Agnieszka Bednarczyk-Płachta

Mariusz Grzyb

Marta Woźniak-Zapór

Project management

Project management

.

Agnieszka Bednarczyk-Płachta

Mariusz Grzyb

Marta Woźniak-Zapór

Project management

Kraków 2022

Cover design: Marta Woźniak-Zapór; cover art: pl.dreamstime.com

Translated by the authors

Published from materials provided by the authors

Table of contents

Glossary of basic terms

Project budget – the amount of money allocated to the project.

Project objectives – the main issues of the project – technical, organisational, financial, time and quality.

Project life cycle – the phases a project goes through in order to realise the outcomes set for it from the development of their concept to the completion of the project.

Cut-off time – the shortest possible time required for the processes in question.

Modal time – the most likely duration of the processes involved.

Expected time – the duration of the processes in question calculated using the weighted average method.

Optimistic time – the duration of a given process under the most favourable conditions.

Pessimistic time – the duration of a given process under the least favourable conditions.

Fictitious act – a contractual act with zero process time.

Critical activity – an activity, a delay in the implementation of a particular process resulting in a delay in the implementation of the entire project.

Project definition – a description of the tasks and basic conditions that make up a project.

Discounting – bringing future cash flows to their present value.

Project phase – a defined period of time in a project, separate from the other processes. Project phases have their own individual timeframes and consist of coherent activities and outputs to achieve defined objectives.

Scheduling – selecting and applying the most appropriate techniques to create a path of activities aimed at achieving the project objectives within the assigned timescales in the capital project.

Milestones (checkpoints) – significant events in the project that define the different phases of the project, associated with the need to make decisions.

Direct cost – (in the CPM-COST method) the cost associated with performing the activities.

Frontier cost – (in the CPM-COST method) the cost of performing an activity at a frontier time.

Unit cost – (in the CPM-COST method) the cost of reducing an activity by a unit of time.

Indirect cost – (in the CPM-COST method) the cost associated with the fact of running the project.

Net Present Value (**NPV**) – the sum of the discounted cash flows calculated over a specified period of time, taking into account the capital expenditure. A project is considered viable when the NPV is greater than zero.

Payback period – the time after which the cash streams generated by a project will fully cover the capital expenditure.

Financial plan of the project – a compilation of data concerning the amount of all investment outlays, including the sources of their financing and financial statements. The financial plan should be constructed on the basis of future expected investment outlays, income from the sale of products or goods possible to be gained from the implementation of the project, the running costs incurred as a result of implementing the project.

Project risk – the threat of an unforeseen event or possible situation with a potentially negative impact on the overall success of a project or certain project outcomes.

Project strategy – the way in which all individual project objectives should be achieved.

Synergy – a characteristic of a project that makes the project not the same as the sum of its parts.

Information system – the set of all elements and relationships central to the project communication process and the flow of data between processes.

Quality management system – the structure, processes, procedures and resources required for project implementation.

Project management – planning, organising, monitoring and directing all aspects of the project and motivating all project participants to achieve the project objectives within the allocated time.

Project resources – project team members, equipment, materials and infrastructure required to carry out the tasks in the project.

Project team – a group of people who work together to achieve specific project goals. The team may consist of employees from different departments of the company, representatives of subcontractors.

Introduction

Project management is dependent on a number of variables such as the rapidly evolving environment, the market, the ability to self-improve, financial resources, market position and many others. Project implementation can therefore be defined as a combination of resources, skils, technology and creativity of project managers. Efficient and skilful project management allows a balance to be struck between the quality standards required, the objectives set and the time in which they are to be achieved, and the budget allocated.

This is possible by a project team in which those responsible for the various elements of the task are identifiable, productive, efficient and well-managed. Project management is a growing and desirable field that has begun to attract interest at a rapid pace due to the processes of globalisation of the economy that have progressed over the turn of the year. It will be reasonable to conclude that the development of the economy in the modern world is dependent on the effectiveness of the implementation of various project tasks.

One of the largest substantive scopes of projects implemented in Poland are IT projects or projects related to the computerisation of a number of entities.[1] Despite their popularity, IT projects are usually tasks that are among the most complex and characterised by a high degree of variability and risk. This is primarily due to the significant evolution and development of information technology and the human factor, which is a risk characteristic of all types of projects. In this context, it makes sense to emphasise the importance of a thorough understanding of the proven methods used in the project management process. These methods are used in all types of projects, of course taking into account the specific scope of each project.

---

[1] B. Jałocha, S. Jałocha, *Problematyka wdrożeń projektów Informatycznych w instytucjach publicznych*, „Zarządzanie Publiczne" 2011, 2(14), pp. 63–76, DOI 10.4467/20843968ZP.12.016.0483.

What is more, this script will consist of several parts that will discuss the most important mechanisms and basics of project management.

1. What is the project?

As a rule, we deal with projects every day in the world around us. Whether we do – organising the Olympics, building a house or organising a holiday trip, we are dealing with a project. The projects we carry out are either micro or macro projects, carried out as part of a personal or professional activity. The construction of the atomic bomb by the United States of America under the codename 'Manhattan', which was carried out in the 1940s, is cited as one of the first projects carried out on the basis of currently understood management methods.[2] This was a watershed moment, as it represents the cut-off point from which we speak of the science involved in describing the phenomenon/process of project management. The experience gained in connection with the realisation of this uncommon task, the way of working on a project, the separation of a separate project team laid the foundations, for the creation of procedures, methods, ways of realising other undertakings on a small and large scale. The know-how developed in the construction of the atomic bomb was used, for example, in the space programmes conducted by NASA.

definition

Initially, the indicated project management experience was mainly applied to projects of a construction or technical nature, which allowed for the refinement of management methods for various elements of large-scale projects. The indicated project management development path has been applied in many areas of life. For example, taking the principles of universal design, which are rapidly entering further aspects of our reality, it should be pointed out that they had their origins in architectural projects, subsequently moving into further spheres of life, including the digital world.

Evolution of a project management principles

Project management is also very often associated with business. In this field, it is a relatively recent concept, e.g. compared to engineering projects, but it is evolving at a tremendous pace. Widespread globalisation resulting in: changes in the organisation and functioning of companies, a huge increase in the information necessary for companies to function, the need to respond to change in a fast and flexible manner, combined with the development of new

Why do we manage projects?

---

[2] P. Pacuła, *W kierunku Global Zero? Broń jądrowa – stan obecny i perspektywy*, „Bezpieczeństwo Narodowe" 2013, nr III/27, p. 69.

technologies, determine the need to launch new projects to secure these needs. This has necessitated a change in companies structured, which used to be based on vertical information flow patterns and decision-making powers, where these were taken at the highest levels of the structure. The tasks and roles of the individual employees who made up the lower structural elements of the corporate structure, were mainly focused on executing orders. Today, project management in companies focuses on creating flat structures, where specialised employees have information and knowledge, enabling employees to contribute professionally to the company through project implementation and management. In this way, when managing a project, information can be communicated and collected more effectively, a team can be built up which is able to react quickly to changes and the situation in relation to the project and build on each other's achievements.

The initiation of projects in a company usually affects the way such an entity functions, its structure, the way information is distributed. From this point of view, a project can be defined as a set of various partial works or activities undertaken to realise a specific objective and achieve a measurable result. The ways of defining the project objective and result in a project will be discussed further on, at this point it should be pointed out that the result of a project is very often called a product. It should be remembered that we cannot identify the product with the project, even though it is the product that really defines the project by having a key impact on the technical dimension of the project, its implementation time or financial aspects. A faulty definition of the project objective and, through this objective, also a faulty risk calculation when defining the product can be a factor for project failure.

Therefore, in order to define a project, indicators can be used to identify the characteristics of a project so that it can be called a project:

project definition indicators

1) one-offs, i.e. the realisation of a unique venture,

2) purposefulness, i.e. the result of a specific strategy,

3) distinctiveness, i.e. lack of links with normal, routine activities companies,

14

(4) limitation, i.e. the existence of a time constraint on the implementation of the project,

5) structural separateness, i.e. the separation of the implementation of the venture as a separate structure within the company,

6) complexity, which makes it necessary to divide the project into a number of sub-tasks that will involve analysis and the cooperation of many specialists – i.e. a variety of resources are needed.

Projects that do not meet these conditions cannot be treated as projects, although it is nevertheless possible, and in many cases even reasonable, to apply project management methods and techniques to their implementation.[3]

Examples of activities that cannot be classified as projects are routine company activities, undertakings of a strategic nature, undertakings of a long-term nature, or those that direct the company's activities rather than pursuing specific objectives, e.g. the delegation of a team to improve communication within the company is a routine activity, not a project, even if such a team has been specially established for that purpose. Another example would be the development of a draft financial plan for future years – a typically strategic undertaking. Both examples cannot be classified as project tasks. A positive example, on the other hand, would be: changing the way information is distributed, listing a company on the stock exchange.

example

Consequently, we can also define a project as an undertaking of a temporary nature, the aim of which is to create a unique product or service, and the temporary nature of the activities means that the beginning of the activities and their end have been precisely defined. The uniqueness of the project, in turn, should be understood as the fact that this product or service is different from all similar products or services on the market – it has its original distinctive feature.[4] The uniqueness of the project, i.e. its originality, is also a question of the

relevant features

---

[3] M. Trocki, *Podstawy planowania przebiegu projektów*, [in:] *Planowanie przebiegu projektów*, red. M. Trocki, P. Wyrozębski, Oficyna Wydawnicza Szkoła Główna Handlowa w Warszawie, Warszawa 2015, p. 9.
[4] Project Management Institute, Management de projet. Un referentiel de connaissances, AFNOR, Paris 1998, p. 8.

progressiveness of the development of the project object. Progressivity means that the designed goals are to be achieved through a progression of activities (defined in a phased, linear or continuous manner). It should also be stressed that the temporariness of a project cannot be equated with short-termism. Projects, especially large ones, can be planned for many years and the temporariness of projects is not a determinant of the service or product itself and its further development. Temporariness is related to the time needed to achieve the planned result. The realisation of the indicated characteristics of projects is realised by carrying out project work with due diligence, professionalism, according to a previously developed project plan and schedule.

These baseline characteristics are the prerequisites for a project to be successful and for us to be able to say that our activities constitute the realisation of project tasks. On the face of it, they may seem trivial or obvious, but when dealing with projects implemented on a contractual basis, they become crucial. For projects implemented on a contractual basis, the key and one of the most important things is to meet the deadlines and the compliance of the achieved objective with the project goals. For this reason, the correct definition of features and tasks in a project enables smooth and efficient operation even if the sub-goals related to the project object change during the project.

projects implemented on a contractual basis

With the indicated project characteristics in mind, the following project classification criteria can be distinguished:

priteria for project classification

– purpose of the project,
– nature of the project,
– expectations of the project,
– project size,
– area of application,
– profitability.

Distinguishing projects based on the characteristic of the project's purpose makes it possible to make a dichotomous division into internal and external projects. With regard to their nature, we can distinguish between technical, administrative, financial, commercial, etc. projects. In terms of expectations, a distinction can be made between complex and fragmented

projects, while in terms of size, a distinction can be made between large, small or medium-sized projects. The area of application, in turn, allows a distinction to be made between projects creating new products, repair projects, IT projects, research and development projects, etc. Quite an important criterion is profitability, which provides the basis for stating that there is an increase in productivity as a result of a project, modernisation, reduction. It is difficult to measure because of the range of possible impacts in relation to project profitability.

Of course, the indicated groups of project classification can be divided into even narrower categories, e.g. IT projects can be divided on the basis of their nature into: organisational projects, development projects, investment projects. Organisational projects include organisational changes in a company, consisting of changing the way it functions or changing its work system. Their purpose is to reorganise the internal structure, change the way of working, improve work efficiency or information flow. Development projects are focused on the activities of an entity. Their most common objective is to develop new products or services, to launch these products or services on the market, to undertake activities accompanying the development of products or services. Development projects include, for example, projects involving the revision and planning of a marketing strategy, the development of a home banking system, etc. Investment projects, on the other hand, are projects centred around the technical infrastructure of an entity, which aim to change the broadly understood work shop. Therefore, they may supplement or extend existing infrastructure or implement completely new investment plans. A characteristic feature of such projects is external cooperation, i.e. the commissioning of external contractors to carry out specific tasks as specialised entities in a particular issue or process.

> further divisions

Team-building is crucial in this field of project implementation, regardless of the type of project, as such an organisation of project implementation offers a greater prospect of achieving the set goals. It is not a question of giving up on the individual and is individual special skills or qualities, but the complexity of most projects, which, due to the variety of tasks involved, are beyond the perception capacity of a single person. Teamwork makes it possible to carry out tasks of a different scope and in different fields

while retaining the need to manage such a human resource. The ability to transform project activities quickly and frequently in response to changes in the market very often determines the success of a project.

The competence to manage change quickly and effectively is an element inherent in project management.

1.1.   Project management objectives

Project management is a tool for the entrepreneur to model the development of the company and its position in the market. The project management methods used by the entrepreneur affect the way and effectiveness of change in the company. With efficient and appropriate project management, these changes will be simple, manageable and useful. The need for projects stems directly from the need for change, i.e. to take preventive or adaptive action, which arises as a result of certain internal or external imbalances in the company. These may relate to the market situation, the legal situation, the economic situation, the tax situation, etc. Due to these factors, a project can also be looked at from a personal point of view, where project management is a process in which the person in charge of the project carries out activities of a purposeful character, characterised by control and supervision of the tasks included in the scope of the project, with appropriate allocation of the resources available for this purpose, using appropriate methods and techniques, so that the objectives set for the project are achieved within a specific time limit and within the set costs. Very importantly, all these activities must have regard to the required level of quality to be achieved. At this point it should also be made clear that the allocation of resources should not only mean financial resources, but also human resources or equipment. This is very important in view of the fact that the realisation of the project's objective, with special consideration for the expectations and needs of the project's commissioner and the allocation and availability of resources, must be based on the provisions of the contracts concluded for this purpose and is therefore carried out in a specific legal regime.

the need for project management

allocation of funds

18

Within the contractual provisions, it is defined precisely:

– the subject, cost, time and scope of the project,

– the needs and expectations of the project client,

– requirements both defined and undefined.

The principle of project contracting is subject to the legal regime in force in the respective implementation system. It is the legal regime that determines the contractual provisions, which may not be in conflict with it. This means that in a contract, the parties are free to agree to anything they jointly and unanimously agree to, provided that it is in accordance with the law. For example, the parties are free to set a deadline for the implementation of the project, as well as for its individual stages to which certain objectives are assigned, as the law does not regulate the minimum boundary conditions of such provisions, leaving the parties to the contract free to do so. However, if the parties wished to regulate the mutual settlement system in a manner deviating from the provisions of the Accounting Act, such contractual provisions would be invalid and the general provisions of law would apply in this respect anyway.

The requirements of the project commissioner in terms of project objectives and delivery (quality), cost, project and delivery time are the basic elements for defining the shape of a given project, which is the basis in project management adopted in the literature for years.[5] Relationships between these requirements (expectations of the project commissioner, cost and time) help to set project objectives.

One of the most commonly used tools for correctly defining objectives is the SMART method, which distinguishes 5 characteristics that a project should fulfil. Every project should be:

– specific,

– measurable,

– attainable,

---

[5] J. Niemczyk, *Jak nowocześnie i sprawnie zarządzać projektami*, „Przegląd Organizacji" 2002, nr 11, p. 4.

- relevant,

- time-bound.

Describing the project in detail and in concrete terms, using unambiguous wording, means that the objective to be achieved by the project leaves no room for interpretation. As a result, we are able to quickly and clearly indicate what needs to be done, why it needs to be done and how we want to achieve it. Measurability means such a formulation that allows us to quantify the degree to which the project is being carried out or by means of unambiguous qualitative criteria. Achievability is planning a project in such a way that it is realistic to achieve, i.e. in line with the expectations of the target group. The project should be relevant, i.e. it should represent an important step forward and have a defined value, e.g. solve the problems of the target group. The project should be designed within a specific time frame in which all project goals are to be achieved.

For a project to offer the prospect of smooth implementation, it should be characterised by a properly formulated objective. A properly formulated project objective allows needs and problems to be identified adequately. This objective should relate to the key problem or problems that the project should address. There is a risk of misdefining the project objective if the main objective and the specific objectives do not respond to all the identified problems in the project, so that the objectives do not correlate with any identified problem. A common mistake made when designing project objectives is to identify them with the product to be produced as a result of the project.

misidentified project objective.

Example: Building an e-learning platform or electronic register as an objective rather than a project product.

Example: indicating a vague and difficult to quantify circumstance as an objective – increasing the quality of life of project beneficiaries;

How to verify the objectives in nonprofit projects, e.g. improvement or image projects? The correct identification and description of such objectives should specify the tasks to be carried out under the project, indicate the target group, diagnose the needs of the target group. With this in mind, the objective

problem

20

should reflect the benefits of the project and indicate its effects. The benefits in question do not have to be of a financial nature, they can be, for example, social benefits.

Example: in the case of a project increasing the accessibility of scientific resources, the benefits will accrue to both business and scientific (R&D) centres and may be financial, but there will also be indirect benefits to certain groups of citizens in specific factual situations.

1.2. Basic issues related to setting and planning project objectives

An important element in determining the profitability of a project is the calculation of profits. How to calculate the profitability of a nonprofit-making project should be carried out through a cost-benefit analysis. The cost-benefit analysis should identify and describe all relevant economic, social and environmental effects of the project. The cost-benefit analysis should be described in quantitative terms (if this is possible of course). The main factors on which the level of uncertain benefits and costs depends are the critical variables relevant to the analysis indicated. A qualitative and quantitative description of the project delivery mechanism and an indication of the impact of these factors on the final balance of benefits and costs reduces and better manages risks and describes the project outputs and objectives.

how do you calculate the profitability of a project that is not intended to generate a profit?

Example of benefit: identifying social needs.

A cost-benefit analysis can be carried out by means of a simplified economic analysis. This analysis can be based on an estimation of the quantitative and qualitative effects of the project. However, if it turns out that the benefits of a project are difficult or impossible to estimate, while we can determine the costs with a high degree of probability, we have the possibility to calculate the unit costs of achieving the non-monetary benefits in a fairly precise way. Importantly, benefits can be quantified, but should not be assigned monetary values. This cost-benefit analysis should also indicate that the project as designed is the most effective way to meet the identified social needs. A cost-benefit analysis is also important and required in a feasibility study to determine whether or to what extent a project is worthwhile from a public or social point of view.

simplified economic analysis

Cost-benefit analysis differs from a simple financial assessment in that it also takes into account quantifiable gains and losses, whether these are borne by the investment developer or society. Cost-benefit analysis very often takes the form of economic analysis, where we adjust the results of the financial analysis

cost-benefit analysis

22

by taking into account fiscal effects, externalities and settlement prices. We can express the results of cost-benefit analysis in a number of ways, including economic internal rate of return, economic net present value and benefit/cost ratio.

It is not straightforward to develop a one-size-fits-all method for valuing benefits in an economic analysis, especially since the valuation should be objective, justified and unquestionable. It should be emphasised that the economic analysis should detail the benefits to society. Therefore, the benefit of the applicant cannot be included in the benefit analysis, but the benefit of the people who use its services.

valuation of benefits in economic analysis

Example: An ongoing project involves the digitisation of a resource. Let's assume that a large group of people (denoted by X) use the paper-based resources annually. They come to the project leader's premises to use the content. It is important to note that these people are not employees of the project leader. The benefit to the project will be the savings generated by not having to travel to see the resources. The benefit will therefore be calculated according to the formula X people times Z£ x 2 (commuter ticket and return ticket) = annual saving.

example

The discounted sum of the benefits should be higher than the discounted sum of the project outlay and maintenance costs.

A cost-benefit analysis is performed for a specific reference. The reference period is the period that includes both the project implementation time and the time after the project completion. It therefore includes both the investment and the operational phase, i.e. operation. The base year in the financial and economic analysis is the year in which the project starts. Exceptionally, a different approach may be adopted if the application for project co-financing was drawn up after the start of the project. In such a situation, the base year is the year of submitting the application for co-financing.

reference period

example

For example, if we determine that the base year is the year in which the project starts, e.g. 2022, it does not matter whether the project starts in January or November of that year, the base year will be 2022. If the project covers a 10-

year period, the last year of analysis will be 2032, i.e. the reference period will be 2022–2032.

The reference period (a.k.a. the time horizon of the investment) is the period for which a forecast of the cash flows generated by the project under study should be made.
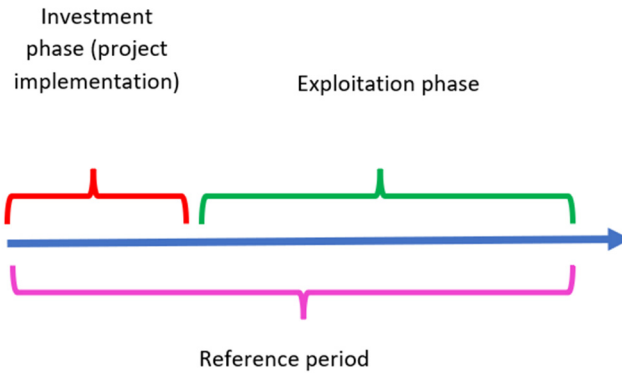
Source: https://www.gov.pl/web/popcwsparcie

Carrying out a financial analysis is essential. It does not matter whether the project generates income or not, a financial analysis is carried out for all projects. Sometimes the obligation to carry out financial analysis results from the applications for project co-financing or other guidelines and regulations under which the project is implemented. Such obligations usually arise from the regulations for projects financed or co-financed by the Structural Funds. It is customary to find there the minimum elements of conducting such an analysis. What is important in a financial analysis is that we understand all income and financial savings if they are generated by the project.

A feasibility study and demand analysis is another element related to the setting and planning of project objectives. The demand analysis quantifies and provides a basis for estimating the public demand for the planned project activities.

demand analysis

The demand analysis should take into account:

– current demand,
– forecast demand.

24

Current demand is estimated on the basis of current data using statistics. Forecast demand, on the other hand, is estimated on the basis of projections that take into account macroeconomic and social indicators. Based on these, a comparative analysis is carried out for both investment and non-investment scenarios. The comparative analysis is called an options analysis.

<div style="border:1px solid black; padding:4px; display:inline-block;">analysis of options</div>

In order to properly analyse demand, it is necessary to identify the sources of the estimates adopted. These may include, in particular:

– publicly available statistics
– results of profiled surveys
– compiled results of customer interviews
– compiled results of surveys on specific samples.

The demand analysis is fundamental to the objectives of the project, especially for investments that are significant for citizens and businesses. The demand analysis is the basis for the correct preparation of the economic analysis.

