Training materials

Construction Sector

MENTORCERT project
Work Package 3

Warsaw, 2019

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Introduction and learning objectives

These training materials have been prepared for the MentorCert Project. They aim to help business mentors or potential business mentors acquire knowledge and skills associated with the development of knowledge in specific business sectors. They are to be used as a resource to underpin the development of (1) project related e-learning materials (2) Face to face training.

Aim of the materials

The aim of the materials is to support business mentors and potential business mentors to achieve the 'hard' skills identified in the MentorCert skills card and outlined in the table below

Learning outcome
To understand options available to identify the scale and scope of the sector
To be able to identify relevant value creation models and apply at least one in a relevant sector context
To understand options available to map the sector eco-system and to apply at least one
Hypothesize about the future of the sector

Structure of the training materials

The training materials are ordered in the following way:

- A brief introduction to the Construction Sector
- Examples of techniques that can be applied in the sector to achieve the learning outcomes (e-learning materials) (including case studies)
- Short case studies to be used in face to face teaching and learning
- Further references and resources

The training materials contain eight case studies to encourage work-related learning.

Long cases (to be used in the on-line training materials)

- Built S.A. (1) – Strategic planning with SOAR Method by Built S.A.
- Brick Ltd. (2) – Value creation model for Brick Ltd. using NPV method
- Vision Engineering S.A. (3) – Understanding the Ecosystem with VCA Method by Vision Engineering SA
- Maths S.A. (4) – Checking profitability of the project with Maths S.A. by BCG Matrix

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Short cases (to be used in face-to-face training)

- Donat S.A. (5) – Strategic planning with SWOT Method by Donat S.A.
- AK-Homes4U (6) – Value creation model for AK-Homes4U
- Kow-Construct Ltd. (7) – Understanding the ecosystem with Kow-Construct Ltd.
- JKLL Design (8) – The future of JKLL Design

Time and materials needed

These materials should be used in combination with other resources developed during the MentorCert Project and the TRUST ME project.

- A methodology handbook introducing a selection of thirty two tools and techniques that can be used to identify the scale and scope of the sector, value creation, eco-system mapping and hypothesise about the future of the sector (MentorCert available here)
- A TRUST ME Handbook for trainers available here

To complete the full e-learning module should take about fifteen hours in total (eight for the methodology module and seven for the Construction module). It will take about 4 hours to complete the face to face element of the training.

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Overview of the sector

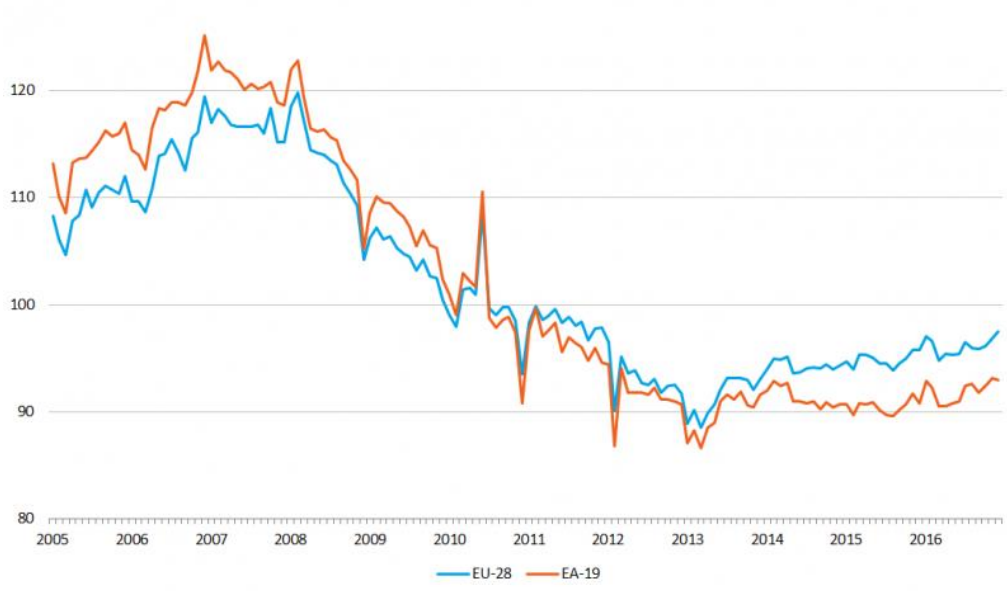
I. Brief overview of the sector

The economic weight of the sector

The construction industry is very important to the EU economy. The sector provides 18 million direct jobs and contributes to about 9% of the EU's GDP. It also creates new jobs, drives economic growth, and provides solutions for social, climate and energy challenges. The goal of the European Commission is to help the sector become more competitive, resource efficient and sustainable. (https://ec.europa.eu/growth/sectors/construction_pl)

Until the end of 2006 construction output in Europe had increased rather steadily and economic and financial crisis output began to decline quite dramatically. Between spring 2008 and early 2013 the level of total construction in the Europe had been on a more or less constant decline (apart from a short peak in summer 2010). In total the index lost more than 30 percentage points. During the following year (between April 2013 and April 2014) construction production recovered somewhat and increased by around 6 percentage points. Nevertheless, production only reached a level of around 80 % of the pre-crisis peak. Since then the production in construction has increased only very slowly (Figure 1).

Figure 1. Construction industry growth



Source: http://ec.europa.eu/eurostat/statistics-explained/index.php/File:EU-28,_EA-19_Construction_output,_m,_sa,_2005-2016.png

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The construction sector in the Europe accounts for more than 5% of the value added (gross). Although the relative share of construction in Europe's economic activity has decreased in recent years, construction remains important for European economies. Therefore, construction output indicators are an important tool for the European Central Bank and national central banks to monitor and analyse economic developments.

Production in construction is one of the so-called Principal European Economic Indicators (PEEI) that serve to monitor and guide economic policy in the EU and the euro area.

Employment

Civil engineering enterprises employed 1.63 million persons, equivalent to 1.2 % of the total number of persons employed in the non-financial business economy (Sections B to J and L to N and Division 95) and 12.1 % of the construction (Section F) workforce. These enterprises generated EUR 72.2 billion of value added which was also 1.2 % of the non-financial business economy total, while equating to 14.6 % of the construction total. For comparison, the number of civil engineering enterprises was a little more than one tenth of the number of enterprises within the population for the construction of buildings sector (Division 41), whereas employment and value added shares were more than two fifths, indicating that the average size of civil engineering enterprises was much greater than that of enterprises classified to the construction of buildings.

The largest civil engineering sector within the EU-27 in 2010 was in the United Kingdom, both in terms of employment and value added, with a 13.2 % share of EU-27 employment and a 20.0 % share of EU-27 value added. The next largest Member States, in value added terms, were France and Germany, both with more than 10 % of EU-27 value added. The 0.4 % contribution of Cyprus to EU-27 value added in this sector was the third highest share in 2010 by Cyprus among all of the non-financial business economy NACE divisions. Croatia's value added in this sector was equivalent to 1.2 % of the EU-27 total, the second highest such ratio for Croatia in 2010.

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Table 1.: Key indicators

	Value
Main indicators	
Number of enterprises (thousands)	101.5
Number of persons employed (thousands)	1 630
Turnover (EUR million)	255 000
Purchases of goods and services (EUR million)	191 000
Personnel costs (EUR million)	51 900
Value added (EUR million)	72 200
Gross operating surplus (EUR million)	20 300
Share in non-financial business economy total (%)	
Number of enterprises	0.5
Number of persons employed	1.2
Value added	1.2
Derived indicators	
Apparent labour productivity (EUR thousand per head)	44.3
Average personnel costs (EUR thousand per head)	33.4
Wage-adjusted labour productivity (%)	133.0
Gross operating rate (%)	8.0

Source: http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Key_indicators,_civil_engineering_(NACE_Division_42),_EU-27,_2010.png

Sectoral Analysis

In the case of sector analysis, it is easier to use indicators related to the development of infrastructure and all data related to the development of construction enterprises.

The construction of roads and railways was the largest civil engineering subsector in the EU, accounting for approximately half of sectoral employment and value added in 2010. The construction of other civil engineering projects was somewhat larger than the construction of utility projects in value added terms.

This situation is presented at Figure 2.

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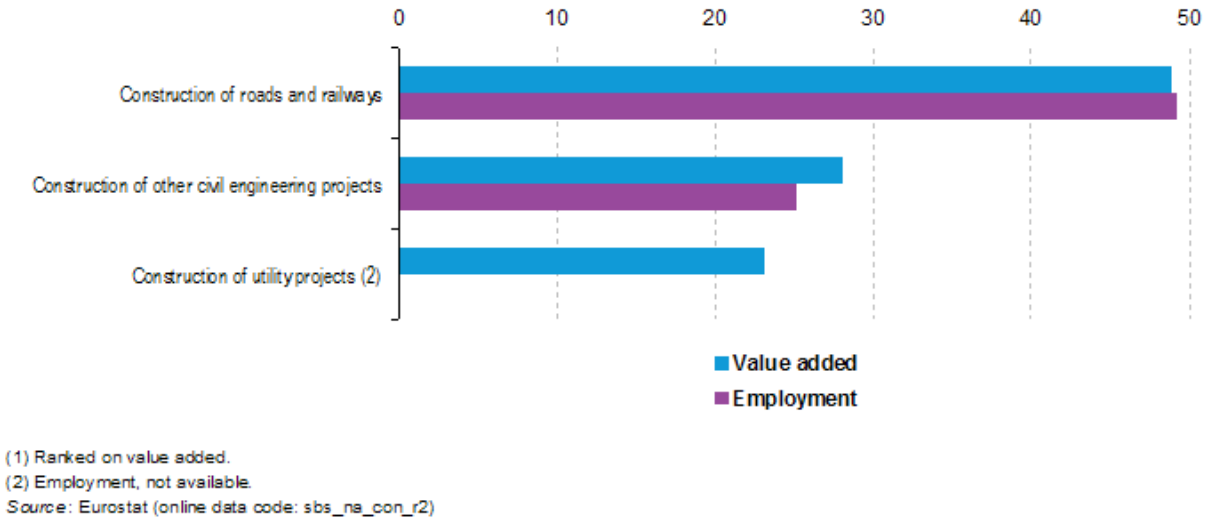
Figure 2. Sectoral analysis of civil engineering



(1) Ranked on value added.
(2) Employment, not available.
Source: Eurostat (online data code: sbs_na_con_r2)

Source: http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Sectoral_analysis_of_civil_engineering_(NACE_Division_42),_EU-27,_2010_(1)_(%25_share_of_sectoral_total).png

An extremely important issue when considering specific sectors is the level of employment and the analysis of the development of productivity and operations of enterprises.

