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Increasing Project Effectiveness by Combining the FMEA Method Results and the Costs of Quality (Based on the Example of an Employee Relationship Management Project)

ABSTRACT

Objective: This article presents a project focused on the stabilization of employment in a multi-generational organization in the scope of human resources –specifically, employee relationship management.



Methodology: The type of project was evaluated by taking into account different typological criteria. The employee generations were defined by providing time ranges based on dates of birth. All important project stages were presented according to the newest PMI 2017 methodology, with particular attention to the selection of the model of the project team and the division of tasks within the team. The critical path method was used in the description of the course of project activities.

Findings: The method of determination of project success factors was specified.

Value Added: In accordance with the title of the article, it was, however, shown how one can combine the identification of the level of project risk (using failure mode and effects analysis – FMEA) and the costs of quality to increase the project effectiveness.

Recommendations: Projects of this type are important in these organizations where the risk of loyalty is high, which leads to negative economic implications. The advantages from such projects can, however, affect more than the employer.

Key words: multi-generational organization, human resources, PMBoK®, costs of quality, employee relationship management, FMEA method, project effectiveness

JEL codes: O15, O22, D81

Introduction

The aim of this article is to present the effective advantages of synergy of project risk management and the costs of quality. The method used for determination of the level of risk was FMEA (failure mode and effects analysis), which is based on the previously determined – within the framework of CPM – specification of project activities. A project regarding employee relationship management that belongs to the projects in the scope of human resources was used as an exemplification. A study of the subject literature in the scope of project management and employee loyalty methodologies was used for its elaboration (items indicated in the bibliography).

Material & Methods

The term 'quality cost', known in the organizational and management sciences for over half a century, is used in many areas of economic activities. This category (Costs of Quality – COQ) can, according to the Project Management Institute (PMI) (2017, p. 245), be used in project estimation. It is in chapter VII (Project Cost Management) of the sixth edition of PMBoK®, specifically in the part regarding the estimation techniques and tools, that this term appears for the first time. The assumptions regarding the costs of quality that are specified in detail in the part regarding quality management (chapter VIII PM-BoK®) are utilized for the purpose of assessing the influence of the costs of additional investments (in the product) on the compatibility or incompatibility with the assumptions of the project. They can also indicate the influence of a (short-term) reduction of costs on more frequently occurring problems at a further stage of the product life cycle.

The classification of the costs of quality comprises (PMI, 2017, pp. 282–283):

- the costs of prophylaxis; that is, the costs connected with prevention of bad quality products, services or results of a given project;
- the costs of assessment/verification; that is, the costs connected with measurement, assessment, audit, and verification of the quality of products, services, or results of the project, and
- the costs of (internal/external) mistakes including the costs connected with the incompatibility of products, services, or results of the project with the stakeholder's needs and expectations.

The optimum cost of quality, according to PMI 2017, is the one that balances investments in prophylaxis and assessment with expenses caused by the occurrence of mistakes. The costs of prophylaxis and the costs of assessment should prevent or equalize the costs that belong to the third category, i.e., the costs of internal or/and external mistakes. This dependency with this particular specification is illustrated in table 1.

Table 1. The costs of quality in PMI

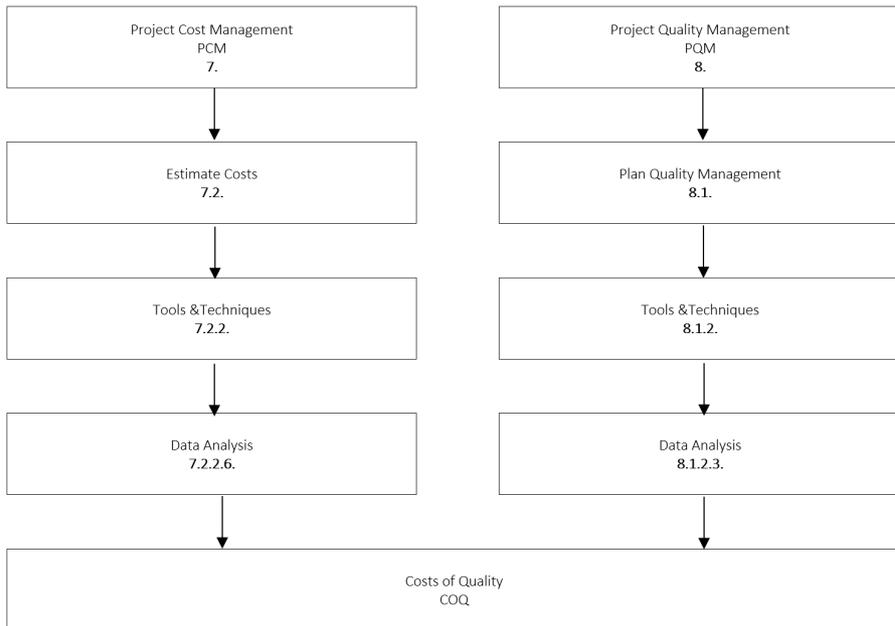
The costs of compatibility	The costs of incompatibility
The costs incurred during the project for the purpose of avoiding mistakes	The costs incurred during the project or after finishing the project intended to remove the mistakes that occurred
The costs of prophylaxis: trainings preparation of documentation equipment time indispensable for correct performance of the task/project The cost of assessment: testing audit/control damage tests	The costs of internal mistakes: reprocessing scrappage The costs of internal mistakes: liabilities towards the customers guarantee repairs loss of order/customer

Source: own elaboration on the basis of PMI (2017, p. 283).

From the table, as well as from the definition of the costs of quality presented in the introduction (Key Concepts for Project Quality Management) to chapter VIII PMBoK®, it is known that the cost of quality comprises all costs incurred in the product lifetime/exploitation: investments in the prevention of incompatibilities with the requirements, the costs of assessment of the product or service considering its compatibility with the requirements and the costs of incompatibility (mistakes/breakdowns), that is, potential costs of repair and/or exchange. The costs of mistakes are divided into the internal costs (observed by the project team) and the external costs (identified after handing over of the product/service to the client). This type of costs is also sometimes referred to as the costs of low quality. The managements of organizations frequently decide to increase the costs of compatibility (investing in prevention of defects) due to obvious advantages in the entire product life cycle. As the feature of the projects is the so-called temporality, the decisions regarding COQ usually belong to program management, portfolio management, the project management office – PMO or operational managers (PMI, 2017, p. 274).

As already mentioned, the category of the costs of quality in the PMI methodology can be found in two topical areas: project cost management and project quality management. These associations are presented in table 2.

Table 2. COQ in project cost management and quality management



* Bold denotes the numbers of chapters of the PMBoK® methodology (PMI, 2017) referring to the costs of quality.

Source: own elaboration on the basis of PMI (2017, pp. 231, 240, 245, 271, 274, 277, 282–283).

It seems that the above illustrated combination of the categories of the costs of quality and the issues of cost management in the project, estimation of costs, quality management, quality planning and data analysis should naturally result in its implementation in the area of risk management, which is discussed in PMI (2017) in chapter XI of the methodology.

