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## Culture managers education: system dynamics model of the coworking design centre

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### Abstract

Coworking Centre is a concept of joint use of space by individuals working in related spheres that seek their chance in the labour market as freelancers. The strategy for the development of creative region mentions coworking centres as one of its tools. This article aims to create a business model of the Coworking Design Centre. By simulating a coworking centre model we are increasing knowledge of the culture managers about this type of business. We have introduced teaching business using the system dynamics modelling for students of art disciplines in order to raise the level of economic education, awareness and success in business through the Coworking Design Centre.

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### 1. Introduction

Many towns and regions across Europe ensure sustainable development through investing into cultural and creative industries. Universities play a strategic role in these activities, providing they are ready to support the creation of new business models. One of the innovative business models is a coworking centre, which offers outstanding possibilities in terms of employing graduates from creative subjects. A coworking centre is a real work phenomenon of our time. It is a concept of joint use of space by population with similar work orientation, who look for work in the labour market as freelancers.

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Florida (2002) called the group of people who work in cultural and creative industries the creative class. According to him, it includes the people who work as scientists, engineers, designers, architects, or in the spheres of education, art or entertainment. Their mission is innovation: they come up with new ideas and technologies. Florida claims that it is just the concentration of these people that functions as the drive for economy and development of towns and regions. Thus the key aspect for the competitive strength of a region is to attract such a group of people, cultivate them and motivate them for work within the region which makes effort to achieve economic growth. The creative class includes three groups of people: “inspirers”, implementers (creators of cultural and creative products) and promoters (competent to sell the products). The problem of the Czech creative business environment lies in the fact that only the implementers receive education (Gebrian, 2010). The strategic role of the Coworking Design Centre is to support sales of products of cultural and creative industries.

A coworking centre also provides the members of the creative class community with an opportunity to share ideas and a possibility to create. Coworking centres are a suitable space for setting up and preserving spin-off companies that commercialize the intellectual property created at university. A coworking centre aims at business success, but at the same time also has social impact in the form of cultural development and social inclusion (Žáková & Cikánek 2012).

Business in the form of setting up a coworking centre is, however, always accompanied by concerns about its economic prosperity. The sustainability of creative coworking centres depends on many external and internal factors: prosperity of companies participating as members of the coworking community, communication between the members of the coworking community, interest of new customers in participating in the community. In the Czech Republic, the risks of this type of enterprise is higher in medium-sized towns (compared to the capital, Prague), because there is not sufficient potential of economically productive members of creative class. On the other hand, starting business of a coworking centre in a medium-sized region increases the chances for economic development of the region, which in return creates a better position for economic sustainability of this business model.

This article focuses on educating cultural managers in the sphere of setting and testing these new business models. The aim of the article is to describe the creation a unique new business model for the Coworking Design Centre. Its simulation should lead to increasing the knowledge on the part of culture managers about this type of enterprise. Teaching business with the use of system dynamics modelling has been introduced in the instruction for arts students as the representatives of the creative class with the objective to increase the level of economic education, caution, and success in doing business through a coworking centre.

## 2. Theoretical Background

The mission of universities taška focused on educating students in creative industry fields is to prepare students not only in terms of creative and artistic work but also in terms of culture management, so that they are able to employ their talents in commercial or non-profit economic sectors independently and effectively. The efficiency of the individuals involved in the learning process thus depends on interconnecting the subjects that have been taught separately until now. As Forrester states (1968), we need to increase future managers' understanding of mutual relations between separate functions of a company. One of the aims of education in artistic subjects is to improve the economic thinking in students. The effort to interconnect subjects can be seen in both directions also at other universities, for example in technical engineering students, who improve their creative thinking in design courses (Pun, 2012).

Through modelling, students of arts subjects gain knowledge that is needed for doing business, knowledge of company economy, accounting, and overview of using money from grant programmes. Models focus on economy of small and medium-size businesses because the knowledge of economy of this type of businesses is crucial in creative industries – they are most likely to offer placement to creative courses graduates. The latest estimations reveal that cultural and creative industries belong to the most dynamic European sectors and represent up to 4.5% of the total GDP in the European Union and approximately 3.8% of total workforce (Building a Digital Economy, 2010).