The following tables show the most important data and indices regarding employment and efficiency of enterprises in terms of companies' income in particular countries. It is worth paying attention to the productivity of work, which directly translates into wages and employee satisfaction. The charts below illustrate this well.

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Key indicators, construction of buildings

	Number of enterprises	Number of persons employed	Turnover	Value added	Personnel costs	Investment in tangible goods
	(thousands)		(EUR million)			
EU-28	843.3	3 174.3	541 443.4	140 067.4	79 698.4	32 197.7
Belgium	23.3	86.2	23 316.2	4 961.8	2 839.2	1 556.7
Bulgaria	7.1	58.3	2 342.8	443.0	247.1	263.9
Czech Republic	32.4	100.9	9 051.7	1 557.9	936.6	532.4
Denmark	3.2	26.6	7 582.0	1 674.6	1 282.4	176.5
Germany	27.2	305.7	58 915.2	16 660.7	11 663.0	1 247.5
Estonia	3.2	14.5	1 607.2	278.9	201.9	50.0
Ireland	13.1	25.4	6 194.9	1 361.7	875.8	111.3
Greece	21.6	69.1	4 416.8	1 361.4	512.3	621.9
Spain	182.6	430.1	48 729.9	12 312.3	9 169.9	2 390.3
France	63.5	174.0	74 037.2	12 910.6	9 958.3	2 528.4
Croatia	6.7	35.8	2 063.2	476.6	282.1	123.7
Italy	124.3	339.0	59 427.4	12 059.0	8 004.4	1 745.0
Cyprus	2.2	8.0	1 092.0	269.3	157.2	14.2
Latvia	3.2	25.4	1 845.7	314.9	185.8	100.7
Lithuania	3.7	44.8	2 126.8	531.7	346.5	125.9
Luxembourg	1.3	12.0	3 001.1	782.4	558.1	120.2
Hungary	13.4	54.7	4 291.8	727.1	363.7	184.1
Malta	1.2	3.4	444.8	135.6	40.4	5.8
Netherlands	63.2	126.1	29 410.2	7 315.3	4 504.4	383.3
Austria	4.3	59.5	11 984.8	3 865.3	2 759.3	202.4
Poland	53.3	250.2	25 106.1	4 726.5	2 164.1	1 489.4
Portugal	38.3	135.8	7 510.9	1 807.0	1 561.8	420.7
Romania	24.1	169.3	7 357.6	2 132.6	731.3	1 248.6
Slovenia	2.9	13.7	1 362.9	289.6	196.3	24.6
Slovakia	10.4	32.6	2 351.8	365.1	285.2	99.4
Finland	18.1	71.2	13 032.9	3 255.5	2 365.5	205.1
Sweden	21.7	96.9	23 934.7	5 471.4	4 513.3	323.0
United Kingdom	73.9	405.1	108 905.1	42 019.4	12 992.4	15 902.7
Norway	23.1	80.8	27 577.1	6 934.1	4 567.4	1 194.8
Switzerland	3.5	87.8	21 214.8	8 138.1	6 875.4	798.2

Source: Eurostat (online data code: sbs_na_con_r2)

	Apparent labour productivity	Average personnel costs	Wage-adjusted labour productivity	Gross operating rate	Investment rate
	(EUR thousand per head)			(%)	
EU-28	44.0	30.8	143.0	11.2	23.0
Belgium	57.6	48.4	118.9	9.1	31.4
Bulgaria	7.6	4.5	167.5	8.4	59.6
Czech Republic	15.4	12.9	119.9	6.9	34.2
Denmark	63.1	51.3	122.9	5.2	10.5
Germany	54.5	40.3	135.1	8.5	7.5
Estonia	19.2	14.4	133.4	4.8	17.9
Ireland	53.7	45.5	118.0	8.0	8.2
Greece	19.7	12.6	156.2	19.2	45.7
Spain	28.6	32.6	87.8	6.4	19.4
France	74.2	59.7	124.3	4.0	19.6
Croatia	13.3	8.6	154.7	9.3	26.0
Italy	35.6	35.1	101.3	6.8	14.5
Cyprus	33.7	20.0	168.1	10.3	5.3
Latvia	12.4	7.6	164.0	7.0	32.0
Lithuania	11.9	7.8	152.8	8.7	23.7
Luxembourg	65.0	46.8	138.8	7.5	15.4
Hungary	13.3	7.4	178.5	8.5	25.3
Malta	39.7	14.8	267.3	21.4	4.3
Netherlands	58.0	56.2	103.2	9.6	5.2
Austria	64.9	48.1	135.1	9.2	5.2
Poland	18.9	11.2	169.0	10.2	31.5
Portugal	13.3	13.7	97.0	3.3	23.3
Romania	12.6	4.5	282.5	19.0	58.6
Slovenia	21.2	15.8	134.1	6.9	8.5
Slovakia	11.2	11.5	97.7	4.0	27.2
Finland	45.7	39.8	114.8	7.0	6.3
Sweden	56.5	56.6	99.8	4.0	5.9
United Kingdom	103.7	34.2	302.9	26.7	37.8
Norway	85.8	62.5	137.3	8.6	17.2
Switzerland	92.7	:	:	6.0	9.8

(:) not available
Source: Eurostat (online data code: sbs_na_con_r2)

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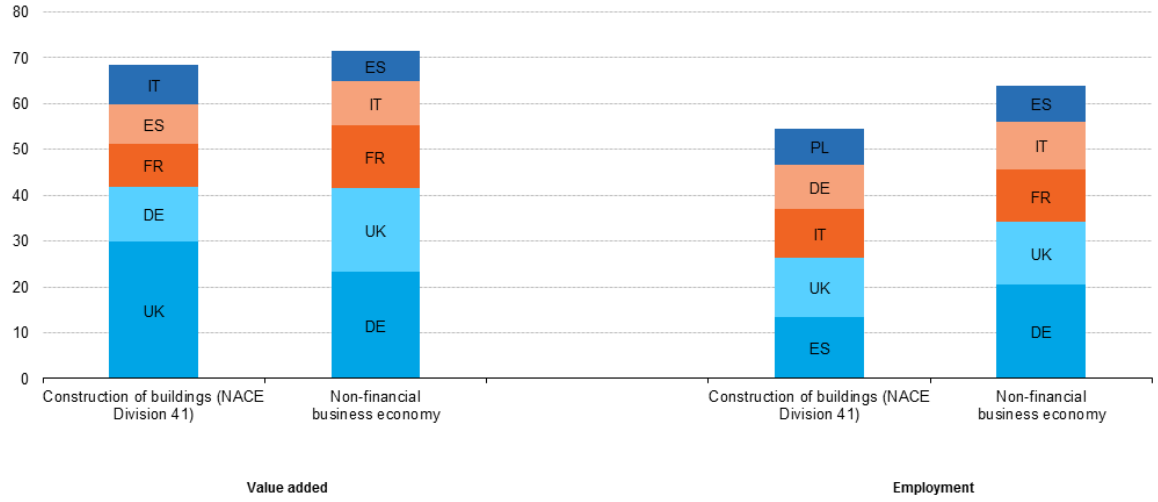
Concentration of employment, construction of buildings



Source: Eurostat (online data code: sbs_na_con_r2)

Europe Strategy

The construction sector has been hit particularly hard by the financial and economic crisis. The main challenges facing construction are:

- Stimulating demand: Efficiency improvements in existing buildings and renovations have the highest potential to stimulate demand.
- Training: Improving specialised training and making the sector more attractive, in particular for blue-collar workers, technical colleges and universities.
- Innovation: More active uptake of new technologies.
- Energy efficiency and climate change: Buildings account for the largest share of total EU final energy consumption (40%) and produce about 35% of all greenhouse emissions.

(https://ec.europa.eu/growth/sectors/construction_pl)

Within this context, a European Council meeting in Nice in 2000, reached an agreement on a set of common objectives for the EU's strategy against poverty and social exclusion, including two objectives related to housing, namely 'to implement policies which aim to provide access for all to decent and sanitary housing, as well as basic services necessary

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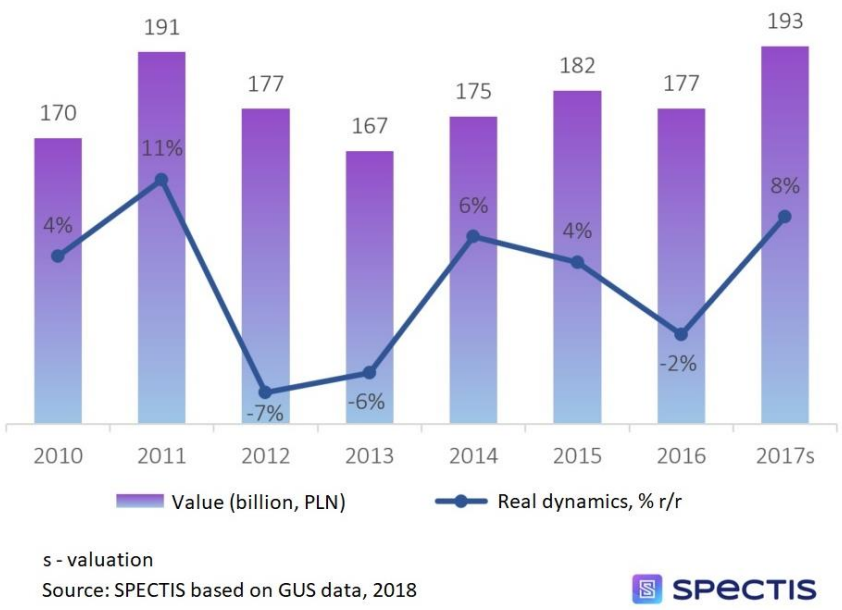
to live normally having regard to local circumstances (electricity, water, heating, etc.)' and 'to put in place policies which seek to prevent life crises, which can lead to situations of social exclusion, such as indebtedness, exclusion from school and becoming homeless.' This remit was extended in 2010 when the European platform against poverty and social exclusion set out a series of actions to help reduce the number of people at risk of poverty or social exclusion by at least 20 million persons by 2020.