In PMBoK® typologies regarding risk management (PMI, 2017, pp. 396, 401, 409, 419, 428, 437, 453) one can find the following areas of obvious

coherence of this area of project management and the categories of the costs of quality. Namely:

- the analysis of data in tools and techniques of planning risk management – the methodology proposes here (PMI, 2017, p. 404) the analysis of the tolerance of risk by project stakeholders;
- planning of the costs of the project, planning of the quality of the project and cost estimation (entrance of the process) and data analysis (tools and techniques) in the identification of risks in the project – with regard to planning of the costs of the project, the methodology “cross-refers” (PMI, 2017, p. 411) to the plan of cost management (PMI, 2017, p. 238); with regard to planning of the quality in project (PMI, 2017, p. 411), to quality management plan (PMI, 2017, p. 286); regarding cost estimation in the project (PMI, 2017, p. 412), to cost estimation in project cost management (not tools and techniques, but a solution) (PMI, 2017, p. 246), whereas regarding data analysis, it proposes (PMI, 2017, p. 415) the root-cause analysis (PMI, 2017, p. 292), the analysis of assumptions and limitations, SWOT analysis and the analysis of documentation (PMI, 2017, p. 143);
- data analysis in tools and techniques of performing the qualitative risk analysis –PMBok® methodology, instead of the analysis of the costs of quality, proposes (PMI, 2017, p. 423): the assessment of risk data quality, the probability of occurrence and the assessment of the results of risk as well as the assessment of other parameters of risk;
- estimation of costs (entrance) and data analysis (tools and techniques) in the process of performing quantitative risk analysis – with regard to the estimation of costs, the methodology indicates the process of project cost management (exit) (PMI, 2017, p. 246), and with regard to data analysis, the Monte Carlo analysis (PMI, 2017, p. 433), the Tornado diagram (PMI, 2017, p. 434), the analysis of the decision tree (PMI, 2017, p. 435) and the influence diagrams (PMI, 2017, p. 436);
- data analysis (tools and techniques) and planning of cost management and quality management (exit) in the area of planning reaction to risk – in-

stead of data analysis, PMI first places (PMI, 2017, p. 446) the analysis of alternative solutions and the analysis of costs and advantages (PMI, 2017, p. 282), listed next to the costs of quality in the part devoted to the planning of quality management; instead of the planning of cost management, PMI proposes (PMI, 2017, p. 447) the plan of cost management (exit) (PMI, 2017, p. 238) and, in spite of planning of quality management, the quality management plan (exit) (PMI, 2017, p. 286);

- data analysis (tools and techniques) in the process of risk monitoring and control – PMI first proposes in this scope (PMI, 2017, p. 456) the analysis of efficiency and the analysis of reserves (PMI, 2017, p. 245); they are listed directly before the costs of quality in the part regarding the process of cost estimation.

Each of the listed items of “connection” (a total of 12 processes in 6 out of 7 groups of processes) enables implementation of the category of the costs of quality to particular groups of the processes of risk management; it is especially emphasized each time (in particular, descriptions of processes) in PMBoK® methodology that the listed tools and techniques of management proposed are not the only ones. It is worth taking into account the many prerequisites and develop the processes of project risk management proposed by PMI (2017, p. 396) by the category of the costs of quality.

Current state of knowledge

ERM, i.e., employee relationship management, means the pro-loyalty strategy for employees that builds the company's relationship capital, the strategy of building long-term relationships with employees, and the strategy of binding (even former) employees with the organization (Lipka, 2011; Strohmeier, 2013; Al-Khozondar, 2015; Chaubey, Mishra, & Dimri, 2017). ERM constitutes an equivalent of customer relationship management (CRM), but with regard to internal customers (to employees) (Devamaindhan, 2014). ERM simultaneously refers to the term relationship marketing (RM) (Groenroos, 1996), which

is of both a detail and universal nature. It is based on behavioural variables (trust, habit, commitment – especially emotional commitment). According to some authors, it may even become acknowledged as the next stage of development of the personal function, after the stages of (Klauffke, 2014):

- bureaucratization (since app. 1960);
- institutionalization (since app. 1960–1970);
- humanization (app. 1970–1980);
- economization (app. 1980–1990);
- entrepreneurship, strategic management (since app. 1990).

The projects in the scope of ERM are important for the following reasons:

- demographic (“Fighting for talents” is intensified because of the decrease of the share of people in the production age and the process of ageing; the necessity to integrate personnel ethnically and generationally is diversified due to globalization);
- economical (there is a minimization of the loss of knowledge and goodwill; there is a focus on creativity and innovativeness that favours the stability of employment, i.e., work for the benefit of a particular organization. This stability is currently low: the median of job seniority at one employer according to BLS (Bureau of Labor Statistics, 2018) research is currently 2.8 for employees aged 25–34 and 4.2 for all employees above 16 years of age; for people employed in Poland in rank and file positions, the job seniority is only two years according to the research of the company Sedlak & Sedlak (Pokrywka, 2012). Therefore, the present is spoken of as the post-employment era (Clowes, 2016);
- social (there is a transformation of values in the form of return to individualization and, therefore, resignation from work, which, for example, fails to provide a work-life balance);
- image (image is a strategic dimension for the organization (Melde & Benz, 2014) that favours the attraction of talent (Ahmada & Dauda, 2016).

The ERM performance cannot take place within the framework of contemporary performances of HR functions as the modern career models

fail to assume work in one organization (Caraher, 2017) and therefore – the “standard” performance of the personal function – the development of employees, which:

- at the operational level means performance of the instruments of development (trainings, mobility, enrichment of the content of work) with regard to particular employees;
- at the tactical level is identical to identification of the directions of employees’ development and the type of developmental undertakings, and
- at the strategic level is approached by planning career paths.

The ERM projects should refer to such dimensions of the employee-organization relationship as: the structure of the relationship, the strength of the relationship, and revenues generated by the relationship. They are strictly connected with one another, which is illustrated *inter alia* by defining the function (strength) of the relationship by granting recommendations, which increases the revenues of the organization.

The main aim of the ERM projects must be the arousal of employees’ interests in staying longer in the organization, which will influence the decrease of loyalty risk. The assumption is that this type of personal risk – next to the risk of employees’ deficits, the risk of qualification adjustment and the motivational risk – is subject to formation (Ledig, 2008, pp. 53–55).

As for placement of ERM projects in the project typology, they should be considered as:

- internal (origin of the order);
- regarding human resources (functional area of the organization);
- of object nature (orientation);
- medium (size);
- developmental (the purpose of performance);
- independent (combination with other undertakings);
- financed from own capital (the method of financing);
- private (the type of investor);
- intraorganizational (organizational range);

- domestic (geographical range);
- strategic (the meaning for the organization);
- medium-complicated (performance difficulty);
- conceptual and performative (scope);
- of medium degree of novelty (the degree of novelty);
- requiring low-advanced technology (the degree of used technology);
- finalizing (the scope of performance of strategic aims);
- performed at a regular pace (the pace of performance);
- feasible (feasibility of the project);
- performed in de facto standards (the dominant standard);
- requiring teamwork (organization of works on the project);
- performed according to the waterfall model (the project management cycle);
- of CSR nature (commercialization of the product);
- aimed at delivering useful results (defining the project results);
- neutral as to the results (profitability);
- of high quality (expected quality of the project);
- of high efficiency (expected efficiency of the project);
- of investment nature (increasing the competitive potential of the organization) and of social nature;
- connected with high risk (the risk of project work).

From the perspective of criteria presented in the subject literature by A.A. Leybourne and R.D.H. Warburton (2012), the projects repeatedly need both high creativity of the structure of the delivered product and high creativity of the management process, which is connected with, among others, a certain flexibility of defining expectations and, thus, the possibility of a selection of tools, with improvisational style of activity. Nota bene, one should attest that the strand of the theory of works that explains creativity in project management is neglected. In addition, one can indicate the theories that describe such management. We can distinguish here the Gestalt approach (that belongs to classical theories of the creative process) (Nęcka, 2012) that

points to the necessity of supplementation of the problem situation with the lacking links (e.g., with full specification of the stakeholders). Then, the “creative investment” theory by R.J. Sternber and T.J. Lubart (1995) indicates what risk is connected with “expensive” (e.g., requiring cost-consuming analyses) and with “cheap” buying. One should also mention the M. Csikszentmihalyi conception “individual, field, domain” (Csikszentmihalyi 1988; 1990; 1996), because:

- the domain can be identified with the type and content of the project;
- individual – with the project team, and
- the field – with individuals who verify the fulfilment of requirements and the criteria for exiting the project, that is, its acceptance.

