

TECHNICAL AND TECHNOLOGICAL COST EFFECTIVENESS ANALYSIS FOR ESTABLISHMENT OF A PRINTING HOUSE

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Professional paper

The aim of this paper is to investigate the profitability of the establishment of printing house in Croatia (Split). The paper applies an interdisciplinary approach: an engineering approach to the analysis of technical and technological solutions and economic approach to economic-financial analysis. In fact, after detailed technical analysis, based upon real circumstances, the evaluation of investment projects has been carried out by a software application. Two scenarios of the project realization, based on the actual circumstances, are simulated. Both scenarios have the same value of the initial investment, the difference between them arises from the edition size. For each scenario, results of the analysis for economic and financial terms are acceptable. This applies primarily to the high liquidity, retained profit, return on investment and other business success indicators. However, the scenario with smaller number of copies has been estimated as more realistic and ultimately inclusive as the better choice for the implementation of concrete projects. Presented investment project has good preconditions for successful business.

Key words: *analysis, cost effectiveness, printing house*

Tehničko-tehnološka analiza isplativosti osnivanja tiskarske kuće

Strukovni članak

Cilj je ovog rada utvrditi isplativost osnivanja tiskarske kuće u Republici Hrvatskoj (Split). U radu je primijenjen interdisciplinarni pristup: inženjerski pristup u analizi tehničko-tehnoloških rješenja i ekonomski pristup u ekonomskoj-financijskoj analizi. Naime, nakon detaljne tehničko-tehnološke analize, na temelju stvarnih okolnosti, u programskoj aplikaciji za evaluaciju investicijskih projekata simulirana su dva scenarija realizacije projekta. U oba scenarija početna ulaganja su ista, a razlika među njima proističe iz veličine naklade. Rezultati analize u ekonomsko-financijskom smislu, za oba scenarija, su prihvatljivi. To se odnosi prije svega na likvidnost, zadržanu dobit, razdoblje povrata kao i ostale pokazatelje uspješnosti poslovanja. Međutim, scenarij s manjom nakladom se procjenjuje kao realniji i zaključno kao bolji izbor za realizaciju konkretnog projekta. Prikazani investicijski projekt ima dobre pretpostavke za uspješno poslovanje.

Ključne riječi: *analiza, isplativost, tiskarska kuća*

1

Introduction

Uvod

The idea of establishing a printing house is interesting in many aspects such as entrepreneurial, technical and technological, cultural - sociological, marketing and the other. However, at the very beginning it imposes the question: *Is the printing cost-effective in Croatia?* Namely, printing as a branch of the graphic industry in Croatia has a great problem. There is no law in Croatia on publishing or law on books, there is only the Law on Copyright and Related Rights [1] issued on October 7th, 2003. by the Croatian Parliament. According to the Law 4.3.1 Publishing contract, Article 56, it is stated:

- 1) Publishing contract obliges the author to a publisher to establish the right to reproduce a certain part of the author's work or by other similar process and the right of distribution of copies of author's work (the right to publish), and the publisher agrees to publish the author's work in the agreed way and to pay the author the contracted compensation if not otherwise contracted, and to take care of the successful distribution of copies of the author's work and give the author information about the distribution of the author's work. The publishing contract must contain provision on the duration of the publishing rights.
- 2) If the publishing contract states otherwise, it is considered that the publisher has the exclusive right of publishing the works under Paragraph 1 of this article.
- 3) The presumption in Paragraph 2 of this Article does not apply to the right of publishing articles in the daily and periodical press or publications.

In a layman point of view, with no legal aspect, the law has certain shortcomings. This point shall be explained by a simple example: Croatia is dominated by two major publishing houses: Profil and Algoritam. Profil [2] as a publisher possesses its own printing house and its distribution channels, which enables it to maintain the market monopoly. They do not publish publicly the information on the number of copies, because they are not obliged to do so according to the Law on Copyright and related rights.

The publishers and booksellers' association organized a roundtable conference at the Book Fair Interliber, in titled Five to 12 for the Croatian book, on which it is emphasized that it is necessary to organize the Croatian publishers better and to issue the Law on book. This will enable competitiveness of small printing shops and a fair market competition in general, too [3].

The aim of this paper is to show whether it is profitable to establish a printing house in Croatia in these circumstances.

2

The basic elements of the feasibility study

Osnovni elementi studije opravdanosti

2.1

Description of entrepreneurial idea

Opis poduzetničke ideje

The graphics industry is now one of the three mostly spread industries in the world. Printing as one of its activities is present in all aspects of human life. Not only in books, magazines and newspapers, but all the packaging,

clothing, music media (CD/DVD), etc. The primary business of printing houses presented in this paper is printing of books and comics. A book as an investment is a commodity whose value can only grow over time, not decline. It is entirely unnecessary to talk about the importance, value and impact of books and literature through history or in present.

Location of the project is Split (Kaštela), and in it, as the second largest city in Croatia, only four printing houses exist, one of which (Marjan Publishing Ltd.) is exclusively oriented to printing of books. It is in fact an obvious opportunity to enter the market. The publishing houses in Split, such as Verbum, use printing houses in other cities or states to print certain editions. Using appropriate business strategy, quality marketing and price competitiveness it is possible both to achieve the desired business results and to take a certain percentage of the market.

Comic books, as the most important product of the considered printing house, are especially interesting. In fact, a comic as an art form, for a long time has been considered as a working-class and children entertainment. Its influence was completely marginalized, but nowadays things have changed significantly. This is mostly evident in the prices. It is a profitable and powerful branch of art which in a specific way presents and criticizes the present in a somewhat provocative form.

2.2

Market data (projection of competition)

Tržišni podaci (projekcija konkurencije)

This is one of the most important chapters of the project because it must provide information on the market advantages and benefits of products, goods or services, targeted markets -potential consumers, competition and potential market share, real possibilities of market expansion as well as procurement of the project inputs, which includes: equipment, raw materials, capital, labour and the other [8].

Analysis of the market is determined by activity specifics of the project as well as its macro-location of the project (Split-Dalmatian County). It is primarily oriented to the competition projection and then estimated how much market share can be taken. The planned strategy for positioning in the market is called monitoring of competitors, intended to attract potential business partners by higher quality and more favourable payment terms.