Situation in Poland

Recently, the situation of the construction market in Poland was very different but for several years we have been observing an increase in demand for construction services. The value of the Polish construction market in 2017 reached an unnoticed value. The year 2018 is expected to bring further growth, although still average in relation to the value of GDP. (Figure 5).

Figure 5.: The value and real dynamics of the construction market in Poland, 2010-2017



s - valuation
Source: SPECTIS based on GUS data, 2018

These data indicate that in 2017 the total construction and assembly output of construction and non-construction entities increased in real terms by approx. 8 percent, reaching PLN 193 billion. Market data for Central and Eastern Europe are clear because these countries are experiencing economic recovery and are moving towards growth patterns. Various analysts believe that the growth rate in this region is at least 4%, as it is increasingly investing in energy transport and production. The railway construction

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market is expected to reach EUR 1.5 billion in 2015. Poland, as the strongest player in Central and Eastern Europe, is responsible for 60% of construction production in the region. Despite the upward trend, the contribution of the construction sector to the Polish economy is much lower than during the preparations for Euro 2012. In the years 2008-2011, the value of the construction market in relation to GDP fluctuated around 12 percent. Meanwhile, in 2016-2017, this share was less than 10 percent. The latest Euroconstruct projections have been tempered in outlook to just under 2% growth in 2015, with maybe slightly over 2% growth in 2016 and 2017.

Specialists say that a positive trend has been visible in the construction market for several months. The number of dwellings completed has been increasing, and additional investments have been launched, using funds from European programs. According to the latest available data in the US, an average of 2.4 people live per person, and only slightly worse (2.2 rooms per person) is in Belgium and New Zealand. Poland with the index of 1.4 is below the European average, which is 1.6 rooms per head.

However, Poland is systematically chasing the West from year to year. In the last ten years (2005-2015) this rate has increased in Poland from 1.23 to 1.40. What distinguishes Poland from other European countries is a much larger share of new construction in the national investment perspective, while in Western Europe the repairs of already existing buildings have a much larger share. (Source: http://www.euroconstruct.org/ec)

Polish trends and challenges

Poland, like many EU countries, has many interesting ideas and initiatives related to civil engineering. The idea of ecological construction comes to the front, in which Poland is leading the way if it is about certification. Between March 2016 and March 2017, a 25% increase in the number of certified buildings (of all types, in all systems) was noted. This increase is very similar to the initial stages of the development of prosperous Western countries. According to the report "Certification of green buildings in Poland", prepared by the Polish Association of Ecological Building, in March last year there were 551 certified facilities in our country. This amounts to as much as 68 percent. increase compared to the same period in 2016, where the number of certified facilities was 331. This shows that the domestic eco-building market is growing systematically from year to year.

In Europe, countries such as the United Kingdom, Germany and France have a strong position, especially when it comes to BREEAM certificates. The growth dynamics is also significant here, according to which Poland records 13 percent. This is a very similar result to the initial stages of development of the aforementioned European countries.

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II. Global trends and challenges

Challenges

Due to the development of various industries in the world, new problems and challenges are facing new people. As for the construction sector, as technology advances, we are able to find new solutions that significantly enrich the construction industry.

We can distinguish several elementary challenges of today's time for Europe. The main point is the business model. This issue is explained by Leo Quinn. He told that Construction companies take inordinate risk at very low margins, with ever more difficult contract conditions in an increasingly punitive legislative environment. Quinn took the audience through some recent contracts that Balfour Beatty has bid for, noting the vast differences in bid values. These illustrate a lack of rationality in the market.

He described the problems of "forced growth," in which a company continues to grow its top line, whether through acquisitions or international expansion, to stay ahead of its cost curve. This approach can lead to profit warnings when growth stops but costs continue to grow because they haven't been integrated properly. Ultimately, Quinn believes it's all about cash. Construction companies are kept in place by banks who provide credit lines and money. Indeed, this explains why the biggest construction companies in the world are Chinese - they seem to have an infinite capacity for cash.

On the other hand, McCartney described the macroeconomic picture and the upward inflationary pressures created by foreign exchange rates. Financing costs have been exceptionally low for a number of years, which has helped fuel some investment in the construction sector. But larger M&A activity has been suppressed. McCartney expressed his hope that more certainty from government policy will lead to a return in confidence and willingness to invest.

Brexit is an issue worth considering. McCartney also briefly talked about it. There are issues around project delays and cancelations in private sector real estate investment and general uncertainty for house builders. This can be tracked back to uncertain consumer confidence and much depends on what happens when the reality of Brexit becomes clear. There is clear potential for confidence to evaporate further. McCartney says that some of the other concerns and challenges for the sector. Cost inflation, and the ability of a low-margin business to pass costs through within existing contracts is a fundamental concern. There is a need to educate buyers to procure smartly. On cash, there's a clear focus on getting smarter and transforming the industry culture so that everyone understands its importance. And there's a hope that margins will see an upswing led by increases on the demand side.

(Source: European Construction and Infrastructure Roundtable: discussion summary)

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Trends

The world is going through a series of disruptive changes, which, when coupled with the economic crisis, create a significant discontinuity.

The five grand transformations may be listed alphabetically as:

a) Automation and abundance;

b) BRICs: Brazil, Russia, India, China, India and globalisation;

c) Climate change and energy;

d) Demography and ageing;

e) E-everything, information, technology, computers, everything electronic

(Source: Turk, Žiga. "Global Challenges and the Role of Civil Engineering." In Performance-Based Seismic Engineering: Vision for an Earthquake Resilient Society, pp. 51-61. Springer Netherlands, 2014)

Ecological construction is becoming more and more fashionable. Already in the design phase, architects are trying to create buildings for the environment. Thanks to the increasingly stringent EU directives, it will be impossible in the future to build a building that is not environmentally friendly. From 2020, all newly constructed buildings are to be characterized by a possibly zero energy balance (they have to consume a small amount of energy, mainly from renewable sources).

This will be the effect of the EU directive on energy efficiency introduced in 2012. It imposed an obligation to reduce greenhouse gas emissions and energy consumption. It will be difficult to meet it, currently the real estate is responsible for 40% of total energy consumption in the European Union.

Environmental Engineering is one of the fastest growing engineering disciplines with an expected 15% growth rate through 2022 or 820 jobs per year. It is a young discipline (994 BS graduates in 2012-2013) that is growing exponentially (Figure 3). Consequently, there will be a large demand for Environmental Engineers over the next decade.

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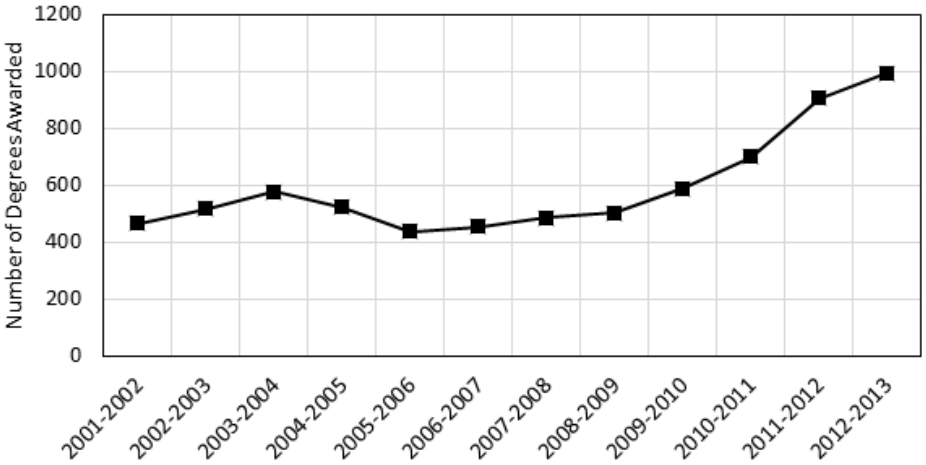
Figure 3.: Environmental Engineering BS Degrees



(Source: https://ceees.nd.edu/research/environmental-engineering)

Trump and Brexit

So far, it seems that leaving the EU structures by the United Kingdom and choosing Donald Trump as the president of the United States will have only a minor impact on the construction sector in Europe. The Dutch sector should remain indifferent to these issues. Our local experts point to potential uncertainty in the economy and financial markets caused by the above political changes - construction can indirectly feel their effects. Despite these threats, the European construction sector should use its experience of carrying out large projects and public-private partnerships to be able to benefit from the extensive infrastructure investments announced by President Trump and the British government.

(Source: https://www2.deloitte.com/pl/pl/pages/real-estate0/articles/europejski-monitor-budowlany.html)

Last year, the Central Office of Building Supervision issued a report on construction work in Poland. In 2015, the lowest number of building permits was granted since 2010. In turn, from the 2016 PSB Group's research, we know that the last quarter was a period of price increases for virtually all construction materials, up to 9%.

Based on data from the Building Radar regarding all matters related to the construction market in the EU, there are some forecasts regarding the short-term growth trends in the European construction market. Analysts predict that the market will stabilize in some countries, preparing for long-term growth in the future. In other countries, markets will continue to grow steadily.

