

Multiscale Quality: Micro, Meso and Macro Concepts

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Abstract - The quality concept can be defined according to different points of view, dimensions, and characteristics. Quality can be considered as a multiscale concept. This leads to the need of understanding how quality measurements and evaluations are done across products, processes, people, organizations and territories. The aim of this paper is to build a quality holistic view to the problems that arise in different management levels through a measurement system of quality.

A preliminary literature review is presented and the main insights that come up from it are shown and explained, resulting in a definition of multiscale quality, as well as a first approach to the characterization of macro, meso and micro dimensions.

The added value of this paper is the comprehension and clarification of several terms related to multiscale quality, as the terms micro, meso and macro have been increasingly used in different fields of application and knowledge.

The future work intends to develop a model that can be used in companies as it integrates quality measurements of different management levels of an organization in a single integrated and consistent model.

Keywords - quality measurement; multiscale quality; micro, meso and macroquality

I. INTRODUCTION

Quality has gained several meanings along the time and across organizations or countries. Cambridge dictionary defines quality as a standard, characteristic or excellence, highlighting a subjective meaning of this concept. Quality is “how good or bad something is” as a standard, it is “a characteristic or feature of someone or something” as a characteristic, and “a degree of excellence of something”, as an excellence [1].

Quality has a subjective meaning. However, it is also a strategic factor in a global world mainly related to the needs and expectations of customers and the identification and management of opportunities. The application of quality is made daily through different tools, techniques and methods leading to continuous and permanent improvement to achieve organizational excellence [2].

The study of different fields of knowledge through different scales, levels and dimensions has been done in several areas across the time. Macro, meso and micro are terms often used in different contexts, situations and fields of application. One of the best known areas is economics. A better understanding of the meaning of these concepts in the quality field is a clear research opportunity. So, this paper intends to answer the following research question: can quality be measured in different scales? Such a

characterization will lead to the development of a multiscale conceptual model that allows the understanding of quality according to different scales, as well as their similarities, differences, and possible relationships between them. This paper is structured as follows: the research methodology; a compilation of micro, meso and macro concepts and some examples in different areas (quality of life, health sector, and sports); some insights regarding the management categories and its relationship with micro, meso and macro levels and quality scales; first insights for a quality multidimensional model based on the described literature review; and conclusions and future work.

II. METHODOLOGY

A literature review was carried out on Google Scholar in order to realize the meaning of macro, meso and micro scales in different fields. Several keywords were used as a literature search strategy, such as macro-level, micro-level, organization, quality, model, and dimension. The main insights are now showed and presented.

III. MICRO, MESO AND MACRO

Macro, meso, and micro are common concepts used by and familiar to people in several areas and fields of application.

Micro-level is associated to the individual level and it depends on the personal motivations, such as challenges and opportunities, so it is subjective and the decisions taken are based on the individual issues, needs, perceptions and factors in a micro scale level [3]–[5]. This micro level deals with the engagement and interaction of the individual on relationships, attitudes and different roles and activities. It is related to processes [6]. A challenge that arises in this point is the equality of micro-level decisions and the offered services when the same problem and issue is presented because it will affect the individual [7], [8]. The end-level user has an important role in the micro-level decisions due to its perceptions, impacts and consequences of the decisions defined. The time to make decisions is short and the decisions are based on the individual circumstances [9]–[11]. Looking to the micro meaning in quality, microquality is associated to quality contributions to the improvement of products, services, processes and organizations at a local scale of time and space [12].

Meso-level refers to a regional context or a community and the decisions that have to be made

affecting this level [3]. This is related with policy maker decisions and services that can serve a certain community and a specific group of people in a specific region [7]. In an analogy to the meso-level in the quality field, mesoquality deals with quality issues and challenges that relate mostly to larger organizations and regions [12].

Macro-level arises usually associated to policies, regulations, policymakers and governments as they have to see a country or region as a whole and define objectives in order to take a decision related with a group of individuals [3]–[5]. Macro is related to the systemic level that refers to the collective and it depends on the external factors and the societal context, so it deals with economic issues and evaluations, negotiation and long term decisions that affect population [3], [4], [7]. These macro-level decisions are related with something that affects a group of people or the needs of a population in an aggregate level [8]. In this scale, it is important to point out that the decisions are made based on public preferences in a certain context and takes it into account over a period of time [9], [11], which goes in line with Saraiva et al. [12] insights. So, macroquality can be presented as quality of a country or in an international level and it is mostly related with national or multinational organizations [12].

In a pioneering approach, Saraiva et al. [12] came out with a characterization of quality in terms of micro, meso and macro levels as it was already described.

Saraiva et al. [12] got a point of view that looked into quality scales as a relationship between time and distance. So, macroquality decisions are taken in a longer term way as they deal with macro-regions and need time to be implemented and to see results. On the other hand, microquality decisions are related to decisions that have almost immediate impact and consequences. It is simple to realize that the unit of analysis differs from the individual to a group as the quality dimension is different, from a micro to a macro-level, respectively [5].

The approach of Saraiva et al. [12] also looks into quality by top down and bottom up perspectives, under what they refer as being glocal quality. It is easy to realize that macro-level decisions usually have micro-level impact and consequences, which reflects the glocal quality meaning [8], [12], because one then needs to think local and act global and to think global and act local. This reflects the dynamics of quality decisions in different management levels leading to a simple understanding of the interactions of these relationships.