Business based on cultural and creative industries has similar economic targets as in other industries but the production is different. In creative industry, authors have authorial relationship to their production, and production of works of art is a high-risk activity. Creative companies sell (through their employees) an idea transformed into a physical product such as a DVD, book, piece of furniture, tool, paper, photograph and others. However, the value of

this production does not lie only in the physical form of the product but also in the idea, in its authorial aspect. As Kloudova (2010) states, creating an original idea is not a matter of education or concentration. It is often a matter of good luck and, above all, talent. Nevertheless, even talent needs to be promoted and sold so that it can be further supported and developed. In other words, the talent must „pay off“. That is why, within our education of cultural managers, we offer creative companies' economists and producers a new attitude to doing business with systemic approach and dynamic elements.

Most business plans provide their authors with economic data on the company development over the period of up to one year. Such plans, when used for business in creative fields, are usually limited to the linear development of the revenue, profit and cash flow. A strategic business plan prepared in advance for several years is rather an exception. Modelling with the use of dynamic variables and software designed for this modelling, contains three aspects that most business plans are not able to take account of: non-linear character, delay and influence of feedback. As Šusta (in Neumaierová, 2005) states, managers' decisions are an attempt to solve a complex problem of a company, and the first attempt is rarely successful. Proving the correctness of the mental model with the use of expressing it in a system dynamics model is more accurate, while this model is also more efficient in estimating the impact of managerial decisions on the economic development of the company.

The business plan was prepared for a model coworking centre focused on design. From chapter four on, the text mentions specifically the COWORKING DESIGN CENTRE. Žáková & Cikánek (2012) state, that cultural and creative industries need suitable space with creative atmosphere for cooperation and networking. It is reasonable to support such working environment that enables meeting, innovation and business development. Coworking centres enable sharing of knowledge and experience, they create ad-hoc work and project teams, and are most effective for the sphere where freelancers and small businesses prevail. Strategies for the development of a creative region list a coworking centre as one of their tools.

At present, design is considered an important factor in competitive strength (Žáková & Cikánek, 2012). It is one of the significant areas of innovation, because thanks to it more innovative products, services and environment can be created, which better satisfy people's needs, provide more of the aesthetic pleasure and improve the quality of life. Focus on design was also chosen as it is the most complex of all subjects of cultural and creative industries. In the broad sense of the term, design includes audiovisual and animation work, if we use these two subjects in marketing and distribution processes for design products.

### 3. Research Methods

The main research method is system dynamics modelling, which enables study of complex feedback systems for the purposes of controlling these systems. In order to enable the use of this method, a set of elements for the creation of the model must be prepared. The set was established on the basis of two additional research methods:

1. Analysis of coworking centres in the Czech Republic
2. Designing of causal loop diagram following the concept of system thinking (Senge, 2007)

Coworking centres in the Czech Republic were analysed with the use of a combination of these research methods: content analysis of case studies on creative centres and creative neighbourhoods (Marková, Slach & Hečková, 2013), and research in coworking centres in the Czech Republic. This qualitative research in coworking centres carried out by the authors of this paper was carried out through in-depth interviews with businesspeople, who are founders of coworking centres and were willing to share their experience with the research team. The interviews were carried out in eight coworking centres, three in Prague, the capital of the Czech Republic, one in a bigger regional town and four in smaller towns around the Czech Republic.

The elements of the studied system were compiled into a table (Tab. 1) with the help of a detailed analysis of the interviews recordings. The table presents and critically evaluates the main aspects of this type of business. The data found in the research was supplemented on the basis of searches of Czech coworking centres' websites.

### 3.1. Causal Loop Diagram

To describe behaviour of any system in a clear, comprehensible way, the best tool to use is a causal loop diagram. It is a graphic tool which enables sufficient generalization of the data discovered on the studied phenomenon. Causal relations between the variables in the loop diagram are shown with arrows. An arrow with the plus symbol (+) is positive and means that the change in the previous element has the same tendency (to increase or decrease) at the following element. An arrow with the minus symbol (-) is negative and means that the change of the element in the model will result in an opposite tendency (to increase or decrease) for the following element. For instance, the relation between the elements „costs“ and „profit“ is negative, but the relations between the elements „orders“, „revenues“ and „profit“ are positive.