Erasmus+
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	2014 CONSTRUCTION OUTPUT	% CHANGE IN REAL TERM						
	Billion euro	2014	2015	2016	2017	2018	2019	2020
Germany	285	2,40	1,80	0,20	-0,40	0,30	0,39	0,48
France	200	-2,80	-0,40	1,80	1,60	1,66	2,13	2,47
United Kingdom	177	5,20	5,10	3,50	2,40	3,12	4,21	5,10
Italy	163	-2,20	1,10	2,50	2,80	3,72	5,18	7,20
Spain	63	-2,40	1,80	3,60	5,00	6,50	7,93	9,04
Netherlands	60	0,30	3,40	3,50	4,70	5,78	7,98	9,73
Switzerland	53	0,80	-0,70	1,40	1,50	1,97	2,71	3,01
Norway	46	2,10	3,90	2,50	2,90	3,80	3,87	5,04
Poland	44	4,90	7,10	6,20	6,70	7,50	8,78	10,45
Belgium	39	0,70	0,00	1,50	2,40	2,93	3,40	3,94
Sweden	34	5,30	1,30	1,10	1,60	2,13	2,60	3,25
Austria	32	1,70	1,00	1,30	1,50	1,91	2,63	3,52
Finland	29	-0,20	1,50	1,70	3,20	4,10	5,20	5,41
Denmark	27	2,50	2,90	3,50	3,70	4,26	5,49	6,48
Czech Republic	16	1,00	2,50	3,30	4,00	4,96	5,56	7,67
Portugal	15	-1,00	2,50	3,60	5,00	6,55	8,25	10,40
Ireland	9	10,10	9,00	10,60	9,20	9,29	9,94	9,94
Hungary	9	14,30	5,10	3,80	2,90	3,45	4,35	5,52
Slovak Republic	4	-0,40	1,80	2,70	3,00	3,51	4,00	4,16
Western Europe	1.232	1,9	2	2	2	2,70	2,97	3,12
Eastern Europe	73	5,5	5,1	5,5	5,5	7,15	7,79	9,98
Euroconstruct Countries	1.305	2,1	2,2	2,2	2,2	2,40	2,52	2,72

Development of the construction output in the Euroconstruct countries

All analyzes have been devoted to various sectors of the construction industry, which should be developed in the near future. It is expected that they will grow steadily. 2015 was extremely important for the general construction sector. All data is presented below.

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Total output development by market segments – % growth rate in real terms

	2013	2014	2015	2016	2017	2018	2019	2020
New Residential	-4	0,1	2,6	4,7	3,7	5,0	6,2	7,6
New Non-residential	-5,2	0,6	2,7	2,1	2,3	3,1	4,1	4,7
Building R&M	-0,3	1,4	1,6	1,1	1,4	1,8	2,2	2,6
Civil Engineering	-4,2	1,4	2,2	2,6	2,7	3,7	4,4	4,9
Total	-2,7	1	2,1	2,2	2,2	2,9	3,6	4,2

III. Best practices of answering to the challenges

In reference to the creation of a new - better business model, a lot of initiatives are created, which are designed to optimize work in the construction sector.

Automation and robotics are enabling the industry to produce more and more with less and less work. The EU can use rich cultural and ethical capital or reorient its economy towards creative economy. By combining science, innovations and creativity to create products and services that are more than what they are useful for. Maintain its world class brands and create new ones that embed our culture and values. Or it can engage in uphill struggle on price and function only.

The best way in optimization is enter BIM or Building Information Modelling technology. In short, it is the means by which everyone can understand a building or structure by the use of a digital model. In plain language, it is the virtual modelling of numerous aspects of a building, from its design and construction, to its management and life cycle, and even to its recycling and disposal systems. BIM offers something for everyone within the building industry, no matter where your involvement is within the buildings life span. The process and ideology of BIM technology is depicted in Figure 4. Many companies develop the design process by special software. The most popular software are Tekla Structures, Revit and Archicad. Statistics show that Autodesk is the most popular company that produces software for design.

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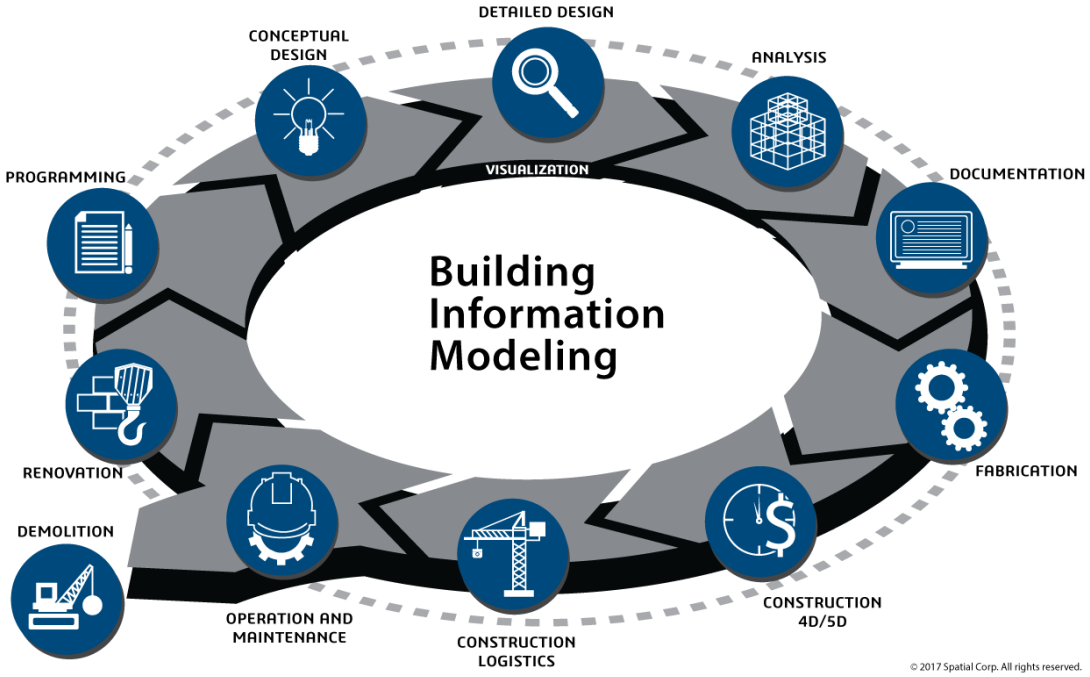
Figure 4. Building Information Modeling



Source: https://www.spatial.com/industries/building-information-modeling

Source: http://www.allseasonshire.eu/blog/post/introduction-to-bim/

Source: https://respondarchitects.co.nz/building-information-modeling-lets-call-it-bim-for-short/

IV. Lessons for the curriculum development

Over time, it turned out that the training of managerial staff is just as important as the training of employees. For many years, on the basis of experience, efforts were made to find issues related to the development of work and optimization that would directly help the management. It is important that the most important matters for the management are:

- Managing time efficiently
- Practice basic skills, even if you do not need them anymore
- Don't be arrogant but be confident
- Understand other engineering disciplines
- Give good presentations
- Risk and reward

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In practical terms, these issues are often not used for many reasons. Consequently, there are not many good specialists on the market, which directly translates into worse results. It is very common to notice the untimely performance of works that can be directly caused by the lack of effective time management. For the past few years, courses and trainings have been increasingly implemented to educate people about the proper use of time.

New methods of harmonizing and implementing BIM (Building Information Modeling) technologies improve the quality and overall condition of the construction engineer's profession. The best example of this is related to costs. A well-made construction schedule and good time management is an extremely important factor affecting the investment costs, which is extremely important for the investor.

A great initiative that would combine the above-mentioned points and positively affect the development of investment and construction process, and especially the management would be assisted by Lean Management. Generally, this is an idea that aims to optimize the work taking into account every stage needed for the construction investment process. The implementation of this system is successively developed by many enterprises. In civil engineering, it is a relatively new technology but is constantly being implemented and improved. The key idea of this technology is to involve all employees in the process of improvement and improvement. It would be better if we involve everyone in the company. One hundred percent of the crew improves the company's operation and learns how to work together more effectively. All these processes can significantly improve the quality of services provided through general optimization. There is often a management team that does not develop these skills, which causes many inconveniences.

In developing skills and arranging some kind of guidelines for people who want to be mentors in the program, knowledge about conducting business activities in the construction industry, it is absolutely essential to create basic features and mentoring issues. It is extremely important to find gaps in skills and any mismatches as soon as possible with regard to all activities related to being a leader. The SKILLCO project, which started in 2016 in Germany, Slovenia and Hungary, is a very interesting initiative on completing gaps and gaps in skills.

This project is according to FI EU press release in 2016 there were for example over 3325000 construction businesses in the EU. They supposed more than 14 368 000 jobs and contributed 1,278 billion euros to the EU`s economy. Eurostat recorded the gross values that EU construction sector added in 2016 at over EUR 710,583 million.

Four key joint gaps can be distinguished, which must be eliminated. First, it is necessary to collect data and carry out any theoretical analysis. Then, practical analyses are carried out, often with the participation of students. These activities lead to establishing real goals

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that can be achieved. Another important element is the development of craft skills such as skillful communication, work safety and green skills. This is closely related to the use of soft skills that are often lacking in older employees. All this leads to the creation of auxiliary materials such as literacy, occupational Safety and Healthy, Green Skills and Numeracy. All these activities would not work well were it not for calculating costs using expenditure forecasts in construction. It is very important to use measures to prevent pain and muscle and bone injuries.

Source: http://www.fiec.eu/en/news/news-2018/skillco-project-skills-gaps-and-mismatches-in-construction.aspx

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Case studies

to the selected Hard Skills of the MentorCert Skill Card

I. Strategic planning

Long Case

Strategic planning with SOAR Method by Built SA

A1. Strategic planning for Construction

A1.1 Introduction

The present case study is based on the activities of Built SA company (General Contractor in the area of roads) which is the medium size Construction company looking for development of new strategy. The company employs about 500 people, including many young apprentices and students, because the company is very enthusiastic about new employees, providing them with a lot of support. The company is located in Warsaw with branches in main Polish cities: Kraków, Wrocław, Poznań, Gdańsk. This case show how the SOAR method can be used for creation of new strategy, for company which feels the road construction market is shrinking. So this method is used to answer the question: What are the Strengths, Opportunities, Aspirations and Results of the company wishing to move its main activities towards railway construction.