About 80 publishing houses exist in Croatia. The great, and well known to everybody, publishing houses such as Profil, Algoritam, VBZ, Mozaik knjiga, Evergreen, Vuković i Runjić, are located just in Zagreb. In Split the following three publishing houses exist:

- Slobodna Dalmacija: the largest publishing house in this area;
- Verbum: oriented to publishing religious literature, fiction, philosophy, history, manuals and opinion journalism;
- Književni krug: oriented to publishing poetry, literature and political history.

The publishing houses such as Profil, Algoritam, VBZ, Mozaik knjiga mostly use printing houses such as Vjesnik, Zagraf, Grafički zavod Hrvatske for printing services. The Slobodna Dalmacija publishing house uses its own printing department or services of Marjan tisak. Verbum Publishing

House uses printing services of Mladinska knjiga from Slovenia.

In the area of the city of Split there is only one printing house exclusively oriented to printing books, Marjan tisak, as well as three more printing houses to which it is not primary activity:

- Tiskara Oxa: smaller printing house, which has 6 employees [4].
- Tiskara Des: oriented to printing leaflets, posters, brochures, blocks, monographs, books of soft and hard binding [5].
- Tiskara Slobodna Dalmacija: it is unquestionably the largest and best equipped printing house in this area [6].
- The other printing houses in Split-Dalmatian County, thinking on Kaštela, Trogir, Omiš, are oriented to the printing of menus, brochures, leaflets, calendars, print on the textile (T-shirts), etc. [7].

Based on these data we conclude that market conditions are very favourable. Competition is not strong. When it comes to comics, the Croatian publishing scene is still pretty undeveloped. Only a few publishing houses exist, from which: Ludens Ltd., Strip -Agent Ltd., Bookglobe Ltd., Tiskara-Porat Ltd. can be selected. AKD ZAGREB Ltd., Tiskara Tipomat Ltd. and SAF Ltd. are mainly used for printing services.

2.3

Technical-technological analysis

Tehnološko-tehnička analiza

A review of the technical and technological analysis is given below, due to limited space, it includes only those elements that are particularly important for the project in subject.

2.3.1

Working process organization in the printing house

Organizacija radnog procesa u tiskari

The foreseen work in the printing house should be carried out in several different technical departments and phases which, among others, include:

- query, calculation, bid, acquisition of the material and production of the models in case the bid is accepted
- reception and sorting of materials for processing
- processing of materials: pictures, text, integration and break of the pages
- arrangement of pages, copying of the working sheets in the print form for a particular printing technique (old system)
- making of printing forms by the CTP devices
- installation of printing forms in a printing machine and printing upon the appropriate press base and
- refinement, final design of the graphical products.

2.3.2

Technological process and selection of technology

Tehnološki proces i izbor tehnologije

The technological process includes the printing process, which integrates the three main phases: graphical preparation, printing and graphical finishing.

The prepress is the beginning of the technological

process of making graphical products. After the preliminary design of forming and defining the basic parameters of a graphical product the process of creating the template follows. Modern prepress uses computers and software solutions as a powerful tool for the realization of ideas and requirements imposed by the market.

Printing is a central process in the realization of the production of graphic products. There are many, technically different, printing techniques where the main goal is to make the faithful reproduction in greater number on the desired material and preferably at minimum cost.

Graphical finish is the final process in realization of the graphical product production. After the printing and drying process, the final jobs take place by which the final product gets its final form and functionality. They are divided into jobs of large and small format. The small format involves folding tasks, fluting, warm plastification, spiral binding, paperback, cutting of flat profiles etc. The large format finishing jobs include finishing in large format machines. Depending on the type of material and the final purpose, the jobs of hot and cold plastification, setting of frames, pasting on the desired surfaces, cutting of various profiles, assembly, etc. are possible.

The offset printing is a technology by which the printed materials shall be printed in the considered printing house. The offset printing has a specific printing form, which requires that the printed and free surfaces are almost in the same plane. The principle of printing is based on wetting the printing forms, that is the free surfaces, by "water" (hydrofily, oleofobity), i.e. printing surface by colour (oleofily, hidrofofity). Printing forms are made on thin plates mostly from rolled aluminium (Al) 99,5 % purity. Except mono-metal, the plates may be bimetal. The plate thickness ranges from 0,15 to 0,50 mm. Before applying the photosensitive layer on the plates, it should be treated in the way to increase the relative surface. Increase of the relative surface is achieved by making a porous coating.

Particularly important parameter in offset technology is wetting. Unlike all other major printing techniques, the offset uses liquid for wetting in the printing process. The basic ingredient of the wetting liquid is water, that is alcohol. The newer machine constructions with new systems for wetting, as an addition to the wetting liquid, use isopropyl alcohol with the addition of 10-12 %. Also, an important parameter are colours for offset print. In fact, like most printing colours, offset colours consist of pigments, binders, resins, fillers and additives. Dispersed pigments in binders (oils + resins), fillers and additives give pasty mixture of great consistency. To enhance the drying of paint on the printing base during the colour printing the drier can be carefully added (successive).

Automation in the offset printing process as a rule shortens unproductive time and provides uniform printing quality. However, preparation period and setting of offset printing machine for sheet prints depends on many factors. First, it depends on whether it is necessary to change printing of colours and whether it is necessary to change the operating machine settings as well due to the different sheet formats. Furthermore, it depends on the number and degree of printing expertise, and also whether the machine is provided with remote control and the printing process control and whether the reader of the offset printing plate is installed. The manual change of the offset plate by a conventional device, including its setting lasts about 20 minutes, while it takes only about 4 minutes when the automatic device is used. The manufacturer's experts

emphasise that the possible savings when printing with stable papers amounts up to 80 % of the time normally required for manual set, and in particular with heavy paper, about 50 %.

2.3.3

Machinery and equipment in the printing house departments

Strojevi i uređaji u odjelima tiskare

A printing house should include a number of machines and devices that, depending on the role in the technological process, are located in various departments as shown below.

Preparation department includes:

- Input units: scanners, digital cameras;
- Computers with the appropriate tools for the design and processing of images and text;
- Output units: lighting units, machines and devices for digital printing (plotters, printers);
- Copy frames, devices for making layers and development of printing forms, control devices, CTP, devices for making copper rollers, engraving devices;
- Machinery and equipment for the proof sheet : Match print, Oza salt, Trial presses (nowadays almost not used) and
- Digital printers for making four-colour proof sheet.