A model of each activity depicted with the use of a causal loop diagram is shown in Fig. 1. A coworking centre is shown in the loop diagram in a simplified way, with the use of the main elements the company consists of: customers, bank account, revenues, costs, profit and staff. This form of a model is simple, relevant and intuitively understandable, yet the picture of the company operations it offers is not too simplistic.

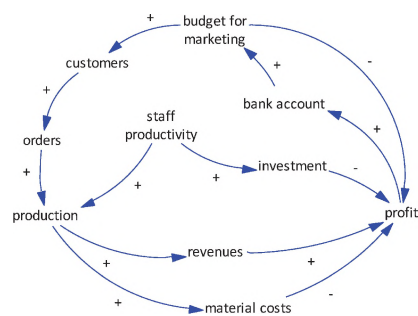


Fig. 1. General feedback loop diagram of the Coworking Design Centre activities

A causal loop diagram (Fig. 1.) is a model illustration of the situation in a company that focuses on services in design or produces design products. As every model, it is a simplification of the reality with the advantages and disadvantages following from the simplification. Even if this model seems closed, it can be extended with further elements and relations. These extension always depend on fulfilling a certain purpose for which the model was designed. The purpose is mostly to find an answer to a question through the simulation of model behaviour. Our problem question is generated by the business environment in which the model is contained: under which conditions will the coworking centre be economically sustainable for a period longer than one year?

### 3.2. System Dynamics Model

In order to make the main research method fully understandable, it is necessary to explain several basic principles and graphic symbols (Fig. 2.) System dynamics puts emphasis on stocks and flows, and their relation to the feedback loops. Each element of the system (i.e. in the loop with feedback) is either stock or flow. Stocks are characterized by having memory, that means they do not change immediately. Stocks can only be changed by flows, but it requires certain time. The delay is sometimes very small, other times it can be significant, but it always occurs in the system. Delay is thus a rather tricky feature of systems. It complicates the solution because it separates problems from their manifestation in time.

Flows are manipulated variables, they accumulate and create dynamic behaviour. That means that dynamics is not formed by the feedback loops. It is simply behaviour that is a result of flow accumulation. As Forrester (1992) puts it, only the degree of flow alters the stocks. Decision controls the degree of accumulation of flows. In other words, decision controls all change processes.

In the model there are also additional variables, which include algebraic calculation of any combination of stocks, flows, constants or other additional variables. Constants are exogenous parameters of the model. Additional variables do not have memory, they change immediately, without a delay. They can be the entry into flows but are never an entry into stocks, even though in models they can serve to express the original level of stocks. The symbol of „cloud“ is used to show the borders of the model.

So that the system dynamics model can truthfully capture the problematic behaviour of the system, it must represent the basic structure of the politics of the given system (Šusta in Neumaierová, 2005). The programme Vensim by Ventana Systems (Vensim, 2005) was used to formalize feedback loop diagram (Fig. 2.).

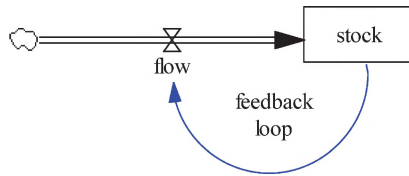


Fig. 2. The symbols used in the model: Stock, Flow, Feedback

The basis of an economic prototype for coworking centre is a model of a smaller company at the beginning of its existence (Schwarz & Schöneborn, 2004). In order to prove the economic prosperity of a company, the stocks used are profit and bank account balance (cash flow). Fig. 3 shows a simplified model of stocks and flows within the company based on a feedback loop diagram (Fig. 1.).