A.1.2 The Case and the Problem

Country where the Built SA is located was modernised in terms of transport infrastructure. Thousands of kilometres of roads were built by the company and her competitors. Now due to the new European funds directed by the country government for railways construction, the company managers decided to investigate if the company can change its main activities. Present strategy of the company was related to roads construction only. Company possesses equipment relevant in roads construction like: diggers, bulldozers, cranes etc. Company employs designers and managers experienced in construction on roads both concrete and asphalt type. Management of the company is based on old

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methods where president of the company and management board supervise branch directors who supervise particular project managers.

A2. Leader: personality, attitude, communication, etc.

Paul is an experienced civil engineer with railway construction skills and he is appointed by president of the company to assess if the transition of the company from road construction to the railways construction will give positive results from financial and marketing point of view. He is a very calm and optimistic person, happy family father with seven children. He is very happy to spend the majority of his time at work. His passion is strategic planning and if the strategy will be chosen by his boss, he will be responsible to develop the new branch of the company (railway construction): marketing, clients search, staff employment, managing new projects etc. Local directors are: Ludwik - director from Gdańsk, Paul's colleague from studies, he is against the changes; Leon - director from Wrocław - new appointed financial specialist, he support changes suggested by Paul; Ludomir - director from Poznań - he is neutral in respect of changes; Lesław - director form Kraków - he is very enthusiastic with the changes.

A3. Content of explanation of the case:

Paul is not sure if railways construction is a good market for Built SA. He's got several doubts like: lack of machinery of Built SA, lack of personnel, designers devoted to roads construction, the staff`s skills shortages and he knows that the railway construction is a really complicated business. Paul needs a mentor to help him to decide if the new strategic plan to move roads to railways will have a positive influence on the company.

A3.1 How to apply the chosen method: Presenting how the given method can be applied to that company, to that given situation.

Firstly, recognize SOAR method and recognize SOAR Relevant Definitions:
S = Strengths
What an organization is doing really well, including its assets, capabilities, and greatest accomplishments. Check company achievements list all the assets including equipment and personnel.
O= Opportunities
External circumstances that could improve profits, unmet customer needs, threats or weakness reframed into possibilities. Recognise prices and profits in railway construction industry.

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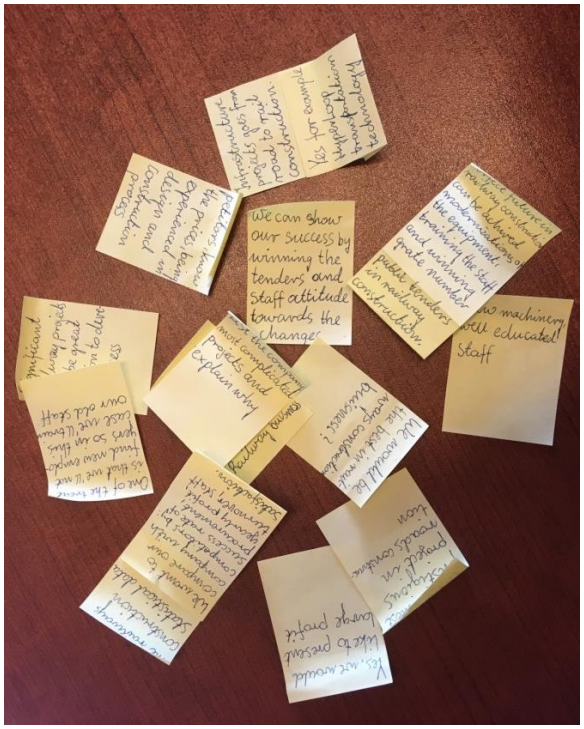
A= Aspirations
What the organization can be; what the organization desires to be known for. Try to assess what are the personal goals of the company managers do they want to expand to construction of railways or they would like to shift from construction to railways.
R=Results
The tangible, measurable items that will indicate when the goals and aspirations have been achieved[1]. Try to make a list of indicators to assess if the success was achieved (f.e. increase profit of the company).

The method foreseen the following steps:
Step 1: Paul should organise a meeting with company managers to sit and write down the problem. Then quietly put ideas, data, etc. on cards, pieces of paper, or Post-it notes. The operative word is quietly. This is not like a typical brainstorming session where people are very vocal about their ideas. We want this to be a quiet exercise so that no one person(s) biases the other team member's ideas. Participation from local branches from Kraków, Wrocław, Poznań, Gdańsk is advisable. It is strongly recommended to organise the meeting, not only with the company managers, but also with employees, stakeholders, suppliers, etc., to have a broader view of where the contributions would be the best, as precognized by the SOAR method.



[1] https://www.groupmap.com/map-templates/soar-analysis/

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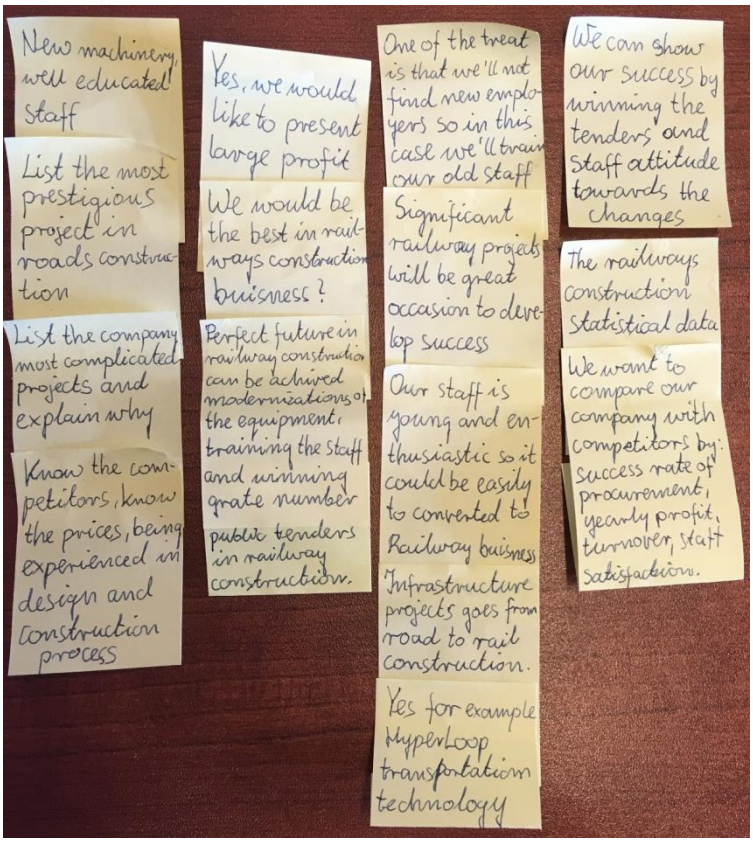
Step 2: Put into homogeneous groupings. For example: need for the new machinery for railways, training for present staff, employment new experts, recognitions railways governmental agencies, prices in railways construction, margin profit etc.



Step 3: Affinity Heading

Develop affinity heading cards. For example, there is a homogeneous grouping for human resources related items. There is another grouping for the training department. Another grouping deals with general processing (like purchase of new equipment of railways construction). One of the heading should be related to cost of transition. And, the last grouping addresses employee empowerment. The heading cards will be placed on top of each of the homogeneous groupings.

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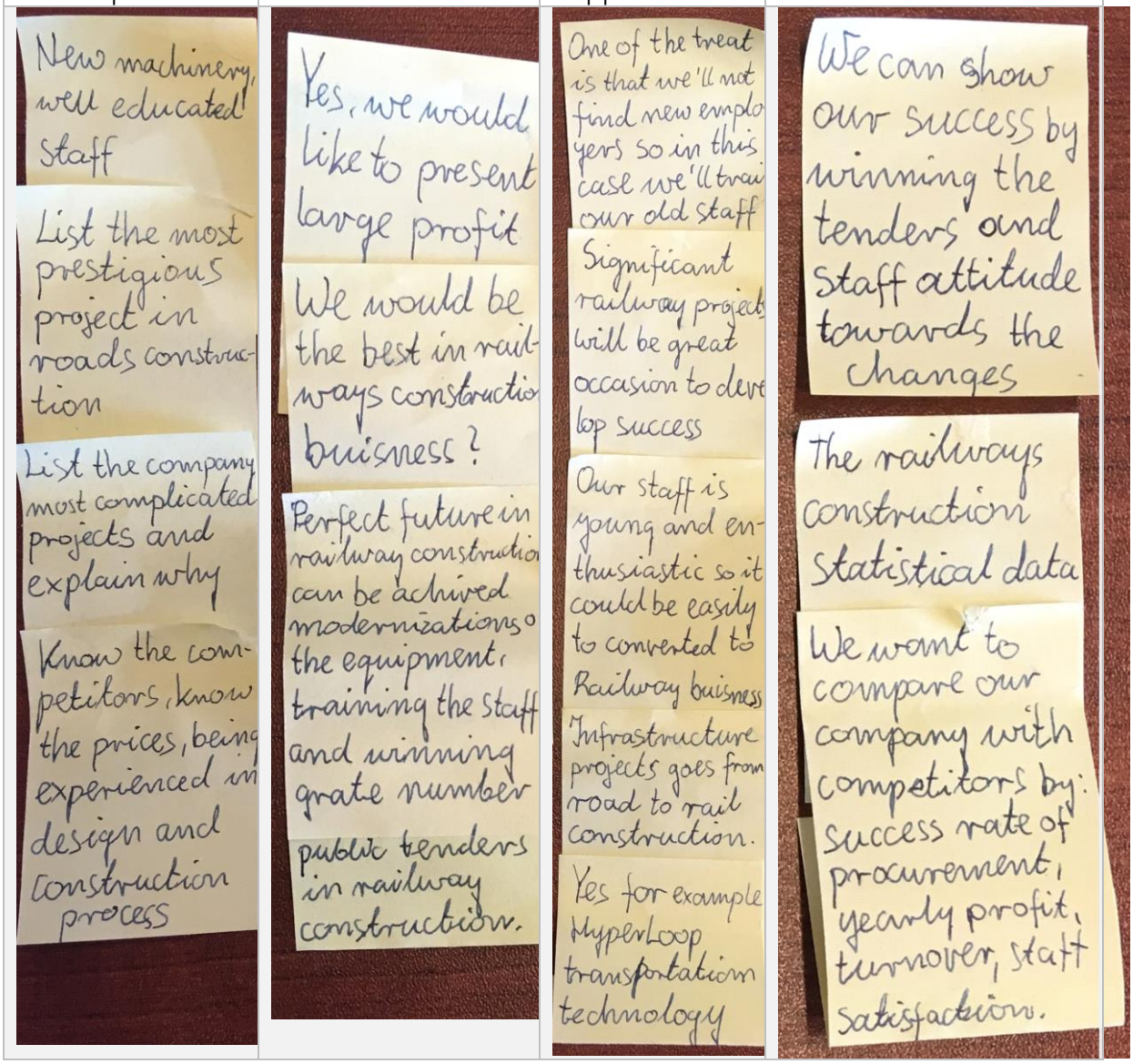
Machinery and competitors	Why?	Threats and opportunities	Success and profits
			