The term of acceptance also occurs in another system (similar to the two aforementioned) conception of creativity, i.e., the D.K. Simonton’s conception “chance and configuration”. Transferring its content to the area of project management would mean that obtaining project acceptance would require:

- project stakeholders’ knowledge about cognitive components;
- ordering of the cognitive representation of reality;
- coherence of the stakeholders’ cultural codes;
- reconstruction of the original configuration of cognitive components.

Finally, M.A. Runco’s two-layer model of creativity, due to the variables taken into account, can be considered in the area of project management. The two layers are ideational fluidity (the number of reported ideas) and ideational flexibility (the variety of reported ideas) because they play a significant role by the selection of project solutions. In general, the use of creativity in project management is explained by the ambidexterity theory (Tushman & Oreilly, 1996) that dictates a combination of advantages from the routine (of the process and project structure) and creativity.

The analysed projects should consider all employee generations that constitute peculiar segmentation criteria (it was assumed that the traditionalists are persons born in the years 1914–1945, baby boomers in the years 1946–1964, Generation X – 1965–1980, Generation Y – after 1981, Generation Z – after 1995) and extend, in accordance with the employees’

life cycles in the organization (Richmond, Rothboeck, & Henschel, 2017), to all phases of the employees' life cycles in the organization (apart from the initial phase – due to lower loss caused by the employees' departures at this time), and even comprise relationships after cessation of work in the organization. This means that the project is coherent with the strategy of increasing (generational) diversity of human capital as one of the possible personal strategies distinguished, in addition to the strategy focused on decreasing the degree of diversity (e.g., in connection with high expenditures for it or with the defensive strategy) and the strategy of matching the degree of team diversity to the structure of customers (e.g., their generational belonging), due to the degree of deriving from the diversity of human capital. Moreover, it is coherent with such personal strategies as:

- the offensive strategy;
- the quantitative and qualitative strategies;
- the strategy oriented to "entrance";
- the strategy of maximization of human capital value;
- the strategy focused on the a.m. (on generational "segments"; therefore, it is not coherent with the non-diversified or individualized strategy);
- the strategy of focusing on talents (not coherent with the strategies of "question marks", "dogs", and "cash cows" – see the BSC matrix with personal portfolio);
- the strategy of transformation (which – contrary to the strategy of auto-selection, transaction and autonomisation – combines the constructivist approach to employees with the model of human capital that assumes intensity of investing in this capital).

The performance of the project in accordance with the assumptions of the cascade model (Kneuper, 2015) means that:

- the project life cycle consists of an infinite number of phases that end with a particular result;
- it is impossible to start another phase without finishing the previous one (referring to the performance of products for particular generations);

- there is no feedback between the phases (also referring to the performance of products for particular generations);
- the project's final results must be in accordance with its initial specification.

Below is the ERM project charter (the further part of the text discusses the elements that require more specific descriptions – tables 4 and 5) for the most valuable employees – MVE.

Table 3. The elements of the employee relationship management* project charter for the most valuable employees** in the multi-generational organization

The elements of the project charter according to PMI	Characteristics
Aim of the project	Transformation of loyalty of employees from various generations into partner loyalty***; recovering of lost valuable employees; keeping bond after employees exit from the labour market****
Sponsor of the project	The organization that performs the project
Source of financing	The organization that performs the project
Stakeholders of the project	Table 3
Requirements	Creation of products that correspond to the strategy of diversification (separate products from the ERM scope for MVEs from different generations)
Measurable aims and criteria of success	Table 4
Project manager, model of structure of project team	Isomorphic structure; members of the team – HR specialists; project manager – economic analysis specialist
Milestones	In table 5: 1. Identification and analysis of MVEs from the given generation before the project; 2. Determination of the product for MVEs for the given generation; 3. Summary of tests of the protocol of critical events and cohort analysis of MVEs from the given generation; 4. Summary of the results of comparative analyses of the variables determined for MVEs from the given generation before and after implementation of the project; 5. Analysis of departures of MVEs and their clients; 6. Calculation of project cost effectiveness for MVEs from the given generation; 7. Synthesis of the results of all analyses of team members and the manager

Key achievements and limitations	Number and type of rewards and terms of receiving rewards by MVEs; number of possible promotions dependent on the structure of the organization
Criteria of acceptance	Extension of the length of the phase of growth, maturity and decline of employees' life cycles in organization****; increase of average LTV value*****; increase of MVEs that represent partner loyalty and unconditionally loyal MVEs; decrease of departures of MVEs; decrease of multi-loyal ***** MVEs; decrease of departures of customers serviced by MVEs; decrease of the number of inadequate relationships to critical events regarding MVEs; increase of the value of recommendations; stabilization or increase of the share of the company in the market; decrease of subjectively perceived expenditures for management; increase of work efficiency of MVEs; increase of MVEs returning to the company; effects of the projects are higher than the expenditures
Project risk	Table 6
Costs of exiting from the project	Table 5

Explanations:

*Employee relationship management – ERM;

**Most valuable employees – MVE;

***Partner loyalty is defined by three internal mechanisms of loyalty: trust, routine and organizational commitment, which in the case of partner loyalty, are simultaneously high;

****The project fails to comprise obtaining loyal employees from different generations, which constitutes the routine HR function;

*****The growth phase will be identified as time until the employee reaches the average work efficiency for the given category of the employed persons, and the maturity phase, as time from reaching efficiency at this level until the beginning of a permanent decrease of this efficiency;

*****LTV (lifetime value) is calculated according to the pattern that refers to E. Flamholtz's discounted cashflow method (1985): $-K + p_1(1+k) + p_2(1+k)^2 + \dots + p_n(1+k)^n$, where K is the cost of work, k is the cost of capital, and p is the cash flow at work position;

*****Multi-loyalty is connected with simultaneous work for the benefit of different organizations and can be operationalized through the time of work devoted to them.

Source: own elaboration.

The tasks to be performed in the project can be structured according to their addressees; thus, one can divide them into 5 areas of responsibility, referring to such number of employee generations.

Taking into account the a.m. areas of responsibility, i.e., their relative separability, the adequate option with regard to the structure of the project

team seems to be the isomorphic structure. It has numerous advantages (Turner, 2016, pp. 340–345), among others, clear division of duties, transparency of information flow, no greater integrative and communicative barriers, independence of the contractors of tasks at ease of exercising the control function by the project manager, and shortened time of performance of the entire project thanks to simultaneous work over the products for various employee generations. It seems that the project team should consist of the minimum of 6 persons (the manager and the persons responsible for the performance of ERM targets for MVEs from five individual generations). The persons responsible for particular generations shall have the following tasks (see the table):

- participation in the training;
- determination of the phase of life cycle in the organization for each MVE;
- identification of the type of loyalty of each MVE;
- identification of the phase of loyalty of each MVE;
- identification of the size of multi-loyalty among MVEs;
- determination of the number of promotions for each MVE;
- determination of the number of serviced customers for each MVE;
- determination of the number of recommendations for each MVE;
- testing of satisfaction and needs of MVEs in factors that influence their staying in the company;
- determination of the list of attractive rewards for MVEs and the principles of obtaining them according to the assumptions and limitations imposed by the project manager;
- keeping the protocol of critical events regarding MVEs;
- carrying out of the cohort analysis (cohort table, survivorship curve, survivorship indices) taking into consideration sub-cohorts: the phases of life cycle in the organization, the type of loyalty, the phase of loyalty, and loyalty towards one or more numbers of loyalty;
- determination of averages and medians for particular phases of the life cycle in the organization;

- determination of the proportion of MVEs who were promoted (before the project and after its implementation);
- comparison of efficiency of work from the moment of implementation of the project with efficiency, which was the basis of MVE identification;
- comparison of the dynamics of the number of customers serviced by MVEs (before the project and after its implementation);
- comparison of the value of recommendations of MVEs (before the project and after its implementation);
- comparison of the satisfaction from work of MVEs (before the project and after its implementation);
- analysis of departures of MVEs;
- calculation of project cost effectiveness for MVEs from the given generation.