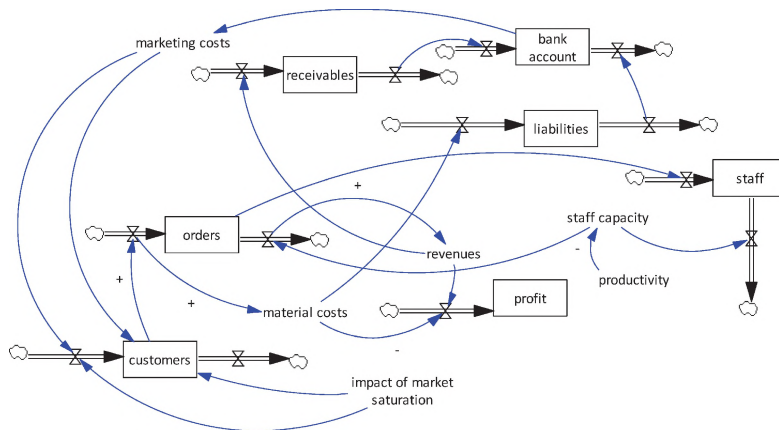


Fig. 3. Model of stocks and flows within one business activity of the Coworking Design Centre

The basic system dynamics model of a company (Fig. 3.) contains all economic operations so that it provides complete data for the balance sheet, profit and loss statement and cash flow review (Yamaguchi, 2004, Šviráková 2012). The model also includes the starting business loan for launching the coworking centre operations. The model enables simulation of revenues, variable costs including personnel expenses, it enables setting fixed costs such as rent. The decision making element for further strategy of investment in the model company is its payment ability. The model is sufficiently variable, it is possible to change the input parameters, set the variable conditions, assumptions and expectations of the entrepreneur, so that they are able to prepare for the probable economic and payment situation of their company. The data entered into the model enable control of correct results in the company accounting and correctness of the entrepreneur’s strategic considerations, decision-making mechanisms and impact of the decisions on the economy of the modelled company.

#### 4. Outline of the basic model structure

The research into coworking centres in the Czech Republic (Tab. 1) proved that especially in smaller towns entrepreneurs offer only sharing of spaces, but not of other services and activities that are an essential part of a coworking centre. They are motivated by the tendency not to take too big risks and so to maintain good condition of their business. The life-cycle of such a coworking centre is then usually shorter and the centre finishes its business activities within three to five years.

Therefore, two groups of coworking centres were created for the purposes of modelling. The first group (Group 1 in Tab. 1) consists of coworking centres that offer its customers only space rental. Out of eight coworking centres studied, this type of business was done in half the cases, and those were all coworking centres in smaller towns. The other group comprises coworking centres that offer their customers more than one coworking activity (Tab. 1).

By comparing the two approaches through the system dynamics model, we want to show the students that in long-term, it is more convenient to offer more activities in the coworking centre, even if at a higher risk.

Table 1. Structural elements of a coworking centre based on the research results

Structural elements of the business plan (Osterwalder & Pigneur, 2010)	Group 1	Group 2
Mission	None.	Important for the overall orientation of the coworking centre. Thanks to the shared mission, companies with similar work and aims will gather in one area. Mission of new coworking centre members is checked in the initial interview with a membership candidate.
Objective	Profit from rental.	To support beginning entrepreneurs, small companies, to help to create informal networking, encourage cooperation between companies, profit from rental, shop and club operations.
Customers	Entrepreneur looking for cheap spaces to rent.	An independent professional, beginning entrepreneur, creative worker, university graduate, cultural activist.
Turnout	Tenant's payments are fixed, monthly sum; turnout is therefore not of importance for the entrepreneur.	Turnout grows when events are organized in the centre. Therefore, activities that increase turnout are emphasised, even if they are not profitable: educational and social events for members.
Value offers	Space rental for business activities, separated offices, emphasis on quiet workplace for each entrepreneur, copy machine and other equipment in shared spaces, meeting room, kitchen.	Shared space, consultancy, social events, prestige, trust, free offers and services for beginning entrepreneurs, accounting and tax consultancy for coworking centre members, personal communication with centre members with the aim to assess and improve the value offers of the coworking centre, emphasis on contacts, openness to innovations. Diversified offer for various groups of customers. Sufficiently large, functional and comfortable space, self-service refreshment facilities, properly working equipment.
Customer communication	Offer of space rental on the website. Meeting customers' needs according to the price list.	Coworking centre community is formed before the actual physical space, the founding members are motivators. Atmosphere of trust is transferred from the staff onto the customers. Information spreads through a creative website, customer awareness increased through PR releases, service, contact spot