The Printers department includes, Fig. 1 [9]:

- **Screen printing:** frames with sieves of different number of threads, raquels, tools for making layers, copy frames, machines for simultaneous multicolour printing;
- **High press:** machines with specific standards for print, presses for the "blind" printing and foil printing;
- **Surface or OFF press:** mono-or multi-colour machines of specific standards for the sheet or web printing with or without the painting device, with or without forced drying devices;
- **Deep print:** machines for printing from the sheet or roll, a machine for sharpening knives for the removal of colour;
- **Flexography print:** machines for printing foil roll - roll;
- **Tampon print:** gold print, sheet print;
- **Digital print:** digital machines for mutual four-colour or black-white printing.



Figure 1 Printing department
Slika 1. Odjel tiska

The finishing department includes, Fig. 2 [9]:

- Machines for cutting of sheets and trimming of products, with one or three blades (triple cutter);
- Paper folding machines with pockets of different formats and functions;
- Sheets collecting machines;
- Machines for sewing of book sheets, automatic lines for collecting and sewing by wire,
- Machines for making covers for the hardcover,
- Machines for binding the covers with the book block, machines for rounding of the ridges,
- Paperback machines,
- Lines for automatic hard binding.



*Figure 2 Finishing department
Slika 2. Odjel dorade*

Brief description of machines and devices:

The offset machine and all printing machines are sets of interconnected equipment and devices, which are well adapted for printing on different printing surfaces. Its functional units are: 1. Device for inserting sheets, 2. Print unit - a system of cylinders, 3. Device for wetting of printing forms, 4. Device for colouring of printing forms, 5. Device for conferences, 6. Controls and operational device, 7. Monitoring systems. The printing house in subject shall use Heidelberg SM 74-4 PH machine (offsetting printing machine); parameters of the machine: Alcolor, CPC 1.04, Perfector, Autoplate, Fig. 3 [10].

The paper folding machine (Falc machine type: K 52/4 KTL F4), Fig. 4 [10], has the following characteristics: 4 rollers for paper folding, 2 electronic knife for cross



*Figure 3 Offset machine
Slika 3. Stroj za ofsetni tisak*

-bending, an additional (5) purse after the first knife, straight inserting device and apparatus, electronic metering of sheets, protection against noise, exhibition table.



*Figure 4 Falc machine
Slika 4. Stroj za savijanje araka*

Binder (paperback machine) HORIZON BQ 270, with the following characteristics: 1 plier for registry block, milling max. up to 3 mm, lateral drift, speed: 500 tacts/h, touch screen, touch screen quick control, automatic inserting of covers, 4 creasing lines [10].

Cutting machine Polar 78 X, with the following characteristics: air table, monitor, programs [10].

2.4

**Economic and financial analysis
Ekonomsko-financijska analiza**

After market analysis, technological - technical analysis (choice of technology, description of the technological process, list of technological equipment ...), an economic and financial analysis as a basic component of the feasibility study follows next [3].

2.4.1

**Required investment
Potrebna ulaganja**

The total required investments in the entrepreneurial venture are divided, as shown in Tab. 1:

- Investments in fixed assets (fixed assets or capital assets) and
- Investments in permanent working capital (short term assets or current assets).

The required investments include investments in preliminary works and equipment. The category preliminary work includes research work (basis for the main design), studies, technical documentation, quality control, and other minor expenses. The category equipment includes equipment for the preparation (Photoshop, Freehand, In design – for processing of images and text) and the equipment for printing (printing machine – mono-colour/two-colour B2, the paper folding machine, the cutting knife).

Table 1 Investments in fixed assets and working capital
Tablica 1. Ulaganja u stalna i obrtna sredstva

	Fixed assets and working capital	Amount kn	Structure %
I	Fixed assests	1 443 818,00	
I A	Non material expense	11 000,00	100
1.	Founding costs	11 000,00	100
I B	Material expense	1 432 818,00	100
1.	Plant and equipment	1 387 500,00	96,83
2.	Accessories and Tools	45 318,00	3,17
II	Working capital	621 712,00	100
1.	Gross wages (per year)	362 712,00	58,34
2.	External services (accounting service-year)	20 000,00	3,21
3.	External services (preparing offset plates)	174 000,00	27,98
4.	The cost of advertising	10 000,00	1,6
5.	Maintenance	50 000,00	8,04
6.	Additional costs	5 000,00	0,83
I+II	Total	2 120 530,00	100

2.4.2

Capital source and financing method

Izvor kapitala i način financiranja

Financial sources are the funds given to the investor under certain terms. Funding sources may be private and/or outside funds. The quantification of both funds for the project is shown in Tab. 2.

Table 2 Project capital sources
Tablica 2. Izvori financiranja projekta

	Project capital source	Amount kn	Structure %
I	Own funds		
1.	Owners capital	200 000,00	9,43
II	External funds		
1.	Bank loan	1 797 640,00	84,77
2.	Subvention HZZ	122 890,00	5,8
III	Total (I+II)	2 120 530,00	100

2.4.3

Simulation of the project business success

Simulacija poslovne uspješnosti projekta

The analysis of the possible project implementation was made using appropriate software [11] and includes simulation of two possible business scenarios of the project. Both scenarios have the same value of the initial investment, the difference between them comes from the different quantity of publicised comics. The stated is reflected on the income and expenditure side of the project. The predicted lifetime of the project is 10 years. The main features of the analysed scenarios are given below.

Scenario 1: The input data in this scenario (required investment) are shown in Tab. 1. The hall in which the printing plant will be placed is owned by the investor (entrepreneur), as well as the land on which it will be built. To purchase the necessary machinery and equipment a loan of 2 120 530,00 kn shall be raised. Internal funds of financing this project amount to 200 000,00 kn. The projected income from the sale of books and comics is

4 885 600,00 kn. The direct material costs amount to 3 146 280,00 kn. The planned annual number of copies of comics is 1 800 000 pieces (3 comics; common, maxi and special edition). The expected annual number of book copies is 36 000 pieces.