Project Manager – apart from the task of supervision (see the table):

- performs training of the members of the team;
- elaborates the lists of employees from particular generations who meet the requirements of MVEs (MVEs are employees that bring the company the highest revenues; therefore, the ERM project is not directed to others distinguished (Stotz, 2007) as most growable employees (MGE) and below zero employees (BZE));
- determines the terms of rewards for MVEs that are loyal towards the company;
- accepts the proposals of rewards for each generation of MVE;
- analyses the dynamics of the costs of trainings;
- collects and analyses data regarding expenditures for management before and after implementation of the project;
- analyses the correlations between stabilization of employment of MVEs and the dynamics of share in the market;
- collects and analyses data regarding the advantages of the project perceived by various stakeholders;
- collects and analyses data regarding the average LTV;

- estimates the general project cost effectiveness and formulates adequate recommendations.

Table 4. The stakeholders of the employee relationship management project for the most valuable employees in the multi-generational organization

Stakeholders	Problems	Expectations	Advantages
Company's Management	Departures of MVEs who generate profits higher than the average and who dispose of unique or distinctive qualifications/skills, resulting in: instability of employment, loss of clients**, lower work efficiency***, lower risk of knowledge loss, higher training costs	Extension of the time of employment of MVEs in the organization and their higher affective commitment****; higher resistance to devaluation by competition in the work market; higher team morale	Higher organizational effectiveness*; higher market position; better image in the work market; advantages from recommendations; lower expenditures for controlling employees; satisfaction from behaviour compliant with the theory of organizational balance and social exchange theory*****; and even affective exchange theory*****
Employees covered by the project	High transaction costs and results connected with continuous work changes (the cost of learning new things, adaptive costs, the risk of worsening own socio-economic status, the cost of return of training fees and contractual penalties in the foregoing organization)	Obtaining additional benefits, deferred remunerations, trainings, promotional possibilities; annuities from the organizational knowledge; company's aid after cessation of work	Improvement of employee image as a result of recommendations of other employees for the company; stability of emotional relationships in the work environment; feeling of fair play behaviour towards colleagues; satisfaction from meeting the psychological contract with the organization

Families of the employees covered by the project	Necessity of permanent adaptation to changeable conditions of the spouse's/partner's work	Obtaining stability that favours family development	Avoiding stress connected with changes in the place of work and residence
Employees that are not MVEs, not covered by the project	Increased workload after departure of MVEs from the organization	Pursuing inclusion in the circle of MVEs	Higher work effects caused by better motivation to work
Members of the project team	Instability of attitudes connected with loyalty	Providing arguments for the benefit of employment stability in an unstable world, which could constitute „signposts“ in own professional life	Learning how to take material and non-material advantages from stable employment
Former employees	Failure to find satisfying work after departure from the company; feeling of monotony after joining professionally passive resources	Possibility to return to the company	Possibility to perform work

Explanations:

*The ERM project resulting from the ERM strategy launches behavioural outcomes that transform into performance outcomes that impact its financial results;

**The so-called loyalty spiral (Schueller & Fuchs, 2005, p.23);

***The so-called loyalty effect (Schueller & Fuchs, 2005, p.189);

****The affective commitment reflects emotional relationships to the organization where the employee feels well and wants to stay; commitment also comprises (Meyer & Allen, 1997) continuance commitment and normative commitment;

*****Silvalogthasan, Hashim (2013–2014);

*****Lawler (2001).

Source: own elaboration.

Table 5. Product, result, influence – the employee relationship management project for the most valuable employees in the multi-generational organization

Aspects	Targets	Standards/indices	Sources of obtaining information
Product	Extension thanks to the project of the loyalty package of the employees' life cycles in the organization through extension of all its phases, apart from the initial phase***	<ul style="list-style-type: none"> - cash value of the rewards for MVEs from particular generations who represent different types and phases of loyalty*; - the number of rewards according to their types**; - attractiveness of the rewards; - probability of obtaining the rewards; - transparency of the principles of obtaining the rewards; - compatibility of the principles of granting the rewards with statements regarding motivation 	Personnel and project data



<p>Result</p>	<p>Gaining advantages from the increase of the median of work seniority in the organization****</p>	<ul style="list-style-type: none"> - the average length of the phases of growth, maturity, and decline for all the employees; - the median of the phases of growth, maturity, and decline for all the employees; - the average length of the phases of growth, maturity, and decline separately for the employees of the traditionalist, baby boomer, Generation X, Generation Y and Generation Z generations; - the median of the phases of growth, maturity, and decline separately for the employees of the generations of the traditionalists, baby boomers, Generation X, Generation Y and Generation Z generations; - the medium value of LTV*****; - the proportion of employees that represent partner loyalty***** (total and from particular generations); - the dynamics of departures of MVEs (total and according to the generations) with regard to whom the project was applied; - the dynamics of MVEs unconditionally and conditionally***** loyal (total and according to the generations); - the dynamics of employees according to the phases of loyalty***** (total and according to the generations); - the dynamics of MVEs that represent multi-loyalty*****; - the dynamics of MVEs who took higher work positions/received higher remunerations (total and according to the generations) - the type of departures of MVEs according to the reasons: <ul style="list-style-type: none"> - the dynamics of the customers' departures; - the dynamics of work efficiency; - the dynamics of the costs of trainings; - the dynamics of the proportion of persons satisfied with work (total and from particular generations); - the dynamics of the number of turning points (critical events) in relationships with the employees, which were not properly reacted to; - the dynamics of the number of correctly selected***** employees from the recommendations of MVEs; - the dynamics of the share in the market; - the dynamics of the managers that assess expenditures for management as low; - the dynamics of MVEs who returned to the company (total and according to the generations); - the project cost effectiveness***** 	<p>The results of surveys (of employees and managers), including using the scales of permanent total and the scales of intentions; cohort analysis; the exit interview analysis; the association analysis (that examines the directions and frequency of employees' departures); internal reports; personnel and recruitment statistics</p>
<p>Influence</p>	<p>Modification of attitudes towards longer bond with one employer</p>	<ul style="list-style-type: none"> - the proportion of current and former MVEs who perceive advantages (in general and according to their types – see table 3) from longer employment in one organization as significant; - the dynamics of MVEs (total and from particular generations); - the perceived cognitive, affective and behavioural***** aspects of greater stability of employment from the employees' perspectives 	<p>The results of surveys; personnel statistics; the results of interviews with the members of the project team (before undertaking the project and after its performance)</p>

Explanations:

*For example, conscious loyalty (with the occurrence of trust but no habit and organizational commitment) or reasonable loyalty (where trust and habit are not accompanied by commitment);

**They are based not on coercive power but on remunerative power or normative power;

***Its shortening means quicker obtaining of better work effects;

****The median is the work seniority above and below, which is the equal number of employees of the organization;

*****See explanations under the table 2;

*****See explanations under the table 2;

*****Conditionally loyal employees are those who, after satisfaction of their additional claims, remain in the organization;

*****The phases of employees' loyalties are similar to the customers' loyalties: cognitive loyalty, affective loyalty and action loyalty (Oliver, 1999, pp. 33–34);