Step 4: Put the groupings into the order of the process. For instance, when employees get hired, they first start off with human resources. The human resources department deals with employee empowerment. And you have the process itself – that goes in the middle. Billing usually comes late in the game. And finally, training is something that involves all employees on an ongoing basis so the team chose to put it in last position.

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A3.2 How to get acquainted with the leader and how to „manage" him (communication, treatment, etc.) properly, in an effective way.

First, agree with the leader what are the positive side of the company and why he care about the future about organization.
Thank to SOAR method Paul will learn how to frame strategic planning in a manner that actively engages stakeholders within their own organization and also will learn a different approach in helping an organization to design a planning process that provides a more meaningful – and clearer - strategic direction.
Mentor should talk to Paul about:

- how to discuss with managers to convince them about the changes.
- what tools should be use to talk to employees, stakeholders, suppliers.

Discussion with Paul could cover the topics which are shown in the table.

Strengths What can we build on? Example questions: • What are our greatest accomplishments in roads construction? • Which products is the most prestigious one? • What was our most complicated project? • What strengths are most valuable in road construction? • What are our advantages in comparison with competitors?	Opportunities What are our stakeholders asking for? Example questions: • What projects would lead to greater success? • Do our "Road Staff" can be easy converted to Railway business? • What changes and trends in the market align with our strengths? • Are there gaps in the railway construction market that we could fill?
Aspirations What do we care deeply about? Example questions: • What do we want to achieve in the future in railways construction business? • Would you like be the best in railways construction market? • What strategies and actions support our perfect future in railway construction?	Results How do we know we are succeeding? Example questions: • How can we better than competitors in railways construction? • What measures will tell us we are on track to achieve success? • How do we translate our vision of success into railway business?

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Answer the questions above, on the base on Paul experienced and SOAR method.

Strengths What can we build on?	Opportunities What are our stakeholders asking for?
Example answers: • List the most prestigious project in roads construction. • List the company most complicated projects and explain why. • Know the competitors, know the prices, being experienced in design and construction process. • New machinery, well-educated staff.	Example answers: • Significant railway projects will be great occasion to develop success. • Our staff is young and enthusiastic so it could be easily converted to Railway business. • Infrastructure projects goes from road to rail construction. • One of the treat is that we will not find new employees so in this case we will train our old staff. • Yes for example HyperLoop transportation technology.
Aspirations What do we care deeply about?	**Results** How do we know we are succeeding?
Example answers: • We would be the best in railways construction business? • Yes, we would like to present largest profit. • Perfect future in railway construction can be achieved modernizations of equipment, training the staff and winning grate number public tenders in railway construction.	Example answers: • We want to compare our company with competitors by: success rate of procurement, yearly profit, turnover, staff satisfaction. • The railways construction statistical data. • We can show our success by winning the tenders and staff attitude towards the changes.

Using the SOAR method the suggestions of mentor the company should move towards Railway construction business.

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Short Case

Strategic planning with SWOT Method by Donat S.A.

Company and case

1. Company

Married couple, Donald and Natalia, are owners of company Donat S.A. which was established in 1994 which is concentrated on housing construction for private clients. The company employs 30 people and they work only in Mazowsze region in Poland. Donald is a president and Natalia is vice-president. Donald and Natalia know very well Mazovian competitors, suppliers, subcontractors and clients. Donat S.A. has been operating on the market for 10 years.
They specialize in the detached and prefabricated houses ready to install in target places. They use high quality materials and they build prestigious residences. The customers are rich people with untypical requirements. Nowadays company is in the stagnation, Mazovian market seems to be too narrow for them. Stagnation is related to operation of large construction companies which offers lower quality and cheaper houses and apartments.

2. The Case

These days company would like to enter new markets other than Mazovian Voivodship. Mentor showed Donald and Natalia the following link:
https://pestleanalysis.com/swot-analysis-for-construction-company/
and discusses SWOT method for the Donat S.A.:
Strengths:

- Market leader in the Mazovian area
- Good quality of houses

Weaknesses:

- Mixed reputation among suppliers
- Lack of knowledge about competitors form other Voivodships

Opportunities

- Improvement of financial status, by increasing profit and decreasing costs
- Getting new clients

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Threats

- Loosing old clients and subcontractors
- Unknown environment in other Voivodships

Questions:

Discuss with Donald and Natalia the following aspects:

1. Will they movement to other voivodships improve their efficiency?
2. Should they employ more personnel to run a bigger company?
3. What methods they should use to identify neighborough markets?
4. How can they find new clients, subcontractors and suppliers, what marketing tools they could use?
5. How could they identify more threats?

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II. Value creation models

Long Case

Value creation model for Brick Ltd. using NPV method

B1. Value creation model for Construction

B1.1 Introduction

Fiction company Brick Ltd. (Building materials producer) is a small size family company looking for financial improvement of their operations. The company exists on the market for more than 50 years. Five different types of products can be found across the country, from small towns to big cities, in the big supermarkets. The owner of this company – George - is an older engineer who is worse in economic issues than in technical aspects. At the moment stagnation in the company is noticed. George employs 100 people including two of his sons. One of them – Albert - is a fresh graduate from economy faculty at university.

B.1.2 The Case and the Problem

Albert suggested to his father to reduce labour costs by automating some tasks which are currently performed manually. His father is against, being not sure if any changes could be positive for his company. Albert wants to increase production and enter new markets. He suggests to his father to use NPV method, to check feasibility of the automation.

B2. Leader: personality, attitude, communication, etc.

Albert is fresh graduate from economy school- full of ideas and with skills allowing him to use modern economical methods he just learned at the university. He's unmarried, so he spends the major part of his time in his father's company. Unfortunately he's not in good contact with his father due to the generation gap. The conflict started in his childhood, when his mother left the family. His hobby is medieval methods of bricks and roof tiles production. He loves to walk out his seven dogs - large labradors. He's very enthusiastic to develop the company, but his father is afraid to introduce new methods of production, bear cost of new equipment, or aggressively enter new markets. He takes

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care of workers of the company and workers like him very much. Albert got a very good contact with potential clients of Brick Ltd. and due to his skills in materials production he knows newest machinery solutions.

B3. Content of explanation of the case:

George thinks that his company has already reached the maximum capacity and does not want to develop it further. He has no plans to enter new markets or at least to automate the production process. Albert, in turn, is determined to develop his father's work, but through bad contacts with him cannot convince him to act. Albert needs a mentor who will help him to convince his father to take a development initiative using modern methods.

B3.1 How to apply the chosen method: Presenting how the given method can be applied to that company, to that given situation.

First, let's get acquainted with the method used:

Net present value method (also known as discounted cash flow method) is a most popular capital budgeting method that takes into account the time value of money. Net present value of the investment project is use acceptance or rejection of an investment for projects like purchase of new equipment, purchase of inventory, expansion or addition of existing plant assets and the installation of new plants etc.
Net present value (NPV):
Net present value is the difference between the present value of cash inflows and the present value of cash outflows that occur as a result of undertaking an investment project. It may be positive, zero or negative. These three possibilities of net present value are briefly explained below:
Positive NPV:
If present value of cash inflows is greater than the present value of the cash outflows, the net present value is said to be positive and the investment proposal is considered to be acceptable.
Zero NPV:
If present value of cash inflow is equal to present value of cash outflow, the net present value is said to be zero and the investment proposal is considered to be acceptable.
Negative NPV:
If present value of cash inflow is less than present value of cash outflow, the net present value is said to be negative and the investment proposal is rejected.

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B3.2 How to get acquainted with the leader and how to „manage" him (communication, treatment, etc.) properly, in an effective way.

Albert is planning to reduce its labor costs by automating a critical task that is currently performed manually. The automation requires the installation of a new machine. The cost to purchase and install a new machine is 15 000 €. The installation of machine can reduce annual labor cost by 4 200 €. The life of the machine is 15 years. The salvage value of the machine after fifteen years will be zero. The required rate of return of Smart Manufacturing Company is 25%.
Should Brick Company purchase the machine?

Solution:
According to net present value method, Brick Company should purchase the machine because the present value of the cost savings is greater than the present value of the initial cost to purchase and install the machine. The computations are given below:

Initial cost	15 000 €
Life of the project	15 years
Annual cost savings	4 200 €
Salvage value	0
Required rate of return	25 %

Item	Year(s)	Amount of cash flow	Present value of cash flow
Annual cost savings	1 - 15	4 200 €	16 208 €
Initial investment	Now	(15 000)	(15 000)
Net present value			967,00

Net present value method – uneven cash flow:
Notice that the projects in the above examples generate equal cash inflow in all the periods (the cost saving in example has been treated as cash inflow). Such a flow of cash is known as even cash flow. But sometimes projects do not generate equal cash inflows in all the periods. When projects generate different cash inflows in different periods, the flow of cash is known as uneven cash flow. To analyze such projects the present value of the inflow of cash is computed for each period separately.