		for designers and their customers, personal relationships, open door days, selection procedures for new members, emphasis on mutual contacts, interactive presentations of coworking centre members. Joint breakfasts and lunches.
Acquiring customers	Advertisements in press, on websites, cooperation with real estate agents, website of the centre.	Members obtained especially on the basis of recommendation from other of former members. Buzz marketing and WOM plays a big role. Community oriented even before the centre operations start. Investment into loss-making activities aimed at widening the community.
Key activities/products	Rental is the main activity, technical equipment of the spaces is ensured, as well as cleaning services, peace and quiet for work, and facilities.	Products: membership with access 24/7, rent according to rooms and equipment, presentation of business experience, informal networking, get-to-know events, courses, shared space, individual space, space for meetings.
Key partnerships	Not required, companies work separately, interaction between tenants does not take place, tenants may attend the events organized by coworking centres but do not consider them beneficial to their business.	Cooperation and interconnection with other coworking centres, achieving bigger variety in coworkers, cooperation with innovation centres supporting beginning entrepreneurs.

With the use of the system dynamics simulation we examined two scenarios for business of a coworking centre type. The first scenario corresponds with Group 1, where the coworking centre offers only space rental. The second scenario represents the principles of business in Group 2, ie. a coworking centre that offers its customer rental plus other services.

The following activities were selected on the basis of the research results for the business plan of the newly prepared COWORKING DESIGN CENTRE:

1. Coworking Bar, linked to the Coworking Club including membership;
2. Coworking Exhibition: exhibitions including previews and informal networking with exhibiting authors, virtual sales gallery;
3. Coworking Shop: purchase and sale of creative products and possibly a share of the Coworking Design Centre in production, creating conditions for a rise of a platform for cooperation between designers and production sphere in terms of prototype development on the basis of industrial and utility models or patents, production of prototypes, prototyping consultancy;
4. Coworking Academy: conferences, lectures, joint events, arts workshops for the members of the Coworking Design Centre, and also for the public to a certain extent – especially at the beginning of the existence of the Coworking Design Centre;
5. Coworking Space – rental of joint spaces, offices, meeting rooms, studios and workshops including equipment, rooms for videoconferences, rental of audiovisual studio.

Each of these business activities is incorporated into the model separately and is interconnected through the connecting variables (customers) to other activities of the Coworking Design Centre. The activities of Coworking Exhibition and Coworking Academy, which are unprofitable, have a positive impact on the numbers of customers of the coworking club and creative shop, thus indirectly influencing the number of potential tenants of the coworking centre spaces. The loss-making quality of these activities is financed with the help of profit-making activities (coworking club in the form of a bar, design shop, space rental).

The following causal feedback loop diagram shows the relations between the activities as they could be defined on the basis of the research results. Understanding of the meaning of this feedback loop (Fig. 4.) in the course of planning and designing the coworking centre spaces is crucial for further research and model design.

Figure 4 below shows the interconnection between the activities of the Coworking Design Centre. The feedback loop diagram (Fig. 4.) is based on the first activity, which the Coworking Club with a bar. The Coworking Design Centre starts its operations with this activity and this activity also brings first customers. The more customers there will be in the Coworking Club, the bigger interest they will have in exhibitions. More exhibitions that the Coworking Club members will participate in will attract bigger interest on the part of the public concerned about culture and design education. People qualified in design will be more interested in buying design products and in sharing spaces and ideas while cooperating in business.

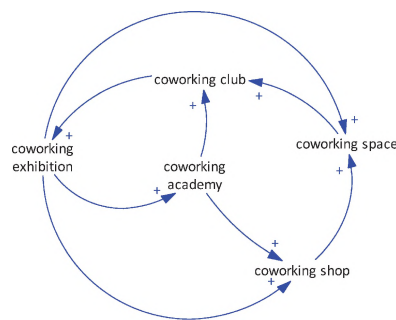


Fig. 4. Customer model for the Coworking Design Centre with five key activities

## 5. Results of the simulation runs

Three graphic illustrations were used to show the results of modelling (Fig. 5., 6., 7.). They include two lines – one represents Group 1, i. e. a coworking centre based only on rental. Group 2 provides a full range of services in five activities, that is a full version of the Coworking Design Centrum company.

