in the current period, resulting from immersion in an environment characterized by high risk levels, decline in individual and organizational commitment levels among individuals, and weakness in adopting modern administrative techniques, and despite the productive and human capabilities possessed by these institutions, their outputs do not reflect the required form for customer requirements or targeted quality standards.

Recent literature indicates that self-management skills are fundamental pillars that can raise individual and collective effectiveness within the work environment by enhancing discipline and commitment to operational responsibilities, and by developing the ability to make accurate and rapid decisions. However, self-management skills practices remain weak and unframed within systematic administrative strategies for optimal human energy investment.

On the other hand, the Quality Function Deployment (QFD) tool, represents a methodological framework for translating the voice of the customer into precise operational and technical specifications, ensuring improvements in product and service quality. However, the application of this tool in Iraq remains limited, predominantly theoretical or partial, without integration with employees' behavioral and administrative practices.

Through the integration between the technical-administrative dimension (Quality Function Deployment (QFD) tool) and the

behavioral dimension (self-management skills), and between the practical reality characterized by weak application and poor awareness of the importance of this integration, this gap limits the ability of Iraqi industrial institutions to achieve sustainable operational efficiency that enables them to meet market needs effectively.

2.2 Research Objectives

The current research aims to achieve a set of scientific and practical objectives, the most important of which are:

1) Clarifying the extent of implementing the Quality Function Deployment (QFD) tool in the company to reveal the level of its utilization in the process of converting customer requirements into effective operational and production specifications.
2) Analyzing the reality of self-management skills practices to demonstrate their reflection on the performance of individuals working in the General Company for Electrical and Electronic Industries.
3) Studying the relationship between the Quality Function Deployment (QFD) variables and self-management skills, considering it an important strategic approach in improving operational efficiency and output quality in the company.
4) Diagnosing the challenges and obstacles that hinder the implementation of (QFD) and limit the effectiveness of self-management skills in the company.
5) Presenting a proposed applied framework characterized by integrating the behavioral dimension of self-management skills and the technical-administrative dimension of (QFD), in a manner that helps raise the quality level of electrical and electronic products to achieve sustainable competitive advantage for the company.

2.3 Research Importance

The importance of the research is represented by the following:

- It contributes to building a new integrative perspective that expresses the interaction between individuals' behavioral capabilities, self-management skills, and technical administrative tools QFD) to improve industrial performance in Iraq.
- It supports an orientation toward sustainable competition by presenting proposals that help the company meet local and international market requirements through improved employee self-discipline and investment in modern smart quality tools.
- It provides scientific evidence for decision-makers regarding the mechanisms that enhance the quality of products of the General Company for Electrical and Electronic Industries and raise operational efficiency based on realistic field results.
- It addresses a knowledge and application gap in Iraqi studies that mostly separates between the behavioral aspects of employees and the methodological tools of smart quality, while the current research seeks to integrate them within one comprehensive framework.

2.4 Research Hypotheses

The hypotheses of the current study are based on the literature on Total Quality Management and organizational behavior. The theoretical framework indicates that Quality Function Deployment (QFD) is not merely an engineering tool, but rather a methodology that restructures an individual's thinking and requires them to translate customer requirements into precise operational practices. This methodological discipline is expected to have a positive impact on employees' personal behaviors and self-management skills, such as self-control, trustworthiness, adaptability, and initiative.

- **First Main Hypothesis: There exists a statistically significant correlation between the independent variable (Quality Function Deployment (QFD) tool) and the dependent variable (self-management skills).**

The following sub-hypotheses emerge from this:

a. There exists a statistically significant correlation between the Quality Function Deployment (QFD) tool and the dimension of self-control.
b. There exists a statistically significant correlation between the Quality Function Deployment (QFD) tool and the dimension of trustworthiness.

c. There exists a statistically significant correlation between the Quality Function Deployment (QFD) tool and the dimension of adaptability.
d. There exists a statistically significant correlation between the Quality Function Deployment (QFD) tool and the dimension of initiative.

The hypothesis of a negative effect is based on the fact that the outputs of the Quality Function Deployment (QFD) tool assume specific work mechanisms that compel individuals to adopt self-management skills to ensure compliance and quality. This means that the QFD tool is an independent variable that helps explain the variation in self-management skills as a dependent variable.

- **Second Main Hypothesis: There exists a significant effect between the independent variable (Quality Function Deployment (QFD) tool) and the dependent variable (self-management skills).**

The following sub-hypotheses emerge from this:

a. There exists a significant effect between the Quality Function Deployment (QFD) tool and the dimension of self-control.
b. There exists a significant effect between the Quality Function Deployment (QFD) tool and the dimension of trustworthiness.
c. There exists a significant effect between the Quality Function Deployment (QFD) tool and the dimension of adaptability.
d. There exists a significant effect between the Quality Function Deployment (QFD) tool and the dimension of initiative.

2.5 Research Hypothetical Framework

Figure (1) represents the hypothetical framework of the research as follows:

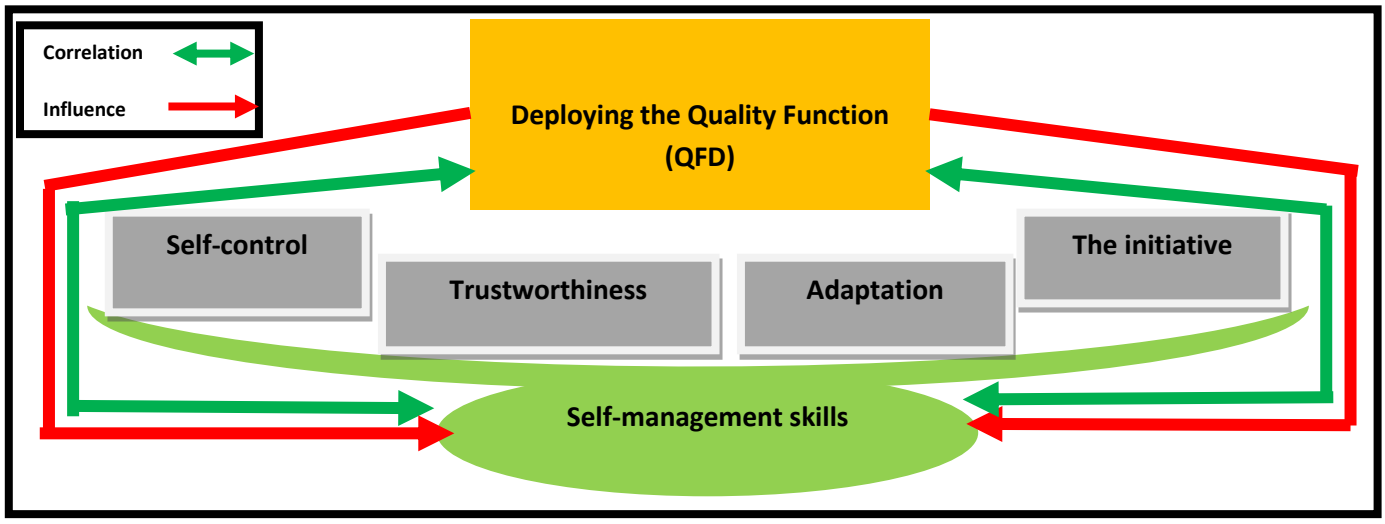

Figure 1. Research Hypothetical Framework

Source: Prepared by the researcher

2.6 Research Population and Sample

The research community at the General Company for Electrical and Electronic Industries-Baghdad, as one of Iraq's manufacturing industries. The exhaustive sampling method was used, involving (106) technical and engineering staff members at the company, Questionnaires were distributed to them; (11) were excluded due to the respondents' unavailability, and (95) were returned, all of which were valid for statistical analysis.

3. Theoretical Framework

This section will present the theoretical frameworks for the research variables, the tool for promoting quality in the workplace and self-management skills, as follows:

3.1 Conceptual Framework Quality Function Deployment (QFD) Tool

This section provides an overview of the concept, objectives, advantages, and disadvantages of the Quality Function Deployment (QFD) tool, which are as follows:

3.1.1 Concept of Quality Function Deployment Tool

The Quality Function Deployment (QFD) tool is one of the modern tools of Total Quality Management that focuses on organizing information for decision-making related to product design, as it ensures that products are designed to meet the specifications required by customers. Although QFD is implemented during the design and engineering, and production, it begins with the stage of defining customer requirements. It is a multidisciplinary tool used in the planning and design of new products (Chan & Wu, 2002).

The Quality Function Deployment (QFD) method also provides insight into the integrated design and manufacturing process from concept to production and can significantly improve production efficiency. It also helps resolve production issues early on and is a very useful tool because it incorporates the customer's voice into the designs, and thus the final product is likely to be better designed to meet customer needs and requirements (Fargnoli & Haber, 2023).

The implementation of a quality function is an advanced approach that enhances the effectiveness of traditional quality function deployment by utilizing information systems to collect and analyze customer requirements and to build a quality house, in a way that ensures the accuracy of design decisions and rapid response to requirements, thereby achieving sustainable quality for the company (Zhu et al., 2023).

3.1. 2 Objectives of the Quality Job Posting Tool

There are many objectives achieved by the Quality Function Deployment (QFD) tool, when implemented in companies; therefore, these objectives are divided into two groups:

1) Customer-Specific Objectives
   Customers are both the starting point and the end point of a company's activities. A quality function deployment (QFD) tool achieves a set of objectives for customers, namely satisfying their needs and desires (Jansone & Nawalage, 2026) and making customers feel valued when the QFD tool is implemented.
   a) Achieving customers' personal well-being by taking their suggestions and opinions into account to develop the best product that meets their needs and desires.
   b) Accurately identifying the customer and what they want.
   c) Providing an appropriate method to fulfill customers' desires.
   d) Identifying the product characteristics that meet customers' actual needs.
2) Company-Specific Objectives
   When implementing the Quality Function Deployment (QFD) tool, businesses achieve a set of objectives.
   a) Gathering all the information necessary to prepare the design of a product or service without neglecting any perspective.
   b) Maintaining coordination between planning and product manufacturing processes.
   c) Automatically documenting the product during its evaluation (Oliveira et al., 2020).
   d) Identifying current performance metrics closely linked to customer satisfaction.
   e) Identifying new, customer-oriented performance metrics that are in demand.
   f) Identifying conflicts associated with different performance metrics. Setting target values for customer-oriented performance metrics (Huang et al., 2022).

Based on the foregoing, the researcher believes that there are several key objectives of the Quality Function Deployment (QFD) tool, the most prominent of which are:

a) Determining the company's current market position relative to its competitors.
b) Accurately identifying customer requirements in order

to meet them.

c) Translating customer requirements into engineering characteristics and specifications to meet them with greater precision.
d) Identifying competitors and conducting a benchmarking analysis to determine the gaps between the company and its competitors.

3.1.3 Benefits and Drawbacks of Quality Function Deployment Tool

The Quality Function Deployment (QFD) tool, offers a number of benefits due to the way it operates across various fields, as follows: (Vancouver & Weinhardt,2022)

a) A significant reduction in development time and shorter design cycles.
b) It places clear emphasis on the customer's role and their active contribution to shaping the product design strategy.
c) It is an effective tool for reducing the time required to complete the design process, thereby enabling new designs to be brought to market quickly.
d) Improves internal communication, fosters the formation of cross-functional teams, and encourages teamwork.
e) Accurately documents customer needs and desires rather than relying on decisions based on opinions.
f) Increases customer satisfaction (Chan & Wu, 2002).