The level of demand makes it possible to estimate, in particular:

– benefits of the project
– unit transaction costs (performance of a service or retrieval of a document with public sector information)
– the costs of maintaining and developing the products created as part of the investment.

If it does not appear from the principles and implementation of the project that an economic (financial) analysis is required, a demand analysis will be an essential component for the success of the project's objectives.

The description of the analysis of solution options should include how to satisfy the previously diagnosed needs or how to remove or mitigate probable problems that may arise during project implementation. In order to check whether the selected variant of project implementation is the best solution among

all possible ones, a feasibility analysis, a demand analysis and an analysis of options (alternatives) are carried out.

The feasibility analysis identifies investment solutions that are feasible in technical, economic, environmental and institutional terms, among others. The options analysis compares and assesses the feasible investment solutions that we identified at the feasibility analysis stage. It does not compare one investment solution with a non-investment option.

An exception to this rule is projects that have no technical, financial and legal alternative solution. In that case, only one investment solution that meets the technical, legal and financial criteria is justified.The purpose of the analysis is to indicate which of the above-mentioned solutions is the most advantageous. They should be comparable with each other in terms of a number of criteria, including technical, institutional, economic and environmental.

Typically, the analysis captures:

– business as usual – no action
– minimum option – the least costly project to implement in order to achieve the objectives
– other options.

<div style="float:right; border:1px solid black; padding:4px;">elements of anairosis</div>

Another fundamental issue related to the setting and planning of project objectives is the preparation of a description of the project methodology. The described methodology should take into account and document the main activities of the project:

– business operations,
– risk management,
– risk management procedures,
– control tools in the form of a risk register.

<div style="float:right; border:1px solid black; padding:4px;">project implementation methodology</div>

The business case is a specific justification for the implementation of the project. The justification should indicate the business case for the planned

26

project, including the anticipated benefits, planned project outputs, implementation and maintenance costs, risks and baseline dates. The risk management strategy should in turn set out the project's risk management procedures and control tool in the form of a risk register. The risk register should include the most important risks relevant to the implementation of the project. There is no ready-made risk register catalogue, as each subject is different and subject to different risks. Therefore, it is necessary to analyse what external factors may occur and negatively influence the project, making it impossible or difficult to carry out the project in a significant way. Creating a risk catalogue helps in making a diagnosis of the likelihood of risks occurring.

Risks should be taken into account when developing the risk register:

register of risks

– organisational,

– Financial,

– legal,

– HR,

– related to the use (or lack thereof) of project products,

– communication – within and around the project.

Organisational risks refer to the preparation for project implementation and the coordination of project activities when gassing different units of an entity. Financial risks make it possible to assess liquidity risks. Legal risks make it possible to prevent possible third-party claims, and personnel risks provide an opportunity to responsibly plan a project team with the right competences. Risks related to the use of products in a project allow for the effective planning of indicators adopted in projects. Communication risks provide the opportunity to properly manage communication in the project.

The catalogue of risks indicated is, of course, an open catalogue – an example – which must be adapted to the scope of the project in question. External risks must also be taken into account in this aspect, especially if the project in question is affected by or linked to other projects.

Identifying the cost, quality, time and basic parameters of a project are elements of planning and controlling the course of the project and influence the control processes. The indicated determinants have specific functions in the concept:

– indicative,
– selection,
– coordination,
– control.

The orientation function allows the project activities to be targeted. The selection function makes it possible to optimise the solutions adopted. The coordination function allows the decomposition of the main objective into particle objectives, which enables the coordination of the individual steps in the project implementation. The control function helps to establish a specific value for the individual parameters (time, costs) that should be achieved during the project, which also allows the project's stage of advancement to be checked on an ongoing basis. Using these functions helps to manage the project, i.e. to optimise performance:

– planning,
– motivation,
– coordination,
– monitoring.

project management

human resource Management

task and other management

resource management
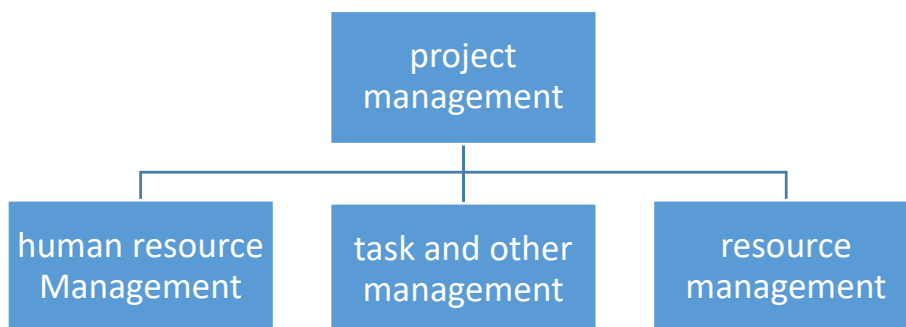
Figure 1: own development

28

2. Project life cycle

The project life cycle consists of a number of phases, which differ both in their length and in the extent to which various resources are involved, in the methods of carrying out the project, in the planning of project activities and in its control.[6] How many phases we divide a project into depends on the subject matter and scope of the project in question. There are many examples of how projects can be divided into phases due to the need for planning. For example, service projects can be divided into phases concerning:

- project initialisation,
- the concept of a hierarchy of objectives,
- implementation of the necessary measures,
- implementation of the objectives set,
- supervision and control of project results.

In turn, construction projects can be divided into phases:

- needs analysis (required especially for construction projects carried out through tendering procedures),
- feasibility study,
- Design,
- implementation,
- launch.

In the case of building projects, the phases must coincide with the conditions imposed by the building law and the administrative and legal procedures associated with it.

Taking a universal approach, four phases can be distinguished:

1) project launch,
2) planning,
3) implementation,
4) implementation of the objectives achieved.

---

[6] R. Wysocki, *Efektywne zarządzanie projektami*, wyd. 7, Helion, Gliwice 2018, p. 184.

These phases should follow each other smoothly, although in practice they may overlap slightly.

Project initiation is the phase of identifying the needs and opportunities for a project and making the decisions that set the various phases in motion. Planning is the most important phase for a project, during which the expectations of the project are defined, the objectives corresponding to these expectations, the commitment of resources and the determination of the duration of the various phases of the project. Project execution refers to the coordination of the team's activities according to the agreed plan. The above-mentioned project phases are aimed at bringing the project to a successful conclusion, i.e. implementing the achieved objectives. In this phase, a presentation of the results to the party for whom the project was carried out is made and the documentation is closed and archived. In parallel to the above-mentioned phases, project control is carried out in accordance with the defined objectives. This control consists of monitoring the correctness of project activities and the progress of work, which enables the ongoing coordination of the project and taking preventive measures in the event of irregularities or deviations from the adopted objectives. Control, in its simplest formulation, is therefore a process that involves comparing what is with what should be.
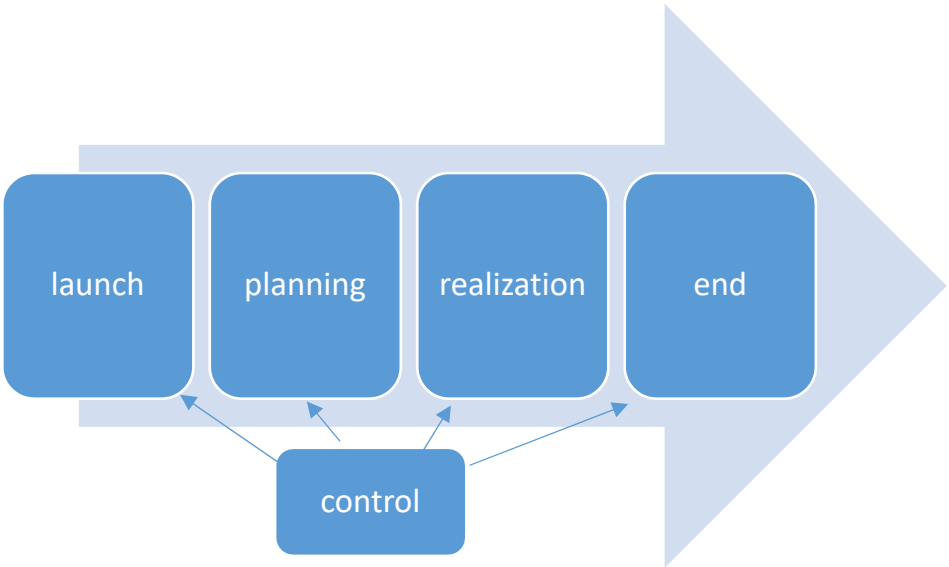
Figure 2: own development

Each phase has its own sub-objectives, which must be achieved during its assigned duration. In order to optimise the effectiveness of the activities carried out during the individual phases, it is important to precisely and formally define the purpose and content of the individual phases of the project life cycle. This formalism involves keeping records of the beginning and end of each phase.
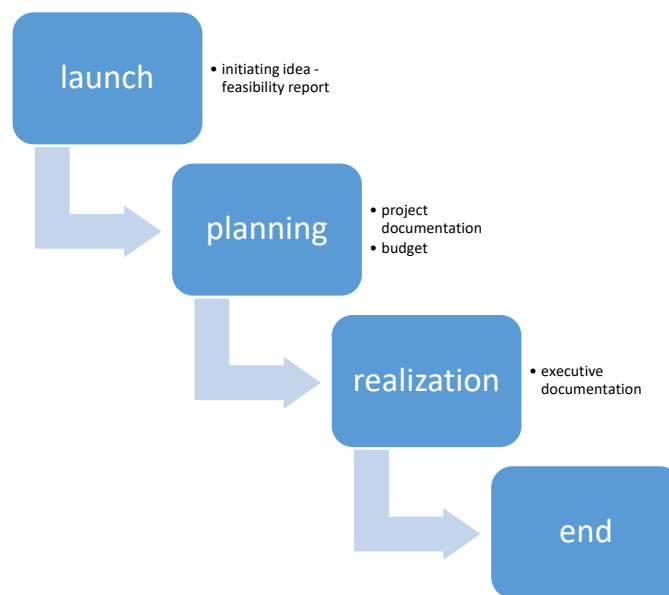
Figure 3: own development

The project life cycle therefore determines what work needs to be done in a particular phase of the project, as well as who should do it and the resources that need to be deployed. It also makes it possible to clarify what types of activities need to be carried out to get the project off the ground and what activities need to be carried out for closure and accountability.

Regardless of how we describe the project life cycle, it has its own characteristics:

features

– cost and labour input,

– probability of success,

– the possibility of making changes to the project.

31

Project costs tend to be lower at the beginning of a project and increase with the subsequent phases of its implementation, reach their maximum value at the culmination of the project and decrease progressively the more the project moves towards its completion. Project risk is characterised by the exact opposite in that it is highest at the beginning of a project and decreases during its implementation. These elements affect the likelihood of a project's success, which can also be helped by flexibility, i.e. the ability to make changes to the project. This is highest at the beginning of a project and decreases closer to completion. The ability to make changes to a project is most available to its principal.

3. Project organisation in the company

3.1. The organisational structure of the company.

We can divide companies or other project-oriented entities into four groups based on their level of experience in project management:

- implementing ad hoc projects,
- managing projects in an operational manner,
- strategically managing projects,
- project-oriented.

The implementation of ad hoc projects is characterised by a lack of precise definition of objectives and task forces, which carries the risk of conflicts between the project commissioner and the team. With this type of project there is also an increased risk of not completing the project, and poor staff motivation may be one of the factors that exacerbate this risk. In ad hoc project entities, the initiation of projects and the implementation phase are carried out without a uniform systematic approach. The main problems with such a project management model are:

implementation of ad hoc projects

- different understandings of the term project by team members and managers,
- the activities initiating the project are difficult to reproduce, as are the requirements assumed at its launch, due to the lack of uniform documentation,
- project managers are at the same time managers dividing their time and commitment between project management and managing their core business,
- lack of organisation of the project implementation through adequately defined responsibilities and competences of the project team, to which low qualifications of the team members may contribute,

– there is also usually a lack of tools, methods to coordinate and control the project, or if they exist they are often not used rationally.

Operational project management is characterised by a high degree of labour-intensive coordination activities in the project while taking into account other tasks normally carried out (off-project) by the respective entity. The risk of successfully completing projects managed in this way can be assessed as high. Companies implementing projects operationally usually have a traditionally accepted and functioning way of implementing projects, where the basis of work is a separate project organisation. Teams are entrusted with specific tasks with assigned persons responsible for their implementation, and there are clear boundaries between tasks and specific persons. They use tools to support planning and control tasks and to improve the clarity and completeness of documentation. The project manager and project team members have a substantive background, which translates into the quality of communication within the team. Unfortunately, in such entities, despite the project manager's strong commitment to the project, there are often quite significant losses sometimes resulting from internal convoys between project teams and other employees. This very often results from mismanagement of the responsibilities and time of team members and other employees and an unclear division of competences between their routine activities and project tasks. Very often in such entities, projects are not accepted and fully understood by all members of the organisation, making it necessary to chronically demonstrate their desirability.

operational project management

Strategic project management is the development by a company of a uniform project management concept applied to all projects undertaken by that entity. Such management gives a high probability of success and achievement of project objectives. This is because such enterprises consciously and cyclically improve their project management methods, tools and personnel. There are guidelines, manuals, good practices in the field of project management and implementation, which allow processes to be structured and roles and tasks to be

strategic project management

assigned unambiguously, while clearly indicating the cooperation between the project (team) and the rest of the company. The universality and accessibility of the procedures enable tasks to be carried out clearly and efficiently. The prior provision of prepared procedures and accepted methods to the project team makes it possible in this project management system to avoid the repetition of certain work in each project and to maintain uniformity in the entity with regard to project management *know-how,* as project managers have knowledge of which tools and methods to use when working on a project. In addition, through the introduction of training systems, the competences of managers and employees are improved so that the team is ready to relieve project managers in the most effective way. This applies to both project team members and other bottom-up staff.

At the same time, project-oriented enterprises do not use established management methods. Such entities do not create organisational schemes, as they are characterised by a high culture of teamwork. The result of such a project management technique is a high success rate of the projects undertaken and a high degree of employee motivation.

> project orientation

Project orientation is the most favourable form of project implementation and management in:

- companies whose income is generated directly by the execution of projects,
- enterprises in which day-to-day operations are determined by the implementation of complex innovation processes,
- research and development departments of companies specialising in new technologies.

Project management in a project-oriented manner, on the other hand, does not have as significant an impact on those practically only involved in production.

The need to delegate staff quickly and flexibly to individual projects arose with the rise of project management and the project-based way in which different entities operate. In order to effectively manage human resources in the context of projects and organise the work of project teams optimally in the case of project-oriented companies, it was previously necessary to change the hierarchical structure of the entity, which can be very difficult with other project management systems. This is because in project-managed entities, we are dealing with the replacement of permanent jobs by project teams, which function in their assigned form until the project is completed. After this point, the team is disbanded and employees and project managers are delegated to the next ones, where their knowledge, competences and skills are most needed at a given moment. In entities of this type, we are practically not dealing with the position of „line manager", as only service cells remain in the hierarchical (structural) dependence system, although a huge change is taking place in this respect as well, in favour of outsourcing (use of external entities). As managers do not have permanent subordinate employees assigned to them, the whole system of team and human resources management is shaped differently.[7] The people who make up the project teams (also sometimes referred to as the „cluster") are not divided by seniority, but are classified on the basis of the qualifications they possess both in terms of content and soft skills. This means that, with project-oriented management, the classic division between managers and subordinate staff disappears. The advantage of such a solution is that the project team can be assembled by the manager assigned to this task in a flexible manner, according to the competences, knowledge and skills represented by the individual people who will make up the team. In this way, there is an opportunity for the project to be worked on by those best matched in terms of qualifications to the objective to be achieved and to the sub-objectives, which in turn gives a greater chance of success. However, in order for such a team to be technically and organisationally feasible, especially in large organisations, it is necessary to have a central coordination of human resources as well as other resources. In this way, it is

advantages of project-oriented management

no hierarchical job structure

---

[7] H. Bieniok, *Organizacja pracy kierowniczej w nowoczesnym zarządzaniu przedsiębiorstwem*, Uniwersytet Ekonomiczny w Poznaniu, „Zeszyty Naukowe" 2011 (189), p. 9.

36

possible to provide specialists adequately and efficiently, i.e. no specialist remains on stand-by for too long, which would result in unnecessary costs and a decrease in the efficiency of such a person. This formulation of project management policy is also associated with a high degree of responsibility of each person involved in the project, which generates a significant level of individual autonomy and forces employees to take care to „promote" their skills in an attractive manner. This is most easily achieved through effective project work, which positions the employee as desirable for subsequent activities. In a project-oriented management system, standardised job descriptions are logically replaced by descriptions of the tasks to be assigned, the work objectives of individual people with deadlines for completion assigned to them. Very importantly, the manager of a given project is characterised by a high degree of autonomy in all content-related, commercial or personnel matters with regard to project boundaries. His or her activities can be compared to those of an independent entrepreneur, where all responsibility is concentrated on him or her. This is a task made all the more difficult by the fact that the project management system adopted means that other projects compete for the employees working on a given project managed by the manager, which forces him or her to plan activities precisely, to set an appropriate pace of work, as mistakes in this respect may not only cost him or her a delay, but also the loss of important members of the team who have already been planned and assigned to other projects, i.e. their time is limited. On the one hand, therefore, there is full discretion over salaries, staffing and other project costs and, on the other hand, full responsibility for these activities. For this reason, the project manager usually has a separate budget, separate from the company budget. Of course, this model raises certain risks in the interpersonal field concerning the managers. Due to the dynamic nature of project implementation and management of the entity, these cadres lose their status, stability and privileges, as permanent managerial positions disappear and a person who shows a particular aptitude for management in a team can act as a manager in the next project.

In summary, it can be concluded that project-oriented entities are developing very dynamically, continuously improving their strategy by evolving such components of the adopted project management system as

| powers of the manager |

| elements of the structure |

– organisational structure,

– the principles of the company's operation and, in particular, its projects,

– preparing and improving staff in teamwork,

– developing the organisational culture by building a culture of project implementation.

3.2. Basic principles of shaping a company's organisational structure

The way in which projects are managed and the strategy adopted by an entity in this respect is related to the structure of that entity. Depending on the type of entity, whether it is a company, a public entity, a foundation, etc., not only the way projects are managed and implemented will depend on its structure. The structure must therefore be subsidised by the objectives and strategies adopted by this entity.[8] In order to properly shape the organisational structure of a company in which projects will be implemented, four principles should be taken into account, which will allow a more effective formation of the internal network:

> principles
> of internal
> structure

1) designation and delimitation of tasks,
2) the chain of command and the entity's governance arrangements,
3) optimum steering range,
4) efficient circulation of information.

The designation and delimitation of tasks is related to the necessity of assigning specific powers and responsibilities to individual persons/positions/ organisational units. It is a matter of dividing tasks and functions within a given entity in such a way that they are adapted to the qualifications, skills, abilities and experience of employees and at the same time ensure the effectiveness of the functioning of the entire entity. The subject-oriented shaping of the policy

> designation and
> delimitation of
> sentences

> hierarchy
> and unity
> of command

---

[8] S. Lachiewicz (red.), *Organizacja pracy kierowniczej*, Wydawnictwo „Absolwent", Łódź 1994, pp. 32–38.

of assigning and demarcating tasks involves the necessity of specialising employees, assigning them responsibility for the consequences of their actions.

The hierarchy of services and the unity of management stipulates that all organisational units and positions should have a defined place in the company's organisational structure and should function within some structure of internal dependence. Actions are carried out taking this structure into account, whereby an employee with a problem knows who his superior is and to whom he should turn. Similarly, any issues flowing down from the highest positions should pass through the various levels of the organisation downwards.

The principle of the **optimum management span** relates to the determination of the appropriate number of persons forming the structure of an enterprise or other entity, i.e. the determination of such a number of appointed employees that their superior is able to manage them effectively, with efficient and timely execution of tasks. In practice, the determination of the management span limit faces a number of obstacles, which are due to subjective and objective factors. According to management theory,[9] the following should be taken into account when determining the extent of the management span:

> optimum steering range

- the level of qualification of the manager and team members,
- the nature of the tasks assigned to the team (complexity, importance, degree of difficulty, repetitiveness, variety, etc.),
- the degree and organisation of the management system, including project management,
- equipping employees with work equipment,
- the positioning of the team in space,
- the range of qualifications and degree of autonomy of staff,
- the effectiveness of the communication system in the structure.

---

[9] J.A.F. Stoner, F.E Freeman., D.R Gilbert., *Kierowanie*, PWE, Warszawa 1997, p. 318.

An efficient information flow stems from the assumption that the organisational structure should ensure the rapid and reliable transfer of information both between team members and between management and employees. An efficient information flow structure allows all decisions taken by managers as well as instructions and possible expectations or directions to be distributed downwards, and for employees to report on progress and problems. A coherent information flow within the company structure should realise the following conditions:

- strictly define the ways and means of transmitting information so that it reaches every employee,
- use the shortest possible routes/channels for the flow of information, due to the reduction in management efficiency with the large number of stopping points through which information passes,
- shorten information flow paths so as not to cause indirect links to be bypassed, as this can lead to contradictory orders,
- ensure the reliability of the information content, without distortions in the intermediate links,
- eliminate information overload (excessive letters, instructions, etc.), which involves ensuring that information is selected and unnecessary information is dispensed with.

Activities aimed at adapting the organisational structure of a company or other entity to the company's strategy and the scope of the projects carried out should result from the desire to ensure the best possible performance profile for the given entity. The dynamics of market development, globalisation and the new difficulties and problems arising in connection with project management (pandemics, war, recession) force the evolution of company structures and their adaptation to the needs of both clients and the entities themselves. Introducing changes, innovations, minimising tensions between the different levels of the structure within the company, integrating teams and individuals, performing tasks without conflict and efficiently, and good information flow affect the efficiency of operations. What is worth emphasising is that a company or other

entity cannot be changed overnight and abandon the traditional management method for project management or even improve project management in an already functioning system and structure. This always takes place through an evolutionary process that requires a commitment of resources to achieve.

4. Project management – simulation

During the implementation of the activities, a good way to test project management competences is to use a simulation game. During the game, in successive rounds, participants have the opportunity to test their own competences from the planning stage of a project through the hardships of its implementation in subsequent rounds.