For each kind of the Centre's activity the revenues are generated in a different way. In the Coworking Bar, every customer will spend approximately €4, the costs on purchasing goods are approximately €2, there are two employees in the bar, each worth €240 per month. The rent for the space is €120 per month. The loan for setting up the Bar is repaid in monthly instalments of €120. The workload capacity of 1 employee is 400 served customer per month.

The turnout at the Coworking Club for the purposes of modelling: at the beginning of the business, 500 customers of the Coworking Bar per month. Connection between visitors to the Coworking Bar and other activities in the Centre is as follows:

- Every fifth customer is interested in visiting an exhibition,
- Every tenth customer is interested in Coworking Club membership,
- Every hundredth customer is interested in buying a product from the Coworking Shop,
- Every twentieth visitor to the Coworking Exhibition attends the Coworking Academy,
- Every hundredth visitor to Coworking Exhibition is interested in renting space in the Centre through Coworking Space,
- Every hundredth visitor to the Coworking Design Shop is interested in renting space in the Centre through Coworking Space.

The activity of Coworking Space is limited by the space available and its adjustment to customer needs, and the price offer which corresponds with the market demand. The price offer for Coworking Space starts at €120 per month per customer.

One step in the simulation in one month, the results in company development can be shown in the course of six years of the company's life-cycle. The results shown reflect the dynamics of the company growth. The development



of the Coworking Design Centre starts with the customer interest, i.e. the business and payment ability of the Coworking Design Centre will run according to the orders from customers.

The following graph (Fig. 5.) shows the development of the profit in Groups 1 and 2. The main variable which causes the profit decrease approximately from the 50th month of the company life-cycle is the impact of market saturation, which must be taken into consideration in every business model. The influence of this element appears in both Groups. The impact of market saturation in Group 2 can be compensated for example by continuously expanding the range of activities offered by the Coworking Design Centre. Thus the profit growth in the Coworking Design Centre at the beginning of business (up to month 13) is lower, but from the long-term point of view it can eliminate the negative impact of the market saturation. In Group 1 this strategy is not possible.

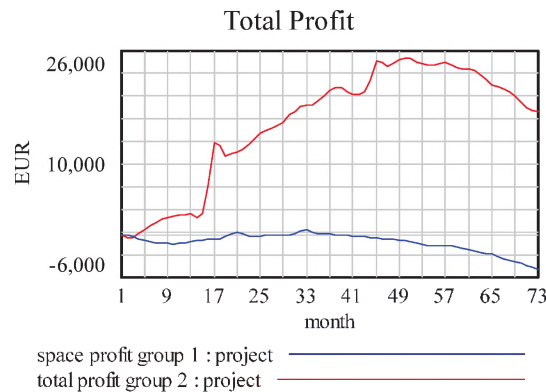


Fig. 5. Profit forecast

An important aspect is the forecast of human resources recruitment (Fig. 6.) which is related to the key activities of the Coworking Design Centre. In Group 1 there is one paid team member in month 1, while in Group 2 there are two paid team members of the Coworking Design Centre in the same period. The development of the number of the Coworking Design Centre staff depends on the number of customers and staff capacity (how many customers can one employee serve). If the number of the Coworking Design Centre customers is growing, the number of required staff is growing, too. The principle is the same in both Groups. In Group 1, the demands for staff are lower throughout the Coworking Design Centre lifetime, as the graph shows (Fig. 6.) with the fall in customer numbers, the need to hire new staff is decreasing too. Staff is hired in whole units and its recruitment is delayed two months after the demand for a new team member arises.