Among soft skills needed to be used by the mentor is to discuss with George how to remove intergeneration gap with his son, what methods could be use to make two guys working together. Using the NPV method has convinced George to increase production of the company by purchasing new modern machines.

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Short Case

Value creation model for AK-Homes4U

Company and case

1. Company

AK-Homes4U S.A. is a Polish real estate developer that has been building in Warsaw since 1996. The company has been conducting also investments in Radom, Lodz and Gdynia (last 5 years).
They specialize in the multi – family houses (apartments and flats). However their first completed project (in 1999) was a hotel. After merging with two other companies they acquired their current name and became a stock company. Polish company AK-Homes4U S.A. employs 500 people and management board consist of three persons: Waldemar - president of the company, experienced manager and engineer in construction, Włodzimierz - vice president for financial issues and Wacław - vice president for technical issues.
Total number of apartments and single – family houses finished by AK-Homes4U SA achieved the level exceeding 5 thousand of apartments and 80 houses.
A few years ago the company commenced the implementation of one of largest housing projects in Warsaw. This project required a huge investment of own capital and several bank loans. Unfortunately standard management methods failed due to the duration and size of the enterprise. Never before have AK-Homes4U SA conducted such complex project. The management was not able to foresee increase in the cost of equipment, material, labour, etc., over the costs specified in the contract, due to continuing price-level changes over time.
The company achieved their market success by means of strategy associated with mass production of flats for reasonable price. The big scale effect allowed for a large profit even though mark-up for a single flat was always low. However, over the years AK-Homes4U SA lost some of their contractors (construction companies) due to the strict policy regarding the terms of the contracts and payments.

2. The Case

The mistakes resulted in financial problems of AK-Homes4U SA. As a result majority of the shares were sold to big Spanish construction company – ESPyCAT Construction. The new owner send to Poland a trusted employee (Esteban) and appointed him as a new

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CEO of AK-Homes4U SA. Esteban was entrusted with the mission to repair the company's financial situation. There is a good chance that first he will recognize the situation in a conversation with current directors, and then apply drastic measures and exemptions. He decided to call the mentor to discuss strengths and weaknesses of the company.

Strengths:

- Market leader in the region
- Good reputation among consumers

Weaknesses:

- Mixed reputation among contractors
- Financial problems
- New management (lacking local experience)

3. The leader

The new leader of the company is Esteban a 56 years old man from Spain who recently moved to Poland. He is a very confident person and shows great perseverance when trying to achieve goals. He studied in England and speaks English and Spanish, however he does not know Polish language. He does not know local customs nor people in charge of the regional construction companies.
Esteban had very good results in Spain but his main area of expertise is erection and assembling works including the activities characteristic for the general contractor. He has risky attitude when it comes to management decisions and is unstoppable if he wants to achieve something. That is why he was chosen to be sent to Poland by ESPyCAT Construction.

Ask the participants to:

1) Raise one problem for face-to-face in the material without any solution!
   a) What do you think about the situation, what is the situation of current directors?
   b) What do you think about the company's main goals right now?

2) Ask them to raise other problems for the face-to-face!
   a) How do you see real estate developer today?
   b) What do you think about the appointment of Esteban as a new CEO?

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3) Ask them to think over which methods can be applied!
   a) Which methods would be the best to solve this case?
   b) What do you think about Lean management methods in this case?
   c) What do you think about NPV analysis in this case?

4) Ask them how they would treat with a foreign (unexperienced in terms of region) leader!
   a) How would you start a conversation with Esteban?
   b) What is the best way to convince to your ideas a leader like Esteban?

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III. Understanding the ecosystem

Long Case

Understanding the Ecosystem with VCA Method by Vision Engineering SA

C1. Understanding the ecosystem, intro and case

C1.1 Introduction

Vision Engineering SA is a company has been dealing in the design of reinforced concrete and steel structures for many years on the Polish market. The company employs about 40 people ranging from young students, trainees and apprentices, through mature and older designers. For years, the company designed constructions for larger and smaller projects such as steel halls, multi-family houses or smaller offices in the city centre. For years, the company has developed its brand and high standard by punctuality and a good working atmosphere for its employees. In relation to competitors company is situated in the first twenty construction companies in terms of profit and in first ten in terms of quality.

C.1.2 The Case and the Problem

The market on which Vision Engineering operates is quite wide but does not go beyond the borders of the country. The market situation in the Polish market is very variable with regard to specialized designers, therefore the design company should consider how it can develop its business to overcome any difficulties with lack of orders, and to develop new skills, which is associated with increasing the number of employees and general development of the company. A great tool for this is VCA (value chain analysis), because this method shows the good and bad sides of an enterprise's activity and which may help to find an advantage over other companies on the market, and thus increase the number of orders. It is the analysis of internal schemes, systems and mechanisms that can help in finding some errors in the company's operations, not by lowering the prices of services but by showing their quality and high standard.

C2. Leader: personality, attitude, communication, etc.

The project manager and the owner of the Vision Engineering Company - Peter - is an experienced designer who is a very good engineer - constructor. He knows his strengths

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and weaknesses. He has a vast knowledge of the entire design process, starting from the conceptual stage, and ending with issuing as-built documentation at the completion of the new building object. He prefers to entrust the selected work scope to someone and get a result than work in a group. Peter thinks that he knows well his employees, but in fact he is not fully aware of their strengths and weaknesses. He assumes that if employees are working and designing their tasks, everything is fine. He has no idea how to further develop the company and what it really can afford, so it still does not implement larger and more ambitious projects, but only maintains the same level.

C3. Content of explanation of the case:

The VCA method consists mainly in the extraction of company advantages and weaknesses by the leader, and the development of the advantages in order to use them for business purposes. Simply looking for certain terms to name your actions is developing and can bring positive results. Creating a value chain and a thorough analysis of specific values can also help employees, because the tasks that need to be allocated can be better tailored to specific groups throughout the company. The creation of new teams will bring better benefits and thus increase efficiency, which in turn will translate into expanding the company's capabilities. Thanks to that, the head of Vision Engineering company will be confident and will be able to participate in designing investments even on foreign markets, and with time will be able to develop its activity, for example, the scope of road and bridge works.

C3.1 How to apply the chosen method: Presenting how the given method can be applied to that company, to that given situation.

The introduction of this method is worth starting with writing out the cost advantages that can be obtained by seeing what resources we have. The cost statement will allow us to see the benefits of this method and its introduction.
There are two different approaches on how to perform the analysis, which depend on what type of competitive advantage a company wants to create (cost or differentiation advantage). The table below lists all the steps needed to achieve cost or differentiation advantage using VCA.

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Competitive advantage types	
Cost advantage	Differentiation advantage
This approach is used when organizations try to compete on costs and want to understand the sources of their cost advantage or disadvantage and what factors drive those costs.	The firms that strive to create superior products or services use differentiation advantage approach.
• Step 1. Identify the firm's primary and support activities. • Step 2. Establish the relative importance of each activity in the total cost of the product. • Step 3. Identify cost drivers for each activity. • Step 4. Identify links between activities. • Step 5. Identify opportunities for reducing costs.	• Step 1. Identify the customers' value-creating activities. • Step 2. Evaluate the differentiation strategies for improving customer value. • Step 3. Identify the best sustainable differentiation.

C3.2 How to get acquainted with the leader and how to „manage" him (communication, treatment, etc.) properly, in an effective way.

Mentor should use his soft skills to recognise Peter attitude to the changes and should convince him to use some modern method of checking the ecosystem of the company. One of the most effective ways is to make a theoretical juxtaposition and show various other advantages. The resulting contrast between defects can develop new paths of possibilities and ideas for further development using Value Chain Analysis. VCA is done differently when a firm competes on differentiation rather than costs. This is because the source of differentiation advantage comes from creating superior products, adding more features and satisfying varying customer needs, which results in higher cost structure.

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Step 1. Vision Engineering SA should identify the customers in the new area of design. Try to list the projects related to company activities which will contribute the most to create customer value.

Step 2. Try to identify the project which will make Vision Engineering SA different from its competitors. Evaluate the differentiation strategies for improving customer value. Managers can use the following strategies to increase product differentiation and customer value:

- Design with use of modern techniques: BIM, augmented reality etc.;
- Focus on customer needs;
- Increase customization - making an individual project for particular customer;
- Offer complementary products like visualisation.

Step 3. Try to use creative way of differentiation. The best combination of them should be used to pursue sustainable differentiation advantage. It illustrates the basic Value Chain Analysis for engineering company that competes on cost advantage. This analysis has to be done for company managers and it is presented below.

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Value Chain Analysis for Vision Engineering SA				
Step 1 - Firm's primary activities				
Design	Supervisory of construction site	Looking for innovation	Testing and quality control of an object	Marketing
Step 2 - Total cost and importance				
$12 M very important	$8 M very important	$1 M less important	$0,1 M not important	$0,8 M less important
Step 3 - Cost drivers				
Number of projects	Number of supervised sites.	Workshop and conferences.	Number of test and control procedures.	Size of advertising budget Strength of existing reputation
Step 4 - Links between activities				
1. Innovations improve design capabilities. 2. Innovations help in supervision of construction sites and testing and quality control of an object. 3. Innovations make the company more attractive in terms of marketing. 4. Better design systems (i.e. BIM) allow for easier supervision of construction sites.				
Step 5 - Opportunities for reducing costs				
1. Create just one model of design (i.e. BIM) for different regions to cut costs in designing and supervising. 2. Slight increase of costs for innovations can help to decrease costs in other categories.				

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Short Case

Understanding the ecosystem with Kow-Construct Ltd.