4.1. Creating an account in a simulation game

In order to start the game, you will need to create an account, which is available to university students. To do this, use your university email address and follow the instructions. The window for creating an account for the game is shown in Figure 4. However, the address of the simulation website for students of the Andrzej Frycz Modrzewski Krakow Academy is: symulacje.ka.edu.pl.

creating an account
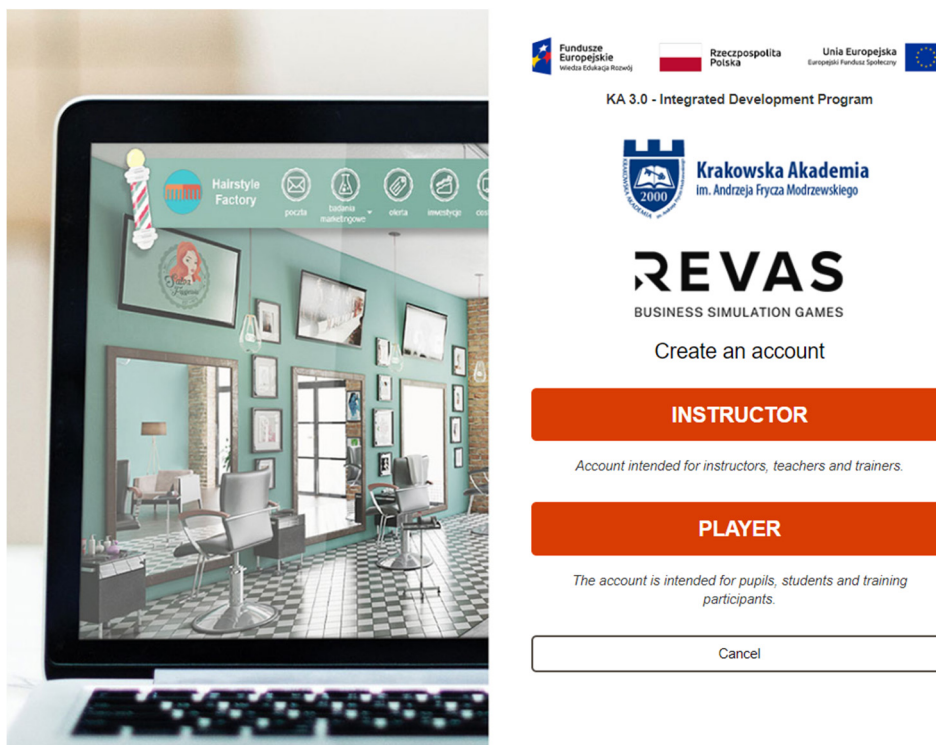
Figure 4: Simulation game account creation page

Source:www.symulacje.ka.edu.pl

The game can be played by lecturers as instructors and by students as players. The instructor has the option to add players to the simulation they have ordered, and to send students to their university email addresses the game number and keys to join the actual simulation. Depending on the option chosen by the lecturer to join players to the simulation, students, once logged in, see the option to enter the game directly, or they have the option to join the simulation by entering the parameters provided by the lecturer. At each stage, the lecturer sees the students' work. The lecturer divides the students into teams in which they will work. Each participant in the game can make changes to the project at the same time. The changes are visible almost immediately to the other team members.

4.2. Project preparation stage

Once all students have joined the game, the simulation can begin. It is important that all teams start at the same time. The game is divided into successive rounds, during which, as in real projects, there may be risks that need to be addressed appropriately for the project to succeed. It is possible to move the game to the next stage when all teams have completed a stage and this is done automatically. It is also possible for the game to be moved to the next stage by the lecturer. However, if teams want to compete with each other, each team should be at the same stage of the game.

project
preparation

Upon entering the game, the student sees the information panel of the round. The student can also navigate to further tabs, from which a description of the project can be seen, as well as the expectations of the board and the management rules. All this information will enable the teams to manage the project in accordance with the established management principles and the expectations of the board. The guidance provided here is already important at the project planning stage. At this stage, the work schedule is laid out, staff is hired for each successive stage of the project, the resources needed are planned and the project budget is planned. Teams should also plan how to respond to any risks that may arise during the various stages.
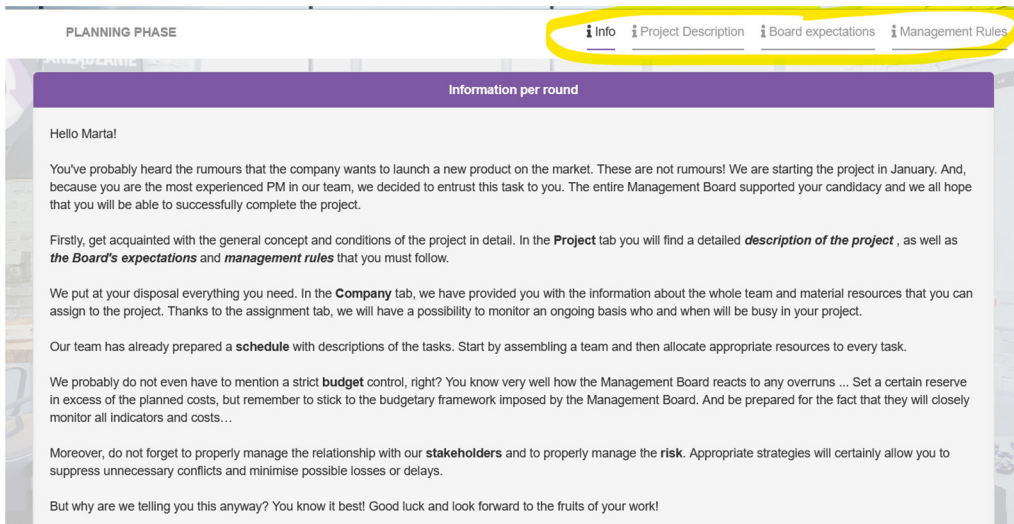
Figure 5: Start screen with information tabs

Source: game screen available at www.symulacje.ka.edu.pl

Under the tab „Project description", teams can see the purpose of the project. The „Management Expectations" and „Management Principles" tabs, on the other hand, contain important information that will certainly come in handy when creating the schedule, planning the budget and planning measures to minimise the impact of risks.

project description
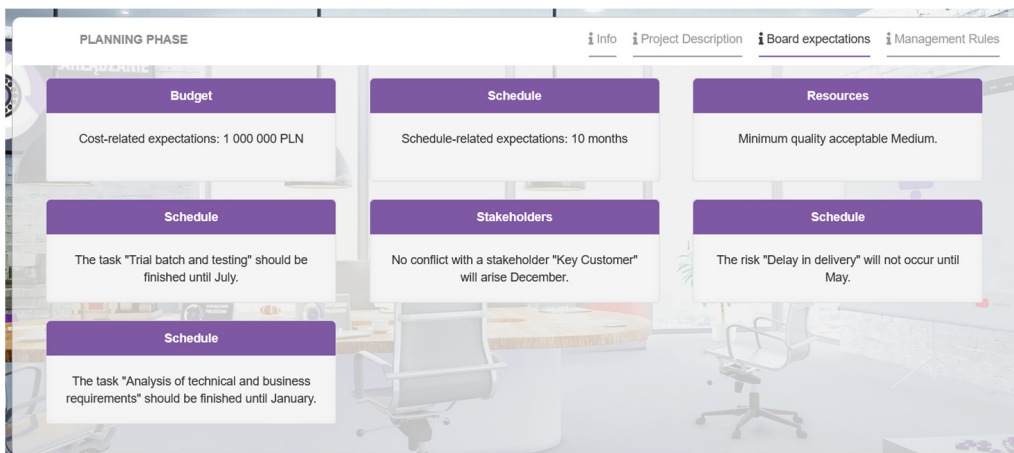
Figure 6: 'Management expectations' screen

Source: game screen available at www.symulacje.ka.edu.pl
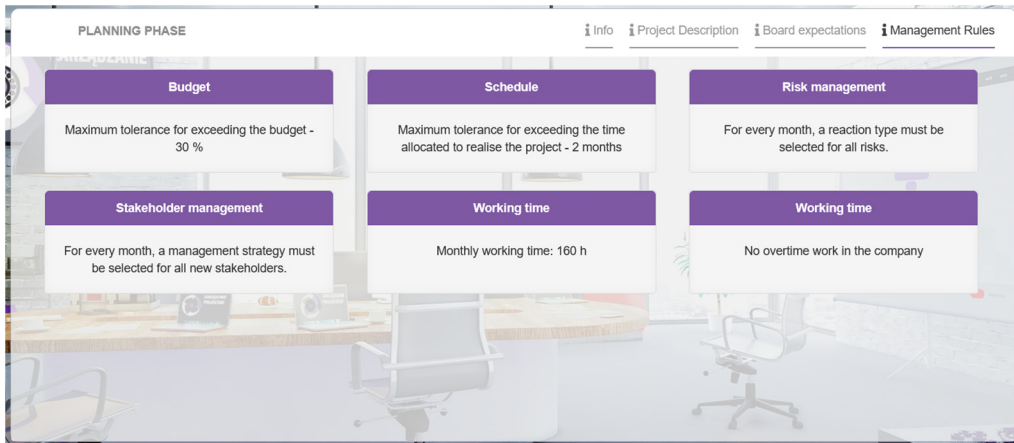
Figure 7: 'Management rules' screen

Source: game screen available at www.symulacje.ka.edu.pl

Once the basic information is known, you can move on to scheduling.
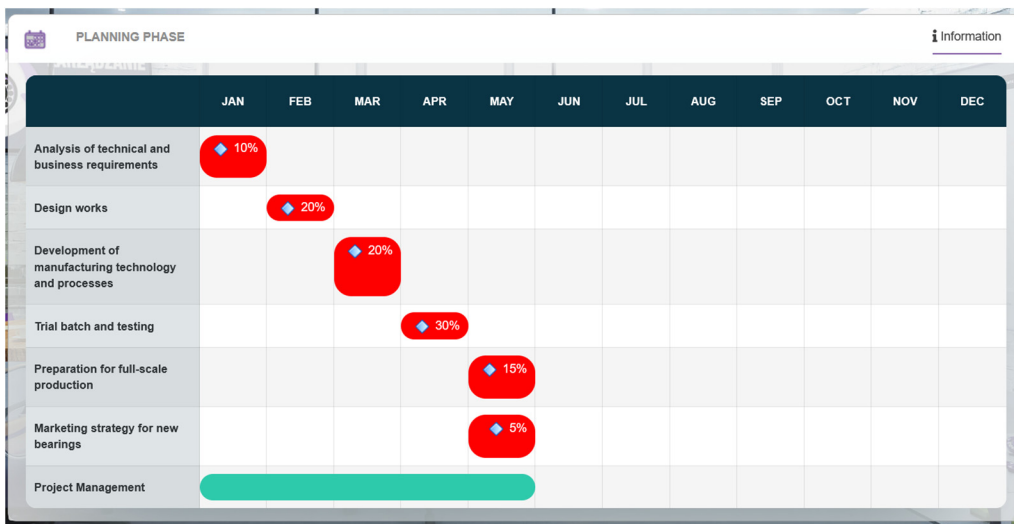
Figure 8: Schedule screen

Source: game screen available at www.symulacje.ka.edu.pl

Under the schedule tab, a Gantt chart is visible to show the overall project plan. „Gantt charts are a well-known graphical planning and control technique for comparing their actual and planned workflow. It is named after a representative of the scientific management movement and also a colleague of F. Taylor, Henry Gantt. He developed the schedule as a tool for managing the process of planning and controlling serial production in a company according to

the system developed by F. Taylor. The scheduling covered the tasks that made up the production process and the workloads of workers and machines. Both Gantt and Taylor believed that the key to improving overall efficiency was to create a comprehensive planning system, and the charts were to be the first step in achieving this. Without Gantt's charts, this system could not function efficiently'.[10]

The realisation of the various stages visible on the left-hand side of the graph is marked at the corresponding point on the time axis – the horizontal axis with monthly units visible at the top of the graph. The smallest unit of time in this case is one month. Depending on the information provided in the project description, as well as the specifics of the individual phases, some phases may run concurrently, while others may start after the earlier ones have been completed. Construction work cannot start before the completion of the Technical Requirements Analysis, while work related to preparing for production and developing a marketing strategy can run concurrently.

To plan the individual stages, click on the block in the diagram.
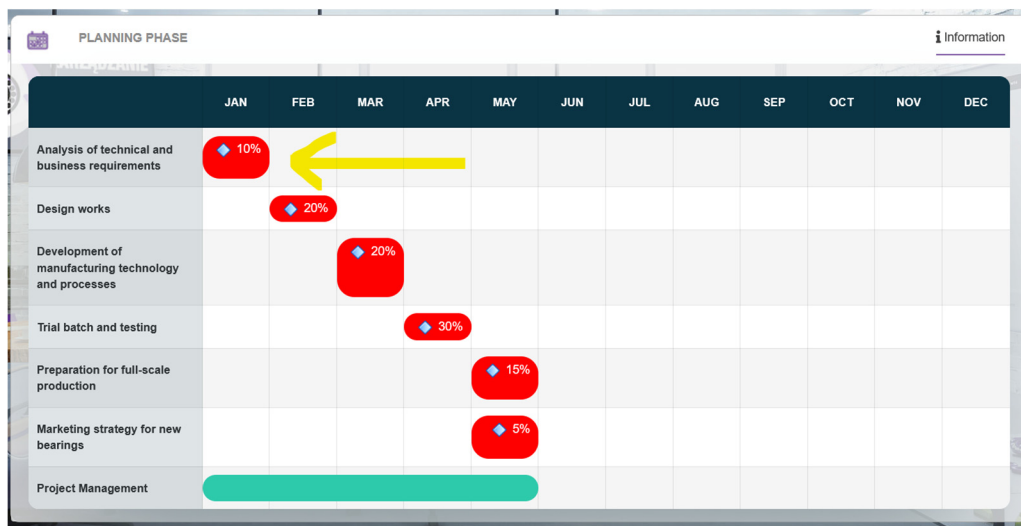
Figure 9: Schedule screen

Source: game screen available at www.symulacje.ka.edu.pl

---

[10] A. Grześ, *Wykres Gantta a metoda ścieżki krytycznej (CPM)*, „Optimum. Studia Ekonomiczne" 2014, nr 4 (70), https://www.researchgate.net/publication/287865099_Wykres_Gantta_a_metoda_scie zki_krytycznej_CPM [accessed: 12.07.2022].

After clicking on the block indicating the next stage of the project, the player is able to assemble the necessary team of workers, as well as allocate the appropriate resources needed to complete the work.
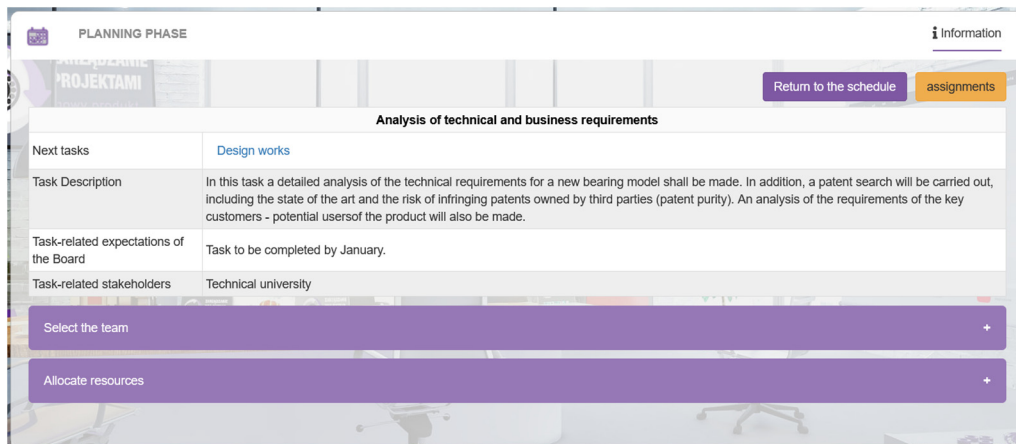
Figure 10: Resource planning screen for the first stage of the game

Source: game screen available at www.symulacje.ka.edu.pl

During the planning of each stage, the player has information on what stage is next, what should be accomplished at that stage, and what the expectations of the board are. Important information also relates to who the stakeholders are at a given stage, which will allow better planning and timing of the risks associated with working with a given stakeholder. The risk of conflict with a particular stakeholder is not the same at every stage of a project.

The work of planning a stage can start by assembling a team. At each stage, the player has information about which workers to hire. The number of hours of employees to be hired for the positions needed in the stage is given. In some cases, specific competences are given that need to be taken into account when planning the hours of employment of individual employees. If this is the case, it is best to start by employing staff in positions requiring specific, specialised skills. If all the required people are hired in the right positions, the player is informed of correctly planned resources in the form of a change in the colour of the bar with the words ,, Select the team" from purple to green.

completing the team
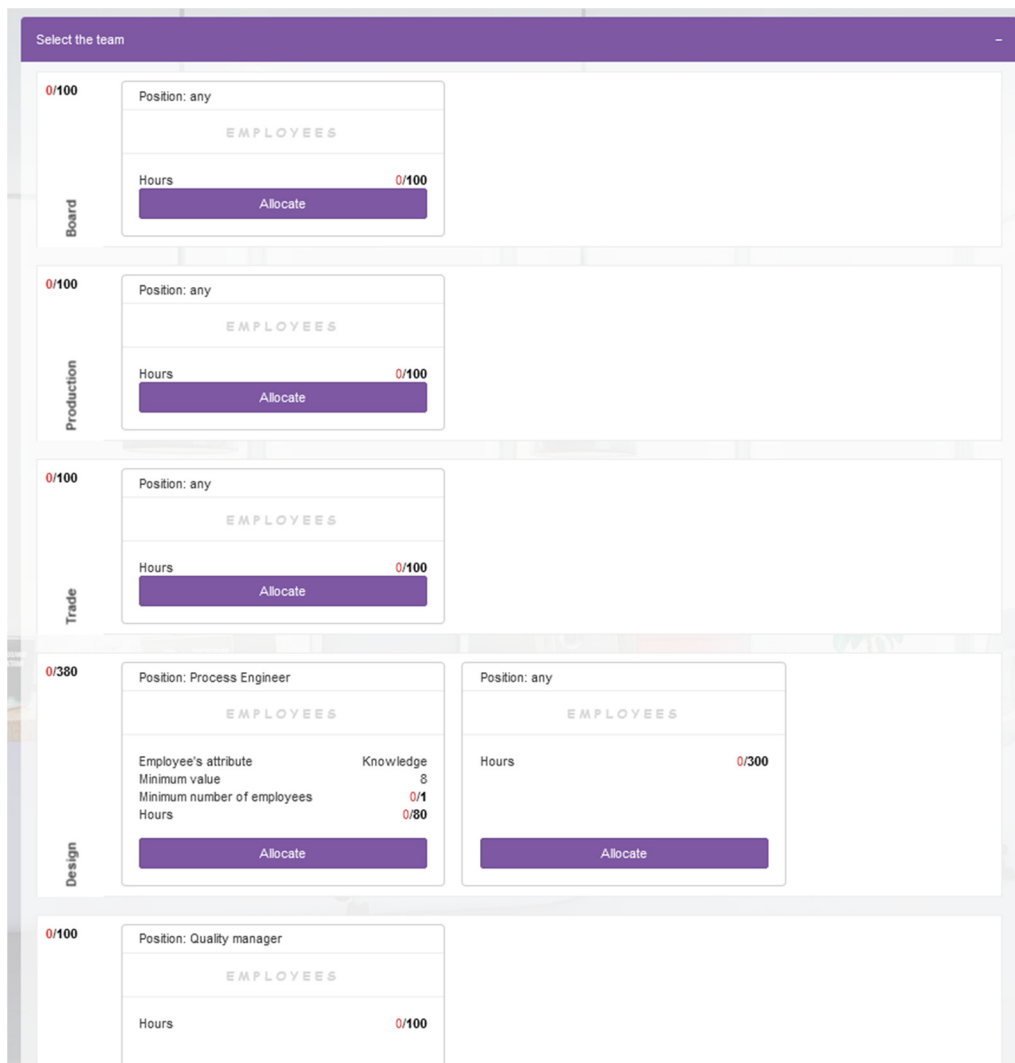
Figure 11: Team completion screen for the first stage of the game

Source: game screen available at www.symulacje.ka.edu.pl

An appropriate number of hours must be allocated for each employee – as required. For a player who is in the position of Project Manager, the commitment is always 100% of the possible hours to be used in a given month and this is a value that cannot be changed. For the other positions, it is possible to plan the hours of the employees in a given month according to their availability. It may happen that, as a result of the lower availability of any of the employees in a given month, or the high number of hours needed to complete a given task in relation to the available human resources, it will be necessary to extend the work and plan the hours of employees in the following months. If these hours are relatively few, it is possible to negotiate an increase in the limit

48

of hours during the project implementation phase. However, this is only possible for employees whose maximum available hours in a given month do not exceed 160 hours. However, it is not possible to negotiate at the scheduling stage.

Figure 12: Team completion screen for the first stage of the game – detailed hours allocation window
Source: game screen available at www.symulacje.ka.edu.pl

The resource completion tab allows the use of internal resources as well as external suppliers. In the case of resources, the player is given the required number of a given resource and sometimes also a minimum quality.

Figure 13: The resource completion screen for the first stage of the game
Source: game screen available at www.symulacje.ka.edu.pl

Once each of the external resources has been developed, it is possible to select the appropriate quantity of resources, the quality of the resources and, very importantly, to plan the order month taking into account the delivery time from the various suppliers. If the player does not pay attention to the delivery time and does not plan the order adequately in advance, he himself generates the risk of increasing delays in the project.

Plan of deliveries - Patent researches   ×

Supplier	Quality	Price	Activation cost	Usage costs per round	Maximum quantity per delivery	Delivery time	Probability of a delayed delivery	Probability of an increase in the price	Delivery cost increase	Month of the order	Number of units	Purchase price
IUSTIS	★★★	24000			2	0	10%	30%	24000	January	0	0
PATENT MASTERS	★★☆	15000			2	1	30%	40%	15000	January	0	0
PATENT OFFICE	★★★	19000			4	0	16%	30%	19000	January	0	0
PTM REGIS	★★★	15000			1	0	18%	50%	15000	January	0	0

✓ OK

Figure 14: Resource completion screen – details for the first stage of the game
Source: game screen available at www.symulacje.ka.edu.pl

In the case of resource planning, information on whether resources have been completed according to the minimum requirements will also be indicated by a change in the colour of the „Allocate resources" bar from purple to green.