Scenario 2: This scenario differs from the previous in the number of copies. The planned annual number of copies of comics is reduced and amounts to 1 800 000 pieces. So, instead of 3 comics, 2 comics will be printed annually with 5000 copies per month (the usual issue and maxi issue). The number of book copies remains unchanged compared to the scenario 1.

Based on the obtained data the project is optimised with respect to the criterion of business success. In fact, the economic-financial analysis is an important instrument in monitoring the company in all stages of its lifecycle. During the phase of establishing the company, by means of the business activities plan, and its quantification through the basic financial reports, the future position of the company and its business effects are predicted, that is the return on investment (ROI) is determined. In the further stage of development and business activities of the company, for each year based on the defined business policies, the business plan is made, its execution is monitored, and by analysing omissions and weaknesses are established, as well as reasons for deviations from the plan, and ultimately, measures to remedy the deficiencies and disorders are proposed.

Often, the disorders can be so great that turn around in business policy of the company is required. The investment undertakings require making of an investment study, whose important part is the economic-financial analysis from which, based upon the previously performed analysis of the markets and technical - technological analysis, the effects on the future business at the following levels are predicted: business success - profit and loss account, financial stability and size - balance [12, 13]. Below the results of the analysis of profit and loss are given, as well as the financial flow of the project and the project performance rating (the static evaluations and pay back period) for both business scenarios of the project implementation.

The profit and loss account is a financial report about the business performance of a company in the observed period of business activities. The basic parameters used in the profit and loss account are income and expenditures. The other parameters used in the profit and loss account are gross profit or loss, profit taxes and net profit. The profit and loss account is shown in Tab. 3 for the scenario 1, and in Tab. 4 for the scenario 2.

From the profit and loss tables it is clear that the project in both scenarios achieves profit. The scenario 1 is ideal, and the most profitable, but somewhat unrealistic, because it assumes the ideal circumstances, i.e. the maximum number of copies. It also includes the highest costs. The scenario 2 is realistic and optimal because it shows profit in real circumstances. The editions in this scenario are reduced in line to the scenario 1, the costs are reduced, but nonetheless a profit is achieved, which is assumed to be increased gradually over the years.

From the graphical presentation of the profit and loss account the difference between the scenario 1 and scenario 2 can clearly be recognized, Fig. 5 and Fig. 6. As previously mentioned the scenario 2 is much more realistic scenario, because if we consider the graph in Fig. 6 it can be noticed that the profit increases over years. It is not, as in Scenario 1, the highest in the first year, but in the tenth year, which is

Table 3 Profit and loss account - scenario 1
 Tablica 3. Račun dobiti i gubitka - scenarij 1

godina/ year->Demo3	1	2	3	4	5	6	7	8	9	10
1.UKUP. PRIHODI / TOTAL	4885	4885	4885	4885	4885	4885	4885	4885	4885	4885
2.UKUP. RASHODI / TOTAL COSTS	3732,974	3762,224	3924,146	3935,674	3879,186	3880,417	3893,327	3906,631	3921,293	3936,276
2.1.Rashod proizv / product costs	3732,9	3762,2	3781,2	3801,2	3753,7	3764,4	3787,4	3811,4	3837,4	3864,4
2.1.1.Mater.trošk / mater.expense	3206	3206	3206	3206	3206	3206	3206	3206	3206	3206
2.1.2.Amortizacija / depreciation	163,9	175,2	175,2	175,2	106,7	95,4	95,4	95,4	95,4	95,4
2.1.3.Bruto plaće / gross wages	363	381	400	420	441	463	486	510	536	563
2.2.Financ.rashodi / financ.costs	0	0	142,9	134,4	125,4	115,9	105,8	95,1	83,8	71,8
3.BRUTO DOBIT / GROSS PROFIT	1152	1122,7	960,8	949,3	1005,8	1004,5	991,6	978,3	963,7	948,7
4.Porez na dobit / profit tax	403,2	392,9	336,2	332,2	352	351,6	347	342,4	337,2	332
5.NETO DOBIT / NET PROFIT	748,8	729,8	624,5	617	653,7	652,9	644,5	635,9	626,4	616,6
5.1.Rezerve / reserves	37,4	36,4	31,2	30,8	32,6	32,6	32,2	31,7	31,3	30,8
5.2.Ukup.dividende / tot. dividends	149,7	145,9	124,9	123,4	130,7	130,5	128,9	127,1	125,2	123,3
5.2.1.Obic.divid / common dividends	149,7	145,9	124,9	123,4	130,7	130,5	128,9	127,1	125,2	123,3
5.2.2.Povt.divid. / preferred divid.	0	0	0	0	0	0	0	0	0	0
6.ZADRZ. DOBIT / RETAINED	561,6	547,3	468,4	462,7	490,3	489,7	483,4	476,9	469,8	462,5

Table 4 Profit and loss account - scenario 2
 Tablica 4. Račun dobiti i gubitka - scenarij 2

godina/ year->Demo3	1	2	3	4	5	6	7	8	9	10
1.UKUP. PRIHODI / TOTAL	3657	3839	4031	4233	4445	4667	4900	5145	5403	5673
2.UKUP. RASHODI / TOTAL COSTS	2932,974	3079,224	3364,146	3504,674	3584,186	3728,417	3890,327	4061,631	4241,294	4429,276
2.1.Rashod proizv / product costs	2932,9	3079,2	3221,2	3370,2	3458,7	3612,4	3784,4	3966,4	4157,4	4357,4
2.1.1.Mater.trošk / mater.expense	2406	2523	2646	2775	2911	3054	3203	3361	3526	3699
2.1.2.Amortizacija / depreciation	163,9	175,2	175,2	175,2	106,7	95,4	95,4	95,4	95,4	95,4
2.1.3.Bruto plaće / gross wages	363	381	400	420	441	463	486	510	536	563
2.2.Financ.rashodi / financ.costs	0	0	142,9	134,4	125,4	115,9	105,8	95,1	83,8	71,8
3.BRUTO DOBIT / GROSS PROFIT	724	759,7	666,8	728,3	860,8	938,5	1009,6	1083,3	1161,7	1243,7
4.Porez na dobit / profit tax	253,4	265,9	233,3	254,9	301,2	328,5	353,3	379,1	406,5	435,3
5.NETO DOBIT / NET PROFIT	470,6	493,8	433,4	473,4	559,5	610	656,2	704,1	755,1	808,4
5.1.Rezerve / reserves	23,5	24,6	21,6	23,6	27,9	30,5	32,8	35,2	37,7	40,4
5.2.Ukup.dividende / tot. dividends	94,1	98,7	86,6	94,6	111,9	122	131,2	140,8	151	161,6
5.2.1.Obic.divid / common dividends	94,1	98,7	86,6	94,6	111,9	122	131,2	140,8	151	161,6
5.2.2.Povt.divid. / preferred divid.	0	0	0	0	0	0	0	0	0	0
6.ZADRZ. DOBIT / RETAINED	352,9	370,3	325	355	419,6	457,5	492,2	528,1	566,3	606,3