*****See explanation under the table 2;

*****Those who achieved specific work seniority in the organization;

*****Effectiveness is –when modified by the risk factor –the quotient of the effect of the economic project of the extended life cycle of employees in the organization (differences between LTV before and after project implementation) and the expenditures for the project;

*****These aspects are included in the attitude regarding loyalty towards the organization.

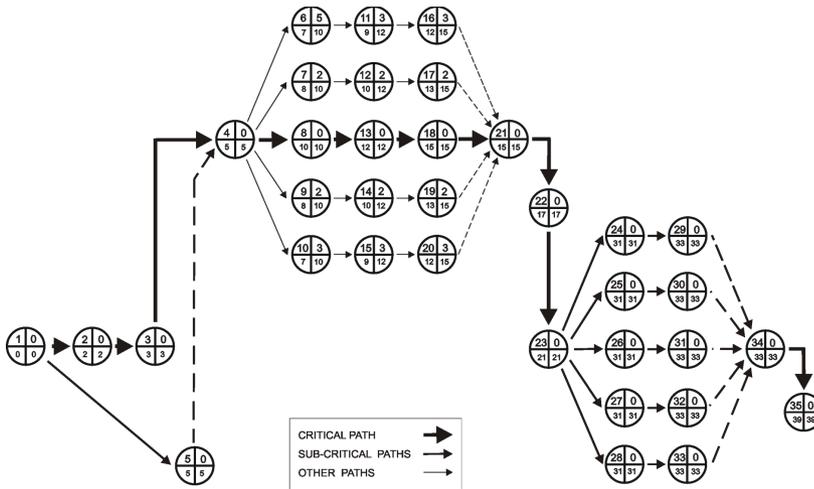
Source: own elaboration.

Table 6 presents the list of activities that must be performed under the project in their temporal connection, whereas figure 1 presents the system of activities. The basis for their construction is the critical path method (CPM). The following tables (7 and 8) identify the level of project risk as well as the methods of its decrease. The FMEA method was applied to determine the level of risk and to present the methods of minimization of the incompatibilities of processes with the requirements. The method was elaborated in the sixties of the 20th century in the USA. Its universal character also allows for its use in the area of human resources. However, one must make the following assumptions:

- instead of the technological sequence, analyse the sequence of personal processes;
- incompatibilities/mistakes refer to activities performed by the members of the project team;

- equate probability with subjective probability, as defined in psychology and behavioural economics;
- treat an employee as “an internal customer” and a main project stakeholder.

Figure 1. The system of activities to be performed under the project



Source: own elaboration.

Table 6. The list of activities of the employee relationship management project for the most valuable employees in the multi-generational organization

Specification of activity*	The symbol of activity	Duration of activity (in weeks)	Preceding activities	Following activities
Appointing the members of the project team and determination of their tasks and scopes of responsibility	V1,2	2	–	V2,3
Familiarization of the members of the team with the target and stakeholders as well as project requirements (including – the terms of rewards for loyal MVEs)	V2,3	1	V1,2	V3,4

Training the members of the team in the scope of knowledge about generations and pro-loyalty strategies	V3,4	2	V2,3	V4,6; V4,7; V4,8; V4,9; V4,10
Elaboration of the lists of employees from particular generations who meet the terms for MVE	V1,5	5	–	V4,6; V4,7; V4,8; V4,9; V4,10
Specification of the characteristics for each MVE from the traditionalists generation: the phase of life cycle in the organization, the number of promotions, the number of serviced customers, the phase and type of loyalty, the value of recommendations, and the existence of possible multi-loyalty	V4,6	2	V3,4	V6,11
Specification of the characteristics for each MVE from the baby boomers generation (see above)	V4,7	3	V3,4	V7,12
Specification of the characteristics for each MVE from Generation X (see above)	V4,8	5	V3,4	V8,13
Specification of the characteristics for each MVE from Generation Y (see above)	V4,9	3	V3,4	V9,14
Specification of the characteristics for each MVE from Generation Z (see above)	V4,10	2	V3,4	V10,15
Testing satisfaction and needs of MVEs from the traditionalists' generation with regard to loyalty	V6,11	2	V4,6	V11,16
Testing as above for the baby boomers' generation	V7,12	2	V4,7	V12,17
Testing as above for Generation X	V8,13	2	V4,8	V13,18
Testing as above for Generation Y	V9,14	2	V4,9	V14,19
Testing as above for Generation Z	V10,15	2	V4,10	V15,20
Elaboration of the proposal of a product (reward) for MVEs from the traditionalists generation and the principles for obtaining it	V11,16	3	V6,11	V16,21

As above for the baby boomers generation	V12,17	3	V7,12	V17,21
As above for Generation X	V13,18	3	V8,13	V18,21
As above for Generation Y	V14,19	3	V9,14	V19,21
As above for Generation Z	V15,20	3	V10,15	V20,21
Acceptance of the proposals of rewards by the manager	V21,22	2	V16,21; V17,21; V18,21; V19,21; V20,21	V22,23
Communication with MVEs; implementation of ERM products for MVEs from particular generations	V22,23	4	V21,22	V23,24; V23,25; V23,26; V23,27; V23,28
Keeping the protocol of critical events, the analysis of departures, the cohort analysis, and the comparison of variables before and after implementation of ERM for the traditionalists	V23,24	10	V22,23	V24,29
As above for the baby boomers generation	V23,25	10	V22,23	V25,30
As above for Generation X	V23,26	10	V22,23	V26,31
As above for Generation Y	V23,27	10	V22,23	V27,32
As above for Generation Z	V23,28	10	V22,23	V28,33
Estimation of project cost effectiveness for the traditionalists	V24,29	2	V23,24	V29,34
As above for the baby boomers generation	V25,30	2	V23,25	V30,34
As above for Generation X	V26,31	2	V23,26	V31,34
As above for Generation Y	V27,32	2	V23,27	V32,34
As above for Generation Z	V28,33	2	V23,28	V33,34
Estimation of general cost effectiveness on the basis of all analyses of all team members	V34,35	6	V29,34; V30,34; V31,34; V32,34; V33,34	-

Explanation:

*Duration of activities will be shorter by their particular divisions, which, due to the framework of the article, is impossible to be listed in detail.

Source: own elaboration.

Table 7. The types of risk* connected with the performance of the ERM project for MVEs in the multi-generational organization

Activity Symbol (Table 5)	Mistake	Result	Reason	P	S	D	C	Corrective activities
V1,2	Wrong selection of the project team members	Multiplication of errors by project activities	Improper selection of the methods for selecting the members of the team	9	4		360	Extension of the spectrum of methods of selection by the methods with highest accuracy (a)
V1,2	Overlapping of the areas of competence	Conflicts in the project team	Under-specification of the general task	5	2	3	30	Correction of the division of tasks (b)
V1,2	Failure to consider all the tasks	Failure to perform all of the indispensable project activities	As above	7	7	6	294	Further specification of the general task (c)
V2,3	Failure to understand the requirements of the project	Failure to meet the specifications of the project	Failure to think over the details of information transfer	8	5	6	240	Implementation of the possibility to obtain additional explanations (d)
V3,4	Insufficient training efficiency	Mistakes in analyses	Providing too much information in a short period of time	5	2	6	60	Procurement of additional training materials (e)
V1,5	Mistakes in identification of MVEs	Wrong determination of the basic project stakeholders	Failure to understand the idea of MVE	8	6	5	240	Further specification of the criterion of identification of MVEs (f)