PLANNING PHASE   i Information

Return to the schedule   assignments

Analysis of technical and business requirements

Next tasks	Design works
Task Description	In this task a detailed analysis of the technical requirements for a new bearing model shall be made. In addition, a patent search will be carried out, including the state of the art and the risk of infringing patents owned by third parties (patent purity). An analysis of the requirements of the key customers - potential usersof the product will also be made.
Task-related expectations of the Board	Task to be completed by January.
Task-related stakeholders	Technical university

✓ Select the team   +

✓ Allocate resources   −

	Resource name	Minimum quality	Required quantity	Quantity in stock	Allocated number of units	Orders	
	Project office	★★★	1	0★☆☆ 0★★☆ 6★★★	0★☆☆ 0★★☆ 6★★★		Allocate
	Patent researches	★★★	2	0★☆☆ 0★★☆ 0★★★	0★☆☆ 0★★☆ 0★★★	0★☆☆ 0★★☆ 3★★★	🛒🚚 Plan delivery
	Consulting (business)	★★☆	40	0★☆☆ 0★★☆ 0★★★	0★☆☆ 0★★☆ 0★★★	0★☆☆ 40★★☆ 0★★★	🛒🚚 Plan delivery

Figure 15: Planning screen with completed resources for the first stage of the game
Source: game screen available at www.symulacje.ka.edu.pl

At each stage of the game, the team can click on the assignments tab and check that everything has been planned correctly. In this way, it is also possible to verify where there is an error that is preventing us from completing the assignments in accordance with the management rules and expectations. The following figures show the situation faced by two different teams within the same game. In the case of team one, the availability of one of the employees is 96 hours. The number of hours the employee must work in the position as recommended is 224. Therefore, the 128 missing hours must be scheduled for the following month – February.
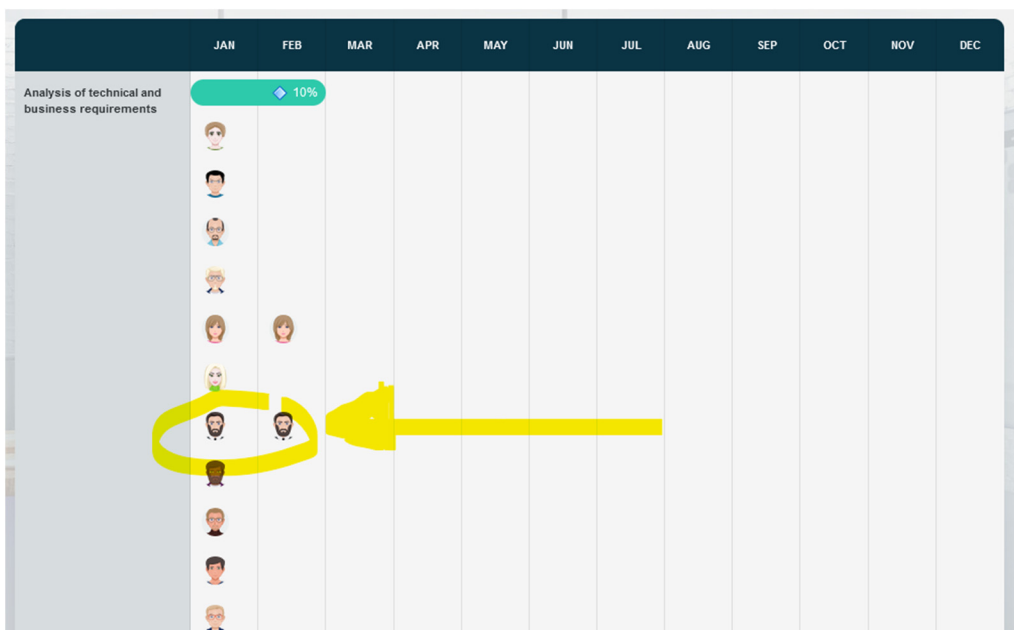
Figure 16: Resource preview screen – Team 1

Source: game screen available at www.symulacje.ka.edu.pl

According to the management's expectations of the timetable, the task 'Analysis of technical and market requirements' should be completed in January.
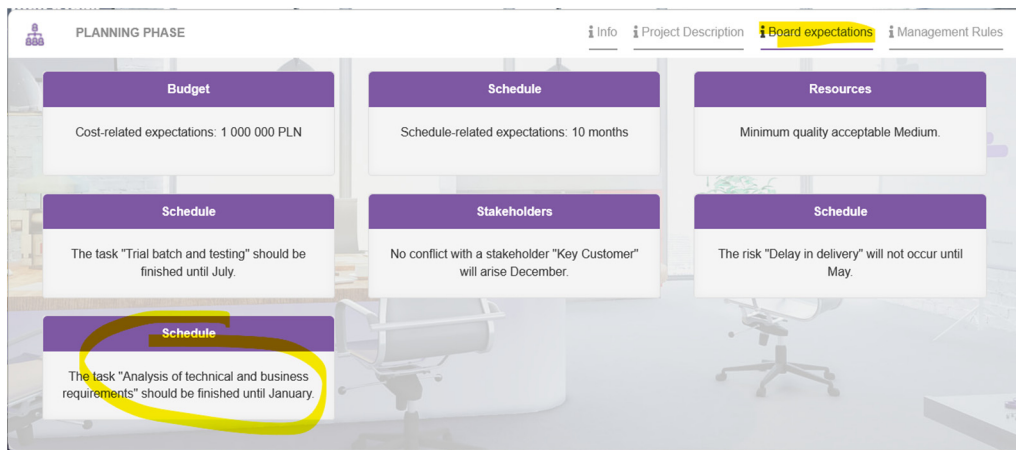
Figure 17: Board expectations screen

Source: game screen available at www.symulacje.ka.edu.pl

This task for Team 1 has no chance at the planning stage to be completed by the end of January due to the number of hours of the quality manager.

Jason Cooper

Salary brutto: **2800**
Position: **Designer**
Organisational unit: **Design**

Attributes		Competences	
Motivation	3	Knowledge	9
Tendency to a conflict	4	Negotiations	6
Leadership	7	Organising	6
		Creativity	7
		Computer skills	9
		Foreign language	9

Motivate ❓   Negotiate availability ❓

Attitude toward the project: **Neutral**

I am fine.

Availability calendar

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Basic availability	96	128	160	128	128	128	80	128	112	96	128	160
Current availability	96	128	160	128	128	128	80	128	112	96	128	160
Maximum overtime	0	0	0	0	0	0	0	0	0	0	0	0
Scheduled number of hours	96	128										
Scheduled - restrictions	96	128										

✔ OK

Figure 18: Employee data preview screen – Team 1

Source: game screen available at www.symulacje.ka.edu.pl

However, this is not a no-win situation. It is possible to negotiate hours with the employee during the implementation phase of the project. As a result of the negotiation, the employee can have an increase of 16 hours, with each successful negotiation. The cost of negotiation is fixed, regardless of the

outcome, whether positive – and an increase in the employee's availability of 16 hours – or negative – i.e. no increase in hours in a given month. However, it is possible to negotiate until the end, the project team is only limited by the cost they can afford during implementation, as each negotiation costs 200.

If all resources are scheduled as required, the task in question is highlighted in green, as in the case of the schedule prepared by Team 2.
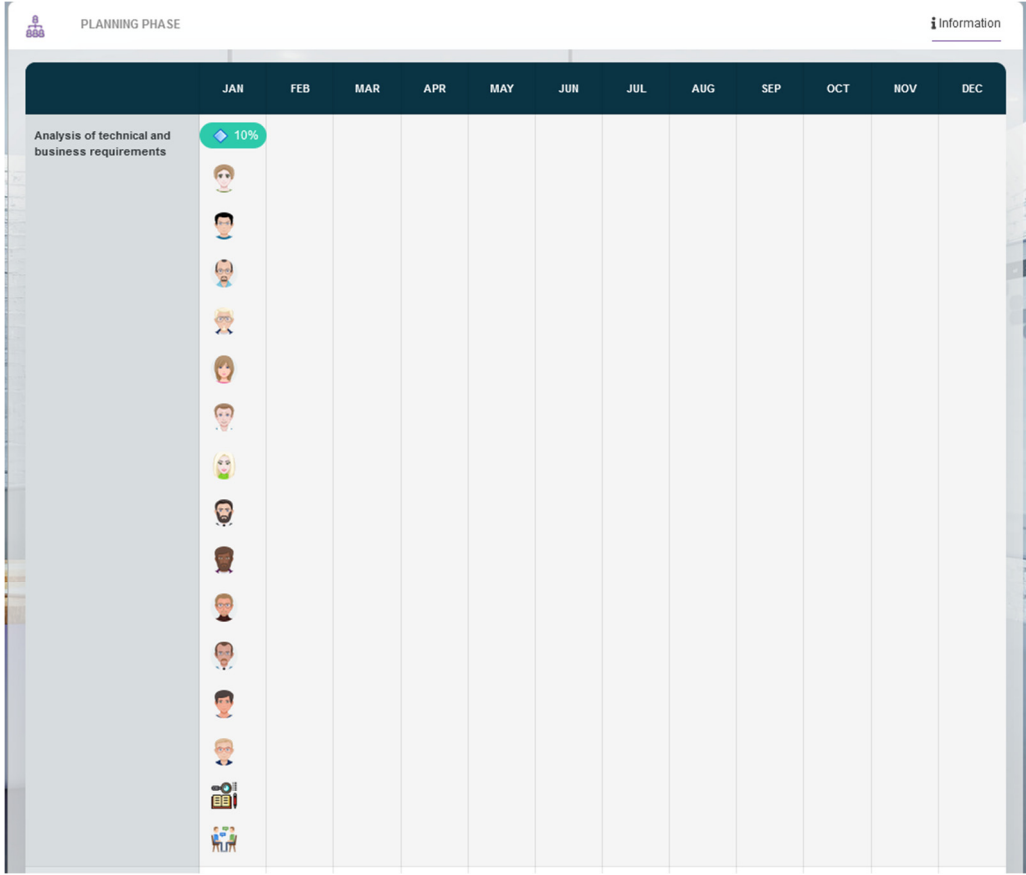
Figure 19: Resource preview screen – Team 2
Source: game screen available at www.symulacje.ka.edu.pl

This is how you should plan the subsequent tasks in the schedule, bearing in mind the constraints and guidelines under project management and management expectations. In the schedule, we should schedule all tasks in a maximum of ten months.
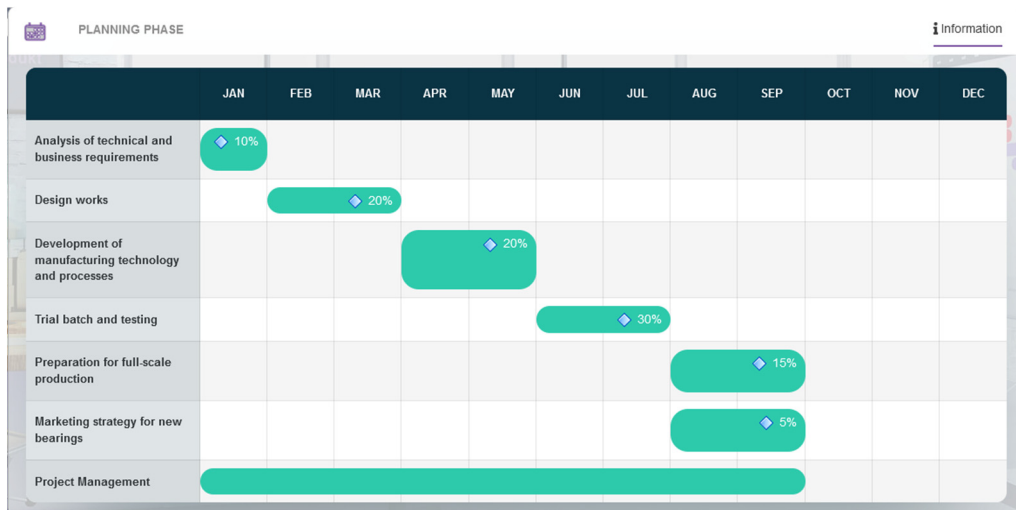
Figure 20: Schedule preview screen – Team 2

Source: game screen available at www.symulacje.ka.edu.pl

The next steps are to plan a strategy to counteract the identified risks that may occur during project implementation and to address possible conflicts with stakeholders.

risks - prevention

In the environment tab, it is possible to plan the strategy in the event of conflict with stakeholders and also to control delivery from individual suppliers who were selected at the scheduling stage itself.

In the first task – Analysis of technical and market requirements – the teams have a stakeholder given – it is a technical university. So certainly for the first task, a conflict strategy needs to be planned during implementation.
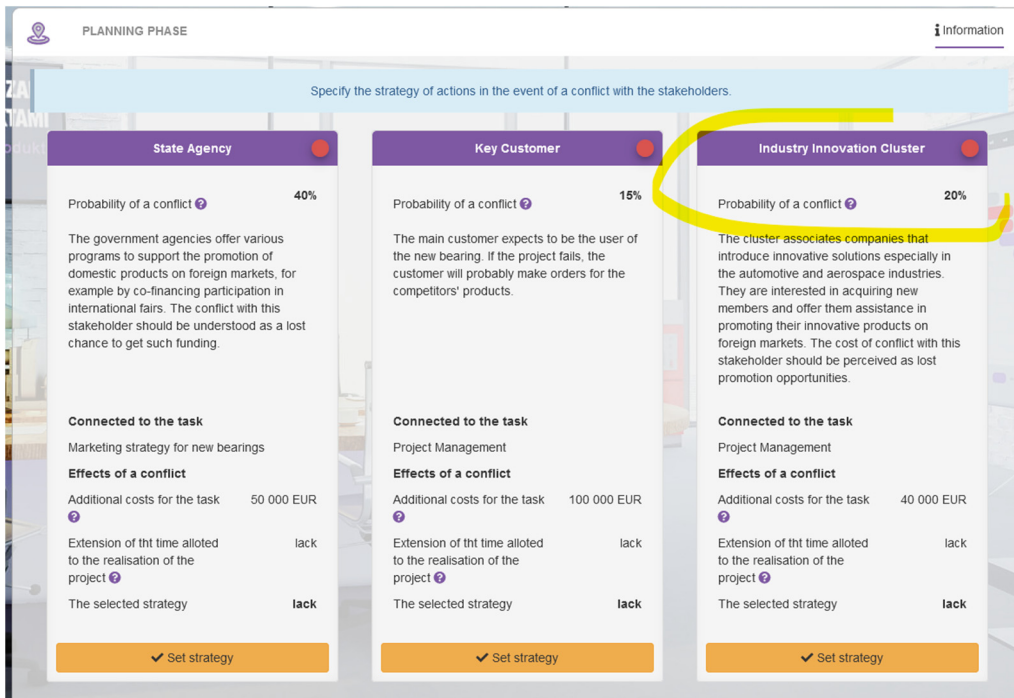
Figure 21: Screen for selecting the stakeholder for whom the strategy will be planned

Source: game screen available at www.symulacje.ka.edu.pl

After clicking on 'set strategy', it is possible to select the strategy that the team thinks is best. Depending on the chosen strategy, a monthly cost is incurred, which is included in the budget. At the same time, information is gained about the new probability of conflict, as well as the costs that will be incurred as a result of the risk. Once a strategy has been selected, each team has the opportunity to determine how long the strategy should last.
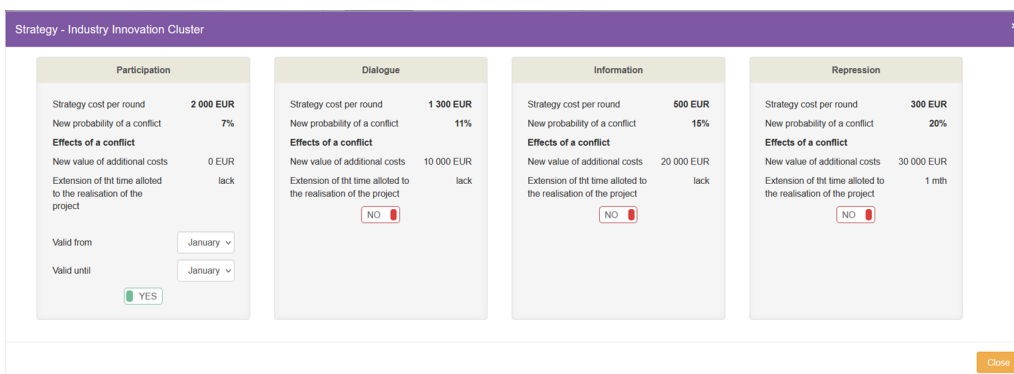
Figure 22: Stakeholder conflict strategy selection screen

Source: game screen available at www.symulacje.ka.edu.pl

The same is true for planning a strategy to counteract identified risks that may arise during project implementation. Here, the strategy must be chosen and also the duration of the strategy.
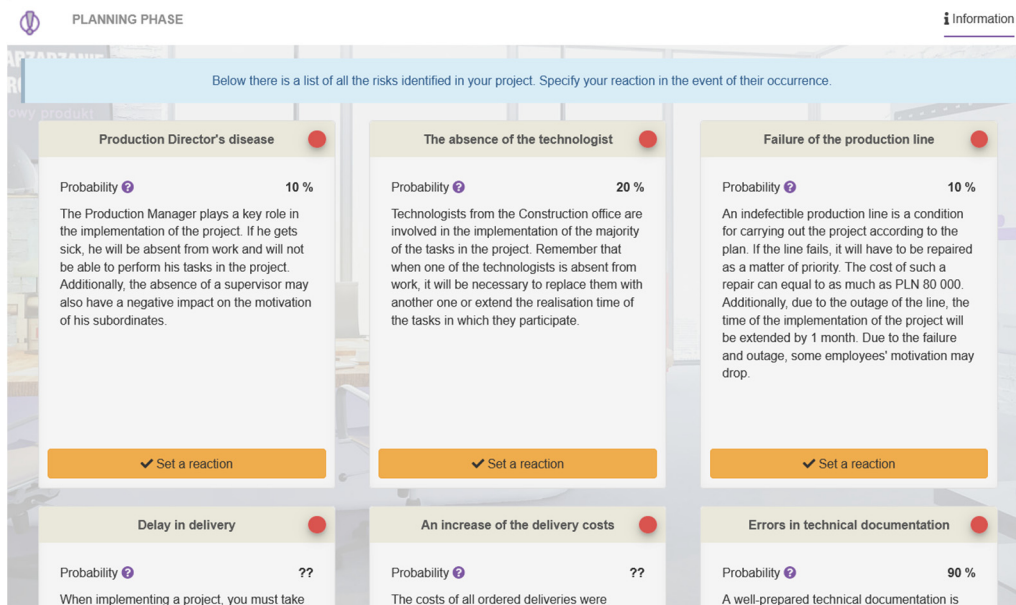
Figure 23: Screen for selecting the risks for which players want to choose a counter strategy

Source: game screen available at www.symulacje.ka.edu.pl

Once the schedule has been planned, as well as the strategies for counteracting the identified risks and the strategies for counteracting conflicts with stakeholders, the cost of which is included in the project budget, it is necessary to go to the budget tab. If the budget available to the teams is exceeded, the costs of supplies, staff costs and also the costs of the planned risk and conflict mitigation strategies should be re-examined. Then manually enter the amount of the managerial reserve, which, according to the terms of the project, should not exceed 30% of the direct costs.

Figure 24: Budget screen

Source: game screen available at www.symulacje.ka.edu.pl

The team that completes the planning stage of the project sends its decision via the „submit decision" button. Once all teams have completed their work or by instructor's decision, the game can be moved to the next round. This means that teams move from the planning stage to the project implementation stage. Each successive round represents consecutive months of project implementation. In each month, teams can modify the schedule, change decisions on risk strategy, change decisions on delivery. These changes can only apply to subsequent months, as happens in project implementation when changes need to be made and ongoing events need to be responded to.