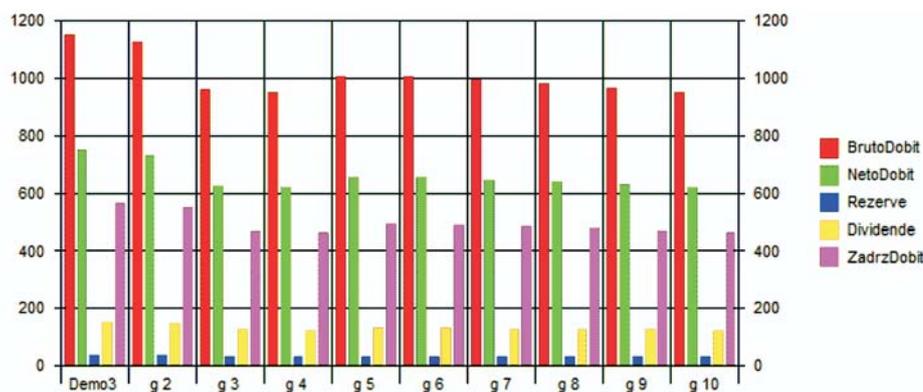


Figure 5 Profit and loss account - scenario 1
 Slika 5. Račun dobiti i gubitka - scenarij 1

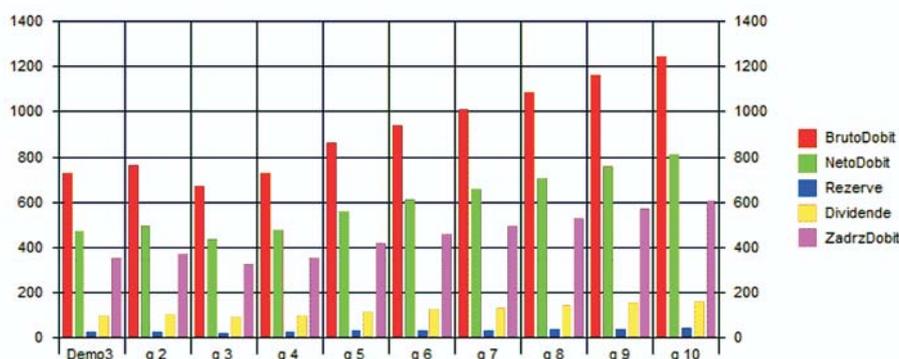


Figure 6 Profit and loss account - scenario 2
 Slika 6. Račun dobiti i gubitka - scenarij 2

Table 5 Cash flows of the project-scenario 1
 Tablica 5. Financijski tok projekta - scenarij 1

godina/ year -> Demo3	0	1	2	3	4	5	6	7	8	9	10
A.UKUPNI PRIMICI / TOTAL INFLOW	2670	4885	4888,4	4925,1	4885	4885	4885	4885	4885	4885	7253,7
1.Ukupni prihod / total income	0	4885	4885	4885	4885	4885	4885	4885	4885	4885	4885
2.Izvori financ. / financ.sources	2670	0	0	0	0	0	0	0	0	0	0
2.1.Kredit / loan	2120	0	0	0	0	0	0	0	0	0	0
2.2.Obicne dionice / common stock	200	0	0	0	0	0	0	0	0	0	0
2.3.Povlast.dionice / prefer.stock	350	0	0	0	0	0	0	0	0	0	0
3.Ostat.vrijed.proj. /residual value	0	0	3,4	40,1	0	0	0	0	0	0	2368,7
B.UKUPNI IZDACI / TOTAL OUTFLOW	1749	5412,1	4162,4	4382,5	4402,5	4432,1	4481	4491,2	4508,8	4527,8	4547,5
4.Invest.osnov.sred. / invest.fixed assets	1749	45	0	0	0	0	0	0	0	0	0
5.Invest.obit.sred. / invest.working capit.	0	1207,7	0	0	5,9	45,5	13	6,9	7,2	7,8	8,2
6.Mater.troskovi / material costs	0	3206	3206	3206	3206	3206	3206	3206	3206	3206	3206
7.Bruto plate / gross wages	0	363	381	400	420	441	463	486	510	536	563
8.Porez na dobit / profit tax	0	403,2	392,9	336,2	332,2	352	351,6	347	342,4	337,2	332
9.Rezerve / reserves	0	37,4	36,4	31,2	30,8	32,6	32,6	32,2	31,7	31,3	30,8
10.Obveze-financ.izvori / liabilities-financ.sources	0	149,7	145,9	409	407,5	414,8	414,7	413	411,3	409,4	407,4
10.1.Aruniteti / loan repayments	0	0	0	284,1	284,1	284,1	284,1	284,1	284,1	284,1	284,1
10.2.Povlast.dividende / prefer.divid.	0	0	0	0	0	0	0	0	0	0	0
10.3.Obicne dividende / common dividends	0	149,7	145,9	124,9	123,4	130,7	130,5	128,9	127,1	125,2	123,3
C. NETO PRIMICI / NET INFLOWS	921	-527,2	725,9	542,6	482,4	392,8	403,9	393,7	376,1	357,1	2706,2