V4,6; V4,7; V4,8; V4,9; V4,10	Mistakes in characteristics of MVEs from the traditionalists generation and/or baby boomers generation and/or Generation X and/or Generation Y and/or Generation Z	Wrong elaboration of the project products	Insufficient analytical experience	5	6	5	150	Elaboration of a guide for the members of the team with the examples of performing analyses (g)
V6,11; V7,12; V8,13; V9,14; V10,15	Failure to obtain authoritative results for the tests of satisfaction and needs of the employees' generations	Wrong elaboration of the project products	Insufficient experience in constructing testing tools	5	5	5	125	Additional consultations of testing tools (h)
V11,16; V12,17; V13,18; V14,19; V15,20	Corrections of the proposals of the product for the traditionalists generation and/or baby boomers generation and/or Generation X and/or Generation Y and/or Generation Z (e.g., promotion paths, raises)	Impact on project effectiveness	Insufficient experience in interpreting the test results	4	4	6	96	Re-analysing of the test results (i)
V21,22	Introduction of modifications to the proposals of rewards	Impact on the date of finishing and on the costs of the project	Deficit of the discussion	4	3	9	108	Discussion within the framework of the project team (j)

V23,23	Low communication efficiency	Inadequate assessment of the project by the stakeholders	Wrong selection of the communication channel	7	2	5	70	Introduction of the helpline (k)
V23,24; V23,25; V23,26; V23,27; V23,28	Mistakes in analyses regarding MVEs from particular generations	Wrong project assessment	Insufficient experience	5	5	6	150	Repeating the analyses (l)
V24,29; V25,30; V26,31; V27,32 V28,33	Mistakes in calculations of project effectiveness for MVEs from particular generations	Wrong project assessment	Unreliability	6	6	6	216	Verification of calculations (m)
V34,35	Mistakes in calculations of project general effectiveness	Wrong project assessment	Overworking of the project manager	5	4	10	200	Verification of calculations (n)

Explanation:

*Risk determined according to the FMEA method with the following assumptions:

P – probability of the occurrence of mistakes (1 – very low; 2–4 – low; 5 – medium; 6–9 – high; 10 – very high); S – detectability of mistakes (1 – almost certain; 2–4 – not difficult; 5 – medium difficulty; 6–9 – difficult; 10 – undetectable mistakes); D – severity of the mistakes (1 – imperceptible; 2–4 – hardly perceptible; 5 – mistakes that may determine the project’s effect; 6–9 – mistakes seriously influencing the project’s effect; 10 – mistakes very seriously impacting the project’s effect).

Source: own elaboration.

Table 8. The costs of quality that decrease the ERM project risk for MVEs in the multi-generational organization

The types of costs of quality (according to Table 1)	Corrective activities (according to Table 6)
The costs of prophylaxis	a, c, d, e, f, g, h, k,
The cost of assessment	j,
The costs of internal mistakes	b, i, l, m, n
The costs of external mistakes	–

Source: own elaboration.

According to tables 7 and 8, the project risk is generated at each phase of its performance; therefore, at each stage, one can and has to manage it, among others, using the idea of the costs of quality.

Results

Implementation of the ERM projects proves maturity of the personal function in the company. Projects of this type allow for (Lipka, 2011) the following offensive targets to be acquired:

- obtaining/recovery of employees, customers;
- increasing of the share of loyal employees in their general number;
- increasing among the loyal employees those who represent the partner loyalty;
- increasing organizational engagement of employees;
- obtaining equivalence of exchange: employee – organization, as well as the following defensive targets:
- increasing the median of employees' work seniority in the organization;
- increasing of the sphere and/or time of tolerance of employees of various inconveniences (e.g., "freezing" of remunerations) in the periods of recession.

According to table 6, the project risk is particularly high for the activities V1,2. Therefore, one should take particular care of the WBS (Work Brown Structure) (see PMI, 2017, p. 570). Moreover, one should take care of expenditures in the form of the costs of quality, which can decrease the risk (table 7). In the discussed example, the costs concentrating on the costs of compatibility (see table 1) and the costs of incompatibility regard only the costs of internal mistakes (incurred before presentation of the project results to the stakeholders). One should pay attention to the fact that PMI 2017 uses 4 categories of costs (table 1). This classification resembles (Feigenbaum, 1991):

- W. Masser's PAF (prevention, appraisal, failure) model;
- A.V. Feigenbaum's PAF model or

- the costs of quality according to ASQC (the American Society for Quality Control).

However, this classification differs from other classifications such as the John Bank's model that also distinguishes the costs of exceeding the requirements (overquality) as an additional – next to the costs of internal mistakes and external mistakes – category of costs of incompatibility, and moreover, a one-element set, that is – the costs of lost advantages. It seems that this type of extension of the category of costs of quality would be worth considering in the PMI methodology. An example of the costs of exceeding the requirements for the project analysed in this article can be the costs of performing within the framework of the cohort analysis (justifying the undertaking of the project and, later, proving its results) too many partial analyses in the form of, for example:

- distinguishing too narrow ranges of time for work seniority in the cohort table;
- defining not only the half-life of the group but also the deficit indices referring to their more particular values;
- distinguishing too many sub-cohorts.

Therefore, the costs of exceeding the requirements can occur in the projects and lead to an increase of the costs of the projects and no increase in their effects, i.e., making the performance of the projects less effective (in the relationship of effects to expenditures). Whereas, the costs of lost benefits are, for example, the costs of using too few instruments in relation to former employees and the failure to include in the project the so-called boomerang employees. Incurring such costs does influence the increase of expenditures for the performance of the project, but – to a greater degree – it influences the increase of its effects, which is beneficial to the project's effectiveness.

The conception of the costs of quality used in project management reflects evolution from the traditional paradigm of the costs of quality that grew on the ground of the production sphere to the new paradigm connected with the process approach (Schneiderman, 1986).

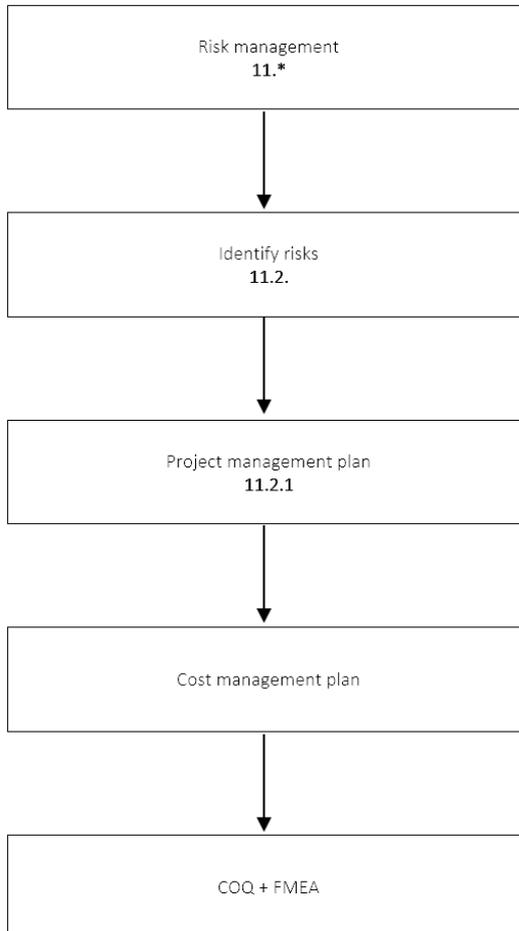
The application of FMEA that uses the specification of activities distinguished for CPM purposes and then the application of the list of mistakes from FMEA to identify the costs of quality allows the increase of the scope of use of the project effects without increasing the expenditures for the project's performance, which thus increases the project effectiveness. Therefore, it is proposed to extend the PMI methodology in the scope of risk management by the category of the costs of quality identified using FMEA at least in the six areas of evident coherence listed in the introduction and illustrated in tables 9–14. It seems that there are no barriers for using this type of proceeding in various (not only HR) projects. The determinants of effectiveness are of the following nature:

- purposeful (directed to the efficiency of the undertaken activities);
- endogenic (regarding organization);
- static (stable in certain periods);
- quantitative (measurable – allowing quantitative comparison of risks before and after application of the costs of quality);
- partial (referring to particular activities/processes);
- direct (not assuming occurrence of variables that moderate the relationship: risk, the costs of quality, effectiveness).