4.3. Project implementation stage

Round one is the first month of project implementation. Teams can check how their planned activities have been implemented and whether what they have planned has resulted in exceeding the budget planned for the month.
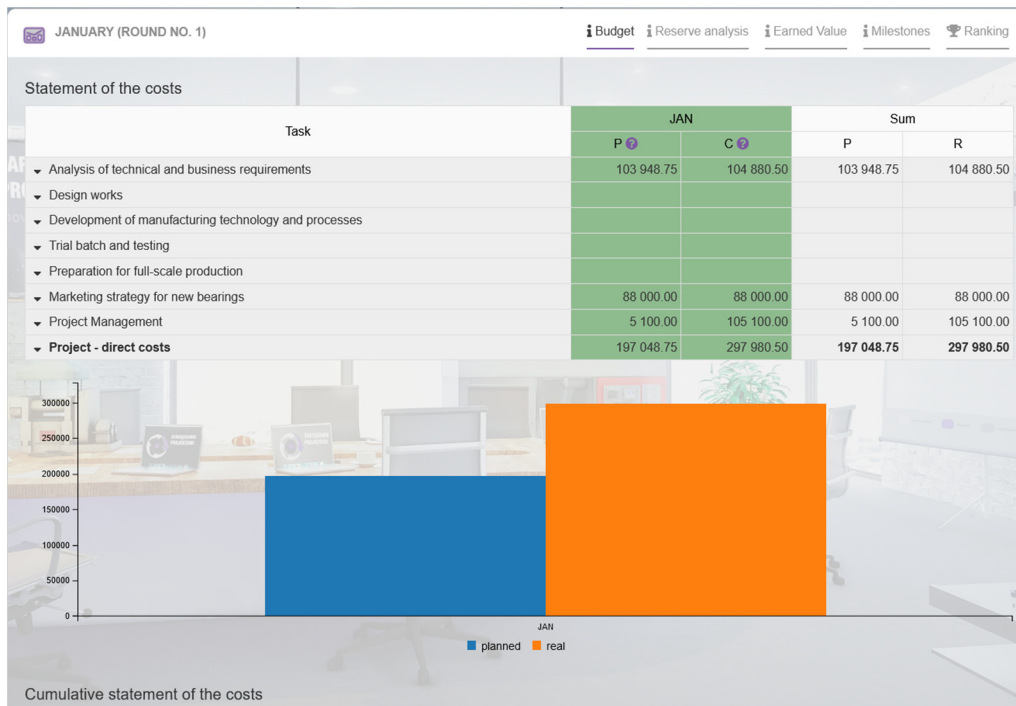
Figure 25: Reports screen, round one

Source: game screen available at www.symulacje.ka.edu.pl

The team-specific reports show that the budget was exceeded in January compared to the planned budget. When the individual items are expanded, it can be seen that the higher costs incurred are related to staff salaries.

budgetary control
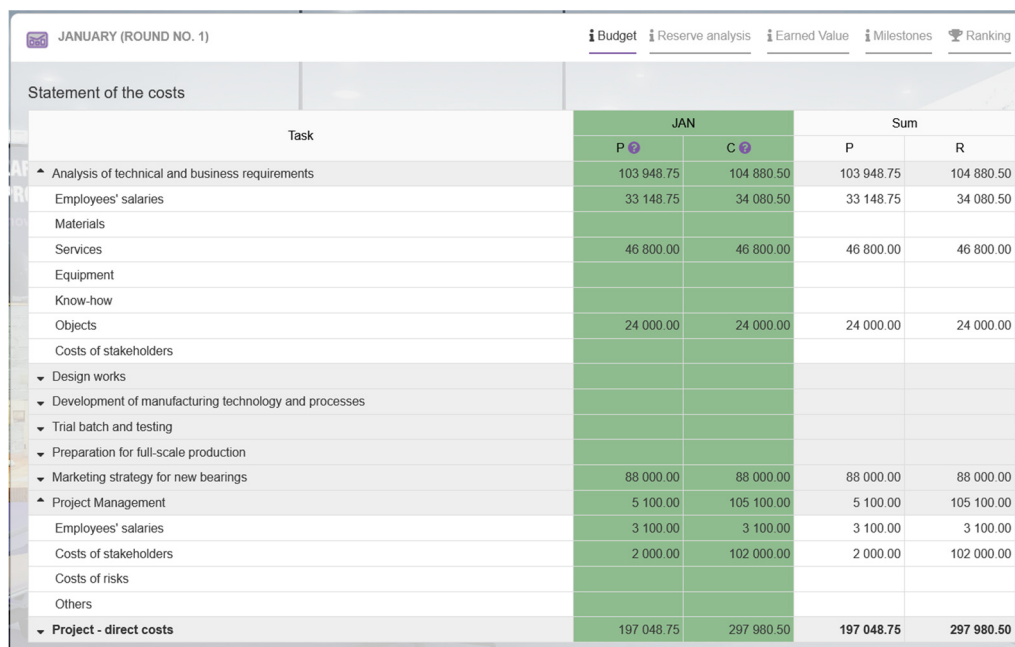
Figure 26: Reports screen – expansion of budget items, round one

Source: game screen available at www.symulacje.ka.edu.pl

An explanation of the costs incurred can be found in the events tab. Here you will find a full list of the risks that occurred, as well as those that did not occur, although there was a risk of their occurrence.
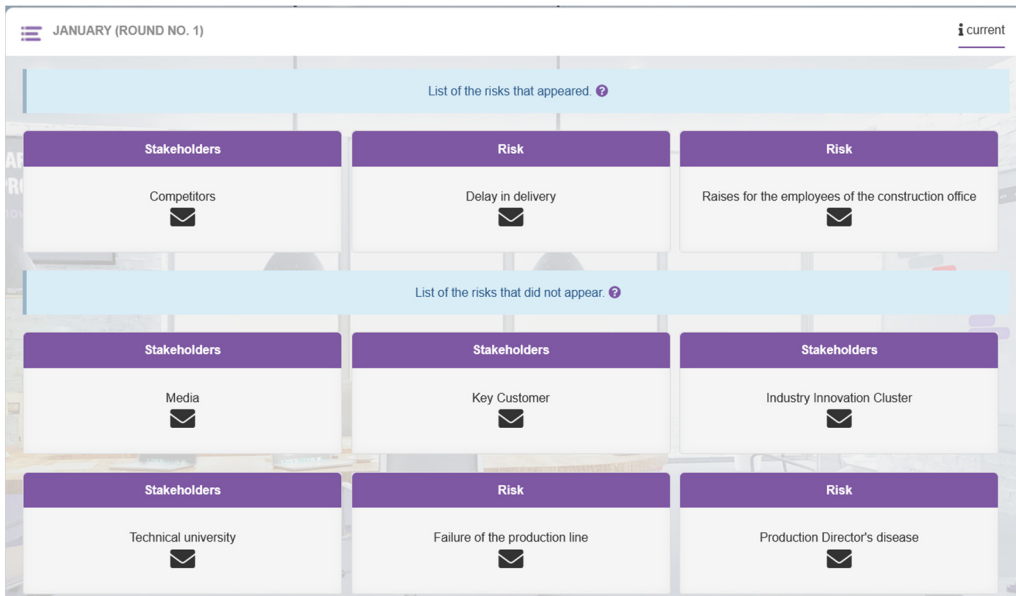
Figure 27: Events screen, round one

Source: game screen available at www.symulacje.ka.edu.pl

A competitive risk occurred in January. The team has not established a strategy to minimise the cost of such an event occurring, so the full cost of adverse competitive action is incurred.

The competition spread false information discrediting the new product.
Your e-mail inbox is full of messages from concerned contractors.

Description Your lack of activities in relation to the protection against the activities of the competition not only did not help in preventing the conflict, but also resulted in enormous additional costs. In order to eliminate the negative effects of disseminated information, it was necessary to create a crisis management team. The members of the team personally met with all potential contractors so as to assure them of the quality of the prepared product and convince them to further cooperation. The costs of the crisis management team have been fully allocated to your project.

Consequences Increase in the cost of the Project management task: **PLN 100 000**
Extension of the realisation time of the Project management task: **none**

Connected task   Project Management

Probability of a conflict   50%

Figure 28: Event screen, round one, competition – details

Source: game screen available at www.symulacje.ka.edu.pl

Figure 29: Event screen, round one, increases for employees – details

Source: game screen available at www.symulacje.ka.edu.pl

At this stage, the project team can make changes to the timetable and can also make changes to the risk strategies. Once changes have been made, it can send a decision.

When the game is moved to the second round, as in every round, a summary is visible of the change in costs in the actual budget compared to the planned budget, the number of delayed tasks, the number of incidents that have occurred and the CPI. The CPI is the ratio of the costs that should have been incurred at a given stage of the work performed (the percentage of the cumulative

planned project costs from the beginning to the end) to the cumulative project costs that have been incurred from the beginning of the project to that stage.

This indicator should be above 1. The indicator shown in the figure indicates budget overruns.
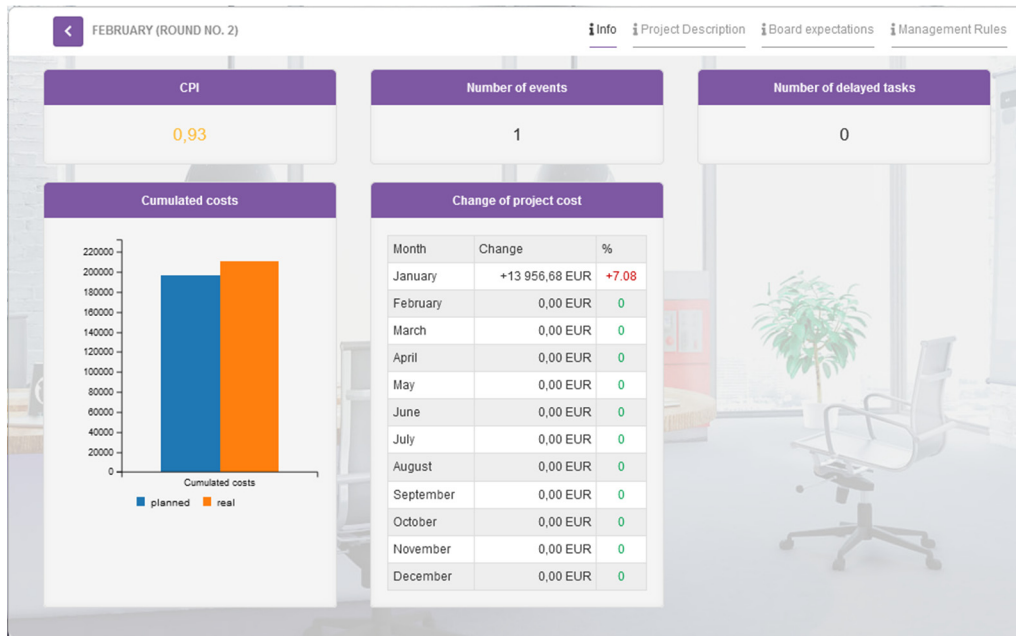
Figure 30: Round two information screen.

Source: game screen available at www.symulacje.ka.edu.pl

In round two, a cost statement is available as before. This time, it is also apparent that the planned costs on the project management line have been exceeded.

Figure 31: Statement of costs, round two

Source: game screen available at www.symulacje.ka.edu.pl

Other reports are also available, including an analysis of the reserve, as well as the indicators used to measure performance and progress.

Figure 32: Screen of indicators measuring performance and progress
Source: game screen available at www.symulacje.ka.edu.pl

From this, the team members can make inferences about the status of the project and the chances of success of its further implementation. A description of the individual values can be found both by clicking on the question marks and in an expanded form with ranges for some values and a detailed description in the glossary on the right-hand side of the simulation screen.

The next tabs contain information on the achieved project milestones. The last tab is related to the ranking and here it is possible to compare the results achieved by the players.
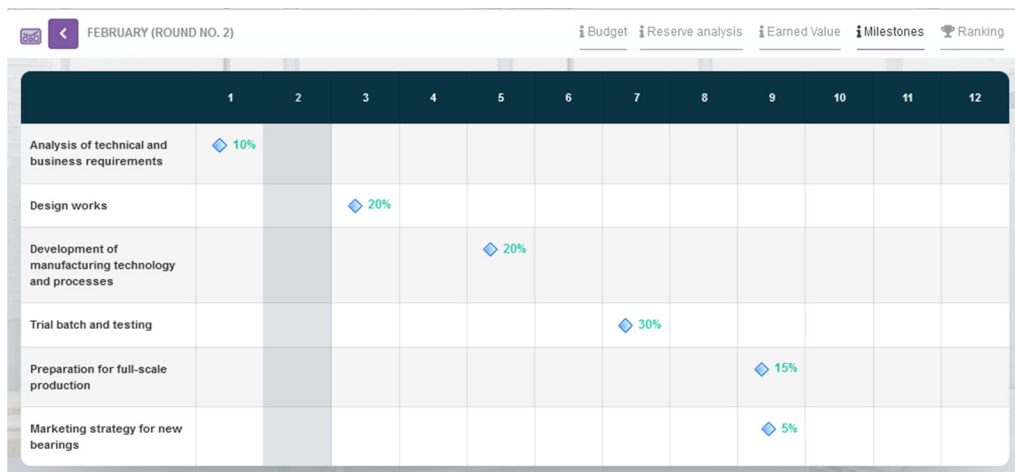
Figure 33: Screen to control milestones

Source: game screen available at www.symulacje.ka.edu.pl

In subsequent rounds, players gain experience and knowledge on how to respond to incidents, what to look out for during project implementation and how to create strategies to counter the effects of risks. Below is an example from the next round. The team re-examined the tasks in the ongoing project and further strategies were planned to reduce the costs incurred when adverse events occur.
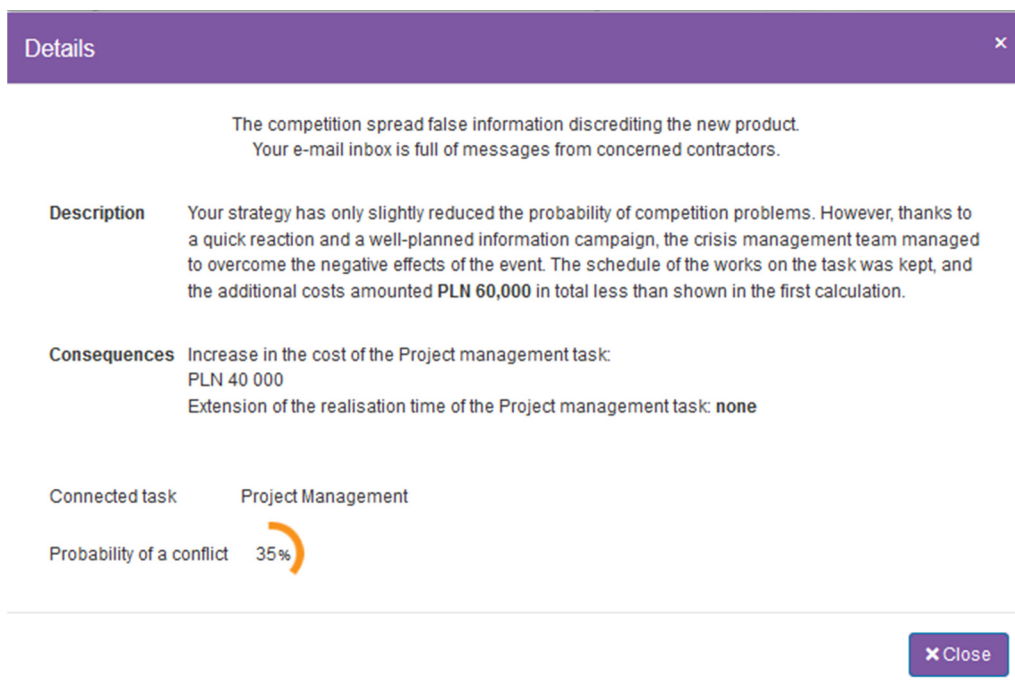
Figure 34: Event screen, round three, competition – details

Source: game screen available at www.symulacje.ka.edu.pl

It turns out that there were more incidents than before – four occurred, but each had a strategy that worked and thus reduced the bad impacts that could have occurred. This kept the financial costs incurred to a minimum, while no event caused the project to be extended.

Figure 35: Event screen, round three, Government agency – details

Source: game screen available at www.symulacje.ka.edu.pl

Figure 36: Event screen, round three, framing section message – details

Source: game screen available at www.symulacje.ka.edu.pl

4.4. Monitoring of competences

All players' actions during the project are saved in the system and rankings are created on this basis. It is possible to check a player's current profile, which changes according to the decisions made in subsequent rounds.

the player profile shows the points awarded for the actions taken in each category
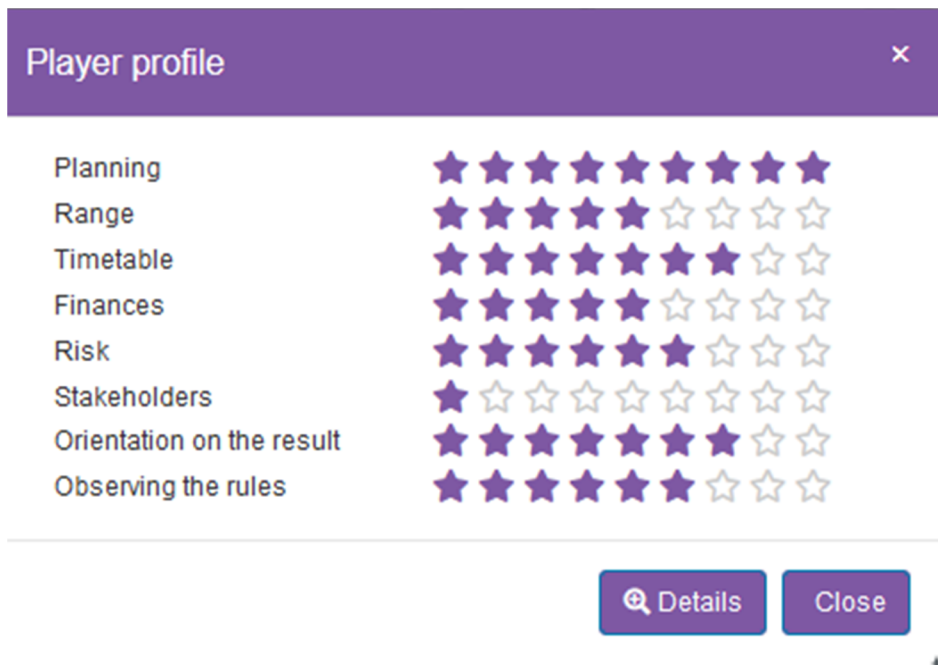
Figure 37: Player profile

Source: game screen available at www.symulacje.ka.edu.pl

By clicking on the details, the detailed points awarded for each decision taken are shown, influencing the final grade. In this way, the player can analyse which of his or her actions had a positive impact on project implementation and thus which competences influencing project implementation are well developed and which still need to be worked on.

Month	Competences	Points	Description
PLANNING PHASE	Observing the rules	0.5	Management rule: tolerance of exceeding the BAC project budget
PLANNING PHASE	Observing the rules	0.5	Management rule: tolerance of exceeding the realisation time of the project
PLANNING PHASE	Observing the rules	-0.5	Management rule: risk management secured for all of the months.
PLANNING PHASE	Observing the rules	-0.5	Management rule: risk management of the stakeholders is secured.
PLANNING PHASE	Observing the rules	0.5	Management rule: no overtime.
PLANNING PHASE	Orientation on the result	2	All of the tasks were scheduled and the time and cost limits were met.
PLANNING PHASE	Planning	0.5	Analysis of technical and business requirements - a correct number of resources has been allocated
PLANNING PHASE	Planning	0.5	Design works - a correct number of resources has been allocated
PLANNING PHASE	Planning	0.5	Development of manufacturing technology and processes - a correct number of resources has been allocated
PLANNING PHASE	Planning	0.5	Trial batch and testing - a correct number of resources has been allocated
PLANNING PHASE	Planning	0.5	Preparation for full-scale production - a correct number of resources has been allocated
PLANNING PHASE	Planning	0.5	Marketing strategy for new bearings - a correct number of resources has been allocated
PLANNING PHASE	Planning	0.5	Project Management - a correct number of resources has been allocated
PLANNING PHASE	Planning	0.5	The realisation time of the project is within the expectations of the Board.
PLANNING PHASE	Planning	0.5	The budget of the project is within the expectations of the Board.
PLANNING PHASE	Risk	-2	At least one of the risks is not covered by the reactions.
PLANNING PHASE	Stakeholders	-2	Not all of the risks concerning the stakeholders have the reactions planned for them.

Figure 38: Player profile – scoring details

Source: game screen available at www.symulacje.ka.edu.pl

Also, the lecturer/instructor is able to analyse exactly how the knowledge, skills and competences of the different teams/players have changed. „The game makes it possible to assess an individual's knowledge (planning tools, project life cycle, monitoring), skills (application of planning and resource management tools in conditions of limited availability), as well as attitudes (ability to work under time pressure, approach to problem solving). The player's competencies are assessed in eight areas, which have been selected on the basis of recognised project management methodologies, in particular the International Project ManagementAssociation (IPMA) European methodology, as described in the current version of the International CompetenceBaseline (ICB 4.0), which is a global standard that defines the competencies required of people working in the field of project, programme and portfolio management."[11]

Runda	Kompetencje	Planning	Range	Timetable	Finances	Risk	Stakeholders	Orientation on the resul	Observing the rules
PLANNING PHASE	5.5	9	5	5	5	3	3	7	6
January	5	9	5	5	5	1	1	7	6
February	5	9	5	6	5	1	1	7	6
March	5.5	9	5	6	5	3	1	7	6
April	5.5	9	5	7	5	5	1	7	6
May	6	9	5	7	5	6	1	7	6
June	5	9	5	7	5	1	1	7	6
July	5	9	5	7	5	1	1	7	6
August	5	9	5	7	5	1	1	7	6
September	5.5	9	5	7	5	1	2	7	6
October	5	9	5	7	5	1	1	7	6
November	5	9	5	7	5	1	1	7	6

Figure 39: Example of competency balance details for a two-person team

Source: game screen available at www.symulacje.ka.edu.pl

An example of the values included in the competency balance available to the lecturer is shown in the figure below. The values allocated in this case are for a team of two people who have worked on project tasks.

Simulations allow for the development, but also the testing of knowledge, skills and competences in project management to an extent that is not possible

---

[11] Revas industry simulations, "Competency balance", text with numerical values is available for lecturers including the performance of teams/players.

in traditional classes. In some cases, events may take players by surprise. In a seemingly well-prepared plan, problems may arise at the implementation stage that were not foreseen by the users, to which it is necessary to react as it happens during the implementation of any project.

5. IT project management tools

Nowadays, companies, especially those in the IT sector, use tools to manage IT and other projects. There are dozens of programmes on the market for managing such projects. Below, we have collected those that we believe are the most optimal for IT projects. The software presented has common features and it is possible to create a list of tasks to be performed, mark the stages of their realisation and assign persons responsible for them. It would also be good for such software to have its own internal means of communication, for example in the form of a chat or other means. A calendar that can be integrated with Google Calendar or Outlook is also very useful. This is not essential for the efficient organisation of the team's work and communication with it, but it makes work very easy.

Here are some of the most interesting project management software in our opinion.

1. Asana
2. Jira
3. Microsoft Project
4. Trello

Why Asana?

The basic version of Asana is free of charge and contains basic functions that are sufficient for efficient IT project management. The premium version, is already paid for.

Asana is a web-based version of project management software. To get started with it, go to asana.com and create a free account.

5.1. Creating an account on asana.com in a few steps.

Start your browser and type in the address asana.com
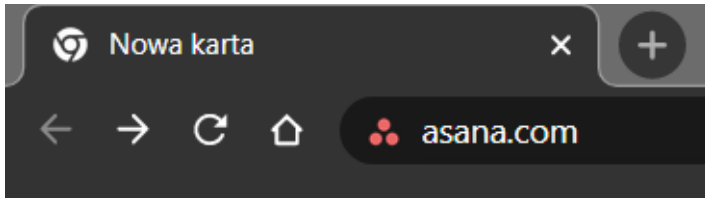
Figure 40: Address of asana.com website, fragment of browser window

Source: asana.com

Once the page has loaded, click on the Get Started icon
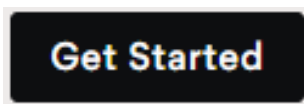
Figure 41: Establishment icon

Source: excerpt from asana.com

In the following steps, complete the registration, firstly by entering your e-mail address.
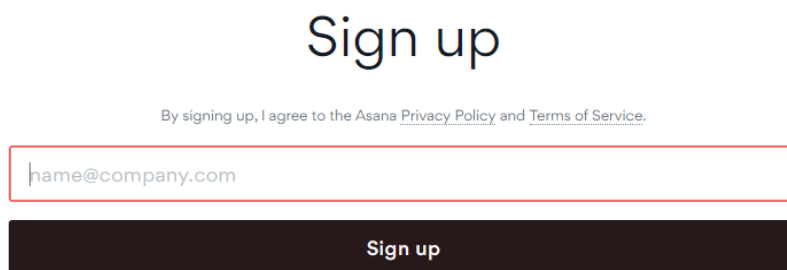
Figure 42: Next step of account registration

Source: excerpt from asana.com

After entering your e-mail address, click Sign up.

72

Please verify your email

Once you verify your email address, you and your
team can get started in Asana.

| Open Gmail | Open Outlook | Open Yahoo! |
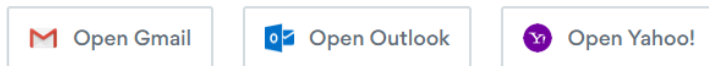
Didn't receive an email? **Resend email.**

Figure 43: Next step of account registration

Source: excerpt from asana.com

Go to mail and click on the link sent, you will confirm your email address with this.

Welcome to Asana!

You're signing up as mariusz.grzyb@g4.net.pl.

What's your full name?

Password

Password must be 8 characters or longer.

☐ Get feature updates and tips via email (recommended).