3.1.4 Disadvantages

The disadvantages of a Quality Function Deployment (QFD) tool can be summarized as follows:

a) Difficulty in identifying the connection between customer requirements and technical (engineering) characteristics if the company has weak infrastructure during the product planning phase.
b) The Quality Function Deployment (QFD) tool is not suitable for all industries and may face low customer acceptance of modern technologies (Oliveira et al., 2020)
c) Any error in the input data leads to misleading results in the Quality House.
d) Ambiguity in customer feedback; therefore, many of the response's customers provide to companies are difficult to classify as needs (Zhou et al., 2024).

3.2 Self-Management Skills

This section provides an overview of the concept, objectives, and dimensions of self-management skills, which are as follows:

3.2.1 The Concept of Self-Management Skills

There is no specific standard by which to define the concept of self-management skills; rather, several terms and concepts have been used to refer to it depending on the context, the focus of the discussion and research, and the field of application (Houghton et al, 2012). Organizations seek to elevate their employees to higher levels by deepening their understanding and reinforcing their awareness of the importance of self-management.

Self-management skills require exploration and research across various disciplines, such as anthropology, psychology, medicine, sociology, and other sciences. Consequently, researchers' concepts and perceptions of self-management have varied based on the objectives, orientations, and characteristics of their research (Vancouver & Weinhardt, 2022), From a medical perspective, self-management skills encompass concepts such as training, empowerment, and self-care, as well as the actions a patient takes to address their health issues or improve their condition when facing health problems.

From an organizational perspective, it refers to an employee's self-regulation to achieve specific goals and maximize performance in organizational processes. and from a psychological and sociological perspective, it refers to a psychological process that leads to the individual's self-empowerment and self-control, in accordance with the social-cognitive perspective on motivation, cognition, reflection, and control, among other factors (Dello & Stawiski, 2023).The concept of self-management skills, as outlined above, is a process associated with the personal ability to manage

emotions, resulting in satisfaction and happiness; it is also a skill linked to an individual's capacity to control behavior, leading to mastery over one's life and the achievement of goals. It involves the individual's understanding of their emotions and their proper management, regulating and directing them, and transforming negative emotions into positive ones. This leads to a greater sense of accomplishment, and the ability to take initiative in situations where one is under the influence of stress and challenging circumstances.

3.2.2 Self-Management Skills Objectives

Self-management skills achieve a set of objectives, which are as follows:

a) Self-regulation: This refers to the internal, emotional, and cognitive functions that rationalize and organize an individual's efforts and emotions, and control them through self-persuasion, self-monitoring, and the evaluation or readjustment of personal standards in response to new challenges or influences (Koopman et al, 2024).
b) Behavioral Modification: Behavior is fundamental to avoiding problems; therefore, the primary focus of self-management skills is modifying and monitoring behavior and the ability to act appropriately in various situations and events.
c) Developing a Sense of Responsibility: Responsibility is the most important variable that plays a key role and influences other variables such as failure, helplessness, despair, and others.
d) Achieving Balance: Striving for a positive balance between the demands of life, family, friends work etc in a way that maximizes the investment of the individual's energy, time, and effort, and ensures success at all levels, most importantly the personal level.
e) Self-confidence: An employee's awareness of their potential and abilities increases their self-confidence, which is considered one of the key objectives of self-management skills (Neck & Manz, 2013).

3.2.3 Dimensions of Self-Management Skills

Self-management skills are based on the following four dimensions:

1) **Self-Control**

The process of effectively managing destructive emotions and impulses, coping with sadness and adversity, remaining calm in stressful and hostile situations, and knowing how to deal with people, situations, or events, It is also defined as an attempt to curb habitual behaviors and desires that might interfere with goal-oriented behavior; when an individual exercises self-control, this involves enhancing, inhibiting, or suppressing habitual or automatic behavior (Kanfer et al, 2017).

Self-control refers to the ability to change and adapt oneself in order to achieve better harmony between the self and the external environment, to overcome or alter internal responses, and to halt, refrain from, and avoid acting on unwanted behavioral impulses. According to this perspective, self-control is expected to yield positive outcomes in life for individuals who possess it to a high degree across various domains (Huang et al., 2022).

2) **Trustworthiness**

It refers to openness and honesty in interactions between a supervisor and their subordinates and among coworkers, as well as consistency between words and actions and the absence of contradictions; it also means demonstrating honesty and integrity in both words and deeds, Trust is a psychological state that encompasses an individual's beliefs and expectations regarding how to behave in various situations with others, and it is a fundamental component of workplace relationships within organizations (Parker et al, 2010). Employees can build trust through their daily behaviors, such as appreciation, respect, emotional support, and feedback. Trust influences a number of organizational processes, including communication, cooperation, information sharing, productivity, knowledge, empowerment, learning, flexibility, success, and organizational stability (Vancouver & Weinhardt, 2022).

3) **Adaptation**

Adaptability involves being open to new information and moving away from outdated assumptions, by being flexible in the face of changing situations and events, letting go of old conclusions, allowing employees to feel comfortable with situations of anxiety and uncertainty, applying new ideas to achieve outstanding results, and being flexible in dealing with change and challenges (Jansone & Nawalage, 2026).

When employees possess this ability, they become more open-minded and adaptable in their work; they are able to be creative and think innovatively to achieve more beneficial results, as well as build social relationships, embrace change, and overcome obstacles, and encouraging employees to integrate, face challenges, embrace new ideas and creativity, and be willing to contribute and give of themselves to the point where adaptability has become an important and essential individual competency for today's demands, due to its ability to help individuals adjust to different situations, respond to new challenges, and continuously strive for change in the interest of development (Stewart et al, 2019).

4) **Initiative**

It refers to creating opportunities that lead to the development of work, taking the initiative, and putting new ideas into action (Neck & Manz, 2013). Optimism is an important component of initiative, because those who consistently achieve high levels of proactive performance have an optimistic outlook on life and hope for success. Those who possess initiative act before events force them to act. This means taking proactive measures to avoid problems before they arise and capitalizing on opportunities before someone else seizes or invests in them. The drive toward achievement has been integrated with initiative to form a single dimension, since the latter embodies the same concept as initiative (Bryant & Kazan, 2012). Therefore, the researcher in this study focused solely on the dimension of initiative based on the frequency of responses, without addressing optimism or the drive for achievement.