Table 6 Cash flows of the project-scenario 2
 Tablica 6. Financijski tok projekta - scenarij 2

godina/ year -> Demo3	0	1	2	3	4	5	6	7	8	9	10
A.UKUPNI PRIMICI / TOTAL INFLOW	2670	3657	3839	4031	4233	4445	4667	4900	5145	5403	8208,5
1.Ukupni prihod / total income	0	3657	3839	4031	4233	4445	4667	4900	5145	5403	5673
2.Izvori financ. / financ.sources	2670	0	0	0	0	0	0	0	0	0	0
2.1.Kredit / loan	2120	0	0	0	0	0	0	0	0	0	0
2.2.Obicne dionice / common stock	200	0	0	0	0	0	0	0	0	0	0
2.3.Povlast.dionice / prefer.stock	350	0	0	0	0	0	0	0	0	0	0
3.Ostat.vrijed.proj. /residual value	0	0	0	0	0	0	0	0	0	0	2535,5
B.UKUPNI IZDACI / TOTAL OUTFLOW	1749	4078,7	3336	3680,2	3909,2	4176,4	4351,5	4556,3	4779,8	5014,4	5259,9
4.Invest.osnov.sred. / invest.fixed assets	1749	45	0	0	0	0	0	0	0	0	0
5.Invest.obit.sred. / invest.working capit.	0	893,7	42,7	8,3	56,8	99,1	69,3	65,7	69,5	72,9	76,4
6.Mater.troskovi / material costs	0	2406	2523	2646	2775	2911	3054	3203	3361	3526	3699
7.Bruto plate / gross wages	0	363	381	400	420	441	463	486	510	536	563
8.Porez na dobit / profit tax	0	253,4	265,9	233,3	254,9	301,2	328,5	353,3	379,1	406,5	435,3
9.Rezerve / reserves	0	23,5	24,6	21,6	23,6	27,9	30,5	32,8	35,2	37,7	40,4
10.Obveze-financ.izvori / liabilities-financ.sources	0	94,1	98,7	370,8	378,8	396	406,1	415,3	424,9	435,1	445,8
10.1.Aruniteti / loan repayments	0	0	0	284,1	284,1	284,1	284,1	284,1	284,1	284,1	284,1
10.2.Povlast.dividende / prefer.divid.	0	0	0	0	0	0	0	0	0	0	0
10.3.Obicne dividende / common dividends	0	94,1	98,7	86,6	94,6	111,9	122	131,2	140,8	151	161,6
C. NETO PRIMICI / NET INFLOWS	920,9	-421,8	502,9	350,7	323,7	268,5	315,4	343,6	365,1	388,5	2948,5

more realistic. If the third year is more carefully considered, it may be concluded that this is the year in which the loan starts to be repaid, as the diagram shows that the profit in the third year is less than the profit in the second year.

Financial flow of the project is a report which considers the activities of the company from the aspect of the cash flow, i.e. business activities according to the principle completed payments are considered. Cash flow indicates the ability to regularly settle company obligations, i.e. indicates the amount of insufficient funds [12, 13]. The incomes in the cash flow of the project are these business events that increase the financial potential of the project, that is all the incomes of the financial funds to the project, regardless of the form of means of payment and ownership of these funds. They include total revenues, funding sources, and the residual project value. The results of analysis of financial flows for both scenarios 1 is given in Tab. 5, for the scenario 2 in Tab. 6. It is evident that the project in both scenarios is not liquid in the first year, unlike the others when it is liquid, and thus solvent. The liquidity problem that occurs in the first year is the consequence of the high material costs, i.e., high cost of direct (consumable) materials necessary for the production.

The total expenditures are higher than the total income, but it is only valid for the first year, after which the situation gets stabilized and the project becomes liquid. In both scenarios, in the zero year total revenues come mostly from bank loans and partly from the common shares. In the 10th

year the revenues are higher than in the previous years because of the residual project value. The residual project value is actually the value of the project at its end, it includes the value of certain assets that are created in the project and includes the value of primary and working capital and fund reserves at that time.

All of the above mentioned is graphically shown in both Fig. 7 and Fig. 8. The project is liquid in both scenarios except in the first year, due to the above mentioned reasons. However, there is no way to make a realistic assessment of the financial needs without the financial cash flow. On the basis of the cash flow the lenders find out how much money should be invested, what is to be expected from the investment, how quickly the money shall be repaid successfully. Without this document the chances that the lenders will support the credit request are small [14, 15].

Feasibility of the project: as there is a number of indicators, the indicators of interest will be established for the considered project, which depends on the characteristics of the project and the interests of the investor. The project efficiency indicators have the actual meaning in comparison with the indicators created by similar projects in the economy of a country or region [14].

In principle, there are two basic groups of indicators of the project performance: static and dynamic indicators. Their values for the considered project are analysed as follows.

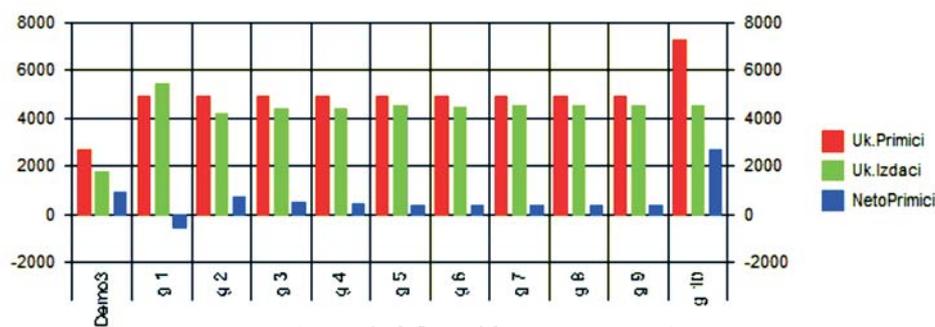


Figure 7 Cash flows of the project-scenario 1
Slika 7. Financijski tok projekta - scenarij 1

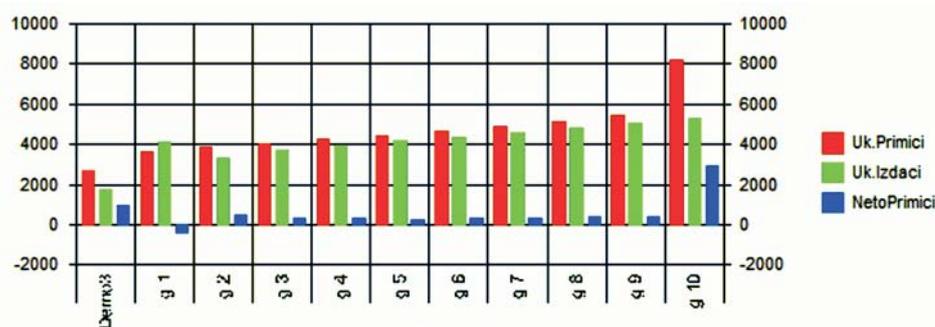


Figure 8 Cash flows of the project-scenario 2
Slika 8. Financijskog tok projekta - scenarij 2