Continue

Figure 44: Next step of account registration

Source: excerpt from asana.com

Enter your full name and password.

Tell us about yourself, Mariusz

What kind of work do you do?

IT ▾

Continue

Figure 45: Next step of account registration

Source: excerpt from asana.com

In the next step, select IT and click Continue.

What's your main objective in Asana?

Your choice here won't limit what you can do in Asana.

▤ Project and process management
Plan projects, coordinate tasks, and hit deadlines

✓ Personal task management
Organize to-dos and plan out my work day

▥ Portfolio and workload management
Monitor status and team-member workload across multiple projects

Continue   I'm not sure yet

Figure 46: Next step of account registration

Source: excerpt from asana.com

Mark

Project and process management

Plan projects, coordinatetasks, and hit deadlines

Click Continue

Figure 47: Project creation

Source: excerpt from asana.com

Enter a name for the project and click Continue.

Figure 48: The next step in project development

Source: excerpt from asana.com

Enter the tasks and click Continue.
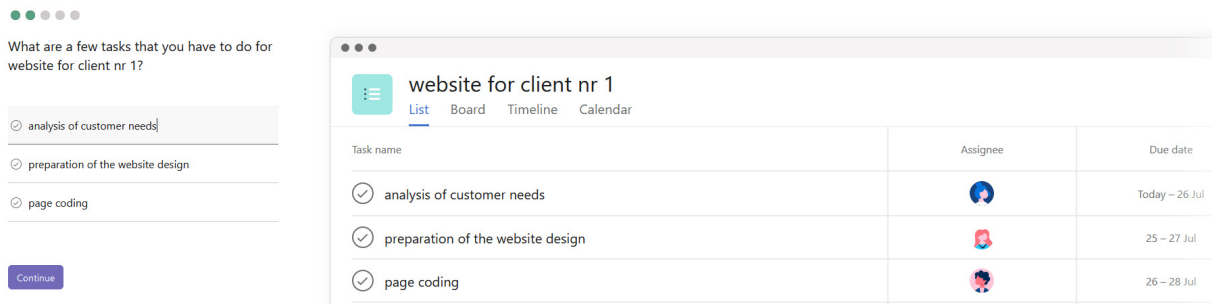
Figure 49: View of the tasks entered

Source: excerpt from asana.com

In the next step, enter and group the tasks into sections or stages.
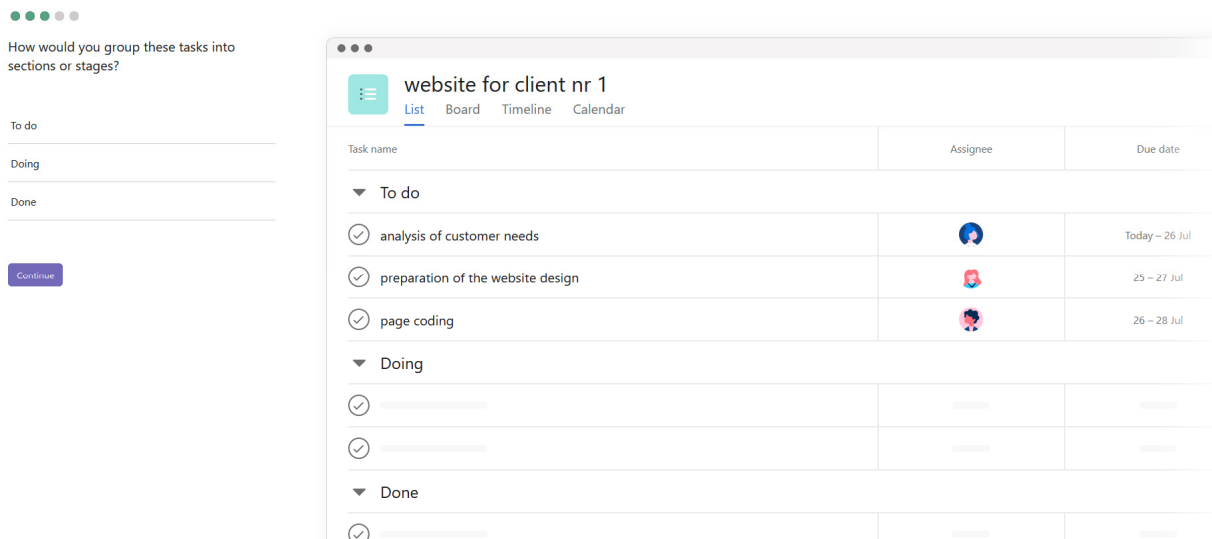
Figure 50: Dividing tasks into sections or stages

Source: excerpt from asana.com

Enter the names of each section or stage and then click Continue.
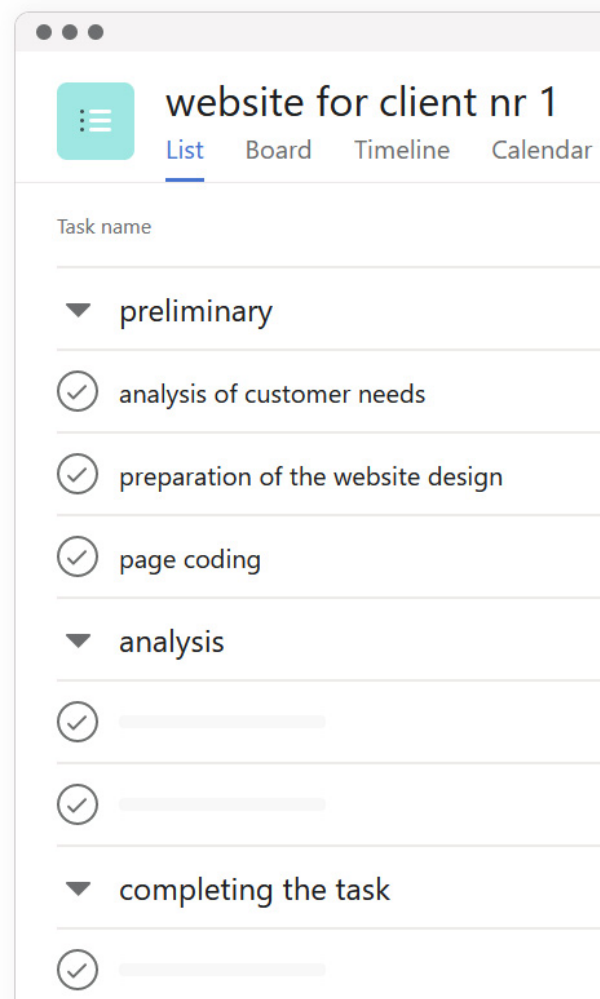
Figure 51: Division into sections or stages

Source: excerpt from asana.com

Choose the layout that works best for your project. You can always change this layout to another at any time during the project.

There are four layouts to choose from: List, Board, Timeline, Calendar
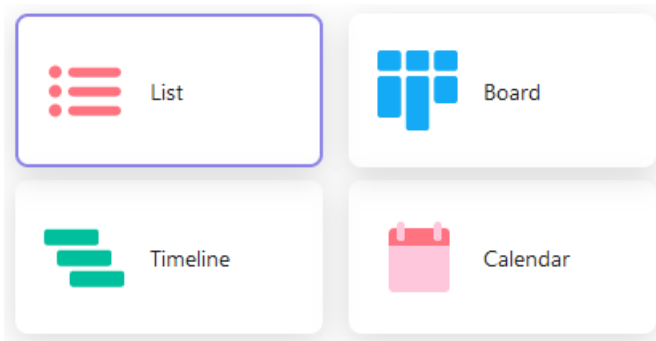
Figure 52: Arrangements to choose from

Source: excerpt from asana.com
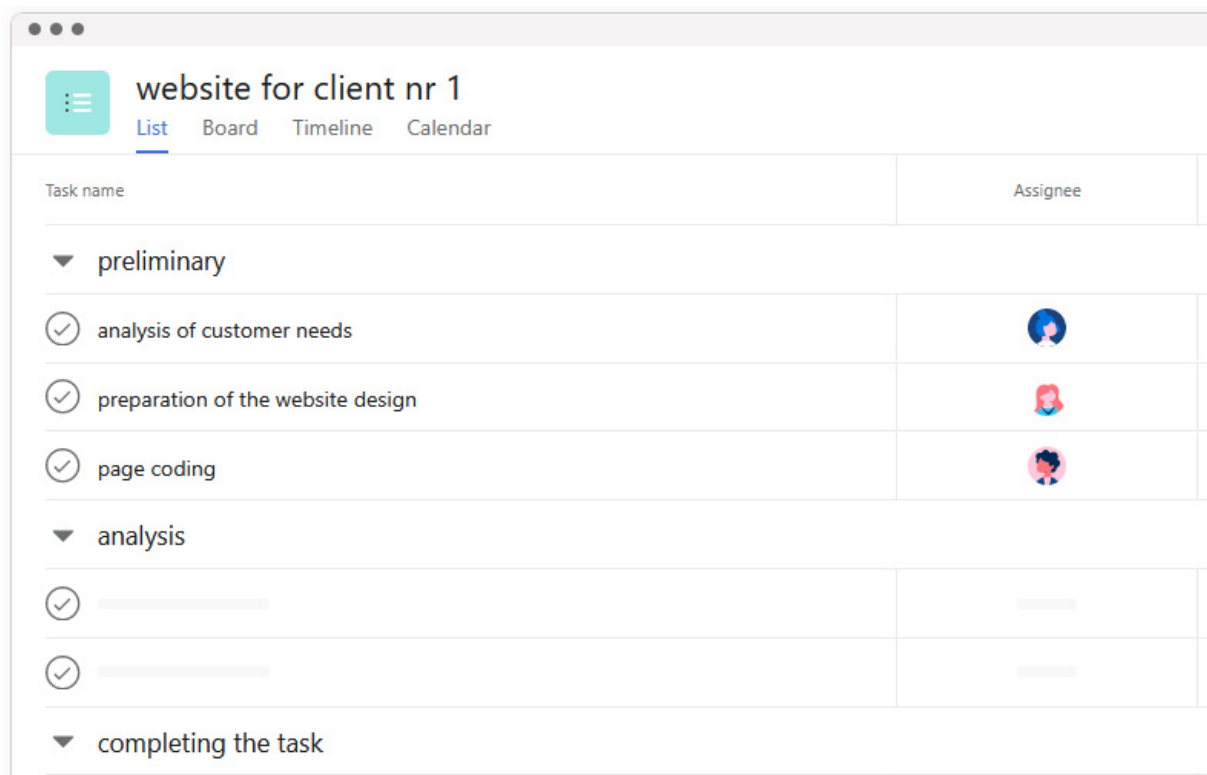
Figure 53: View of the List layout

Source: excerpt from asana.com
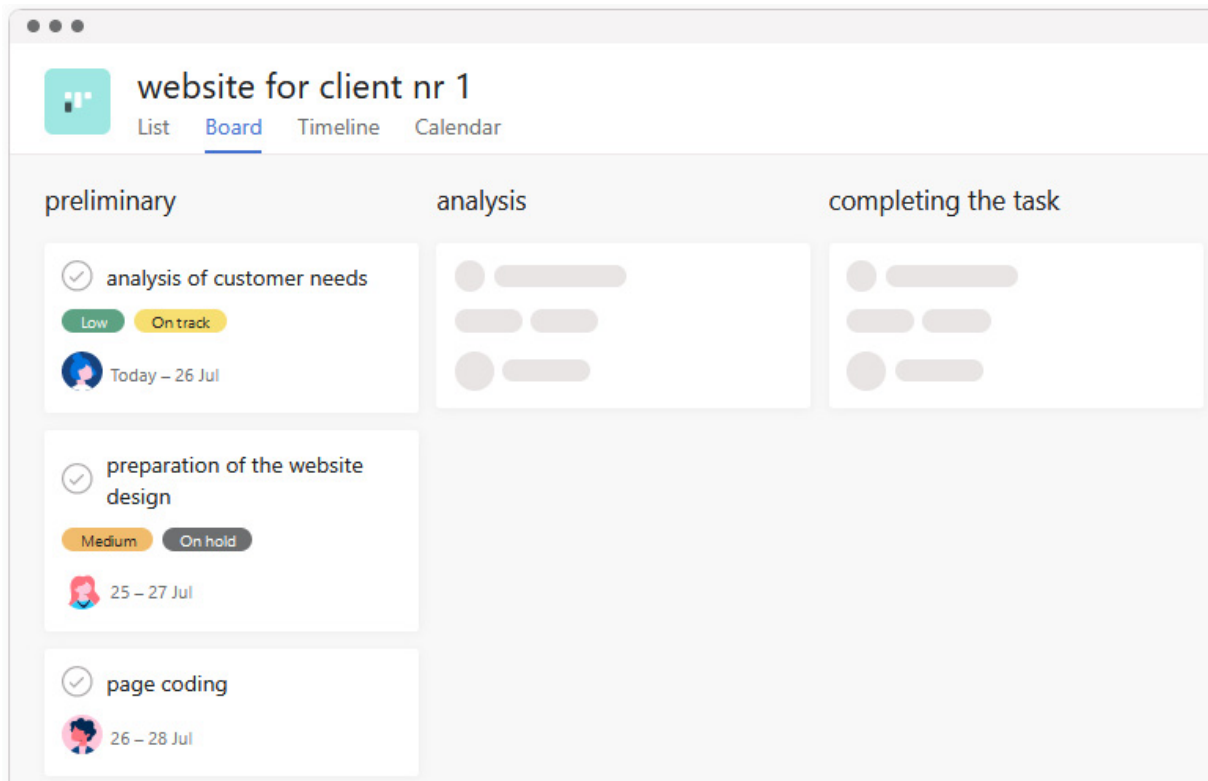
Figure 54: View of the Board layout

Source: excerpt from asana.com
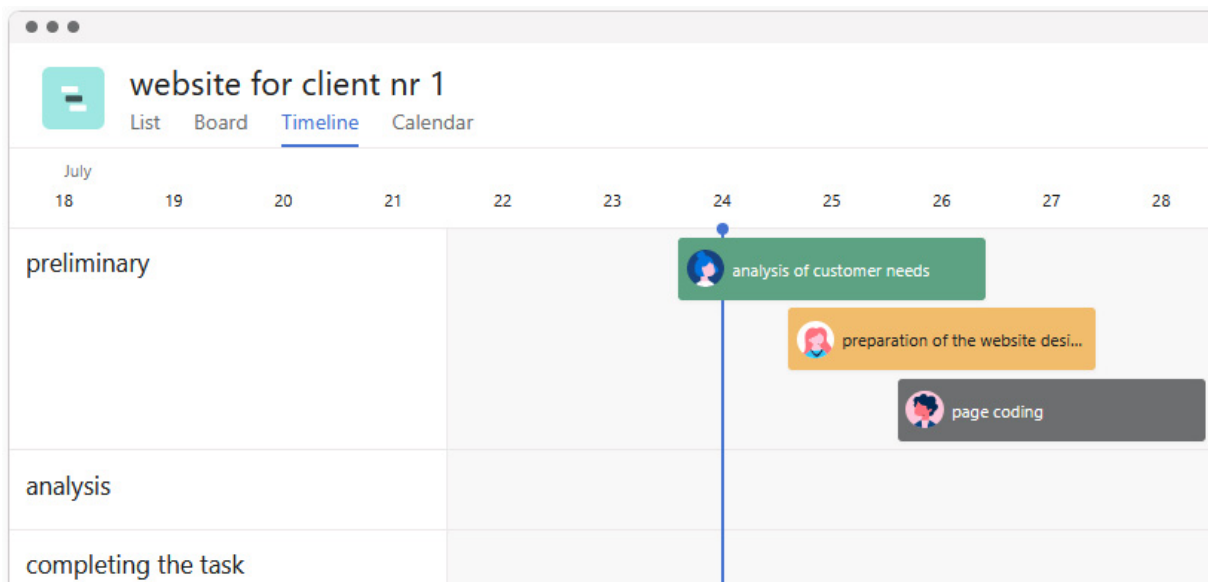
Figure 55: Timeline view

Source: excerpt from asana.com
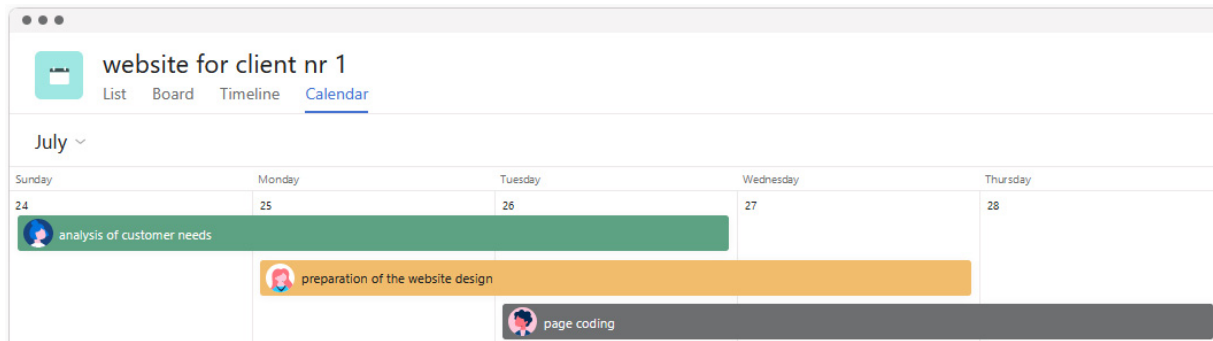
Figure 56: View of the Calendar layout

Source: excerpt from asana.com

For the next steps, we select the List layout and click Continue.

Figure 57: View of adding team members

Source: excerpt from asana.com

Once you have entered the email addresses of the participating team members, click Continue.

Get Asana for all your screens

Download Asana for iOS, Android, or
desktop. Work together from anywhere.

[↗ View apps and continue]   Skip for now
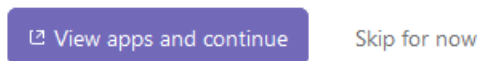
Figure 58: View of information about the possibility of using Asana on mobile devices.

Source: excerpt from asana.com

On the top right we have an icon with our initials. We click on it and then on My Settings....

[📁 Upgrade] MG

Mariusz Grzyb
g4.net.pl
...
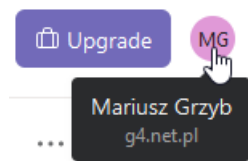
Figure 59: Option icon

Source: excerpt from asana.com

✓ g4.net.pl ●

Add Seats

Admin Console

More   ›

My Settings...

Privacy Policy

Log Out
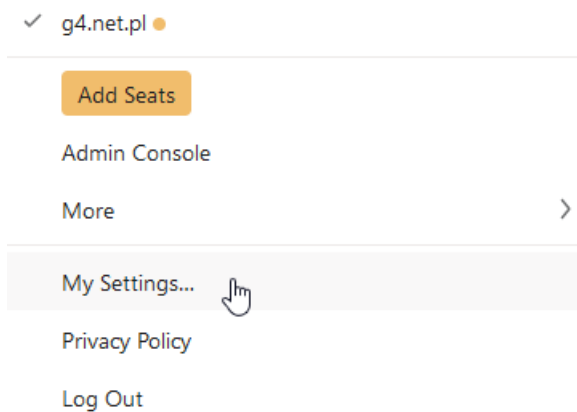
In Asana we also have the choice of Polish

Figure 60: Selection of settings

Source: excerpt from asana.com

In the Display tab we can set the Theme, Language and First day of the week

My Settings

Profile   Notifications   Email Forwarding   Account   **Display**   Apps   Hacks

Theme

Light ⌄

Language

English ⌄

First day of the week

Monday ⌄

Advanced Options

☐ Show task row numbers
☐ Enable compact mode
☐ Enable color blind friendly mode (protanopia and deuteranopia)
☑ Show occasional celebrations upon task completion
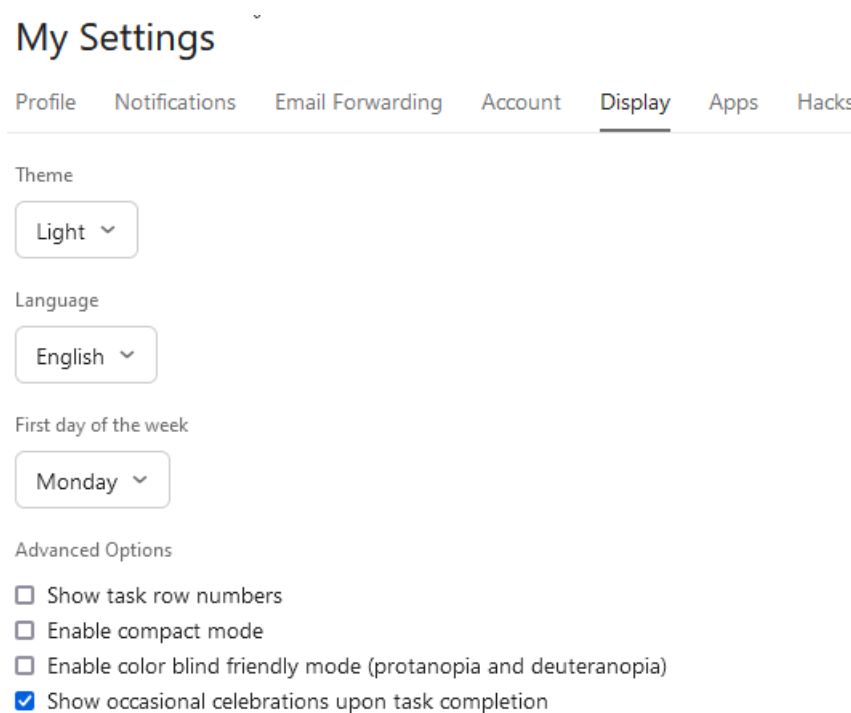
Figure 61: My Settings view

Source: excerpt from asana.com

We adjust Appearance, Language and First day of the week to our own preferences. We, for the purposes of this book, have set Appearance – Light, Language – English, First day of the Week – Monday. After changing the settings, we save and close My Settings.

We have completed the work of setting up the account, preparing the first project and basic settings. The next stage is to work on the programme.