IV. EXAMPLES OF APPLICATION OF MICRO, MESO AND MACRO LEVELS OF QUALITY

A. Quality of life

The quality-of-life concept depends on what each person intends to achieve and the corresponding goals, and it naturally varies from one to another person according to the choices each one makes according to the hypotheses and opportunities that show up. The cultural

context and the subjective assessment of each person are factors that cannot allow the creation of a characteristics list related to quality of life, in terms of individualized levels. Although there are no rules or standards related to quality of life, there are some characteristics and variables that can be used as a proxy of the quality of life [4].

The macro and micro-levels are usually related to quality of life. However it is a quite difficult term to define due to its subjective concept depending on each person [4]. Micro-quality of life depends on each individual and it is usually associated to personal characteristics and to a set of valuable options for an individual [4]. On the other hand, macro-quality is related to a set of valuable options for a group of people that are not depending of individual choices but the ones of the group such as education, health, politics and freedom [4]. Generally, the quality of life is associated to well-being and, consequently and subjectively, to happiness and satisfaction of the biological, psychological, and social needs [4].

B. Health sector

There are three levels for decision making in the healthcare systems: micro, meso, and macro [7]. The levels macro and micro, as well as meso have been used in the health sector, namely as a link between research and clinical practices as a way to identify intervention priorities [13]–[15]. Wilson et al. [3] says that decisions can be made in these three levels regarding healthcare services and they present a framework linking the level of analysis (micro, meso and macro) with different dimensions (quality of care, ethics, and economics).

C. Sports

In sports, a micro-level decision deals with actions that players have to do in the moment [10]. At the same range, factors related to sociodemographic factors lie on the micro-level as well [16]. On the other hand, macro-level decisions deal with defined policies and, for example, which and where some sports infrastructures should be located [16]. Wicker et al. [16] shows micro-level as directly linked to the individual and its intrinsic characteristics, and macro-level to sports facilities and programs depending on government decisions.

D. Performance management

A performance measurement system is sometimes related to an efficient measurement with indicators such as productivity or profits, which can be inadequate if they do not reflect the real performance. This leads to the emergence of new approaches to measure organization performance and the stakeholders satisfaction [17].

Several performance indicators exist in the different management levels. However, it is important to point out that they could be used only to fulfil the requirements and not aligned with the organization goals. Performance

indicators are used to measure the performance of a specific area of an organization depending on the different stakeholders involved such as customers, markets, products, processes, suppliers, human resources, community or society [17]. The performance indicators only show how the performance is but not how it is achieved and improved. Once a performance indicator is defined, the deployment to the processes of the organization should be made and they can be grouped according to different goals from a macro to a micro level [17]. It is important to point out that too many indicators and information can be a problem as well the lack of information, so benchmarking could be a good strategy but a balance and coherence in the number of indicators is needed [17]. The flexibility associated to the indicators should be presented in the organization and all workers should be aware of the performance indicators, in terms of which they are, how they are calculated and their goals and also the actions to be taken to improve them [17].

V. PERFORMANCE MANAGEMENT CATEGORIES AND QUALITY DIMENSIONS

The hierarchical management levels are usually divided into three categories: strategic, tactical, and operational. The strategic level is related mostly to the planning [17]. This could be associated to the macro-level of organizations because it deals with long term and policies definition [4]. The tactical level is associated with implementation [17]. Meso-level decisions are naturally associated to tactical decisions in order to reach the defined strategy [10]. The operational level is linked to the controlling [17]. It is related with what is happening, in an individual level, which leads to an individual reference, that is linked to the micro-level [4].

VI. FIRST INSIGHTS TO A QUALITY MULTISCALE MODEL

The intention of the compilation of the concepts related to micro, meso and macro-level quality is to create a conceptual multiscale model based on these concepts. The link between different contexts and organizations is important to clarify what could be included in each quality dimension. The validation of that information is quite important for a better understanding, as each dimension has its own characteristics. This multidimensional approach will help to enhance the organizational context and the decisions that are taken, when and by who, resulting in actions, changes, and perceptions of each person involved in the organization. Macro-level deals with the organization and micro-level deals with the individual in the production line [18] and in a world context, macro-level deals with an international level and micro-level with the individual as a quality professional. Table I sums the main insights and shows this comparison of micro, meso and macro levels in different contexts, which will be the basis of the future model, with the allocation of characteristics and

definitions to each dimension.

TABLE I
COMPARISON OF MICRO, MESO AND MACRO LEVELS IN DIFFERENT CONTEXTS

	Organization	World	Country
Macro	Top management	Country	Government
Meso	Middle management	Organization	Region
Micro	Shop floor	Quality professional	Individual

VII. CONCLUSIONS AND FUTURE WORK

This paper highlights the possible characterization of quality through different dimensions and scales. This literature review helped to systematize some concepts regarding the multidimensionality of quality. Macro-level decision making and macroquality deal with a country or an international level. On the other hand, micro-level decision making and microquality relate to the individual. Meso-level decision making and mesoquality are associated to an intermediate level, such as a region or community.

In a parallel analogy, these three dimensions can be associated to the management process categories, as the macro deals with strategic level, meso is related with tactical views, and micro is associated to an operational level. This conclusion comes as each dimension has implications in terms of temporal and spatial reference. As a future work, it would be quite interesting to understand in a real context how the deployment of macro-level decisions is made until a micro-level context is reached. For that to be done, a conceptual multidimensional model is being developed based on the literature review and in case studies performed in multinational companies with factories in Portugal. The case studies intend to assess the application of the future model to different sector activities and to organizations with headquarters based in different countries, which can lead to different conclusions depending on different cultural contexts. Each organization has its own management levels and different report levels, however it is expected that they have coherence and consistency in the measurements made in the different management levels as well as the communication of results and reports from the production line to the top management and, on the other hand, the guidelines and orientations and policies from the top management to the production line. The model intends to characterize each quality dimension.

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