Table 7 Static estimate - scenario 1

Tablica 7. Statičke ocjene projekta - scenarij 1

godina / year -> Demo3	1	2	3	4	5	6	7	8	9	10
s1) Rentabilnost poslovnih sredstava / profitability of assets	0,214	0,18	0,142	0,131	0,13	0,122	0,114	0,107	0,101	0,095
s2) Rentabilnost prometa / profitability of sales	0,153	0,149	0,127	0,126	0,133	0,133	0,131	0,13	0,128	0,126
s3) Rentabilnost financijskih izvora / profitab. of financ. sources	0,214	0,18	0,175	0,16	0,155	0,144	0,133	0,123	0,114	0,106
s4) Obrtaj poslovnih sredstava / turnover of assets	1,398	1,208	1,118	1,043	0,974	0,915	0,866	0,824	0,788	0,757
s5) Udjel tuđeg financiranja / debt ratio	0,681	0,589	0,512	0,446	0,385	0,33	0,281	0,235	0,193	0,152
s6) Reprodukcijska sposobnost / reproductive capability	0,261	0,223	0,183	0,169	0,151	0,14	0,131	0,123	0,116	0,11

Table 8 Static estimate- scenario 2

Tablica 8. Statičke ocjene projekta - scenarij 2

godina / year -> Demo3	1	2	3	4	5	6	7	8	9	10
s1) Rentabilnost poslovnih sredstava / profitability of assets	0,143	0,135	0,112	0,117	0,129	0,132	0,133	0,134	0,134	0,134
s2) Rentabilnost prometa / profitability of sales	0,128	0,128	0,107	0,111	0,125	0,13	0,133	0,136	0,139	0,142
s3) Rentabilnost financijskih izvora / profitab. of financ. sources	0,143	0,135	0,15	0,15	0,159	0,158	0,155	0,152	0,149	0,146
s4) Obrtaj poslovnih sredstava / turnover of assets	1,113	1,05	1,049	1,046	1,032	1,015	0,998	0,98	0,962	0,944
s5) Udjel tuđeg financiranja / debt ratio	0,725	0,651	0,583	0,517	0,448	0,383	0,323	0,266	0,213	0,163
s6) Reprodukcijska sposobnost / reproductive capability	0,193	0,183	0,158	0,16	0,154	0,153	0,153	0,152	0,151	0,15

Table 9 Projection of the pay-off-period - scenario 1

Tablica 9. Projekcija razdoblja povrata - scenarij 1

godine / year -> Demo3	0	1	2	3	4	5	6	7	8	9	10
Godisnja investicija / annual investment	1749	1252,7	0	0	5,9	45,5	13	6,9	7,2	7,8	8,2
Kumulat.investicija / cummulative investment	1749	3001,7	3001,7	3001,7	3007,6	3053,1	3066,2	3073,1	3080,4	3088,3	3096,5
Godisnji ek.primici / annual econ.inflows	0	875,3	871,9	951,6	895,8	853,2	831,7	813,6	794,7	774,3	3121,9
Kumulativni primici/ cummul.econ.inflows	0	875,3	1747,2	2698,9	3594,8	4448	5279,8	6093,5	6888,3	7662,6	10784,5
NEPOVRACENA INVEST./UNRETURNED INVESTI	-1749	-2126,4	-1254,5	-302,8	587,1	1394,9	2213,6	3020,3	3807,8	4574,3	7688

Static indicators quantify the business process by a number of indicators within a short business period, usually one business year. The static indicators of the project efficiency are profitability indicators, activity indicators, indicators of financing and financial stability and liquidity indicators [15].

Tab. 7 shows static estimates for the scenario 1, while Tab. 8 shows rating for the scenario 2 from which we can see that the values of all the static indicators are positive. The obtained results are as expected considering the data obtained so far, for it could have been already seen that both scenarios are suitable for the realisation.

In example of the first-year scenario 1 all the obtained indicators will be explained. In fact, profitability of the complete business assets is the ratio between the net profit and total business assets that is the fixed and working assets. All the values are from the representative year of the project, which means that it is the net annual profit, and the value of the fixed assets is their value without depreciation at the end of the representative year, and the working assets are equal to their value in that year. The project is more acceptable as high as the value of the indicators is, while its marginably acceptable value is equal to zero. In this case it amounts to 0,214, which means that the accumulation is realized in the amount of 21,4%.

Table 10 Projection of the pay-off-period - scenario 2
Tablica 10. Projekcija razdoblja povrata - scenarij 2

godine / year -> Demo3	0	1	2	3	4	5	6	7	8	9	10
Godisnja investicija / annual investment	1749	938,7	42,7	8,3	56,8	99,1	69,3	65,7	69,5	72,9	76,4
Kumulat.investicija / cumulative investment	1749	2687,7	2730,4	2738,8	2795,7	2894,8	2964,2	3030	3099,5	3172,4	3248,9
Godisnji ek.primici / annual econ.inflows	0	611	644,3	729,9	759,4	763,7	790,9	824,8	859,6	896,6	3470,7
Kumulativni primici/ cummul.econ.inflows	0	611	1255,4	1985,3	2744,7	3508,5	4299,5	5124,3	5983,9	6880,5	10351,3
NEPOVRACENA INVEST./UNRETURNED INVESTI	-1749,1	-2076,7	-1475	-753,5	-51	613,6	1335,2	2094,3	2884,4	3708,1	7102,4

Profitability of the turnover is represented by the ratio between the net profit and total income, that is participation of the net profit in the income. In the first year, it amounts to 0,153, which means that the revenues generate net profit of 15,3 %. Profitability of the financial resources amounts to 0,214, which means that the return on invested capital amounts to 21,4 %. The turnover of the business assets, which represents the ratio between the total revenue and the total assets amounts to 1,398 which means that by the total assets higher revenues of 1,398 times during the year are realized, the participation of the outside financing is 0,681, which shows what part of the assets is financed from external sources, which is in this case 68,1 %, and reproduction capability (the ratio between the net profit increased for the depreciation from the business assets) amounts to 0,261 which means that the expanded reproduction is accumulated in the amount of 26,1 %.