On the left-hand side you will find a menu where you will find the three most frequently used functions used during project management.
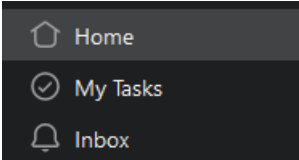
Figure 62: View of the menu on the left

Source: excerpt from asana.com

Click on Home and look for the Projects field
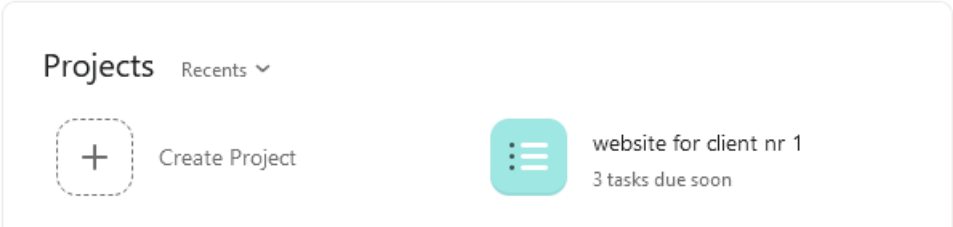
Figure 63: Dashboard view in Asana with projects

Source: excerpt from asana.com

We click on the project we created earlier. We start organising.
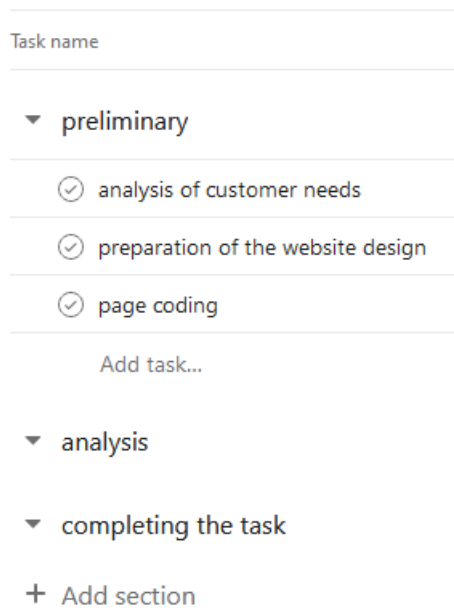
Figure 64: List view of our project

Source: excerpt from asana.com

To move the "preparation of the website design" task to the "analysis" section, hover the cursor over the task and, when the paw appears, click and drag it to the desired location so that the selected task is placed in the "analysis" section.
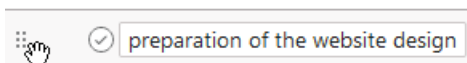
Figure 65: View of the paw when hovering over a task

Source: excerpt from asana.com

Task name

▼ preliminary

   ⊘ analysis of customer needs

   ⊘ page coding

     Add task...

▼ analysis

   ⊘ preparation of the website design

     Add task...

▼ completing the task

＋ Add section
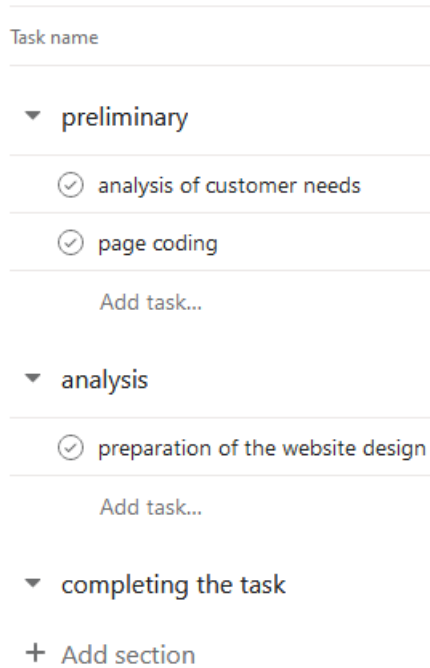
Figure 66: Project view with transferred task

Source: excerpt from asana.com

In the same way, we move the "page coding" task to the "completion of the website design" section in the next step.

If we would like to change the order of our sections, we hove over them with the cursor and, when the paw print appears, click the left mouse button and move them to the appropriate place.

Task name

▼ preliminary

　　⊘ analysis of customer needs

　　⊘ page coding

　　　Add task...

▶ completing the task

　　　　　⠿ ▸ completing the task

▼ analysis

　　⊘ preparation of the website design

　　　Add task...

+ Add section
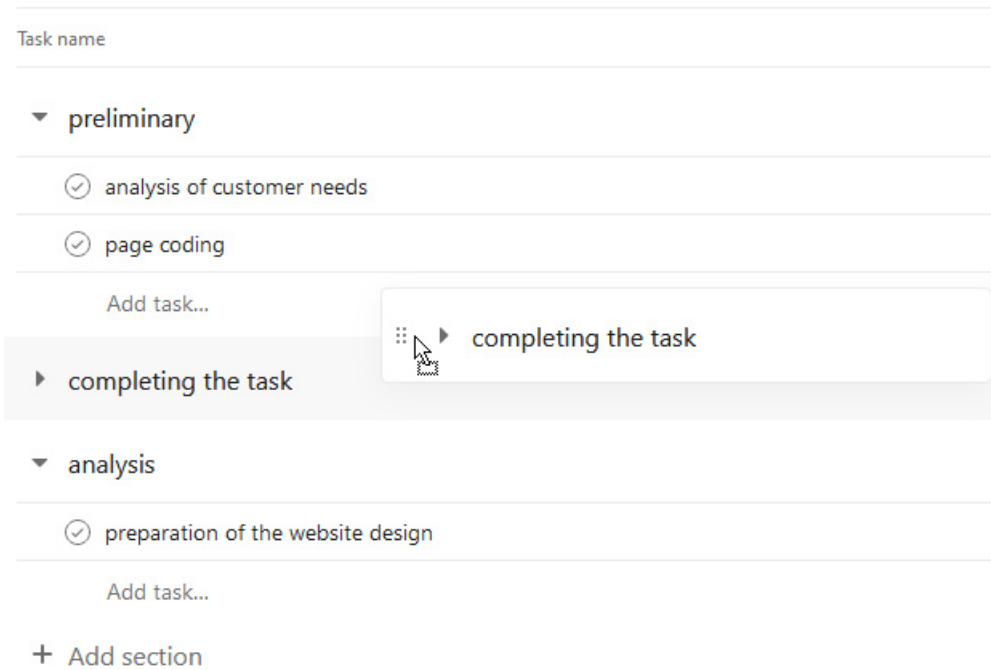
Figure 67: View of the section being moved

Source: excerpt from asana.com

　　　To rename a section or task, simply hover over it and click. Then enter the new name.

　　　We rename the analysis section to design part.

▼ | analysis I　　　　　　 | + ···

Figure 68: View of the section name change

Source: excerpt from asana.com

preliminary

    ✓ analysis of customer needs

        Add task...

design part

    ✓ preparation of the website design

        Add task...

completing the task

    ✓ page coding
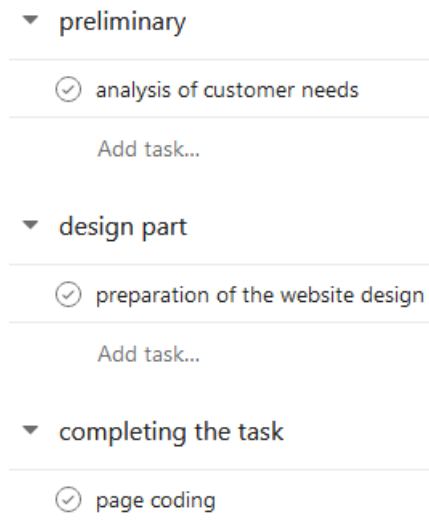
Figure 69: View of the list of renamed sections

Source: excerpt from asana.com

To add another section we click on + Addsection and if we want to add a task we click on Addtask....

completing the task

    ✓ page coding

        Add task...

+ Add section
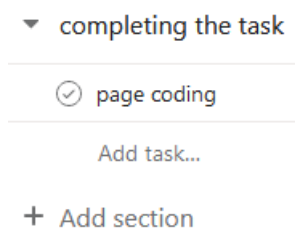
Figure 70: List view with sections and tasks with the possibility of adding more

Source: excerpt from asana.com

Add the task preparation of websitefunctionality and place it above the task preparation of the website design in the design part section.

Click on Addtask... in the design part section and enter a name.

design part
- ⊘ preparation of the website design
- ⊘ preparation of website functionality

Add task...
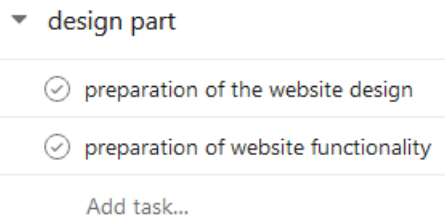
Figure 71: View of design part section with new task added

Source: excerpt from asana.com

Then place the task preparation of websitefunctionality above the task preparation of the website design. To do this, hover the cursor over the task preparation of websitefunctionality and when the paw print appears, click the left mouse button and move it to the appropriate place.

design part
- ⊘ preparation of website functionality
- ⊘ preparation of the website design

Add task...
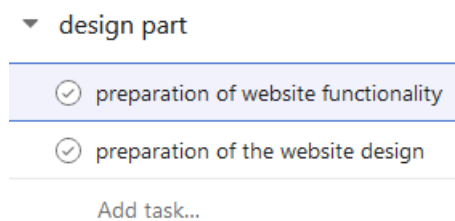
Figure 72: View of tasks after reordering in the design part section

Source: excerpt from asana.com

We add the introductorymeeting task to the preliminary section and post it first.

preliminary
- ⊘ introductory meeting
- ⊘ analysis of customer needs

Add task...
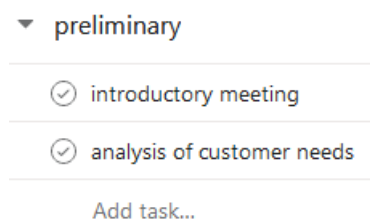
Figure 73: View of tasks after adding another one and changing the order in the preliminary section

Source: excerpt from asana.com

88

We can also use the + next to the section name to add more tasks.
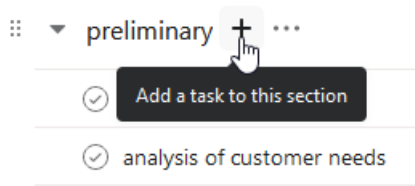
Figure 74: View of adding more tasks

Source: excerpt from asana.com

To delete a section, hover over the three dots next to the name, click the left mouse button and click Deletesection
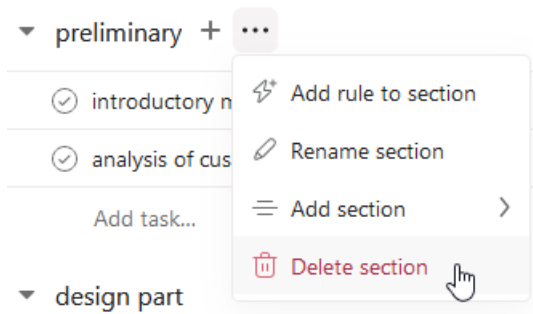
Figure 75: View of deletion of sections

Source: excerpt from asana.com

To delete a task, hover over it with the mouse cursor and click the right mouse button, then click the left mouse button and click "Delete task"
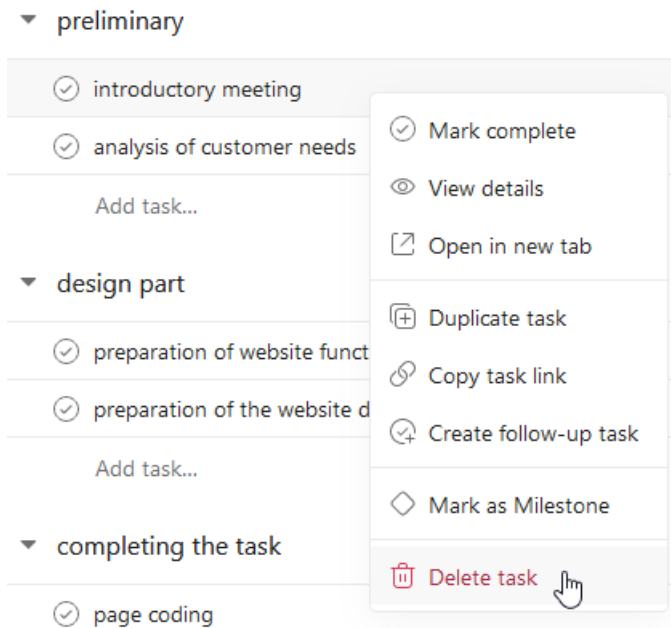
Figure 76: View of task deletion

Source: excerpt from asana.com

In the next steps, we move on to the settings of the individual tasks.

To access the settings for a particular task, click on the task with the left mouse button. A window will open with the settings of the clicked task.
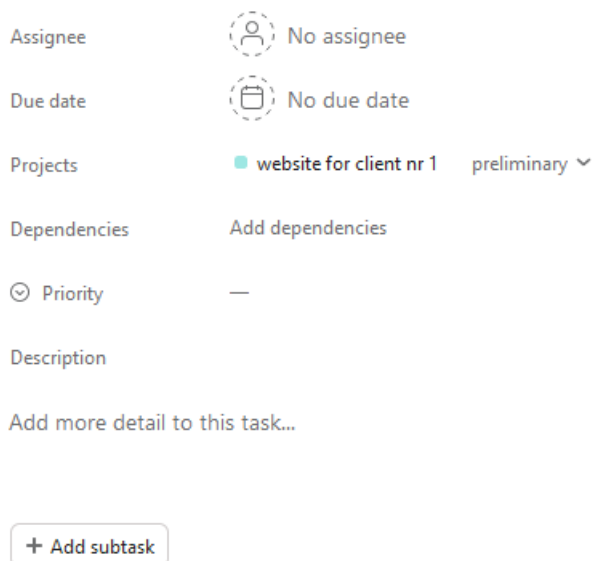
Figure 77: Excerpt view of the task settings before changes were made.

Source: excerpt from asana.com

90

We assign the task to the mandatary.
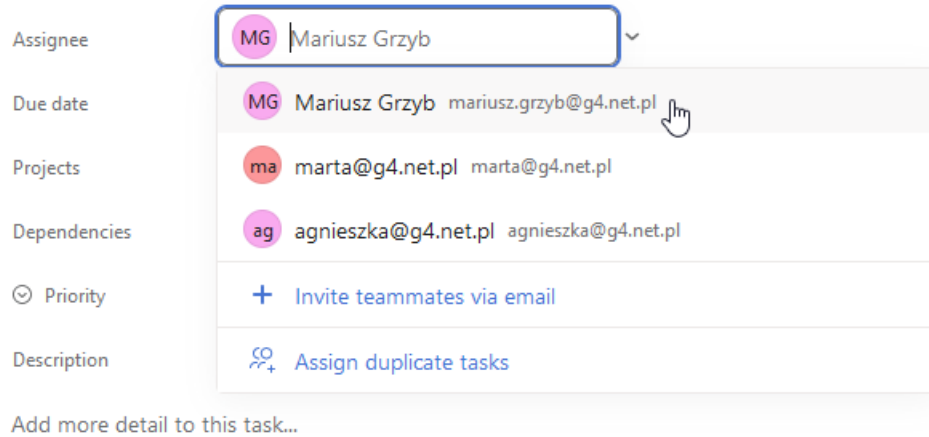
Figure 78: View of mandate assignment

Source: excerpt from asana.com

We set the priority of the task.
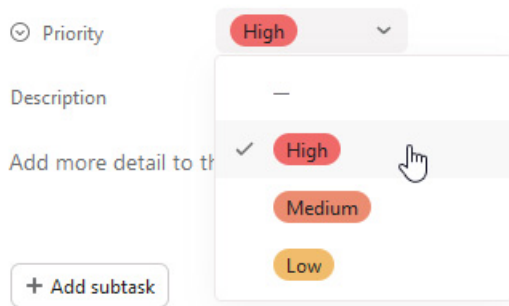
Figure 79: View of task priority setting

Source: excerpt from asana.com

We add a description to the task.
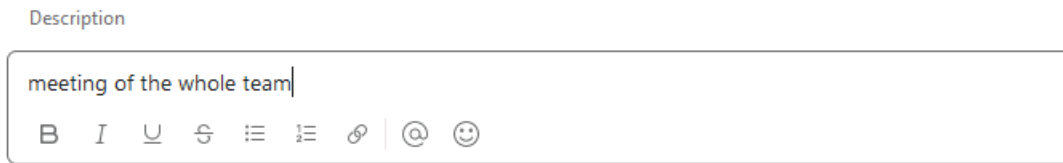
Figure 80: View of task description

Source: excerpt from asana.com

We add colleagues and write them a short message about the date and place of the meeting.
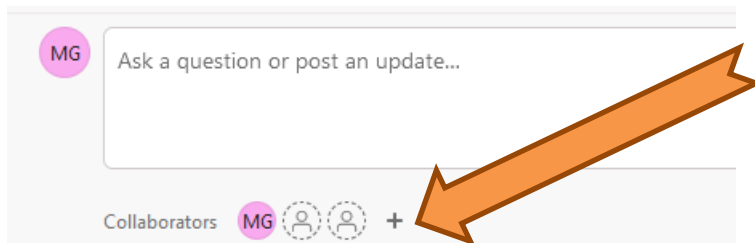
Figure 81: View of adding colleagues

Source: excerpt from asana.com

Figure 82: Adding collaborators

Source: excerpt from asana.com
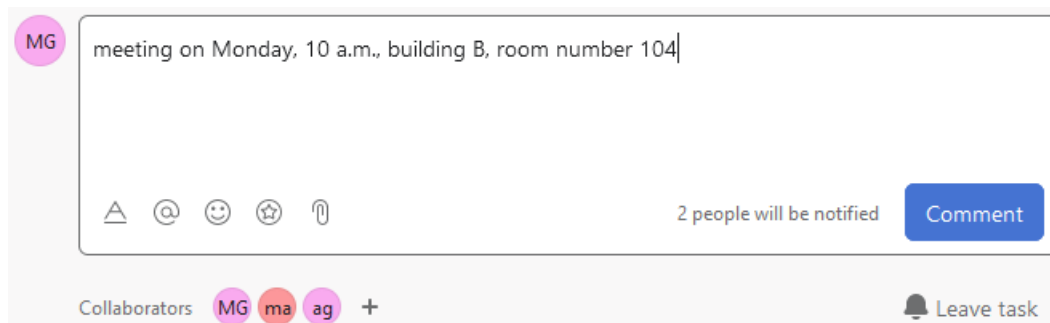
Figure 83: View of task comment entry

Source: excerpt from asana.com

MG Mariusz Grzyb Just now
meeting on Monday, 10 a.m., building B, room number 104

You can like the comment ☺
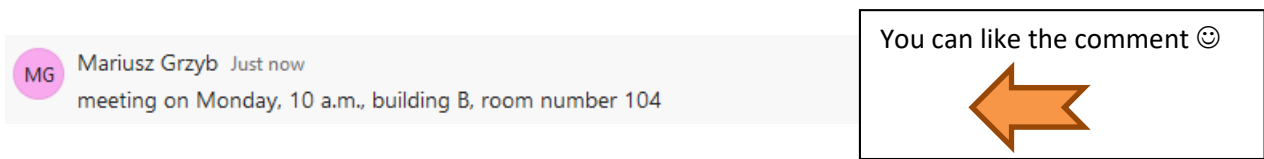
Figure 84: Introduced comment on the task

Source: excerpt from asana.com

The number of comments appeared next to the task.

▼ preliminary
   ⊘ introductory meeting   1 ⊙
   ⊘ analysis of customer needs

Figure 85: View of the number of comments on a task

Source: excerpt from asana.com

We can also add a file attachment to the task, which we can download from our computer disk or from popular cloud drives.

Attachments
Add a file to this task.
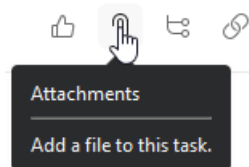
Figure 86: View of adding an attachment

Source: excerpt from asana.com
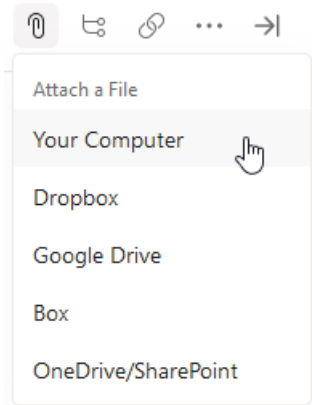
Figure 87: View of adding an attachment

Source: excerpt from asana.com

We can add subtasks to the sentence.
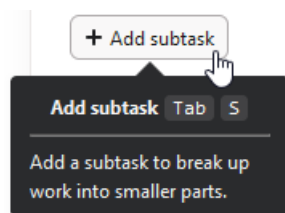
Figure 8: View of adding a subtask

Source: excerpt from asana.com

We add two subtasks "room reservation" and "order of coffee and cookies". We add the people responsible for the subtask and set a deadline for completion.
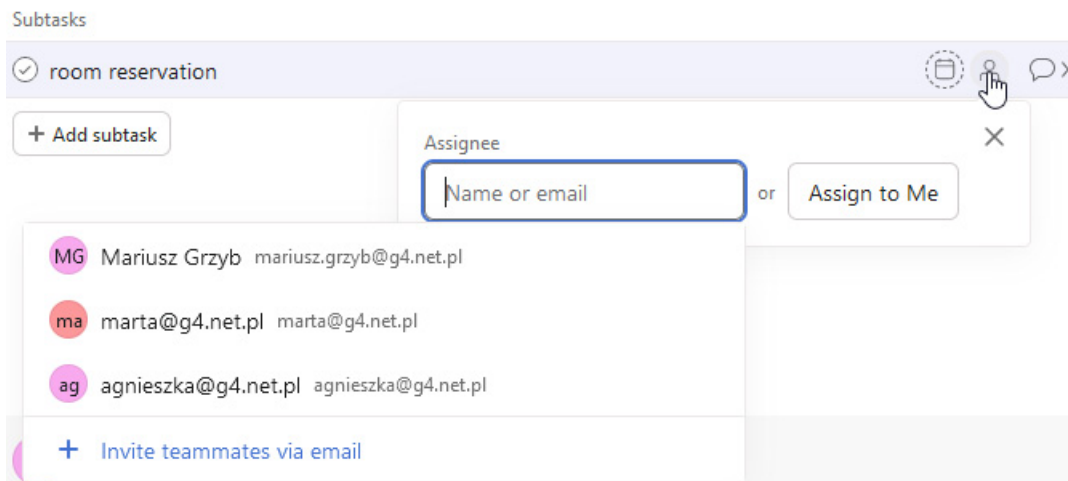
Figure 89: View of the introduction of a subtask and the person responsible for it