The mentioned method of increasing project effectiveness is an efficiency method (increasing of project effects despite not increasing the expenditures for the project). It is not the following:

- a savings method (postulating the decrease of expenditure by maintaining project effects);
- a regressive method (connected with the decrease of expenditures and project effects, although the latter ones, to a lesser extent);
- an intensive method (assuming increasing of results by decreasing expenditures for the project) or
- an extensive method (consisting in increasing project effects to a larger degree than increasing expenditures for the project).

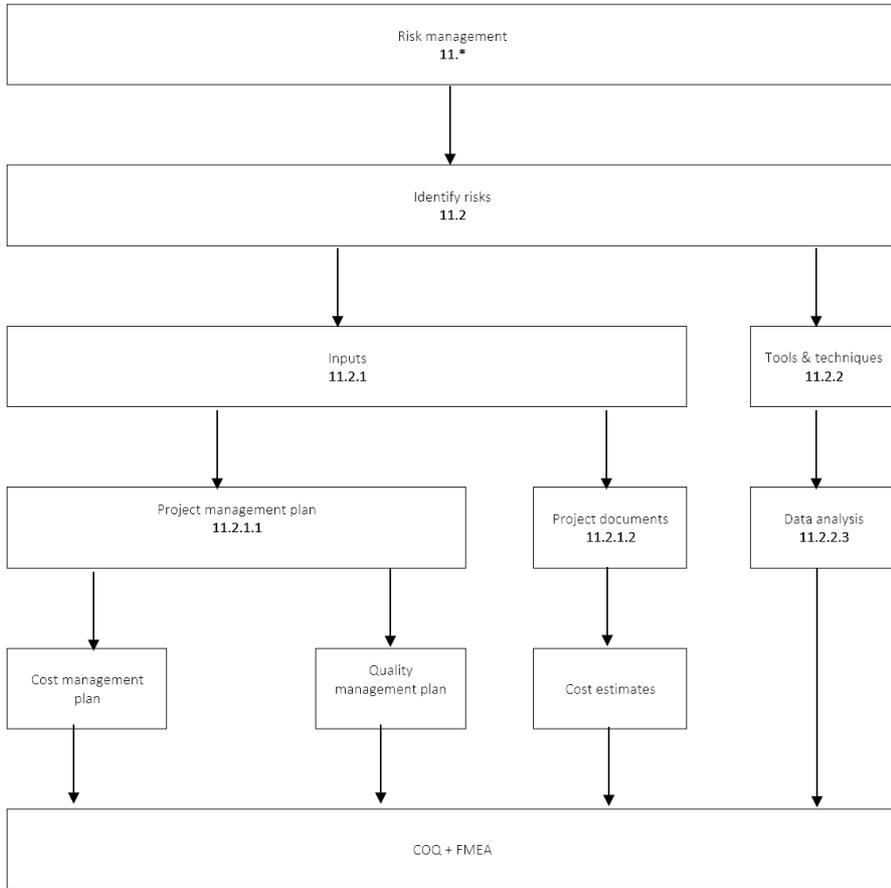
Table 9. Proposal of implementation/place of the category of the costs of quality identified using FMEA in the area of planning risk management



* Explanations: bold denotes the numbers of chapters of the PMBoK® methodology (PMI, 2017) in which implementation of the costs of quality is proposed.

Source: own elaboration.

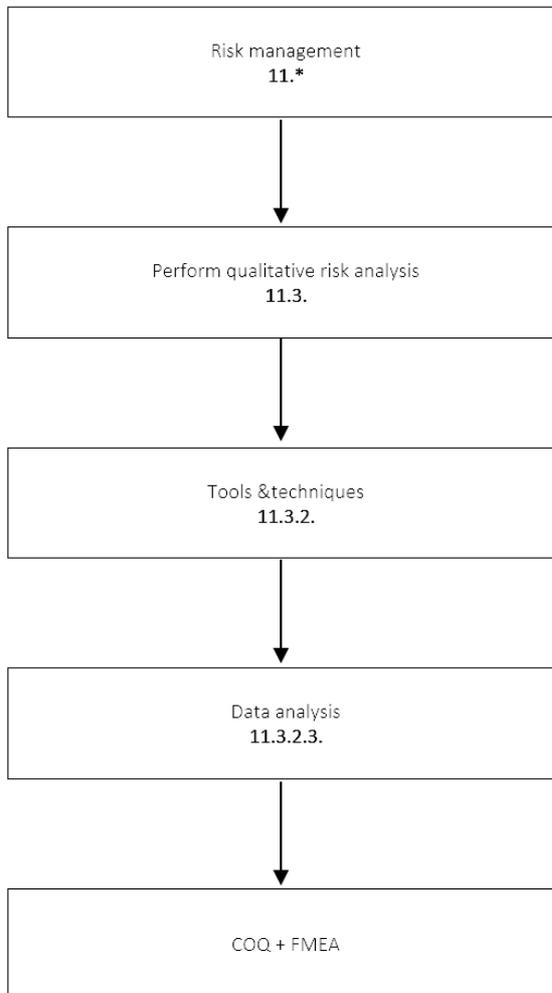
Table 10. Proposal of implementation/place of the category of the costs of quality identified using FMEA in the area of identifying risks in the project



* Explanations: bold denotes the numbers of chapters of the PMBoK® methodology (PMI, 2017) in which implementation of the costs of quality is proposed.

Source: own elaboration.

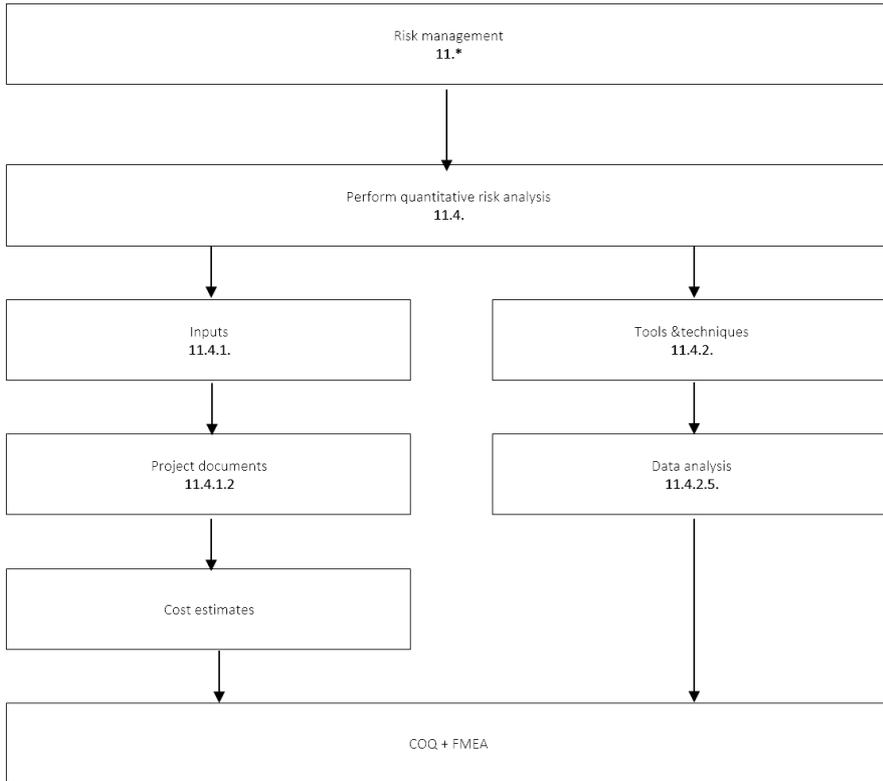
Table 11. Proposal of implementation/place of the category of the costs of quality identified using FMEA in the area of carrying out the qualitative risk analysis



* Explanations: bold denotes the numbers of chapters of the PMBoK® methodology (PMI, 2017) in which implementation of the costs of quality is proposed.