Dynamic evaluation of the project i.e. the discount cash flow method includes return of the entrepreneurial investment, present net value and internal profitability rate. For the considered the pay back period method is particularly interesting. The pay back period is the time required for return of the investments (usually expressed in years). It can also be interpreted as a period during which it is necessary to collect the positive net income during the business period, as to reduce to zero the sum of negative net incomes from the period of performance. This period is determined by a mathematical form and must not be longer than the lifetime of the project, that is investment must be paid back at least at the end of its lifetime. The pay back period is shorter as the technology advances faster, because the shorter pay back period enables choice of the project with faster pay back of the invested capital. Tab. 9 shows results of this method for the scenario 1, and Tab. 10 for the

scenario 2 of the considered project.

As can be seen in both scenarios, the project returns of the invested funds are between the 4th and 5th year that is 6th year of the active period. This would mean that the investment returns in the half-life period of the project. The basic advantage of this method is that it gives an emphasis on the quick return of invested capital, thus contributing to increased liquidity of the project. The logic of this method is easy to understand, and therefore its application does not require prior expert knowledge.

The final rating of the project is the last stage in preparation of the project and the design documentation in which all the aspects of the potential company are shortly described, and an opinion on profitability of establishing the company. Also, the final rating of the project must contain the data and the amount of initial investment, ratio of the invested funds, the potential lifecycle period of the project and the pay back period of the invested capital, [12]. That means that the final estimation of the project depends not only on the preceding analysis and indicators, but also that on the reality and objectivity of the preliminary and analysed data, because it may happen to the certain project in its final estimation it may obtain a high grade, but when it enters the market there may be certain complications and non-compliance with the data obtained from preliminary studies due to the wrongly interpreted data and neglect of the subsequent possible events and activities, [13, 14, 15].

An overview of the basic data required for the final evaluation of the project is shown in Tab. 11. Graphical presentation of the project profitability for the scenario 1 is shown in Fig. 9, while Fig. 10 shows graphical presentation of the project profitability for the scenario 2. The presented parameters are the total revenue, total expenditure and net profit during the considered project period.

Table 11 Comparison of scenarios
Tablica 11. Usporedba scenarija

	Scenario 1	Scenario 2
Initial Investment	2 120 530,00 kn	2 120 530,00 kn
Considered project period	10 years	10 years
ROI	Between fourth and fifth year of the project life	Between fifth and sixth year of the project life
Project Liquidity	Liquid from the second year	Liquid from the second year
Annual edition for comics	1 800 000 pieces (3 comics, common, maxi and special edition)	1 200 000 pieces (2 pieces, common and maxi edition)
Annual edition for books	36 000 pieces	36 000 pieces

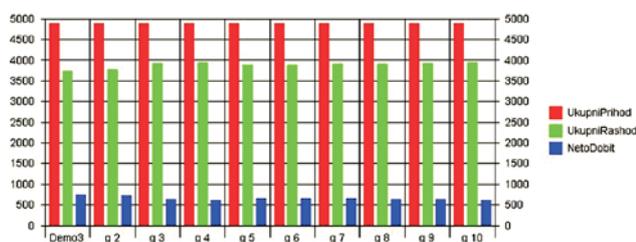


Figure 9 Graphical presentation of the project - scenario 1
Slika 9. Grafički prikaz projekta - scenarij 1

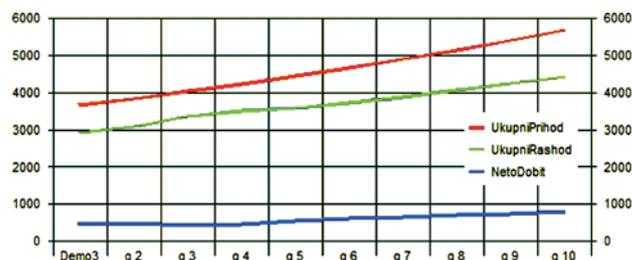


Figure 10 Graphical presentation of the project - scenario 2
Slika 10. Grafički prikaz projekta - scenarij 2

From these data it is evident that both scenarios of implementation of the project are acceptable. However, the scenario 2 is more acceptable due to more realistic specific categories of the considered project i.e. the number of copies of comics.

3 Conclusion Zaključak

Comics as an art form have been for a long time considered as working-class and children entertainment. Their influence was completely marginalized, but today the situation has changed significantly. It is a profitable and powerful branch of art which in a specific way shows and criticizes the presence in a somewhat provocative form. Based on the above said, in this paper we tried to investigate the investment profitability of establishing printing houses in the area of Split-Dalmatian County. The scope of the project includes printing of comics and books.

Particularly interesting quality of the work is ensured by interdisciplinary approach in which, after an engineering analysis in the technical-technological part of the project, a detailed economic and financial analysis was carried out. In fact, two scenarios of the project implementation were simulated in the software application for evaluation of the investment projects based upon the presented and assumed circumstances. These scenarios differ only in the number of copies of comics, while the initial investments for both scenarios are identical. The results of the analysis show acceptability of both scenarios, and the scenario with smaller number of copies of comics is considered as more favourable. The reason for this choice is a more realistic perception of the number of copies in the given circumstances. An optimal investment project comprises the following aspects of business: 200 000,00 kn of own funds, while 1 797 640,00 kn should be provided by bank loans, and the amount of subsidies of the HZZ is 122 890,00 kn. The planned annual number of copies of comics is 1 800 000 pieces and of books 36 000 pieces. The project is liquid from the second year, and the pay back period of the invested funds is between the fifth and sixth year of the project activity period.

Therefore, the investment in the project of printing houses in the Republic of Croatia, more precisely in the Split-Dalmatian County, is profitable. Special importance for the successful implementation of the project has the reliable perception of the number of copies. At the same time, one must not neglect the effects of the recession, which is reflected on all aspects of human activity as well as on this one.

Finally, the following should be noted: adopting a Law on books should mean a wind in the back of the project. In that way, greater competition of small printing houses should be enabled, but also generally a fair market competition in the field of graphic services.

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