Source: excerpt from asana.com
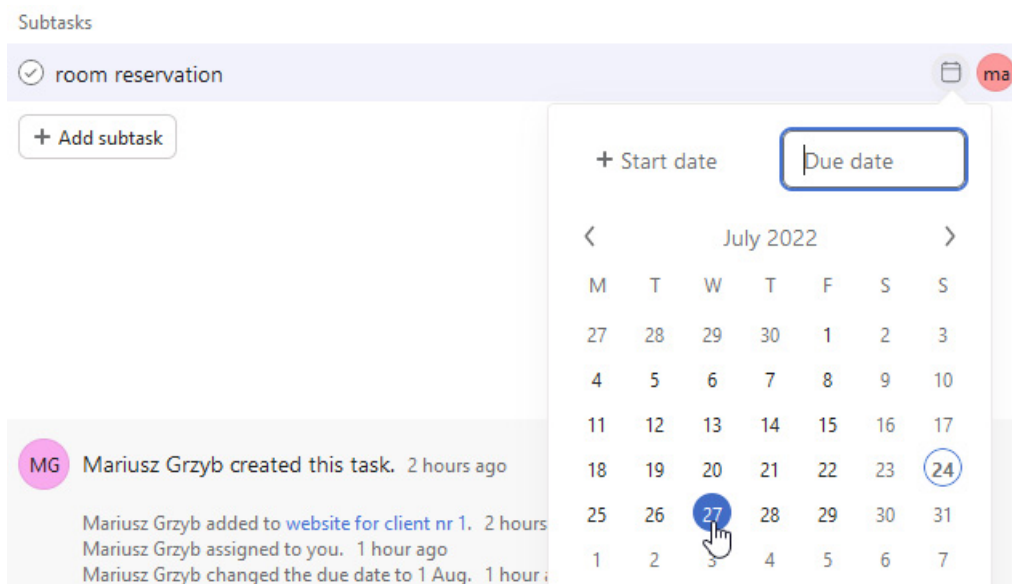
Figure 90: View of subtask and start date entry

Source: excerpt from asana.com

Figure 91: View of the subtasks and with deadlines and persons responsible for them

Source: excerpt from asana.com

Tasks and subtasks can also be tagged. To do this, click on the three dots on the right at the top of the task or underneath the task and then select Addtags.
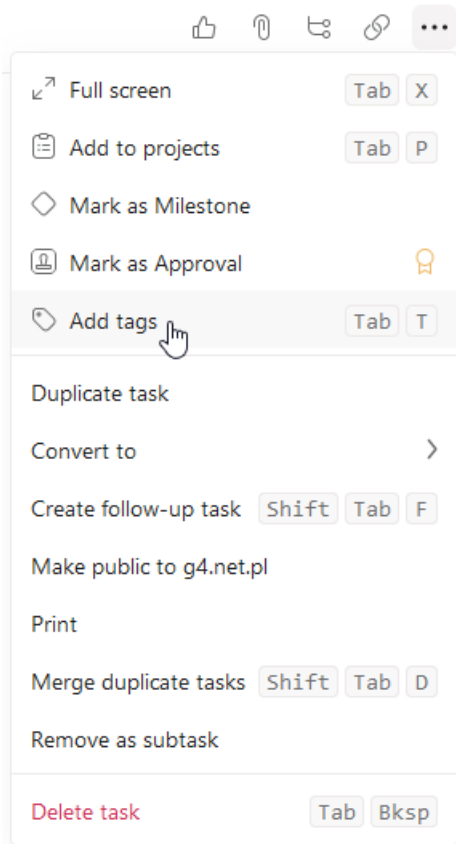
Figure 92: View has a selection of tags

Source: excerpt from asana.com

We enter the name of the tag and choose a colour for it in the next step.
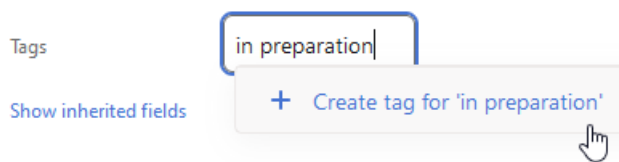
Figure 93: View of tag name guidance

Source: excerpt from asana.com

room reservation

Assignee	(ma) marta@g4.net.pl
Due date	Wednesday
Dependencies	Add dependencies
Tags	in preparation ×

Figure 94: View of a subtask with a tag added

Source: excerpt from asana.com

In order for such tags to be visible on the asana's desktop, their visibility must be turned on. To do this, click on the Customize icon on the top right and turn on the slider next to Tags

↑↓ Sort   ○ Public link: Off   ・・・   Customize

Customize   →|

Fields

+ Add Custom Field

Assignee   ⬤

Due date   ⬤

Created by   ○

Created on   ○

Last modified on   ○

Completed on   ○

Projects   ○

Tags   ⬤

Dependencies   ○
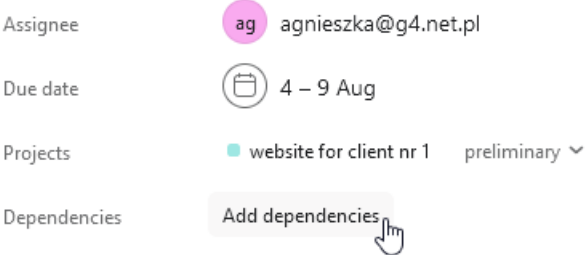
Priority   ⬤

Figure 95: View of the Customize menu

Source: excerpt from asana.com

Tasks preparation of "website functionality and preparation of the website design" cannot start until the analysis of "customer needs" task has been completed. To set this up, click on the task "analysis of customer needs" and then click on "Dependencies under Add dependencies".

Figure 96: View of adding dependencies

Source: excerpt from asana.com

Then set the Blocking option for the tasks preparation of website functionality and preparation of the website design

Figure 97: View of added dependency options for tasks

Source: excerpt from asana.com

In the tasks "preparation of website functionality and preparation of the website design", a blocking notice will automatically appear.

preparation of website functionality

Assignee	MG Mariusz Grzyb Recently assigned ∨
Due date	10 – 19 Aug
Projects	● website for client nr 1 design part ∨
Dependencies	⌛ Blocked by ∨ ⊘ analysis of customer needs · 4 – 9 Aug

Figure 98: View of a task with dependency blocking

Source: excerpt from asana.com

A similar subjection should be set for the pagecoding task, which can start only when the tasks preparation of websitefunctionality and preparation of the website design have been completed.

page coding

Assignee	ma marta@g4.net.pl
Due date	25 – 31 Aug
Projects	● website for client nr 1 completing the task ∨
Dependencies	⌛ Blocked by ∨ ⊘ preparation of website functionality · 10 – 19 Aug
	⌛ Blocked by ∨ ⊘ preparation of the website design · 13 – 24 Aug

Figure 99: Dependency view of the pagecoding task

Source: excerpt from asana.com

preparation of website functionality

Assignee	MG Mariusz Grzyb Recently assigned ∨
Due date	10 – 19 Aug
Projects	● website for client nr 1 design part ∨
Dependencies	⌛ Blocked by ∨ ⊘ analysis of customer needs · 4 – 9 Aug
	⊖ Blocking ∨ ⊘ page coding · 25 – 31 Aug

Figure 100: View of task dependency preparation of websitefunctionality

Source: excerpt from asana.com

preparation of the website design

Assignee	MG Mariusz Grzyb Recently assigned ⌄
Due date	▦ 13 – 24 Aug
Projects	● website for client nr 1 design part ⌄
Dependencies	⌛ Blocked by ⌄ ⊘ analysis of customer needs · 4 – 9 Aug
	⊖ Blocking ⌄ ⊘ page coding · 25 – 31 Aug

Figure 101: View of task dependency preparation of website

Source: excerpt from asana.com

The relationships will be perfectly visible in the Timeline view, where they will be marked with arrows.

Figure 102: Timeline view with dependency arrows

Source: excerpt from asana.com

For tasks and subtasks, set their start and end dates, responsible persons, priority tagged with inpreparation or done.

Taskname	Assignee	Duedate	Tags	Priority
introductorymeeting	Mariusz	1/08/2022	in preparation	High
roomreservation	Marta	27/07/2022	in preparation	Low
order of coffee and cookies	Agnieszka	28/07/2022	done	Low
analysis of customerneeds	Agnieszka	2-9/08/2022	in preparation	Medium
preparation of websitefunctionality	Mariusz	10-19/08/2022	in preparation	Medium

preparation of the website design	Mariusz	13-24/08/2022	in preparation	Medium
pagecoding	Marta	25-31/08/2022	in preparation	High

Table 1: Data to be entered for tasks and sub-tasks

Figure 103: Dashboard view of tasks, subtasks along with input

Source: excerpt from asana.com

Tasks and subtasks can be marked as completed. This is done using the icons in the task list, which turn green when clicked on and the task has a lighter colour.

Figure 104: View with marked tasks marked as finished

Source: excerpt from asana.com

We can display sections, tasks and subtasks in various combinations. For example, we can display only completed tasks.
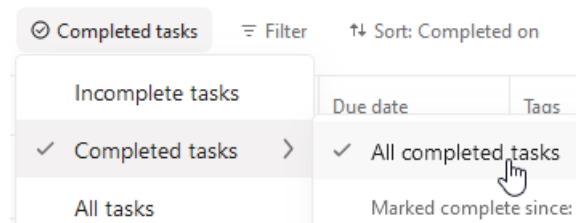
Figure 105: View has a menu for displaying finite tasks

Source: excerpt from asana.com
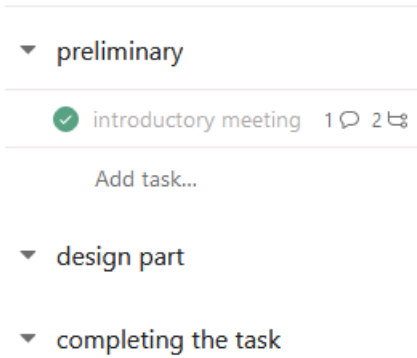
Figure 106: View of completed tasks in the project

Source: excerpt from asana.com
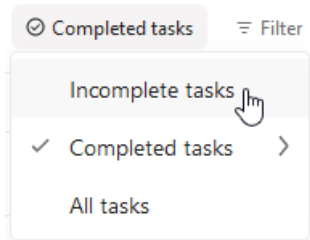
Figure 107: View has a menu to display infinite tasks

Source: excerpt from asana.com
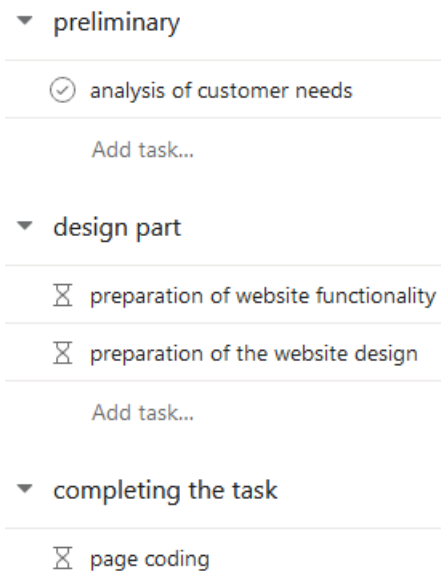
Figure 108: View of infinite tasks in a project

Source: excerpt from asana.com

Asana also allows filtering, where, for example, we can display only our tasks.
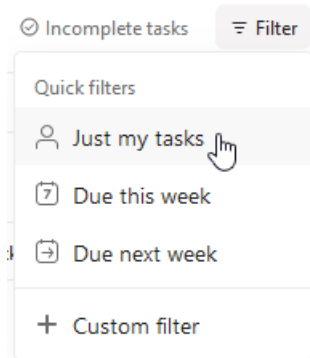
Figure 109: Filter view of Just my tasks

Source: excerpt from asana.com

Figure 110: View in which only my tasks have been filtered out

Source: excerpt from asana.com

Asana also offers the possibility of sorting.
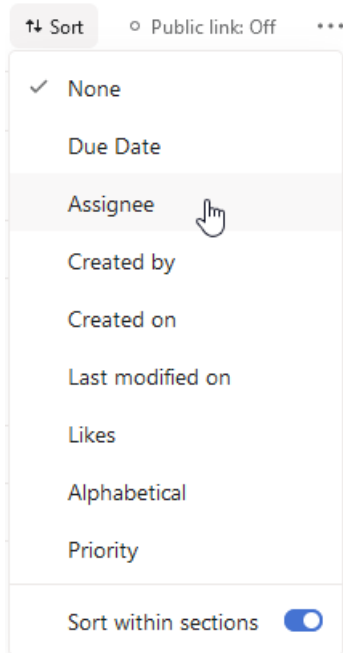
Figure 111: View of the sorting menu

Source: excerpt from asana.com

Figure 112: View of sorted tasks by responsible person

Source: excerpt from asana.com

In addition to the List view in which we have been working since the beginning of this one, we can also display our project in Board, Timeline and Calendar views.
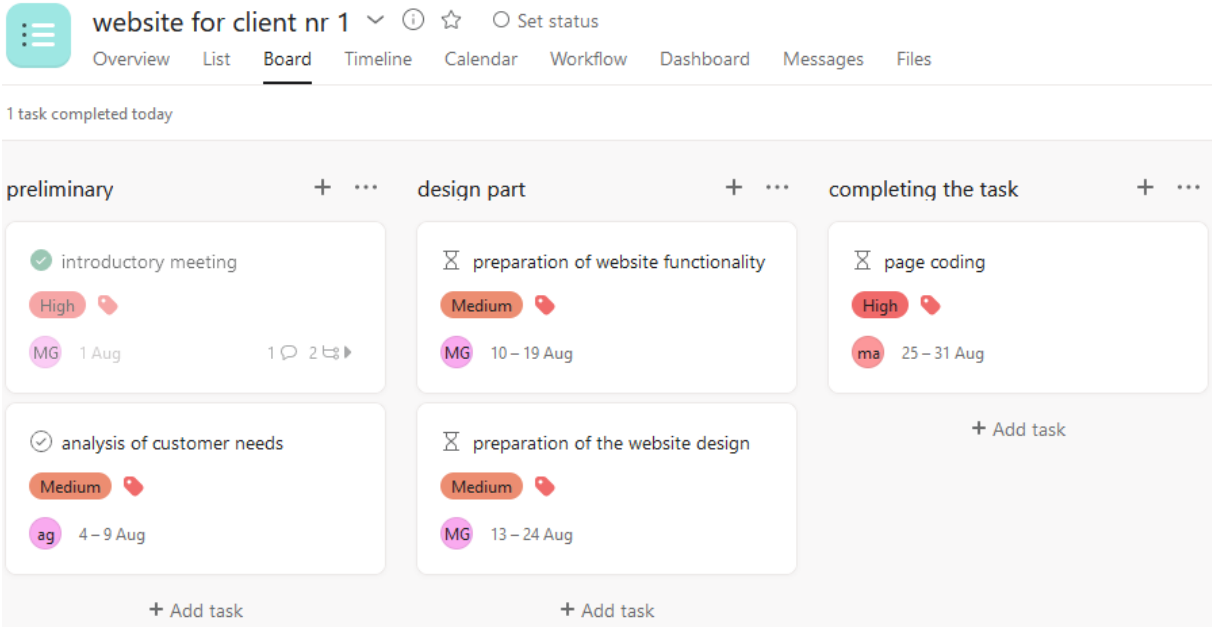
Figure 113: Board view of our project
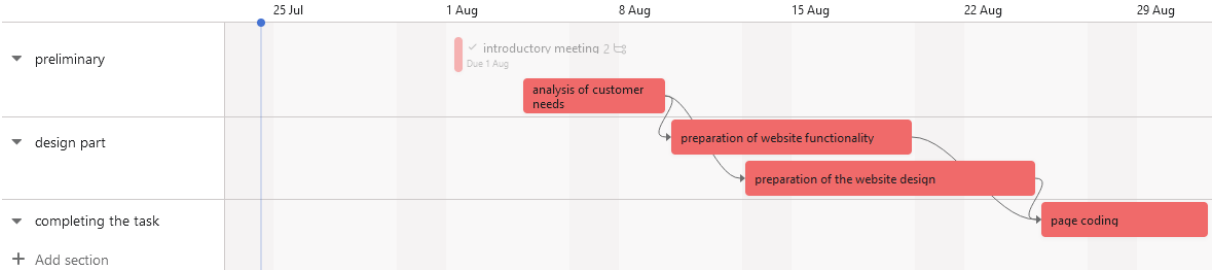
Source: excerpt from asana.com

Figure 114: Timelines view of the project

Source: excerpt from asana.com
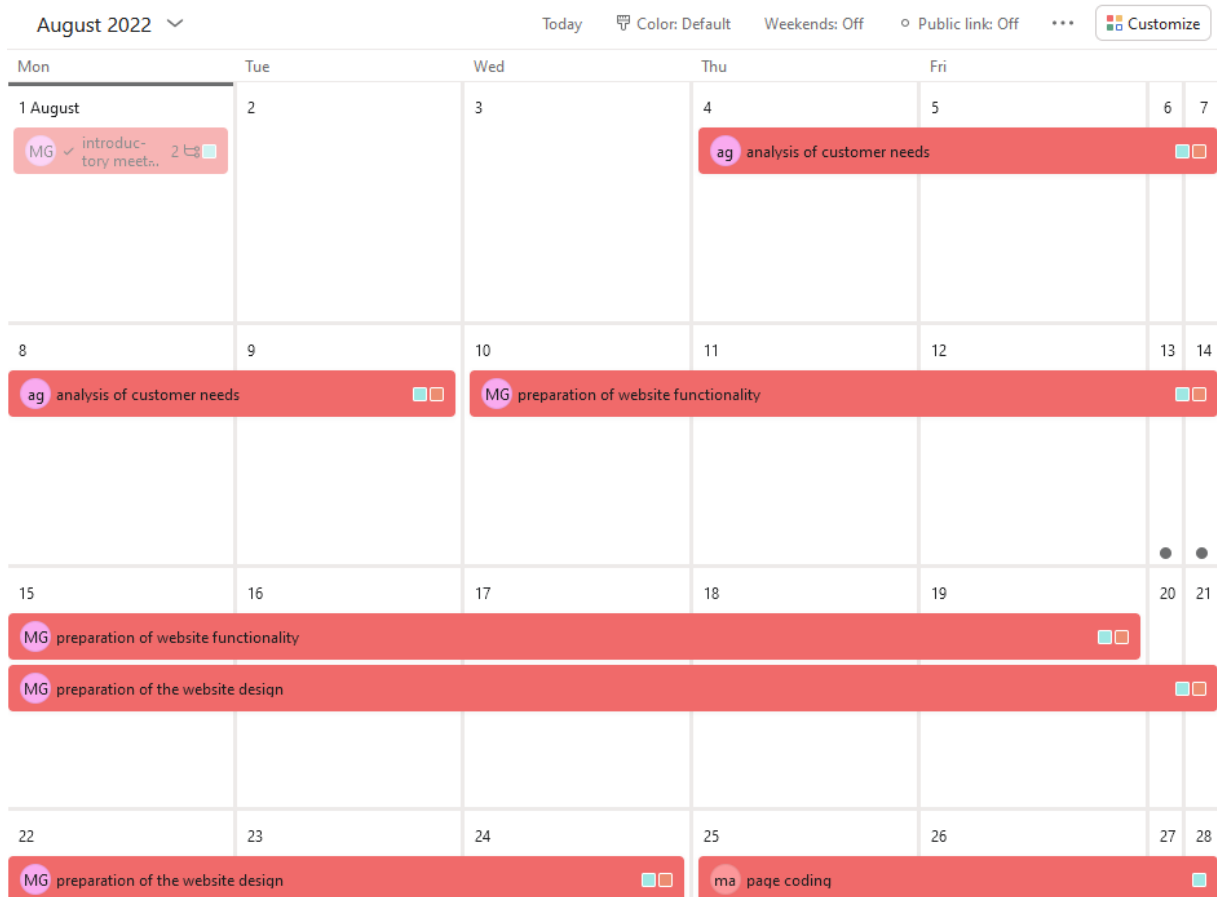
Figure 115: Calendar view of our project

Source: excerpt from asana.com

Asana allows you to send messages to individual users as well as to everyone in a project or the whole team. This can be done by clicking the + in the top right corner and then Message.
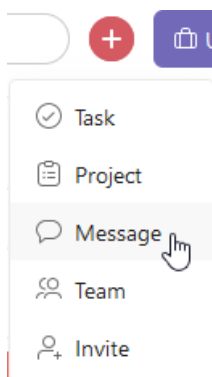

Figure 116: View of adding a new message
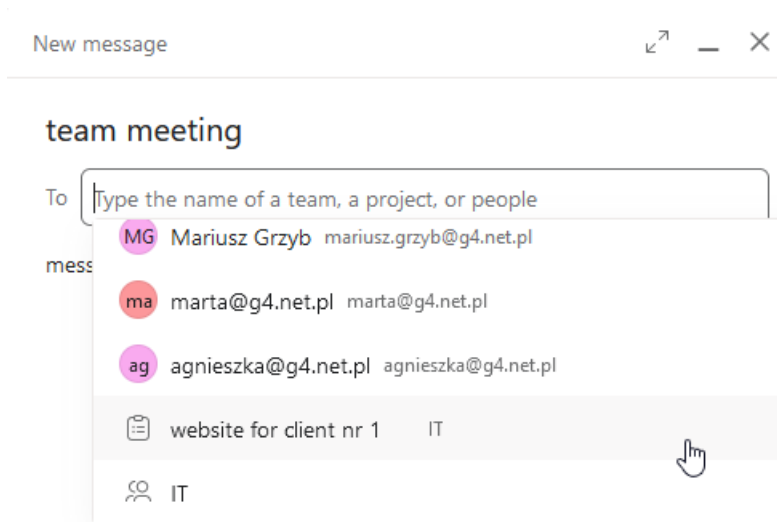
Source: excerpt from asana.com

Figure 117: View of message recipient selection

Source: excerpt from asana.com

Asana allows you to create and manage several projects at once. To add another project, we can use the '+' in the top right corner or the menu on the left. We can also use ready-made templates.
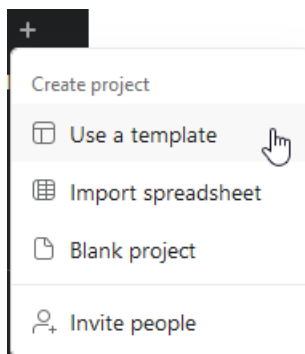

Figure 118: View of adding a project from the template, menu on the left

Source: excerpt from asana.com

Figure 119: View of new project templates

Source: excerpt from asana.com

6. Summary

Skilful project management requires theoretical knowledge, knowledge of management support tools, as well as experience.

The first chapters describe the basic issues of the subject. In addition to a glossary of terms, the definition of a project is discussed, what a project is, the objectives of project management, and the basic issues involved in setting and planning the implementation of project objectives are described.

Asana has been described as one of the management support tools. Thanks to the description of the various functions and actions to be performed inside the system, every user of this manual will be able to start working with the described tool.

The most difficult part turns out to be gaining experience. This is where the opportunity to participate in a simulation game comes to the rescue. During the game, participants are able to test their knowledge in „practice" during the implementation of their own project. This allows them to verify their knowledge of project management with reality, which can eliminate most of the mistakes that a person would make during the implementation of their first real projects in life.