4. Literature Review

The theoretical framework of the present study is based on the intellectual intersection between quality engineering and organizational behavioral science, considering the quality function deployment tool as a methodological framework that effectively translates the requirements and needs of the work environment into precise operational practices (Zhou et al., 2024), Self-management skills, which rely on self-regulation and the ability to guide professional behavior, constitute an individual mechanism that enables company employees to assimilate these inputs and apply them in accordance with theories of self-regulation and professional motivation (Stewart et al., 2019). The implementation of these frameworks in an industrial production environment creates an interactive system that provides continuous feedback, thereby motivating individuals to align their roles with modern standards of operational excellence (Vancouver & Weinhardt, 2022).

5. The Practical Framework of the Research

5.1 Sources of Measurement Instruments

- **Quality Function Deployment (QFD) variable**: The items were adopted and developed based on the studies by (Chan & Wu, 2002) and (Huang et al, 2022), with a focus on the digital aspect and software systems in processing customer voice data and constructing the House of Quality.
- **Self-Management Skills Variable**: The scale developed by (Stewart et al, 2019) was adopted and adapted to align with its four dimensions (self-control, trustworthiness, adaptability, and initiative).

5.2 Reliability and Validity of the Questionnaire for Research Variables

A. **Questionnaire Reliability**

Reliability is no less important in its impact on research results than it relates to the instrument that can be used in research. Reliability measures the extent of consistency in individuals' responses each time the questionnaire is reapplied, meaning the stability of its results. Cron Cronbach's Alpha is one

measure that demonstrates this, where the questionnaire's reliability is very high, indicating the stability and homogeneity of the questionnaire items.

Table 1. Scale Reliability and Validity

Dimensions	Quality Function Deployment Tool	Self-management skills	First	Second	Third	Fourth
Number of Items	26	28	7	7	7	7
Cronbach'sAlpha	0.986	0.839	0.826	0.853	0.852	0.826

Internal Consistency Notes; High stability, which is very acceptable

Source: SPSS.v.26 outputs.

Very high consistency due to the interrelatedness of the items in the methodology and their number (26 items)

B. Construct Validity and Exploratory Factor Analysis (EFA)

Table (2) shows the factor loadings and internal consistency coefficients for all dimensions of the research variables.

Table 2. The Factor Loadings and Internal Consistency Coefficients for All Dimensions of The Research Variables.

Variable/Dimensions	Items	Factor Loadings	Items -Total corr	Kronbach's Alpha Coefficient (α)
Independent Variable Quality Function Deployment (QFD) Implementation	Q1-Q26	0.516 -0.728	0.458 - 0.669	0.986
Dependent Variable Self-Management Skills				0.839
First: Self-Control	Q1-7	0.582 - 0.785	0.374-0.715	0.826
Second: Trustworthiness	Q8-Q14	0.593-0.811	0.510-0.696	0.852
Third: Adaptability	Q15-Q21	0.612 - 0.824	0.503 -0.770	0.853
Fourth: The Initiative	Q22-Q28	0.518-0.925	0.497-0.666	0.826

Source: SPSS.v.26 outputs.

The questionnaire items were subjected to exploratory factor analysis (EFA) using the principal components method and Varimax rotation. The sample adequacy test yielded excellent results (KMO = 0.848), and Bartlett's test was statistically significant (χ^2 = 1570.77, df = 378, $p < 0.001$), confirming the suitability of the data for factor analysis.

The items of the four self-management skill dimensions (self-control, trustworthiness, adaptability, and initiative) were consistent, and all recorded strong factor loadings (> 0.50) without any cross-loadings, as shown in Table (2).

5.3 Quality Function Deployment (QFD) Tool

Table 3. Statistical Description of Quality Function Deployment Tool Variable.

Paragraph	Arithmetic Mean	Standard Deviation	General Trend
1. The company relies on identifying beneficiaries' needs in developing its services.	3.67	1.115	I agree
2. The company takes beneficiaries' opinions into consideration when planning its future operations.	3.58	1.145	I agree
3. Quality Function Deployment methodology helps improve the quality of the company's services.	3.71	1.100	I agree

4. The company continuously trains its employees on implementing quality improvement methods in service delivery.	3.63	1.011	I agree
5. Quality Function Deployment methodology contributes to transforming beneficiaries' needs into practical executable procedures.	3.57	0.930	I agree
6. The company relies on advance planning to reduce errors before work implementation.	3.64	1.129	I agree
7. Quality Function Deployment methodology helps improve coordination between the company's different departments.	3.59	1.125	I agree
8. Company management relies on analytical information and data when developing its technical services.	3.51	1.129	I agree
9. Quality Function Deployment methodology supports the company's technical decision-making.	3.46	1.270	I agree
10. Quality Function Deployment tool contributes to analyzing beneficiaries' needs realistically and systematically before implementing technical services.	3.42	1.251	I agree
11. The company evaluates the level of achievement of beneficiaries' requirements continuously.	3.59	1.198	I agree
12. The company works on introducing continuous improvements based on evaluation results of its technical performance.	3.64	1.031	I agree
13. Quality Function Deployment methodology contributes to achieving beneficiaries' satisfaction with the company's technical services.	3.48	1.071	I agree
14. Quality Function Deployment methodology helps link company objectives with beneficiaries' needs.	3.49	1.110	I agree
15. The company relies on translating beneficiaries' requirements into clear work specifications before implementing its technical services.	3.40	1.189	Neutral
16. The company prioritizes service improvements based on beneficiaries' actual needs.	3.40	1.171	Neutral
17. Quality Function Deployment tool methodology links beneficiaries' requirements with technical procedures.	3.28	1.117	Neutral
18. The company analyzes beneficiaries' expectations before any design or development of technical services.	3.63	1.103	I agree
19. Company management focuses on a systematic organized approach when developing its services.	3.72	1.145	I agree
20. The methodology helps reduce problems before they appear during work implementation.	3.61	1.205	I agree
21. The company relies on realistic data when analyzing requirements for developing its services.	3.51	1.100	I agree
22. Quality Function Deployment methodology helps clarify the relationship between the company's service quality and beneficiaries' requirements.	3.59	1.198	I agree
23. The company involves its employees in determining how to meet beneficiaries' needs.	3.69	1.149	I agree
24. Company management relies on advance planning to ensure its services align with beneficiaries' expectations.	3.60	1.105	I agree