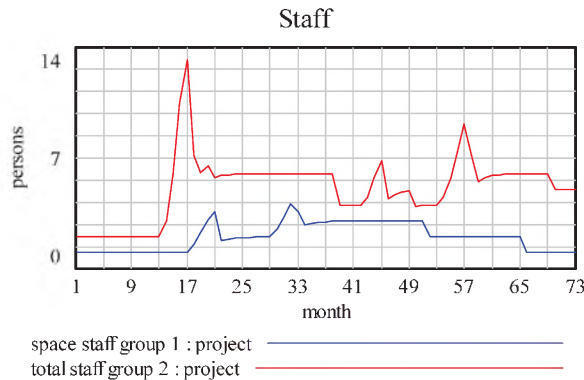


Fig. 6. Forecast of hiring and employing human resources

The last graph (Fig. 7.) shows the situation of financial resources in the bank accounts of Group 1 and Group 2. For this variable, the key elements are debts and liabilities, i.e. revenues and costs, as well as profit. The balance in the bank accounts of both groups is oscillating, while in Group 2 the oscillation is significant. That is caused by a regular monthly income from the debts paid and regular monthly decrease when the liabilities are paid. During the first year of business, debts and liabilities are low, therefore the account balance is stable. In Group 2, the Coworking Shop starts its operation in the tenth month of business, and its customers have a significant influence in the number of customers of the Coworking Space. These two activities start running with a certain time interval, which causes a larger dynamics in business only in the thirteenth month of business. Both activities have the highest turnover and so significantly influence the balance on the bank account. The oscillation is relatively regular since the flow of money into and from the bank account of both groups does not contain any irregularity or change element. In the model, debts and liabilities are paid as due. Dynamics of business in Group 2 is higher than in Group 1, and consequently the oscillation is bigger, too. At the beginning of business, Group 1 invests higher sum into space rental (€12,000) than Group 2 (4000 €). Modelling revealed that in Group 1 business is not possible with a lower starting investment. The graph (Fig. 7.) shows that Group 1 takes smaller risk, but the development of financial resources on the bank account manifests stagnation and foretells the end of the business.

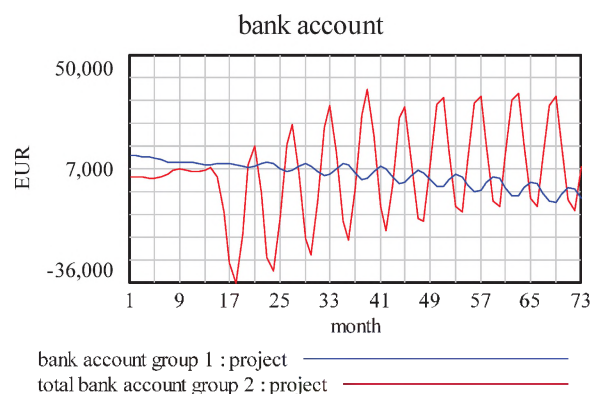


Fig. 7. Bank account balance

## 6. Conclusion and further research

Research into coworking centres in the Czech Republic and the subsequent system dynamics model showed that a coworking centre is a company that needs to offer more than just rental, in order to maintain its position in the market and so that its business activities produce profit in a long-term. Coworking centres whose business is based merely on rental are not permanently sustainable. Both the research and model proved that this type of centres cannot avoid a continuous decrease in customers' interest in their services. Sustainability of the Coworking Design Centre will be secured through five business activities: Coworking Club with a bar, Coworking Exhibition, Coworking Shop, Coworking Academy and Coworking Space. Two of these activities are loss-making (Coworking Exhibition, Coworking Academy). They generate only costs but contribute positively to the overall business model by bringing in customers. Prosperity of the Coworking Design Centre thus depends on the dynamics of all these activities that mutually influence each other.

The system dynamics model that includes feedback loops, delays, flows and stocks can be used to check the viability of a company's business plan. With the use of scenarios we can set variables according to the entry data that we are able to receive.

As the significance of cultural and creative industries is growing, the demands for better economic and business knowledge on the part of arts graduates are increasing. Teaching business with the use of managerial simulator and a model of a creative company such as the Coworking Design Centre is for students a means to searching for a more

convenient and viable scenario for starting a business. The model does not primarily focus on the implementers in the branches of cultural and creative industries, but rather on innovators and promoters of these activities. A simulated training in business leads to overcoming the initial economic limitations that can be imitated on the company model, without the entrepreneur having to face the direct risk of bankruptcy. Systemic thinking and system dynamics modelling that the group of students actively participated in while creating the model of the Coworking Design Centre thus contributes to increasing the quality of arts-oriented university graduates from the subjects of creative management and enterprise.

It would be useful to focus future research on simulating business in creative centres. It is the next, higher level of a coworking centre development, which also includes live culture: a stage for musical and theatrical performances, residential stays of artists, bigger variety in trading with various creative items. Further research will thus not only focus on the sustainability of the creative centre concept, but also monitor the multiplication impact of grant resources on culture that influence the development of the whole region.

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