Company and case

1. The Company

Kow-Construct is a family business specializing in construction of multi-storey houses designed for living. It has been operating since 1992, started by the father – Jan Kowalski – foreman with 7 years of experience (his education finished at technical school). These were interesting times in Poland, the free market was only starting to develop after the collapse of the communist regime. A lot of new companies were emerging on the market, some of them succeeded, some of them failed miserably.

Initially Jan and a group of his 6 co-workers were hired as a working brigade supporting bigger companies. They specialised in brickworks and plastering works. The growing demand for construction works and good quality of Kow-Construct products allowed for the development of the company. Having some connections from his previous endeavours, Jan began expansion of the firm.

At first he hired more workers, expanding to 4 working brigades for rent. Later he broadened the scope of the firm's specialization including construction works related to concreting and roofing. As Kow-Construct was expanding, eventually he managed to acquire some construction machinery, finally allowing the company to construct whole buildings on their own.

By the year 2007 (after 15 years of operation) he employed over 100 people including construction workers, machinery operators, mechanics, accountants, guards and so on. He introduced to the company his only son – Marek Kowalski – who finished civil engineering studies. Marek was still unexperienced on the construction site, however being a fresh graduate with a degree in construction (specialization in production engineering and construction management), he had learned some innovative methods related to cost and time optimisation and engineering.

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2. The Case

The years of 2008-2015 were the time of the crisis in the European construction industry. All the negative trends were reflected in the condition of the labour market. A large number of construction and assembly enterprises went bankrupt, which has led to a rise in unemployment in this sector.

Kow-Construct was also struggling to survive. To overcome this problems, Marek – now vice-president of the company, suggested a new approach to company management and introduction of economic tools such as NPV analysis. Jan – the father and President of Kow-Construct Ltd. – opposed his views, stating that: 'introducing the changes will be expensive and confusing for the workers, and also there is no guarantee that they will work out for the benefit of the company'. Jan's view is very common among construction managers and company owners who started their work before the transformation of the Polish market.

Questions

You are the mentor!

1. What method(s) and approach would you employ to solve the problems of communication between Jan and Marek?

2. How to overcome the generational divergences in the strategic direction?

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IV. Futures

Long Case

Checking profitability of the project with Maths S.A. by BCG Matrix

D1. Futures for Construction

D1.1 Introduction

Maths S.A. (Large general contractor) is a large size stock exchange company checking the best area of its development. The company exists on the market since 20 years. Five different types of operation areas: roads, railways, housing, office buildings and industrial buildings. Management board consists of three very energetic young persons. Jack - the president- is always self-confident, smiling person responsible for housing. Darius - vice president for commercial affairs- is responsible for office buildings. He is in middle age and he is very ambitious and good in contact with partners. Mariola - vice president for technical affairs - is young engineer, extremely good at economy Company employs 200 persons - designers, site managers and engineers.

D.1.2 The Case and the Problem

Math S.A. is now trying to concentrate on their areas: roads, railway, housing, office buildings and industrial buildings. Mariola tries to convince other management board members to develop one of the five areas of their specialities: roads, railways, housing, office buildings and industrial buildings to become a leader in this specific - chosen area. Managers can't agree which area of speciality has to be chosen.

D2. Leader: personality, attitude, communication, etc.

Mariola was chosen to supervise the project of company reconstruction. It combines her two passions: economy and construction. After completing her engineering studies at the Polytechnic, she immediately began studying economics. Even at the stage of education, her talent was noticed by one of the analysts at Math S.A. and less than a year of studies, she went to extramural studies and started working for Math S.A. Over the following years, Mariola climbed up the ladder of her career, until she was elected as the Vice President for Technical Affairs.

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D3. Content of explanation of the case:

Mariola believes that the only way to increase the importance of Maths S.A. in the area of its operation, is to specialize in one of them. Jack, Darius and the rest of the managers generally agree with her, but each of them has a different opinion about which area of Math S.A. should develop. They need a mentor who will help them make a wise decision. All the managers were involved in team which made the analysis of main competitors in the five possible areas of specialities: roads, railways, housing construction, office and industrial construction.

D3.1 How to apply the chosen method: Presenting how the given method can be applied to that company, to that given situation.

First mentor should recognise how the company managers cooperate on daily basis and how they usually make the compromise.

Secondly, let's get acquainted with the method used:

The BCG matrix (also known as growth–share matrix, Boston Box, BCG-matrix, Boston matrix, Boston Consulting Group analysis, portfolio diagram) is a chart that was created by Bruce D. Henderson for the Boston Consulting Group in 1970 to help companies to analyze their business units. In our case this method helps the company allocate resources to five areas: roads, railways, housing construction, office and industrial construction. It could be used as a tool for marketing, product management, strategic management, and portfolio analysis.

How does it work?
To use the BCG matrix, plot a scatter graph to rank the areas of company activities. Market shares and growth rates need to be checked. To do so, it is required to classify your business portfolio into four categories based on industry attractiveness (growth rate of that industry) and competitive position (relative market share). BCG matrix categories are: “Dogs”, “Cash cows”, “Stars” and “Question marks".

What can be achieved?
With the BCG matrix description of the company’s brand portfolio and strategic business units (SBU) on a quadrant along relative market share axis (horizontal axis) and speed of market growth (vertical axis) axis. It uses relative market share and industry growth rate factors to evaluate the potential of business brand portfolio and suggest further investment strategies.

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We'll use this tool by following these five steps - separately for all the company activities: roads, railways, housing, office buildings and industrial buildings.

Step 1 - Choose the unit, for example roads

BCG matrix can be used to analyze SBUs, separate brands, products or a firm as a unit itself. Which unit will be chosen will have an impact on the whole analysis. Therefore, it is essential to define the unit for which you'll do the analysis.

Step 2 - Define the market

Defining the market is one of the most important things to do in this analysis. This is because incorrectly defined market may lead to poor classification. If we would do the analysis for the Maths S.A. - roads construction is less than 8% of relative market share. It is important to clearly define the market to better understand firm's portfolio position.

Step 3 - Calculate relative market share

Relative market share has to be calculated in terms of revenues or market share. For Maths S.A. it is calculated by dividing your own brand's market share (revenues) by the market share (or revenues) of your largest competitor in that industry. For Maths S.A. it is calculated as 4% relative market share.

Step 4 - Find out market growth rate

The industry growth rate can be found in industry reports, which are usually available online for free. It can also be calculated by looking at average revenue growth of the leading industry firms. For Maths S.A. businesses (so not only the road sector?) it is calculated as 4%.

Step 5 - Draw the circles on a matrix

When you calculate all the measures, plot your brands on the matrix. You should do this by drawing a circle for each brand. The size of the circle should correspond to the proportion of business revenue generated by that brand. Calculation and research shows the BCG Matrix at figure 1 and the table.

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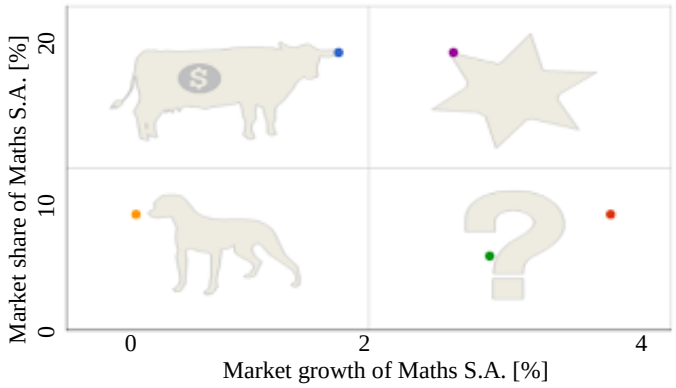
Figure 1: BCG Matrix for Maths S.A. activities



Roads	Railways	Housing	Office	Industrial
Growth 3,8 % Market share 8 %	Growth 2,8 % Market share 5 %	Growth 0,4 % Market share 7,5 %	Growth 2,7 % Market share 17 %	Growth 1,8 % Market share 17 %

D3.2 How to get acquainted with the leader and how to „manage" him (communication, treatment, etc.) properly, in an effective way.

Thanks to the BCG Matrix method at Maths S.A. a special team was created that deals with risk analysis and the company's development opportunities. This team analyzed successively all points from the BCG matrix and based on them, it was determined that due to the company's capabilities and the growing importance of this sector, the most beneficial activity will be increasing office construction.
Thanks to the help of the mentor and the BCG matrix method, Mariola managed to achieve the goal and the company Maths S.A. increased its importance on the office construction market and thanks to that it stabilized its position in other areas of its activity.

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Short Case

The future of JKLL Design

1. The company

The JKLL Design Ltd. is a Polish prestigious design office based in Warsaw. The company was established in November 1999 by Anna Smyk, who is now the president of the company. She is doing all sorts of architectural designs The money needed for setting up a company was provided by her wealthy father – Andrew Smyk – a real estate tycoon.
The firm was created with the thought of designing luxury homes and apartments. Thanks to Anna's father's contacts and orders, the company quickly established a strong position on the market.
It is true that the niche they deal with is not very popular, but high margins allow JKLL Design Ltd. to have very good financial results in relation to the number of employees employed. The company's situation is stable.

2. The case

Andrew would like his daughter to show her independence and strengthen the company. He would like to make out of JKLL Design Ltd. a futuristic design office. He perceives the opportunities for development in modern technologies of construction design and supervision (such as AR - Augmented Reality and BIM – Building Information Modelling). However Anna is very reluctant with her actions.
In order to motivate and steer his daughter in the right direction, Andrew decided to involve a business mentor.

3. The leader

Anna Smyk is a fresh master of architecture. She is a graduate of Warsaw Colleague of Architects and Construction Managers (private colleague sponsored by her father). She is a talented young lady, however she tends to be easily distracted by parties and other nightlife entertainments.
Currently she is trying to get a MBA degree (however she only applied because her father convinced her to do so).
Andrew Smyk manifests an ambivalent attitude towards Anna, he is sometimes overprotective, sometimes very severe and demanding.

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Questions

1. As a mentor what would you suggest to Andrew?
2. How would you deal with Anna?
3. How would you approach discussion between the two family members?
4. Suggest to analyse the potentials ways of developing the company?

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