10.61704/pr.777

25. Quality Function Deployment methodology helps improve management's understanding of beneficiaries' priorities.	3.56	1.118	I agree
26. Management uses the results of beneficiaries' needs analysis in making decisions related to developing its utilized technologies.	3.44	1.089	I agree

Source: SPSS.v.26 outputs.

The table above shows that almost all items have a general direction of (agree), which indicates the strength of the items and the agreement of sample members on the importance of the Quality Function Deployment (QFD) tool for converting beneficiaries' needs into applicable design standards that link to technical specifications for developing products that meet expectations.

Item (19) obtained the highest arithmetic mean and standard deviation, which increases its importance, as it states (the company's management focuses on a systematic, organized approach when developing its services).

Item (3) has the second-highest arithmetic mean among the items with a standard deviation, as it states (the Quality Function Deployment methodology helps improve the quality of the company's services).).e direction of items (17, 16, 15) was neutral with arithmetic means of (3.40, 3.40, 3.28), respectively, and they stated (the company relies on translating beneficiaries' requirements into clear work specifications before implementing its technical services) (the company determines service improvement priorities based on the actual needs of beneficiaries) (the Quality Function Deployment methodology works to link beneficiaries' requirements with technical procedures).

5.4 Dependent Variable (Self-Management Skills)

5.4.1 Self-Control Dimension

Table 4. Statistical Description of Self-Control Dimension.

Paragraph	Arithmetic Mean	Standard Deviation	General Trend
1. I can maintain my composure and control my reactions across various pressures and situations	3.41	1.276	I agree
2. I accomplish my essential tasks with focus and avoid all environmental and technological distractions	3.57	1.078	I agree
3. I have the ability to defer incentives and gains for the purpose of achieving long-term strategic returns	3.80	1.068	I agree
4. I adhere to specified work schedules without procrastination	3.62	1.196	I agree
5. I deliberate in decision-making and examine all alternatives with precision	3.57	1.173	I agree
6. When facing unexpected obstacles, I can maintain consistency in my performance	3.65	1.137	I agree
7. I have self-monitoring to evaluate my behavior regularly	3.42	1.234	I agree

Source: SPSS.v.26 outputs.

Based on the above results, it becomes evident that all items of the self-control dimension are oriented toward a general agreement direction, with arithmetic means ranging between (3.80-3.41) and standard deviations between (1.078-1.276). The third item, which possesses the highest arithmetic mean, states that (I accomplish my basic tasks with focus and avoid all environmental and

technological distractions). The sixth item states (When facing unexpected obstacles, I am able to maintain the stability of my performance). The first item emphasizes the necessity that (I can maintain my composure and control my reactions under various pressures and situations).

5.4.2 Trustworthiness Dimension

Table 5. Statistical Description of the Trustworthiness Dimension

Paragraph	Arithmetic Mean	Standard Deviation	General Trend
1.I am committed to fulfilling all the promises I make to my colleagues and management at work.	3.24	1.200	Neutral
2.I maintain honesty and professional integrity even in the absence of direct supervision.	3.49	1.061	I agree
3.I take full responsibility for my mistakes and personal decisions.	3.71	0.988	I agree
4.I maintain the confidentiality of the information entrusted to me with the utmost integrity.	3. 53	1.270	I agree
5.I am committed to fairness and impartiality, free from bias and personal relationships.	3.62	1.187	I agree
6.My actual behavior always aligns with the principles and values I profess.	3.79	1.148	I agree
7.I ensure that I deliver accurate, professional results that others can rely on at work.	3.88	1.050	I agree

Source: SPSS.v.26 outputs.

The table above shows that the first paragraph has a general neutral direction with an arithmetic mean of (3.24) and a standard deviation of (1.200), stating that (I must adhere to all promises I make to my colleagues at work). The seventh paragraph also stated that (my professional outputs are accurate and others can rely on them at work) with a high arithmetic mean compared to the other paragraphs, reaching (3.88). The arithmetic means for the axis ranged between (3.24-3.88), and the standard deviation ranged between (0.988-1.270).

5.4.3 The Adaptation Dimension

Table 6. Statistical Description of the Adaptation Dimension

Paragraph	Arithmetic Mean	Standard Deviation	General Trend
1. I prioritize my tasks according to emerging administrative requirements	3.46	1.099	I agree
2. I develop effective alternative solutions when facing shortages in resources and capabilities	3.44	1.118	I agree
3. I smoothly comprehend diverse work backgrounds and cultures of new members	3.73	1.275	I agree
4. I maintain the quality of my outputs even when the specified timeframe for completion is reduced	3.47	1 175	I agree
5. I utilize my previous skills in performing new tasks and responsibilities	3.60	1.215	I agree
6. I believe in and commit to collaborative teamwork	3.71	1.228	I agree
7. I benefit from previous experiences in developing new methods for addressing errors and improving my work	3.62	1.187	I agree

Source: SPSS.v.26 outputs.

10.61704/pr.777

The arithmetic means for the above axis ranged between (3.44-3.731) and the standard deviation between (1.099-1.275). The direction of all items was "agree." The third item stated that (I smoothly comprehend the diverse work backgrounds and cultures of new members), while the fifth item emphasized that (I use my previous skills in performing new tasks and responsibilities). The second item also demonstrated the importance of (I innovate effective alternative solutions when I face a shortage of resources and capabilities).