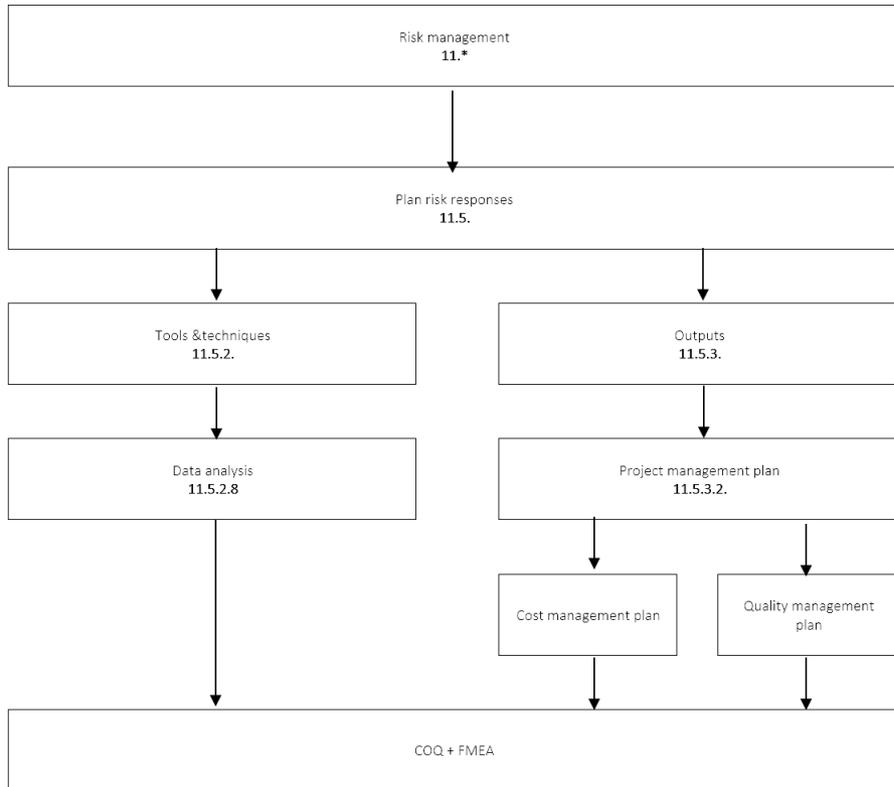
Source: own elaboration.

Table 12. Proposal of implementation/place of the category of the costs of quality identified using FMEA in the area of carrying out the quantitative risk analysis* Explanations: bold denotes the numbers of chapters of the PMBoK® methodology (PMI, 2017)in which implementation of the costs of quality is proposed.



Source: own elaboration.

Table 13. Proposal of implementation/place of the category of the costs of quality identified using FMEA in the area of planning reaction to risk* Explanations: bold denotes the numbers of chapters of the PMBoK® methodology (PMI, 2017)in which implementation of the costs of quality is proposed.



Source: own elaboration.

Table 14. Proposal of implementation/place of the category of the costs of quality identified using FMEA in the area of risk monitoring and control* Explanations: bold denotes the numbers of chapters of the PMBoK® methodology (PMI, 2017) in which implementation of the costs of quality is proposed.



Source: own elaboration.

Final remarks

The use of the costs of quality supports decisions undertaken by the project manager and allows him/her to optimize the costs of quality (incurring them in the specific financial dimension) with regard to project risk (understood not only in losses/threats but also assets/opportunities). It is indispensable to consider that:

- the costs of compatibility, similarly to the costs of incompatibility (excluding specific exceptions), lead to decreasing the project risk;
- the costs of exceeding the requirements can reduce the risk (through strengthening of assets and opportunities) or increase the risk (when such strengthening implicates excessive costs);
- the costs of lost advantages (through failure to notice/use the assets and chances) can increase risk (e.g., when other organizations perform projects that identify the stakeholders' needs more accurately).

The above conclusions refer to the extended (according to that the proposed in PMI) spectrum of the costs of quality and non-unilateral (i.e., contradicting the so-called negative conception according to which risk means only loss/threat) treatment of project risk.

The combination of project risk management and the costs of quality allows closer cooperation of the members of the team project with the project manager responsible for the final cost effectiveness. The exemplification presented that failure mode and effects analysis (FMEA), rather than issue log, root cause analysis, checklists, assumption and constraint analysis, probability and impact matrix, stakeholder risk appetite, and risk responding, is worth using.

In the course of further research, it is worth collecting the opinions of practitioners who will use, or perhaps even further improve, the preceding proposed method. It is also worth mentioning that the proposed method has already been verified in the 5 following projects supporting development (going from the phase test and orientation, through the phase of positioning

and conflict, trust, cooperation to the phase of separation and farewell) of multi-generational teams (Lipka & Giszterowicz, 2019):

- gamification project;
- training project;
- experimental project that diagnoses trust;
- workspace project;
- project determining the dynamics of the value of team.

It is also worth examining the possibility of using other methods by inclusion of risk management and the costs of quality, for example, the X-shaped matrix diagrams. They include the relationships between the following: mistakes that occurred and mistakes that were detected, mistakes that occurred and the ongoing mistakes, and the ongoing mistakes and the undetected mistakes.

Moreover, it is worth considering whether to include in the category of the costs of quality: the costs of lost advantages and the costs of exceeding the requirements to allow more influence on the project effectiveness. In this case, one should redefine the explanation of the optimum costs of quality presented in the beginning according to PMI (2017). According to the modified definition, it would be the cost that balances the investments in prophylaxis and the assessment not only with the expenses caused by the occurrence of mistakes but also with over-quality or lost advantages. This type of extension of the costs of quality in project management would influence the project risk (because neglect reflected in the costs of lost advantages also means risk) as well as project effectiveness (savings in the case of project activities that do not contribute significant value for the stakeholders, that is, in the case of the costs of over-quality/exceeding the requirements).

From the perspective of effectiveness, one should also try to use the following indices that allow, on an ongoing basis, following the costs of quality and their impacts on project effectiveness:

- share (in %) of the costs of prophylaxis in the total costs of compatibility;
- share (in %) of the costs of assessment in the total costs of compatibility;

- share (in%) of the costs of compatibility (both prophylaxis and assessment) in the total costs of quality;
- share (in %) of the costs of internal mistakes in the total costs of incompatibility;
- share (in %) of the costs of external mistakes in the total costs of incompatibility;
- share (in %) of the costs of exceeding the requirements in the total costs of incompatibility;
- share (in %) of the costs of incompatibility (both the internal mistakes and the external mistakes and the costs of exceeding the requirements) in the total costs of quality;
- share (in %) of the costs of lost advantages in the total costs of quality.

A higher share of the costs of incompatibility or the costs of lost advantages in the total costs of quality compared to the share of the costs of compatibility in the total costs of quality can be interpreted as the threat of low effectiveness.

The most important measure of the profitability (effectiveness) of the combination of the project risk management and the costs of quality is the difference between the numerically determined level of this risk before and after incurring this type of cost.



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