5.4.4 Initiative Dimension

Table 7 Statistical Description of Initiative Dimension

Paragraph	Arithmetic Mean	Standard Deviation	General Trend
1. I contribute by proposing developmental ideas and projects without awaiting direction from company management.	3.35	1.174	Neutral
2. I volunteer to accomplish additional difficult tasks and responsibilities within the company.	3.54	1.119	I agree
3. I establish preventive solutions for problems that may potentially occur at work before they happen.	3.51	1.147	I agree
4. I effectively seize available opportunities to improve the quality of the surrounding work environment.	3.65	1.156	I agree
5. I establish consistent steps to solve complex problems immediately upon their emergence for the purpose of resolving them.	3.77	1.162	I agree
6. I develop my professional skills in order to keep pace with technical advancement in my field of work.	3.78	1.159	I agree
7. I continuously modify collective efforts to overcome routine and stagnation in traditional performance.	3.60	1.171	I agree

Source: SPSS.v.26 outputs.

The direction of the axis paragraphs was agreed upon except for the first paragraph, with a neutral direction, which stated (I contribute by proposing developmental ideas and projects without waiting for direction from company management), with an arithmetic mean of (3.35) and a standard deviation of (1.174). The fifth paragraph stated that (I establish fixed steps to solve complex problems immediately upon their emergence for the purpose of resolving them), and the seventh paragraph indicated that (I continuously modify collective efforts to overcome routine and stagnation in traditional performance). The arithmetic mean ranged between (3.77-3.60), and the standard deviation between (1.162-1.171).

5.5 Pearson's Correlation Matrix and Standardized Scores (Cohen, 1988)

According to the classification (Cohen, 1988): weak (0.29–0.10), moderate (0.30–0.49), strong ($\geq$0.50), all numerical correlations (QFD) with self-management skills were statistically significant at ($\alpha \leq 0.01$) The dimension values ranged from (0.499 - 0.614), reflecting a strong positive correlation for all dimensions, with the exception of “Initiative,” which recorded the upper limit of the mean (r = 0.499), as shown in Table (8).

Table 8 Correlation Relationship

Independent Variable Quality Function Deployment (QFD) Implementation	Correlation coefficient R	Sig	Correlation Strength and Interpretation (Cohen, 1988)
Dependent Variable Self-Management Skills	0.638	0.000	A very strong positive correlation
First: Self-Control	0.614	0.000	A strong positive correlation
Second: Trustworthiness	0.598	0.000	A strong positive correlation
Third: Adaptability	0.534	0.000	A strong positive correlation
Fourth: The Initiative	0.499	0.000	A strong positive correlation

Source: SPSS.v.26 outputs.

The results of the Pearson correlation coefficient analysis revealed statistically significant positive correlations at the ($p < 0.01$) level between Quality Function Deployment (QFD) and all dimensions of self-management skills; Based on Cohen's (1988) criteria for interpreting the strength of the relationship, the results can be summarized as follows:

- Main variable (self-management): It is strongly positively correlated with Quality Function Deployment, with a correlation coefficient of ($r = 0.638$).
- Dimensions with a strong correlation: The self-control dimension showed the highest correlation ($r = 0.614$), followed by the trustworthiness dimension ($r = 0.598$), and then the adaptability dimension ($r = 0.534$).
- Dimensions with moderate correlations: The initiative dimension showed a moderate positive correlation ($r = 0.499$).
- In light of these high statistical significance levels ($p = 0.000$), the validity of all statistical estimates is confirmed, leading to the acceptance of the main hypothesis and its sub-hypotheses related to these dimensions.

5.6 Regression Assumptions Test

Table 9 Table of Assumptions

Statistical Hypothesis	Test Used	Statistical Value	Significance Level (P)	Acceptance Criterion	Result
The Normal Distribution of Residuals	Kolmogorov-smior	0.090	0.398	P > 0.05	Investigator
Linearity	Rainbow Test	0.707	0.881	P > 0.05	Investigator
Homoscedasticity in Contrast	Breusch-Pagan	0.423	0.516	P > 0.05	Investigator
Independence of Errors	Durbin-Watson	1.883	-	1.5- 2.5	Investigator
Multicollinearity Linear Redundancy	VIF / Tolerance	1.000	-	VIF< 5	Investigator

To verify the suitability of the data for the linear regression model and their compliance with the basic statistical conditions, the following tests were conducted:

- Normality of Residuals: The Kolmogorov-Smirnov (K-S) test for the model's residuals yielded a non-significant value ($K-S = 0.090$, $p = 0.398 > 0.05$), confirming that the residuals are normally distributed and validating the previous interpretation based on the central limit theorem.
- Linearity: The Rainbow test confirmed the existence of a linear relationship between the variables ($Stat = 0.707$, $p = 0.881 > 0.05$).

- Homoscedasticity: The Breusch-Pagan test confirmed that the variance of the random errors is constant (BP = 0.423, p = 0.516 > 0.05).
- Autocorrelation and Multicollinearity: The Durbin-Watson statistic was 1.883, confirming that the data were free of autocorrelation, and the variance inflation factor (VIF = 1.000) indicated that the model was free of multicollinearity.

5.7 The Predictive and Explanatory Relationship

Table 10 Regression Analysis

Dependent Variable Self-Management Skills	Coefficient of Determination R^2	Coefficient of Regression B (Raw)	B Standard	Calculated t-value	Calculated f-value	Sig
Independent Variable Quality Function Deployment (QFD)	0.407	0.745	0.638	7.988	63.802	0.000
First: Self-Control	0.378	0.804	0.614	7.511	56.417	0.000
Second:Trustworthiness	0.357	0.790	0.598	7.188	51.666	0.000
Third: Adaptability	0.285	0.739	0.534	6.095	37.148	0.000
Fourth: The Initiative	0.249	0.646	0.499	5.559	30.904	0.000

Source: SPSS.v.26 outputs.

The results of the regression analysis show a statistically significant positive effect of the application of Quality Function Deployment (QFD) on self-management skills as an overall variable, as well as on its sub-dimensions (self-control, trustworthiness, adaptability, and initiative) at a significance level of (p = 0.000), which is lower than the accepted significance level (0.05); this confirms the acceptance of the main hypothesis and its sub-hypotheses.

Detailed interpretation of the results:

- Overall variable (self-management skills): The results showed that the application of Quality Function Deployment explains 40.7% of the variance in self-management skills (R^2 = 0.407). The raw regression coefficient (B = 0.745) indicates that a one-unit increase in the application of QFD results in a 0.745 increase in self-management skills. The standardized regression coefficient (β = 0.638) confirmed the strength of this effect, supported by the highly significant F-test value (F = 63.802).
- Self-control: The model demonstrated an explanatory power of 37.8% (R^2 = 0.378). This dimension recorded the highest rate of response to change, where a one-unit improvement in QFD implementation leads to an increase in self-control of 0.804 (B = 0.804, β = 0.614), with a model quality of (F = 56.417).
- Regarding trustworthiness: The explanatory power of QFD implementation in this dimension was 35.7% (R^2 = 0.357), with each additional unit of QFD implementation contributing to an improvement in trustworthiness of 0.790 (B = 0.790, β = 0.598, F = 51.666) .
- Adaptation dimension: The model explained 28.5% of the variation in adaptation (R^2 = 0.285), and the raw regression coefficient (B = 0.739) and the standardized coefficient (β = 0.534) yielded an F-value of 37.148, confirming the significant positive impact of QFD practices on enhancing flexibility and adaptability.
- After the initiative: The analysis confirmed a statistically significant effect with an R-squared value of 24.9% (R^2 = 0.249), where a one-unit increase in the application of QFD raises the initiative level by 0.646 (B = 0.646, β = 0.499, F = 30.904).

Based on the above, the statistical estimates demonstrate that adopting Quality Function Deployment (QFD) as a systematic

methodology for translating customer needs into design and implementation specifications does not stop at process improvement alone; rather, its Predictive Contribution extends to enhancing individuals' self-management and self-discipline skills, as well as fostering initiative and adaptability.

5.8 Cohen's f²

To quantify and explain the magnitude of the effect, this coefficient was calculated using the following equation:

$$f^2 = \frac{R^2}{1 - R^2}$$

Cohen classifies the magnitude of the effect as follows:

(0.35 High)	(0.15 Average)	(0.02 Weak)

Table 11. Cohen's f².

Dependent variable	R^2	f^2	Magnitude of the effect
First: Self-Control	0.378	0.608	High
Second: Trustworthiness	0.357	0.555	High
Third: Adaptability	0.285	0.399	High
Fourth: The Initiative	0.249	0.332	Moderate to High

The results in the table above show that the independent variable the dissemination of quality policies has a strong effect on self-management skills across all four dimensions. The effect size was very large for the first three dimensions, while it ranged from moderate too large for the fourth dimension.

6. Discussion of Results, Conclusions, and Recommendations

This section presents the conclusions and recommendations reached through the statistical results of the research.

6.1 Discussion of the Results

The field results confirm the existence of a significant correlation and Explanatory Relationship between the Quality Function Deployment (QFD) tool as an independent variable and self-management skills as a dependent variable (correlation coefficient r = 0.638, coefficient of determination R² = 0.407, statistical significance p < 0.01). These results are interpreted in light of the existing literature as follows:

I. Consistency with studies on quality: This finding is consistent with the observations of (Fargnoli & Haber, 2023) and (Li & Wang, 2026) that the QFD tool reduces operational errors and increases the accuracy of planning and design decisions.

II. Integration of technical and behavioral dimensions: The results support the theoretical proposition by (Neck & Houghton, 2006) and (Hanna et al., 2000) that structural systems based on specification accuracy impose behavioral discipline on technical and engineering staff. The "self-control" dimension showed the highest effect among the dimensions (coefficient of determination B = 0.804), demonstrating that adherence to the outputs and details of the QFD tool requires individuals to exercise self-control and focus to avoid operational deviations.

III. The effects of competence, adaptability, and initiative: The dimensions of "trustworthiness" and "adaptability" showed significant effect sizes according to Cohen's coefficient (effect size f² = 0.555) and (effect size f² = 0.399), respectively, reinforcing the view (Flick & Röhnsch, 2025) that integrity and commitment form the foundation for the implementation of quality standards. Meanwhile, "Initiative" ranked last in terms of explanatory power and effect size compared to the other dimensions (R² = 0.249, f² = 0.332), which is consistent with (Kagwe & Kiriri, 2025) in those individual initiatives may be influenced by bureaucratic constraints and the context of adherence to direct instructions and specific designs.

6.2 Conclusions

Based on the statistical evidence obtained from the research sample consisting of technical and engineering staff (sample size N = 95), the following conclusions were drawn:

1) **Explanatory power of the QFD tool:** The application of the QFD methodology explains 40.7% of the changes in employees' self-management skills (R² = 0.407, F-test value = 63.802, significance level p = 0.000),

Which suggests that it acts as a tool with behavioral and organizational dimensions that contribute to enhancing empowerment and self-control in addition to its engineering dimension.

2) **Ranking of the Behavioral Dimensions' Responsiveness:** The regression analysis showed that the "Self-Control" dimension is most affected by the application of QFD (with a regression coefficient B = 0.804, f^2 = 0.608), followed by the "Trustworthiness" dimension (B = 0.790, f^2 = 0.555), then "Adaptability" (B = 0.739, f^2 = 0.399), and finally "Initiative" (B = 0.646, f^2 = 0.332).
3) **Strength of Correlational Relationships:** The results of the Pearson correlation test demonstrated a statistically significant positive correlation between QFD and all dimensions of self-management at a significance level of (p = 0.000); the correlations ranged from (r = 0.499) for "Initiative" (moderate correlation) to (r = 0.614) for "Self-Control" (strong correlation).
4) **Limitations of Proactive Self-Initiative:** The statistical analysis revealed a neutral trend for the item "Contributing ideas and development projects without waiting for guidance from company management" (mean score of 3.35), indicating a weakness in individual proactivity compared to adherence to direct instructions and established regulations.

6.3 Recommendations

I. **Organizational and Behavioral Integration:** Do not treat the QFD methodology as an isolated engineering and technical tool, but rather fully integrate it into a system of behavioral empowerment for employees and create an organizational environment that supports self-monitoring to successfully translate customer needs.

II. **Promoting Empowerment and Initiative:** Transitioning toward an empowerment-based management style to expand the authority granted to technical and engineering staff and reduce bureaucratic constraints, thereby enabling them to provide innovative and proactive solutions without waiting for direct administrative directives.

III. **Job Modernization and Training:** Incorporating self-management skills (self-discipline, trustworthiness, adaptability, and initiative) as key requirements in job descriptions and performance evaluation systems, as the behavioral maturity of human resources is the foundation for the success of design standards.

IV. **Forming hybrid work teams:** Institutionalize the link between the two variables by forming hybrid work teams comprising technical quality engineers and employees who excel in self-management skills, to ensure that the "voice of the customer" is translated with a flexible and responsible approach that enhances the accuracy of the company's outputs.

7. Research Limitations and Future Prospects

7.1 Research Limitations

1) Limited sample and scope: The study was confined to the General Company for Electrical and Electronic Industries in Baghdad, which may limit the generalizability of the results to all other industrial sectors.
2) Cross-sectional design: Data were collected during a single time period (the first half of 2026), reflecting the reality of the variables at a specific point in time.
3) Data Collection Tool: The study relied primarily on a questionnaire as the means of data collection, which leaves room for some subjective bias in the respondents' answers.

7.2 Future Research

1) Apply the conceptual model to a variety of companies and organizations across the public and private sectors to compare diverse organizational environments.
2) Introduce new mediating or moderating variables into the model, such as "digital leadership,"

"organizational culture," or "mental resilience," to examine their role in strengthening the relationship between quality tools and behavioral skills.

References

Bryant, A., & Kazan, A. L. (2013). Self-leadership: How to become a more successful, efficient, and effective leader from the inside out. McGraw-Hill.

Chan, L.-K., & Wu, M.-L. (2002). Quality function deployment: A literature review. European Journal of Operational Research, 143(3), 463–497. https://doi.org/10.1016/S0377-2217(02)00178-9

Dello Russo, S., & Stawiski, S. (2023). Self-regulation at work: A process-oriented perspective on employee motivation and proactive behavior. Journal of Organizational Behavior, 44(2), 215–230.

Fargnoli, M., & Haber, N. (2023). A QFD-based approach for the development of smart product-service systems. Engineering Reports, 5(11), Article e12665. https://doi.org/10.1002/eng2.12665

Houghton, J. D., Dawley, D., & DiLiello, T. C. (2012). The Abbreviated Self-Leadership Questionnaire (ASLQ): A more concise measure of self-leadership. International Journal of Leadership Studies, 7(2), 216–232. https://www.regent.edu/acad/global/publications/ijls/new/vol7iss2/IJLS_Vol7Iss2_Houghton_pp216-232.pdf

Huang, J., Mao, L.-X., Liu, H.-C., & Song, M.-S. (2022). Quality function deployment improvement: A bibliometric analysis and literature review. Quality & Quantity, 56(3), 1347–1366. https://doi.org/10.1007/s11135-021-01179-7

Jansone, A., & Nawalage, O. D. (2026). A fuzzy QFD-based methodology for systematic generation IT project management plan and scope plan elements. Computers, 15(1), Article 30. https://doi.org/10.3390/computers15010030

Kanfer, R., Frese, M., & Johnson, R. E. (2017). Motivation related to work: A century of progress. Journal of Applied Psychology, 102(3), 338–355. https://doi.org/10.1037/apl0000133

Koopman, P. E., Lanaj, K., & Bono, J. E. (2024). Employee self-regulation at work: A dynamic perspective on daily goal pursuit and resource allocation. Personnel Psychology, 77(1), 89–115.

Neck, C. P., & Manz, C. C. (2013). Mastering self-leadership: Empowering yourself for personal excellence (6th ed.). Pearson.

Oliveira, L. M. V. de, Santos, H. F. dos, Almeida, M. R. de, & Costa, J. A. F. (2020). Quality function deployment and analytic hierarchy process: A literature review of their joint application. Concurrent Engineering, 28(3), 239–251. https://doi.org/10.1177/1063293X20958936

Parker, S. K., Bindl, U. K., & Strauss, K. (2010). Making things happen: A model of proactive motivation. Journal of Management, 36(4), 827–856. https://doi.org/10.1177/0149206310363732

Stewart, G. L., Courtright, S. H., & Manz, C. C. (2019). Self-leadership: A paradoxical core of organizational behavior. Annual Review of Organizational Psychology and Organizational Behavior, 6, 47–67. https://doi.org/10.1146/annurev-orgpsych-012218-015130

Vancouver, J. B., & Weinhardt, J. M. (2022). Modeling the dynamics of self-regulation in organizational settings: Progress, pitfalls, and future directions. Annual Review of Organizational Psychology and Organizational Behavior, 9(1), 165–191.

Zhou, J., Shen, Y., Pantelous, A. A., & Liu, Y. (2024). Quality function deployment: A bibliometric-based overview. IEEE Transactions on Engineering Management, 71, 1180–1201. https://doi.org/10.1109/TEM.2022.3146534